

Ontario Stroke Report

FY 2020-21

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Ontario Health
CorHealth Ontario

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Introduction

Ontario Health – CorHealth Ontario is pleased to release the 2022 edition of Ontario’s Annual Stroke Report which provides an overview of stroke system performance in the province. The eleven (11) regional stroke networks and their stakeholders use this report to inform stroke care system planning, decision-making and change implementation based on best practice. The goal is to use the evaluation to facilitate better outcomes for patients with stroke and their families.

The reporting period for this Report covers fiscal year (FY) 2020/21 which was the first year of the COVID-19 global pandemic. Where feasible, additional data from 2016/17-2019/20 are provided for trending over a five-year period. Ontario Health – CorHealth Ontario has provided results that are as current. Time periods for some individual indicators may not include all fiscal years due to lag time in data availability and the length of follow-up required.

The ICES Data & Analytic Virtual Environment (IDAVE) platform was used by Ontario Health – CorHealth Ontario to populate most of the indicators in this report.

About this Report

This Ontario Stroke Report FY 2020/21 is divided into four (4) chapters, with indicators in each chapter focusing on an aspect of the stroke care continuum. Each indicator has a dedicated page. Each indicator page will include a:

- Provincial summary graph of performance for fiscal years 2016/17 to 2020/21 (where data are available)
- Legacy Local Health Integration Network (LHIN) summary graph for fiscal year 2020/21

Select indicators have also been reported at the hospital level. Hospitals included in hospital-level reporting are Regional Stroke Centres, District Stroke Centres, stroke unit only centres, and inpatient rehabilitation sites (where applicable). For a list of Ontario hospitals with an acute stroke program, please refer to [Appendix A](#). All LHIN and site abbreviations used in the report can be found in [Appendix B](#).

In Chapter 2, titled Hyperacute Care Access and Outcomes for Ischemic Stroke, the indicator page for the Endovascular Thrombectomy (EVT) indicators (2.3 – 2.6), will include a:

- Provincial summary graph of performance for fiscal years 2017/16 to 2020/21 (where data are available)
- EVT hospital level graph for fiscal year 2020/21

About this Report (continued)

In Chapter 4, titled Post-Acute Stroke Rehabilitation Access and Timeliness, indicators 4.1.1 (Standardized Rate of Access to Post-Acute Inpatient and Home-Based Rehabilitation) and 4.3 (Best Practice Post-Acute Rehabilitation Setting within Target Time) are currently unavailable due to the lack of outpatient rehabilitation data. Additionally, indicator 4.4 (Standardized Active Inpatient Rehab Length of Stay) is not reported. This indicator will be replaced in the future with another length of stay indicator.

In addition to this Report, a supplementary data file for each indicator has been provided to all Regional Stroke Directors and District Stroke Coordinators to enable a more detailed review of performance. This supplementary data file includes provincial, legacy LHIN, and site and/or sub-region level results for all performance indicators included in this report, as well as the numerator and denominator used to calculate these results.

Methodology

Data Sources and Environment

Linkable datasets via encrypted health card numbers were made available to Ontario Health – CorHealth Ontario via ICES' Data & Analytic Virtual Environment (IDAVE) and the Ministry of Health's (MOH), Health Data Branch. Data sources: DAD, NACRS, RPDB, ODB, OHIP, CCRS, NRS, HCD, PCCF+ (V7B)

Cohorts

The stroke and transient ischemic attack (TIA) adult population of interest were identified using the following criteria:

- Ages 18 and older
- International Classification of Diseases, 10th Revision, Canada (ICD-10-CA) codes: G45 (excluding G45.4), H34.0, H34.1, I60 (excluding I60.8), I61, I63 (excluding I63.6) and I64 in the DAD and NACRS databases. Refer to [Appendix C](#) for the ICD-10-CA code definitions.
- Only first (index) stroke patients for each 12-month period, from April 1 to March 31 were included

The stroke and TIA emergency department/acute care cohorts are defined to ensure the homogeneity of cohort patients by focusing only on the first (index) stroke or TIA admission in a given fiscal year where stroke or TIA is the most responsible diagnosis (MRDx), and the stroke event occurred prior to admission to acute care. Patients considered palliative (ICD-10-CA, code Z51.5 with prefix 8) as part of their initial treatment plan were excluded.

For Chapter 2: Hyperacute Care Access and Outcomes for Ischemic Stroke, the cohort has been designed to capture all actual and potential EVT patients and includes:

- Ischemic stroke patients whose MRDx may not have been a stroke diagnosis
- Patients whose ischemic stroke may have occurred after admission to acute care

Additional considerations were implemented to identify patients receiving home-based rehabilitation therapy. A minimum threshold of three (3) rehabilitation therapy patient visits in the Home and Community Care data was used to identify home-based rehabilitation patients.

Methodology (continued)

Reporting

Where appropriate, provincial benchmark values were calculated using the Achievable Benchmarks of Care (ABC) methodology based on hospitals or sub-regions which were highest performing and accounted for at least 20% of the population.¹ To ensure that high-performing care providers with low numbers of patients did not unduly influence the benchmark rates, acute and rehabilitation hospitals or sub-regions that had a cohort size of less than 30 were not included in the benchmark calculations.

For considerations regarding performance status of standardized indicators refer to [Appendix D](#).

Hyperacute stroke care indicators were derived from data provided by the Ministry of Health's (MOH), Health Data Branch. All other indicators were derived from data provided by ICES in the IDAVE platform.

Additional details on methodology and cohorts can be found in the Technical Specifications document, including suppression criteria applied to comply with privacy legislation.

Overall Performance

Hyperacute and Acute Care

Hyperacute and Acute Care

Stroke is a medical emergency that benefits from timely restoration of blood flow to the affected areas of the brain to reduce cell damage and optimize patient outcomes. There are two hyperacute treatment options for patients experiencing acute ischemic stroke: tissue plasminogen activator (tPA) and Endovascular Thrombectomy (EVT). EVT, a relatively new procedure, is highly specialized and only performed at select hospitals across the province. As of FY 2020/21, there are eleven (11) EVT capable centres, including the newest EVT program at Health Sciences North, which launched in the last quarter of FY 2019/20.

With the advent of EVT, access to hyperacute stroke treatment (tPA and EVT) has steadily increased from FY 2016/17 (12.1%) to 2019/20 (14.7%); however, during the first year of the pandemic (FY 2020/21), access to hyperacute care decreased slightly to 14.1%, despite steady growth in access to EVT. Irrespective of growth, there continues to be variability in access to hyperacute stroke treatment (tPA and EVT) across the province (10.0% - 19.9%), necessitating ongoing efforts to optimize regional access to these hyperacute treatments, especially during the pandemic.

In addition to access, timely intervention with hyperacute stroke treatments is essential to reduce brain damage and improve patient outcomes. During the first year of the pandemic, median door to needle time for patients who received tPA decreased from 45 minutes (FY 2019/20) to 44 minutes (FY 2020/21) equating to approximately 2 million neurons saved per patient.² Although this reduction in door to needle time is a success, especially during the first year of the pandemic, the provincial median continues to be well above the provincial target of 30 minutes³ and considerable variability continues to exist across the province (28 minutes to 130 minutes). Local and regional efforts to further reduce door to needle time are therefore required to optimize the effectiveness of this treatment and minimize the impact of stroke.³

Overall Performance

Hyperacute and Acute Care

Hyperacute and Acute Care

Beyond hyperacute care processes and door to needle time (i.e., rapid triage, assessment, diagnosis, and treatment of patients experiencing acute ischemic stroke), increasing public awareness may also contribute to more timely access to hyperacute stroke treatment. Ambulance personnel are trained to recognize the signs and symptoms of stroke and bypass non-tPA capable hospitals to go directly to specialized stroke centres capable of providing hyperacute treatment. It is promising to see that ambulance arrival rate in FY 2020/21 increased to 66% after remaining relatively steady at approximately 60% from FY 2016/17-2019/20. However, recent research assessing Emergency Department visits care and outcomes during the phases of the pandemic suggests that the proportion of people arriving by ambulance increased during the peak of the first wave. This increase could reflect increased event severity or more social isolation during the pandemic.⁴ Promoting public awareness of the FAST stroke warning signs (Face, Arms, Speech, Time to dial 911) is an important approach to improving access to hyperacute stroke care.

In addition to hyperacute stroke treatment, patients who receive stroke unit care are more likely to survive, return home and regain independence compared to patients who receive generalized care.² In FY 2020/21, access to stroke unit care varied considerably across LHINS (19%-83%). Provincially, only 56% of Ontario's stroke patients received care on a stroke unit, compared to 54% in FY 2019/20.

Access to stroke unit care has also been found to influence access to other stroke best practices such as timely and appropriate stroke rehabilitation and applicable diagnostics such as carotid imaging. Further system planning is required to optimize the benefits of stroke unit care and meet the current target of 75% access.³

Overall Performance

Rehabilitation Services

Rehabilitation Services

Stroke rehabilitation is a critical component of recovery, helping patients to regain function and independence. Stroke rehabilitation is an essential part of the care continuum, requiring a systems approach to optimize availability of services, ensure capacity and facilitate access to the right level of care based on patient needs. This includes consideration of early supported discharge, inpatient and community-based rehabilitation programming (home-based and outpatient).

In FY 2020/21 (early stages of the pandemic), access to inpatient rehabilitation did not decrease and remained the same as previous years, at approximately 31%. Many patients did not receive the recommended 180 minutes per day of direct therapy⁵, with a current provincial performance at only 68.9 minutes per day. Rehabilitation intensity continues to be an area for improvement in the inpatient rehabilitation setting.

Access to home-based rehabilitation increased in the early stages of the pandemic from 34.5% (FY 2019/20) to 38.6% (FY 2020/21). To understand system capacity and access to post-acute services, additional data are required. Currently, there is no standardized provincial system to capture the number of stroke patients that access outpatient rehabilitation services or the services received. Furthermore, home-based rehabilitation provided by hospitals is not captured in the homecare database (HCD). Dedicated resource investment to address information gaps in rehabilitation is required before significant system integration or system performance improvement can be expected.

Overall Performance

Secondary Prevention and Summary

Secondary Prevention

Secondary stroke prevention targets reduction of stroke recurrence after a TIA or stroke. During the first year of the pandemic, it was reassuring to see that referral to secondary prevention services did not decrease. Instead, approximately 81% of stroke/TIA patients discharged from the emergency department were referred to secondary prevention services, with two hospitals in FY 2020/21 referring 100% of their stroke/TIA patients to these services. Although the referral rates are promising, it should be noted that, due to a lack of secondary stroke prevention clinic data, a full understanding of access (i.e., if patients went to the secondary prevention clinics) and outcomes associated with secondary prevention services is not possible at this time.

Summary

Fiscal year 2020/21 was a unique and difficult year for all health system providers. Fortunately, access to care during the first year of a global pandemic did not worsen. General access to hyperacute treatment, stroke unit care and rehabilitation remained consistent or modestly better as compared to previous years. Additionally, outcomes of stroke/TIA patients (e.g., 30-day all-cause readmission, 30-day all cause mortality, and 90-day home time) did not worsen during the pandemic.

Continued focused efforts and resource investments are needed to support enhanced system capacity, integration of care and performance measurement to achieve equitable access and quality of services. This includes timeliness and intensity of care services.

Stroke Care in Ontario 2020/21

STROKE IS A MEDICAL EMERGENCY



66%

of stroke/TIA patients arrived at the emergency department by ambulance

81% of patients were referred to secondary prevention services after discharge from the emergency department*

TIME IS BRAIN



14%

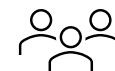
of ischemic stroke patients received hyperacute therapy

11% tPA (tissue plasminogen activator) (Target: >12%)

- **44 minutes** median door-to-needle time (Target: <30 minutes)

6% EVT (Endovascular therapy)

STROKE UNIT CARE IMPROVES OUTCOMES



1.46 per 1000 population

are admitted for acute stroke/TIA

41 hospitals in Ontario have a stroke unit

56% of stroke patients treated on a stroke unit (Target: >75%)

SECONDARY PREVENTION OF STROKE OCCURS ACROSS THE CARE CONTINUUM

8 days**

Median time from acute admission to inpatient rehabilitation

REHABILITATION OPTIMIZES RECOVERY



31%**

of patients accessed inpatient rehabilitation

- **69 minutes** per day of inpatient therapy was received per patient (Target: 180 minutes)

STROKE JOURNEY CONTINUES AFTER DISCHARGE



56 days**

Average number of days spent at home in the first 90 days after stroke

39%** received home-based rehabilitation*

- **9**** median number of visits

75% of patients aged 65 and older with atrial fibrillation filled a prescription for anticoagulant therapy within 90 days of acute care discharge*

PATIENT OUTCOMES

7% of stroke/TIA patients were readmitted within 30 days

12% of stroke/TIA patients died within 30 days

6%** of stroke patients were admitted to long-term care within 1-year post discharge

*There is currently no data available for outpatient rehabilitation and secondary prevention clinic.

** 2020/21 Q2 (YTD)



Next Steps

Ontario Health – CorHealth Ontario will continue to collaborate with the 11 Regional Stroke Networks, the Ministry of Health, groups within Ontario Health, and other key stakeholders to advance best practice stroke care across the province.

Ontario Health - CorHealth Ontario continues to recommend, initiate, and support activities to improve patient access to time-dependent stroke therapies such as tissue plasminogen activator (tPA) and Endovascular Thrombectomy (EVT). In October 2021, Ontario Health – CorHealth Ontario released its second Telestroke Report, and continues to produce biannual reporting on EVT performance indicators. Last year, EVT performance discussions were launched with the EVT sites, and these will continue this year. These discussions provided the programs with the opportunity to reflect on their performance, identify current or planned quality improvement approaches and share strategies that have been successful in achieving positive performance change.

In December 2021, the multi-year Stroke Unit Access and Quality Initiative (SUAQI) was launched. The purpose of the SUAQI is to enable better outcomes for patients in Ontario who experience a stroke by ensuring they have equitable access to evidence-based stroke unit care (i.e., stroke unit care that is based on best practice, and at a level of quality that is consistent across the province). In Phase 1 of SUAQI, the focus will be on stroke unit capacity and access. Through engagements with a dedicated expert task group, diverse stroke system stakeholders and patients and their families/caregivers, a set of recommendations will be developed focused on driving improved access to evidence-based stroke unit care. Phase 2 of SUAQI will focus on quality of care, and the performance measurement framework. The work throughout Phases 1 and 2 are expected to impact how stroke unit care quality and access are measured, and this will be reflected in future iterations of the Ontario Stroke Report.

Next Steps (continued)

In April 2022, the Ministry of Health gave Ontario Health – CorHealth Ontario the mandate to plan, develop, and implement a provincial comprehensive post-stroke publicly funded community rehabilitation program. Currently, there is disparate access to community stroke rehabilitation across the province; services are not standardized nor is there standardized provincial data or a data collection approach. This multi-year initiative will address the data and information gap and facilitate the establishment of an equitable standard of care based on best practice.

These two multi-year initiatives were identified as priority areas by the Stroke Evaluation and Quality Committee (SEQC) and further endorsed by the Regional and District Advisory Committee (RDAC) and the Stroke Leadership Council, as critical undertakings to truly advance the stroke system of care and move the needle on quality, performance, and outcomes.

As Ontario Health – CorHealth Ontario undertakes this work, stakeholder engagement and collaboration will remain at the forefront of our approach. Ontario Health - CorHealth Ontario will continue to leverage its advisory tables, the Regional Stroke Networks, the Ministry of Health, and other areas of Ontario Health to guide meaningful change and promote a provincial standard of care that demonstrates best practice and best outcomes for patients and families affected by stroke.



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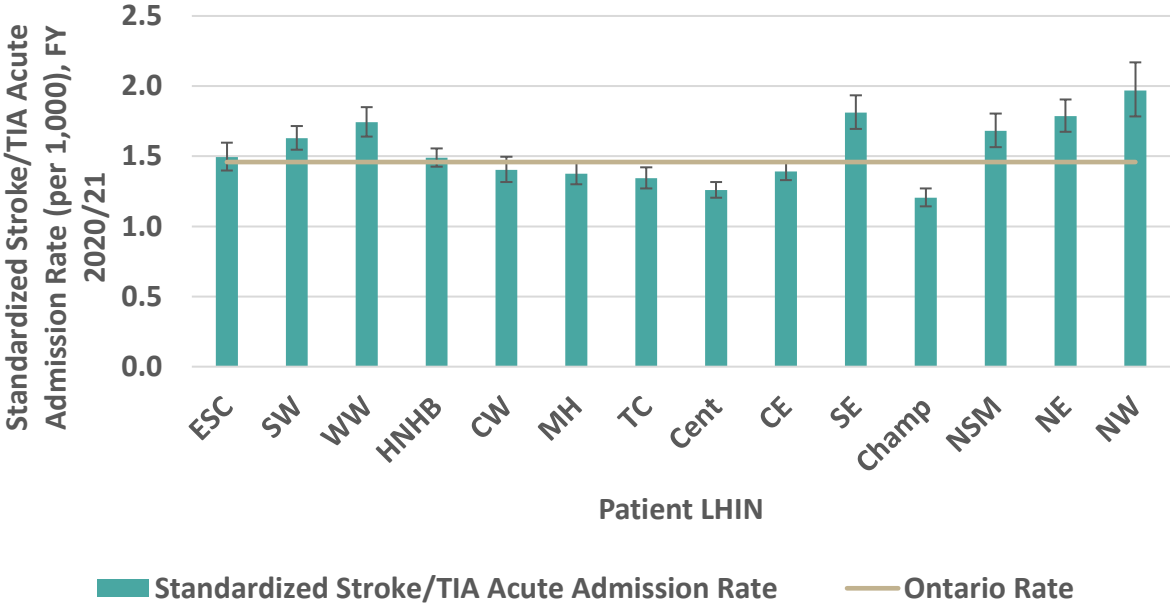
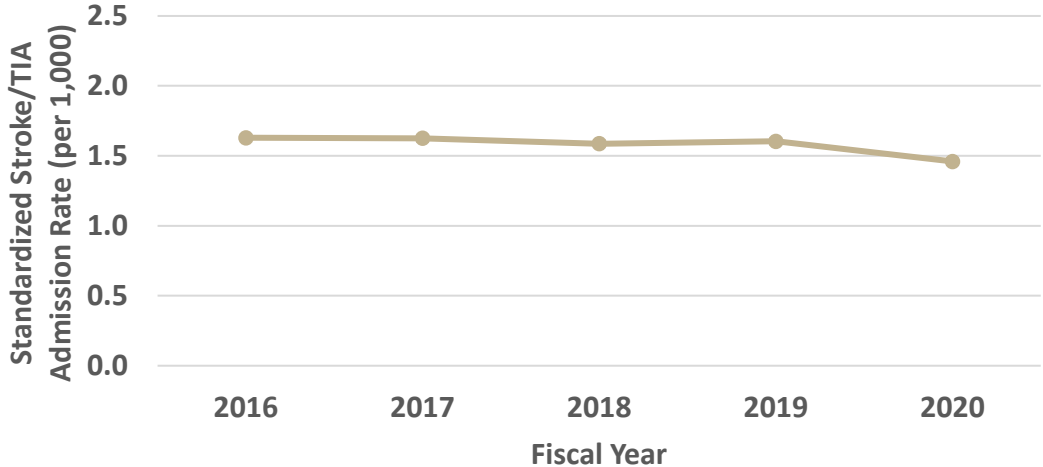
Chapter 1: Prevention & Public Awareness of Stroke and Transient Ischemic Attack (TIA)

Chapter 1: Prevention and Public Awareness of Stroke and TIA in Ontario

Indicator 1.1: Standardized Stroke and TIA Admission Rate to Acute Inpatient Care (per 1,000), FY 2020/21

Indicator Description:

The population rate of admission to hospital for stroke & transient ischemic attack (TIA) reflects several factors including the effectiveness of primary and secondary prevention efforts such as control of hypertension and smoking cessation programs. The cohort for this indicator is the Ontario adult population in the Registered Persons Database (RPDB). Ontario and LHIN performance are directly standardized to the 2020 RPDB population age and sex profile.



Interpretation Consideration:

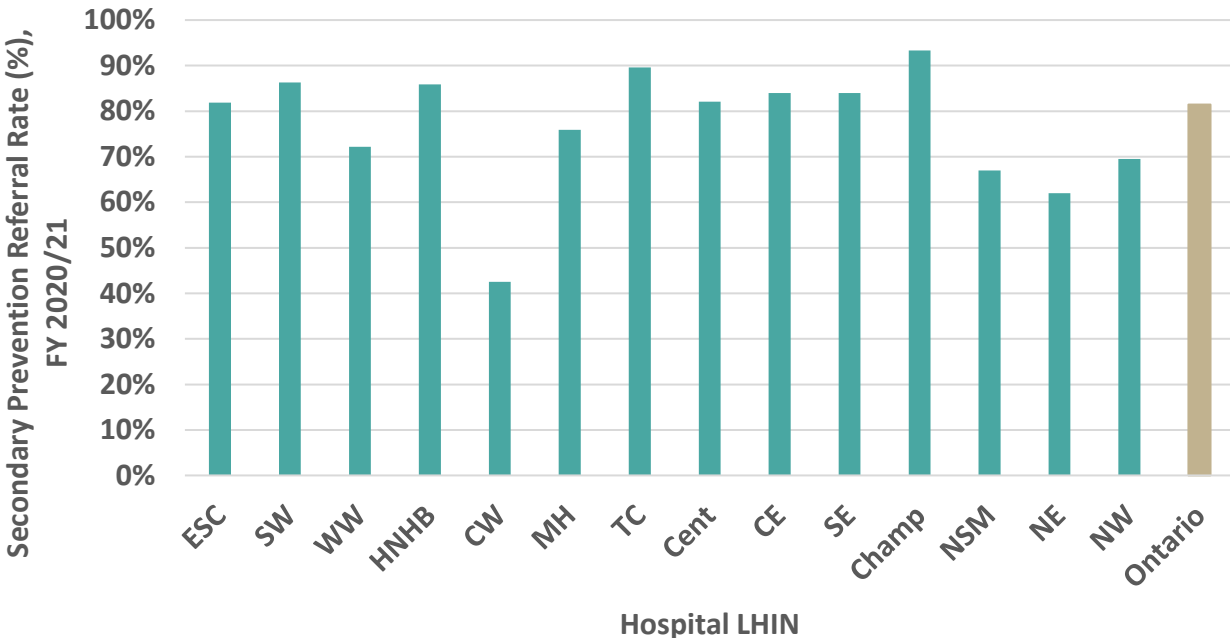
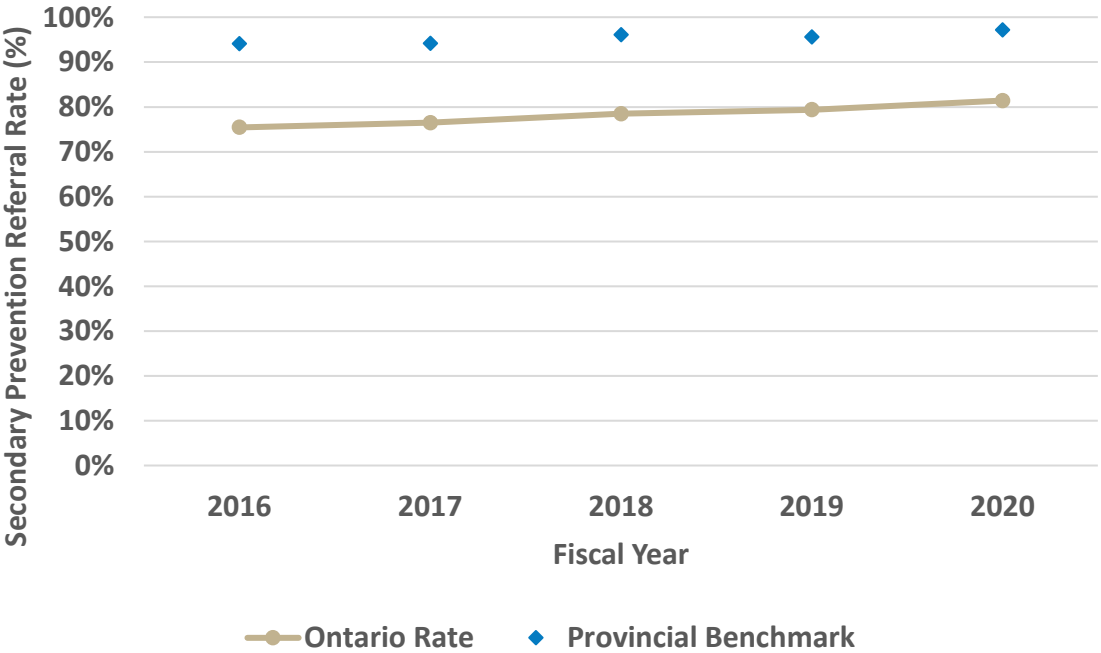
Desired directionality is lower. There was very little movement in the Ontario rate between fiscal years 2016 to 2019, however in fiscal year 2020, there was a noticeable decrease. During the early stages in the pandemic, the number of ED visits for stroke decreased⁴, which may account for some of the decrease in admissions for stroke. Only the first (index) stroke in each fiscal year is included. Factors that may contribute to the LHIN variation observed may be reflective of geographic nuances with respect to social determinants health and health resource equity.

Chapter 1: Prevention and Public Awareness of Stroke and TIA in Ontario

Indicator 1.2: Secondary Prevention Referral Rate of Stroke & TIA Patients Discharged from the Emergency Department, FY 2020/21

Indicator Description:

Proportion of ischemic stroke and transient ischemic attack (TIA) patients discharged from the emergency department (ED) who were referred to secondary prevention services (query stroke/query TIA are excluded).



Interpretation Consideration:

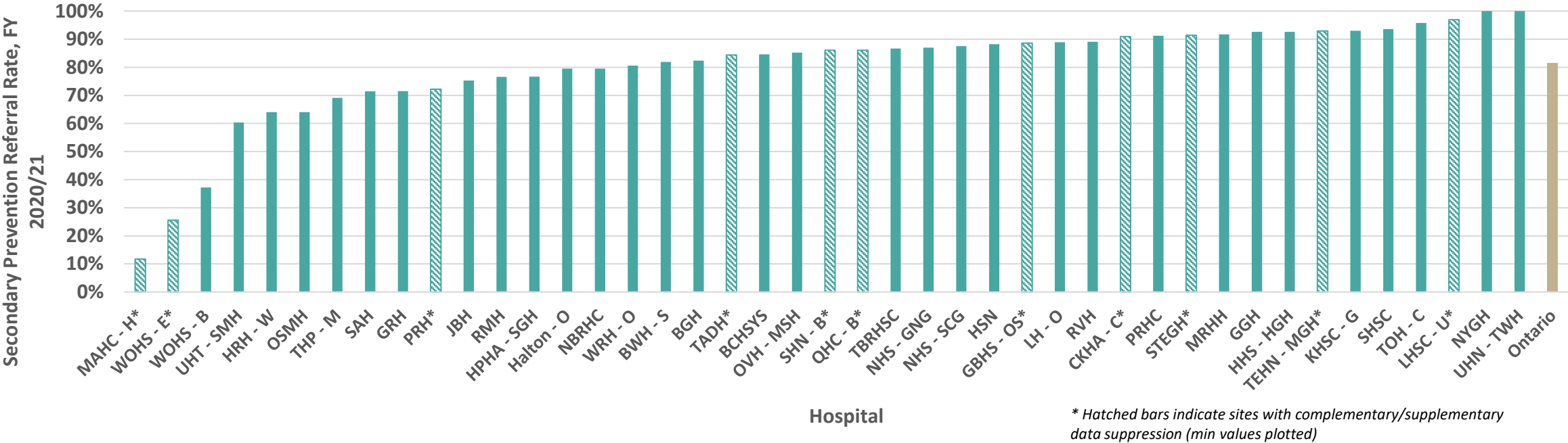
Desired directionality is higher. Provincial rates have been steadily increasing from 75% (2016) to 81% (2020). During the first year of the pandemic, patients were continuing to be referred to secondary prevention services. There is wide variation in the LHIN rates where over half the LHINs are achieving values of 80% or more. The limitation with this metric is, although patients are referred to a secondary prevention clinics, lack of standardized stroke prevention clinic data prevents full assessment of access (i.e., if patients went to the secondary prevention clinics) and outcomes associated with secondary prevention services.

Chapter 1: Prevention and Public Awareness of Stroke and TIA in Ontario

Indicator 1.2: Secondary Prevention Referral Rate of Stroke & TIA Patients Discharged from the Emergency Department, FY 2020/21 – Hospital Level

Indicator Description:

Proportion of ischemic stroke and transient ischemic attack (TIA) patients discharged from the emergency department (ED) who were referred to secondary prevention services (query stroke/query TIA are excluded).



Interpretation Consideration:

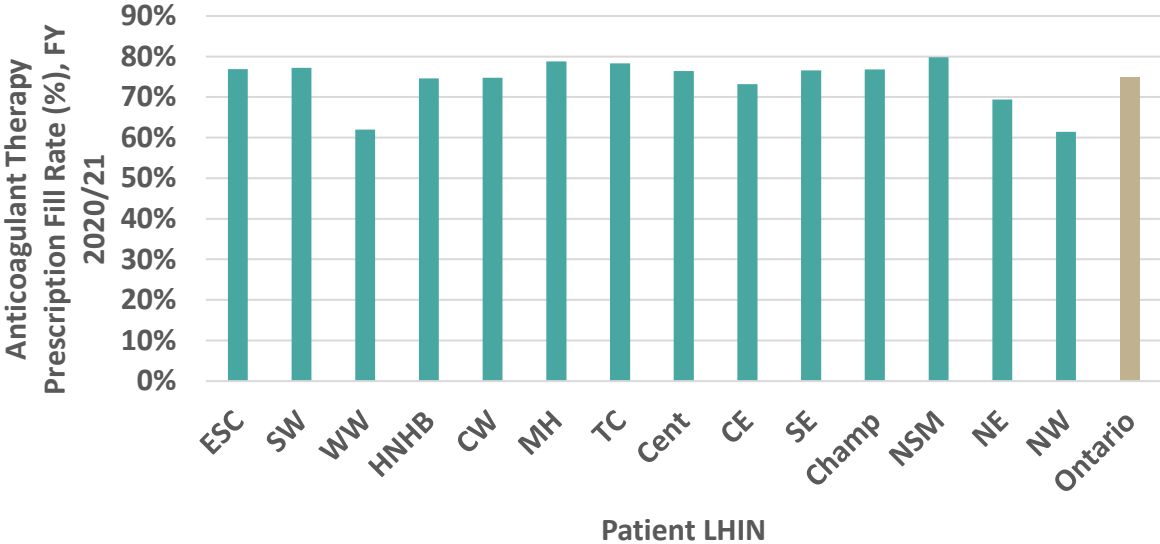
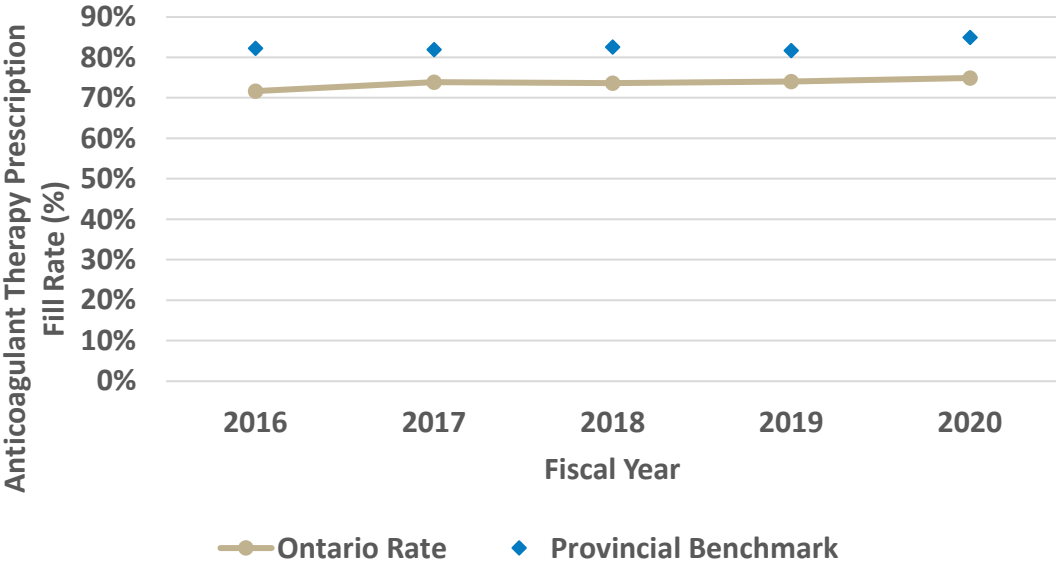
Desired directionality is higher. Most of the sites have a rate of 80% or greater for referral to secondary prevention services. The limitation with this metric is, although a patient is referred to a secondary prevention clinic, it is not known whether the patient received services due to a lack of standardized data availability. Additionally, patients discharged from the ED with an unknown diagnosis, may not be captured in the data, and may not be referred yet and still be at risk of stroke. Refer to [Appendix B](#) for hospital abbreviations.

Chapter 1: Prevention and Public Awareness of Stroke and TIA in Ontario

Indicator 1.3: Proportion of Ischemic stroke/TIA inpatients aged 65+ with Atrial Fibrillation who Filled a Prescription for Anticoagulant Therapy within 90 days of Discharge from Acute Care, FY 2020/21

Indicator Description:

For long-term stroke prevention, most people with atrial fibrillation should be treated with an anticoagulant. This indicator focuses on the population age 65 and older with atrial fibrillation who filled a prescription for an oral anticoagulant therapy within 90 days of discharge from acute stroke care. The cohort focuses on patients with a history of atrial fibrillation (in the past three years) and does not capture patients with a diagnosis of atrial fibrillation after discharge.



Interpretation Consideration:

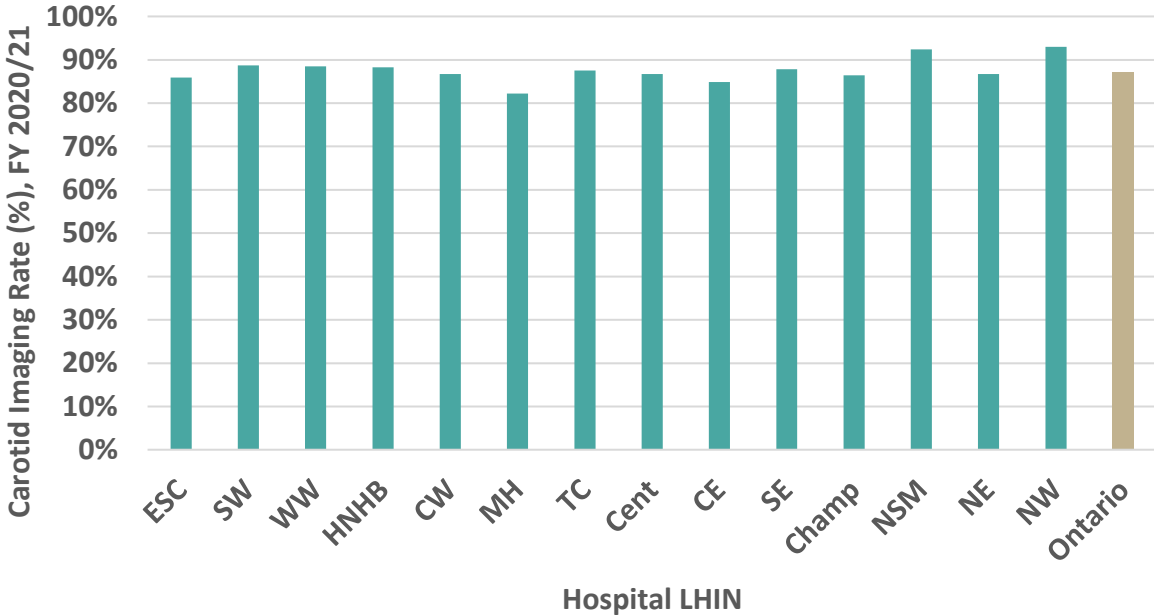
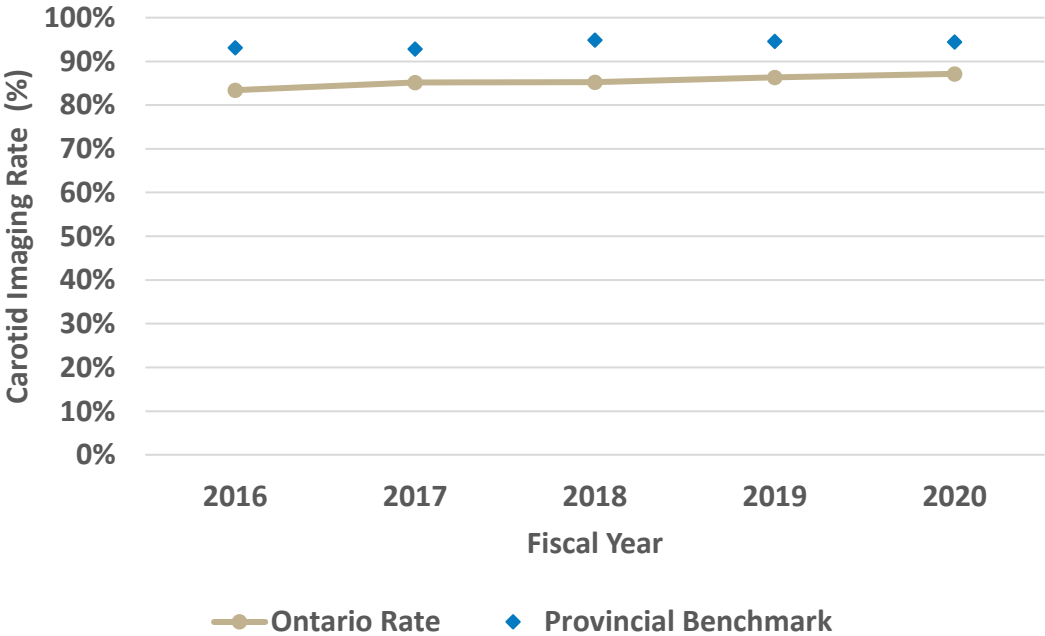
Desired directionality is higher. The rate of filling a prescription for anticoagulant therapy has remained steady for the reporting period. Prescription drug information data are only available for those 65 years and older and who filled the prescription using the Ontario Drug Benefit plan. An integrated care approach that focuses on diagnosis, health literacy, education and behaviour modification with health care providers and patients is required to optimize anticoagulant use as a prevention strategy for stroke.

Chapter 1: Prevention and Public Awareness of Stroke and TIA in Ontario

Indicator 1.4: Carotid Imaging Rate for Ischemic Stroke Admission to Acute Care, FY 2020/21

Indicator Description:

The proportion of acute ischemic stroke inpatients who received any one of the following carotid imaging tests: carotid doppler, carotid computed tomography angiography (CTA), carotid magnetic resonance angiography (MRA) or carotid angiography.



Interpretation Consideration:

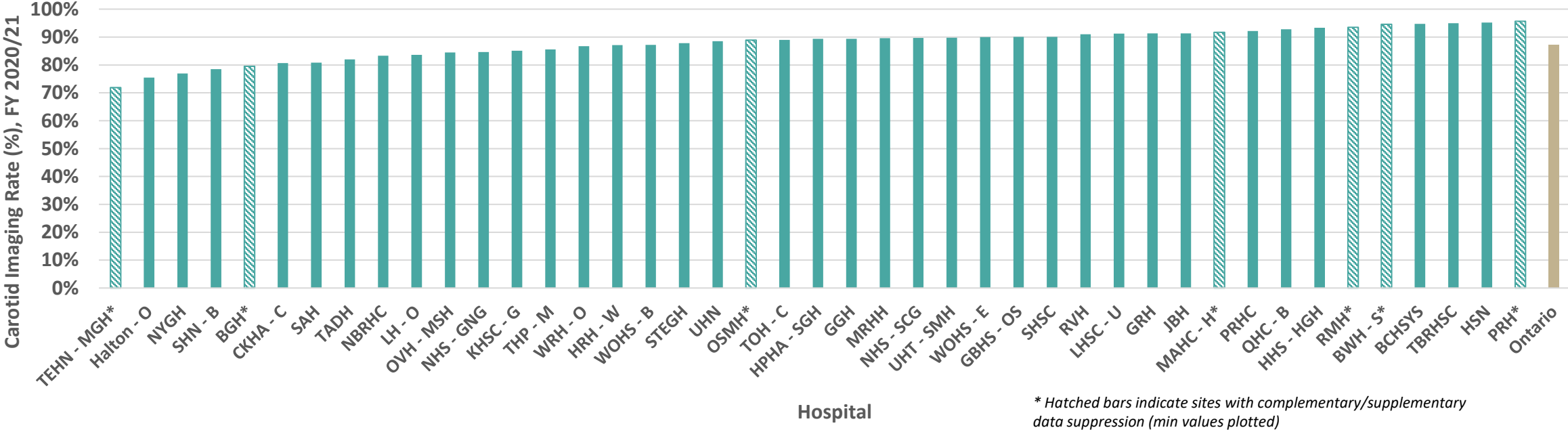
Desired directionality is high. All LHINs achieved rates greater than 80%, with NSM and NW LHIN achieving greater than 90%. Coding for carotid imaging is optional in the DAD dataset but mandatory in NACRS dataset; therefore, data capture may be contributing to the variation observed.

Chapter 1: Prevention and Public Awareness of Stroke and TIA in Ontario

Indicator 1.4: Carotid Imaging Rate for Ischemic Stroke Admission to Acute Care, FY 2020/21 – Hospital Level

Indicator Description:

The proportion of acute ischemic stroke inpatients who received any one of the following carotid imaging tests: carotid doppler, carotid computed tomography angiography (CTA), carotid magnetic resonance angiography (MRA) or carotid angiography.



Interpretation Consideration:

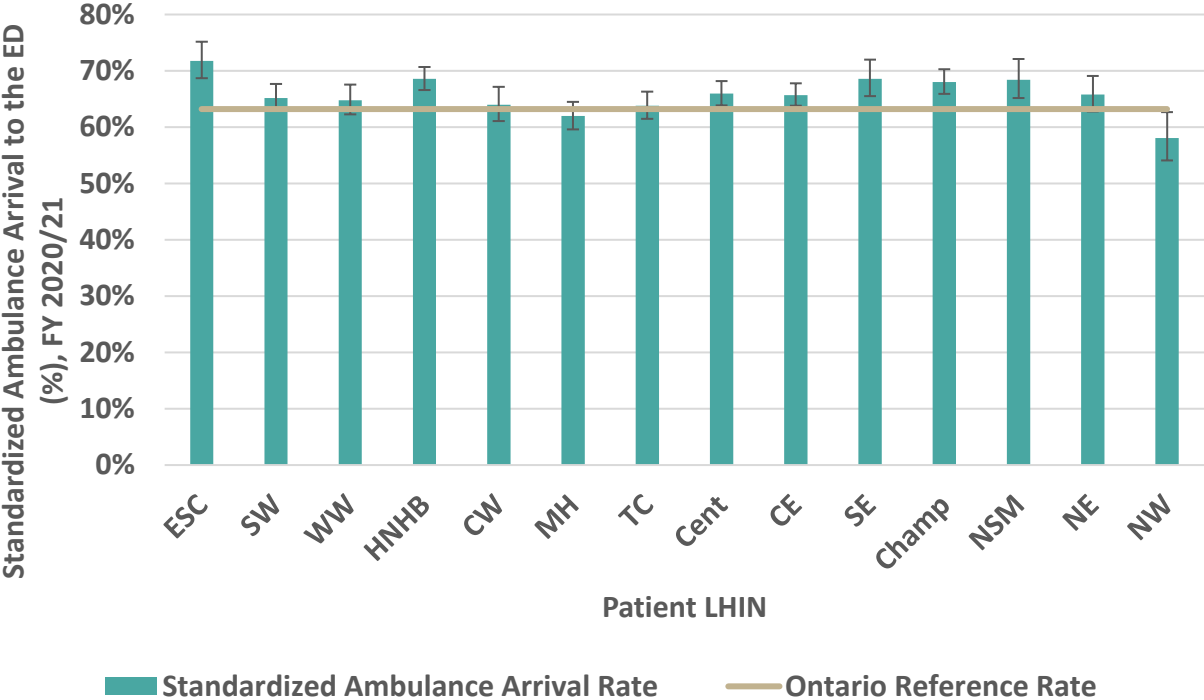
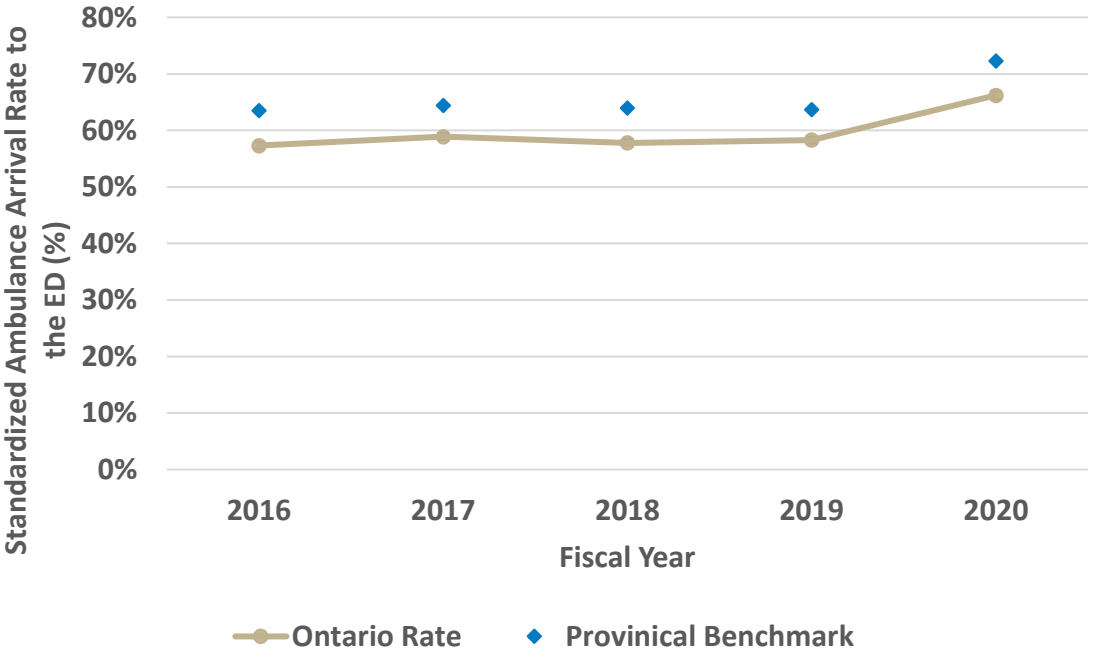
Desired directionality is high. Carotid imaging rate ranges from 72% (TEHN-MGH) to 96% (PRH). Coding for carotid imaging is optional in the DAD dataset but mandatory in NACRS dataset, therefore data capture may be contributing to the variation observed. Refer to [Appendix B](#) for hospital abbreviations.

Chapter 1: Prevention and Public Awareness of Stroke and TIA in Ontario

Indicator 1.5: Standardized Ambulance Arrival Rate to the Emergency Department for Stroke & TIA Patients, FY 2020/21


Indicator Description:

The rate that stroke/TIA patients arrived by ground, or a combination of ground and air ambulance to the emergency department (ED). This indicator is standardized for stroke type.



Interpretation Consideration:

Desired directionality is high. Ambulance arrival rate in fiscal year 2020 (first year of the pandemic) increased to 66% after remaining relatively the same from 2016-2019. The rise in ambulance arrival could be due to an increase of severe strokes and/or a lack of mild strokes presenting to the ED during the early stages of the pandemic⁴ and communication efforts to the public that hospitals are safe for stroke care. All stroke regions have ambulance protocols that facilitate access to specialized stroke hospitals. Public awareness that focuses on recognizing the signs and symptoms of stroke and the importance of calling 911, is critical to influence ambulance use and timely access to hyperacute care.



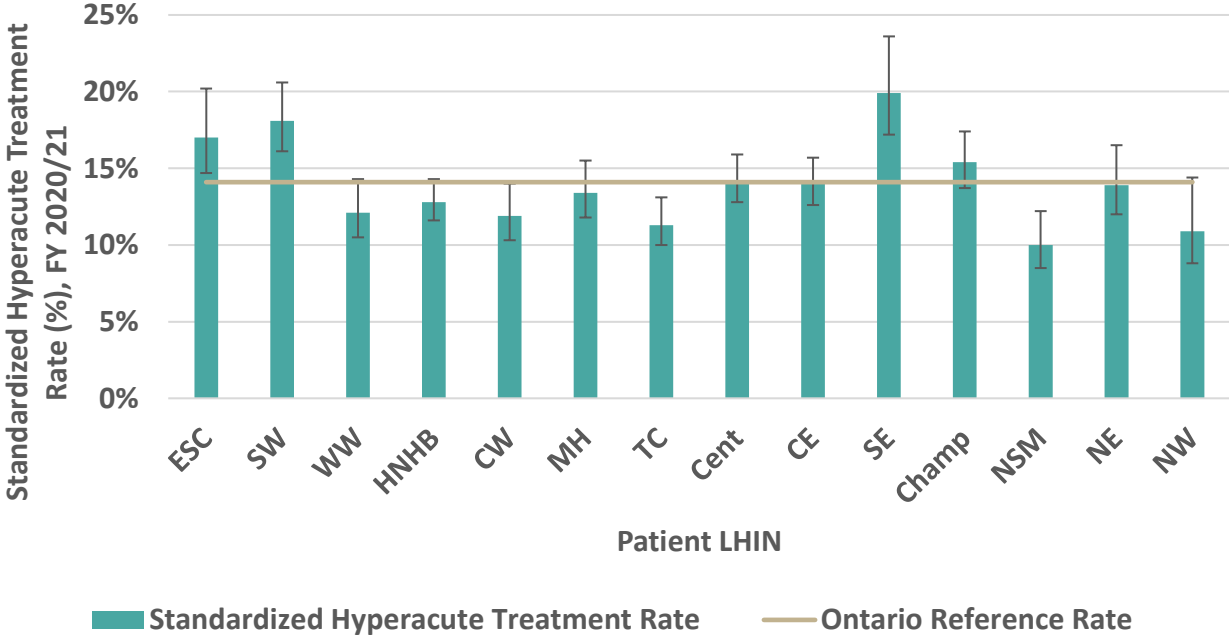
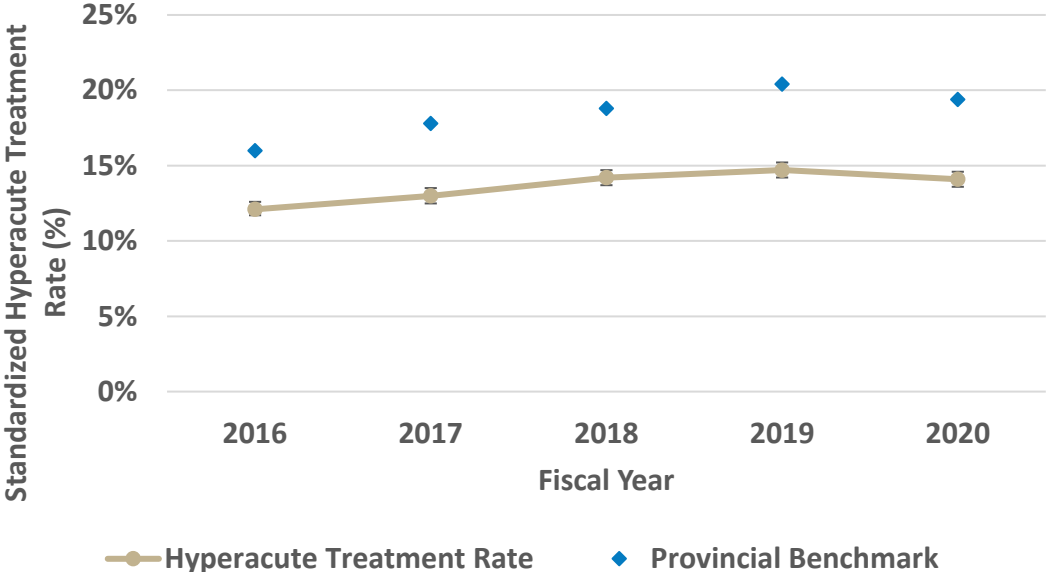
Chapter 2: Hyperacute Care Access and Outcomes for Ischemic Stroke

Chapter 2: Hyperacute Care Access and Outcomes for Ischemic Stroke

Indicator 2.1.1: Standardized Hyperacute Treatment Rate (tPA and/or EVT), FY 2020/21

Indicator Description:

This indicator measures the rate of ischemic stroke patients who received hyperacute therapy which includes endovascular thrombectomy (EVT) and/or tissue plasminogen activator (tPA). The indicator is standardized for type II stroke diagnosis (i.e., in-hospital stroke) and whether ischemic stroke was the MRDx.



Interpretation Consideration:

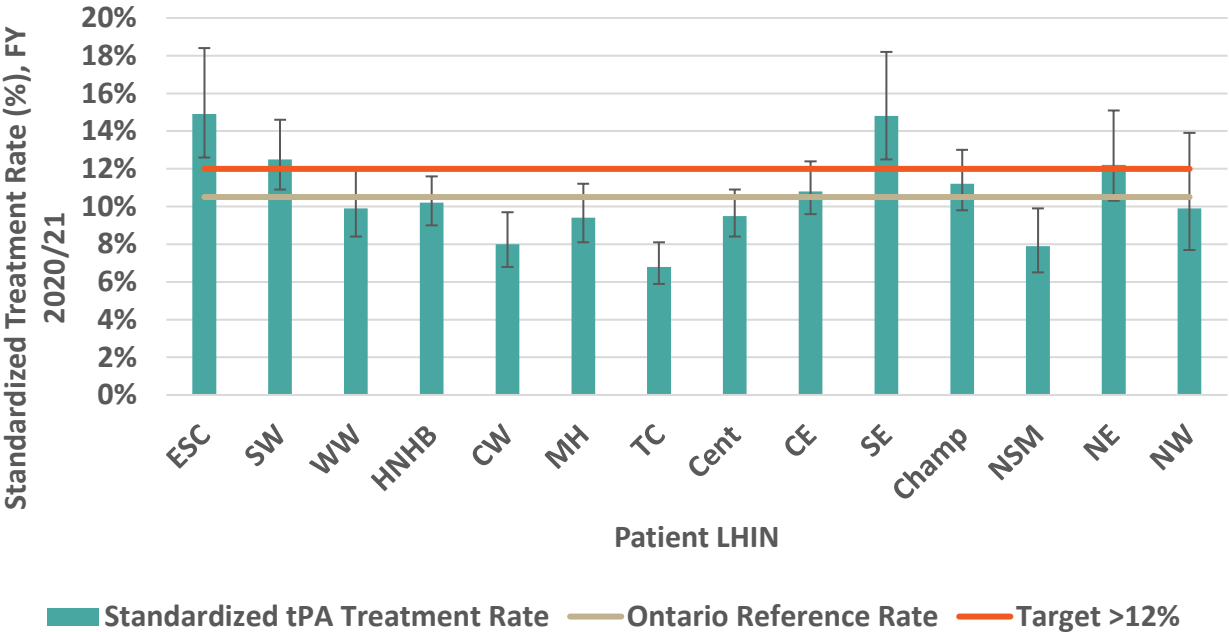
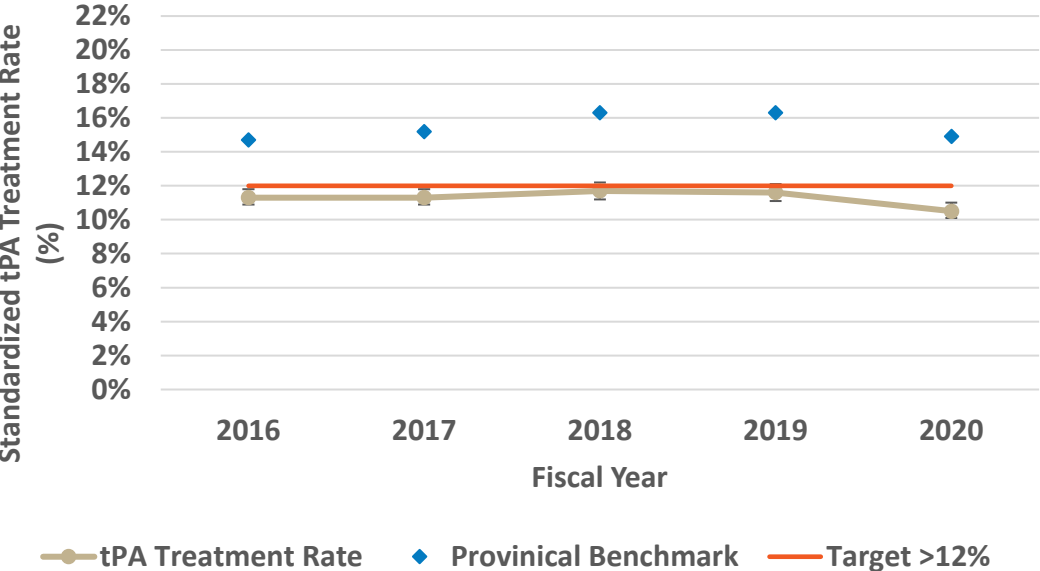
Desired directionality is higher. With the introduction of EVT, hyperacute treatment rates have been steadily increasing from fiscal years 2016 to 2019. In 2020, the first year of the pandemic, the hyperacute treatment rate decreased but not by a large amount. There is variability in access to hyperacute treatment in the province, and hyperacute treating centres will need to continue to optimize regional access.

Chapter 2: Hyperacute Care Access and Outcomes for Ischemic Stroke

Indicator 2.1.2: Standardized tPA Rate, FY 2020/21

Indicator Description:

This indicator measures the rate of ischemic stroke patients who received tissue plasminogen activator (tPA). The indicator is standardized for type II stroke diagnosis (i.e., in-hospital stroke) and whether ischemic stroke was the MRDx. Target is >12%⁶



Interpretation Consideration:

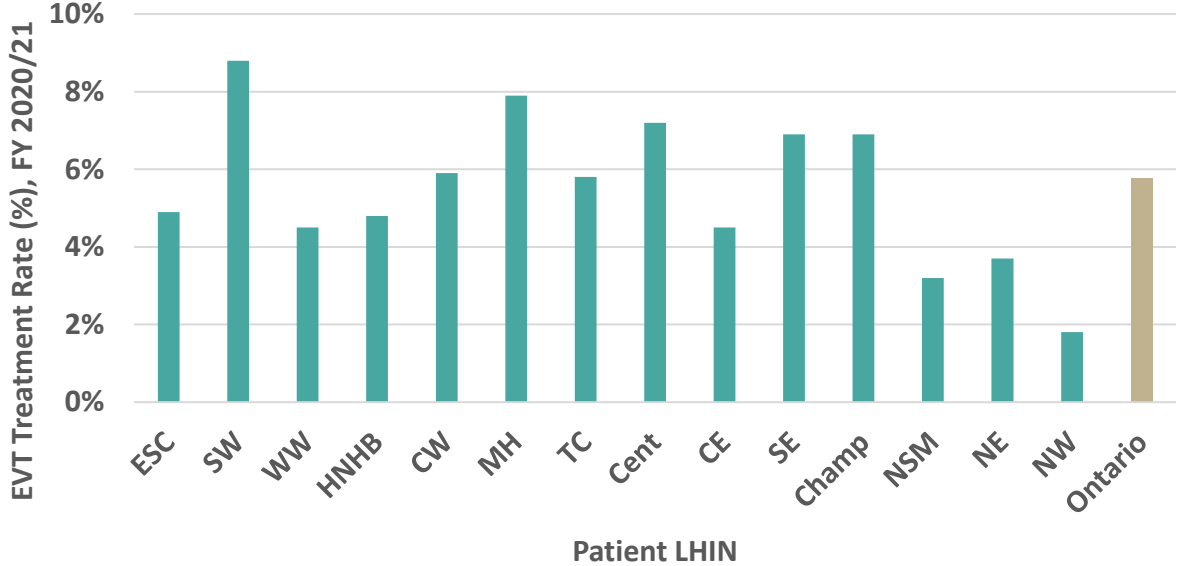
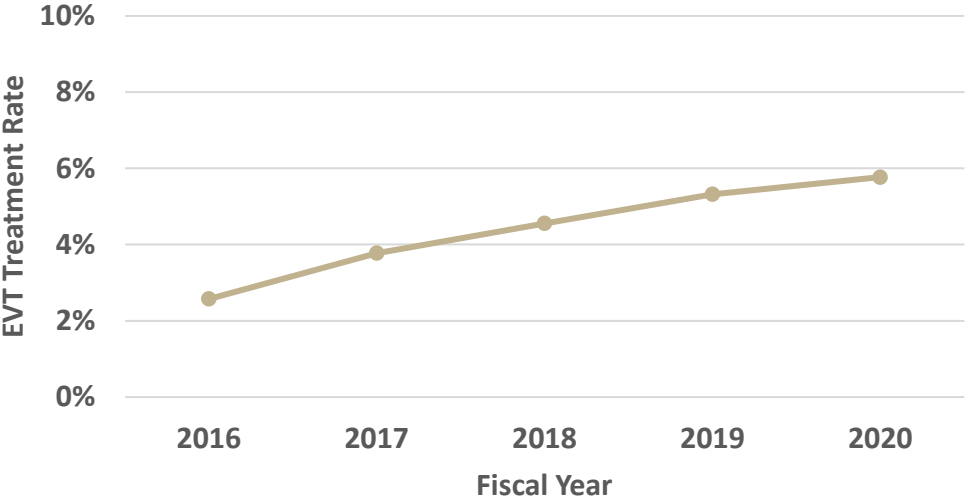
Desired directionality is higher. Provincial access to tPA saw a decrease in fiscal year 2020. Due to the pandemic, if patients delayed seeking treatment for their ischemic stroke, this could impact their access to tPA treatment as this is a time sensitive treatment. There is variability in LHIN performance, and this may be influenced by the level of organized stroke care and patient behaviour (e.g., delays in seeking medical attention). Regions need to take into consideration pre-hospital and other emergency factors that may be influencing results.

Chapter 2: Hyperacute Care Access and Outcomes for Ischemic Stroke

Indicator 2.1.3: EVT Treatment Rate, FY 2020/21

Indicator Description:

This indicator measures the rate of ischemic stroke patients who received endovascular thrombectomy (EVT) therapy.



Interpretation Consideration:

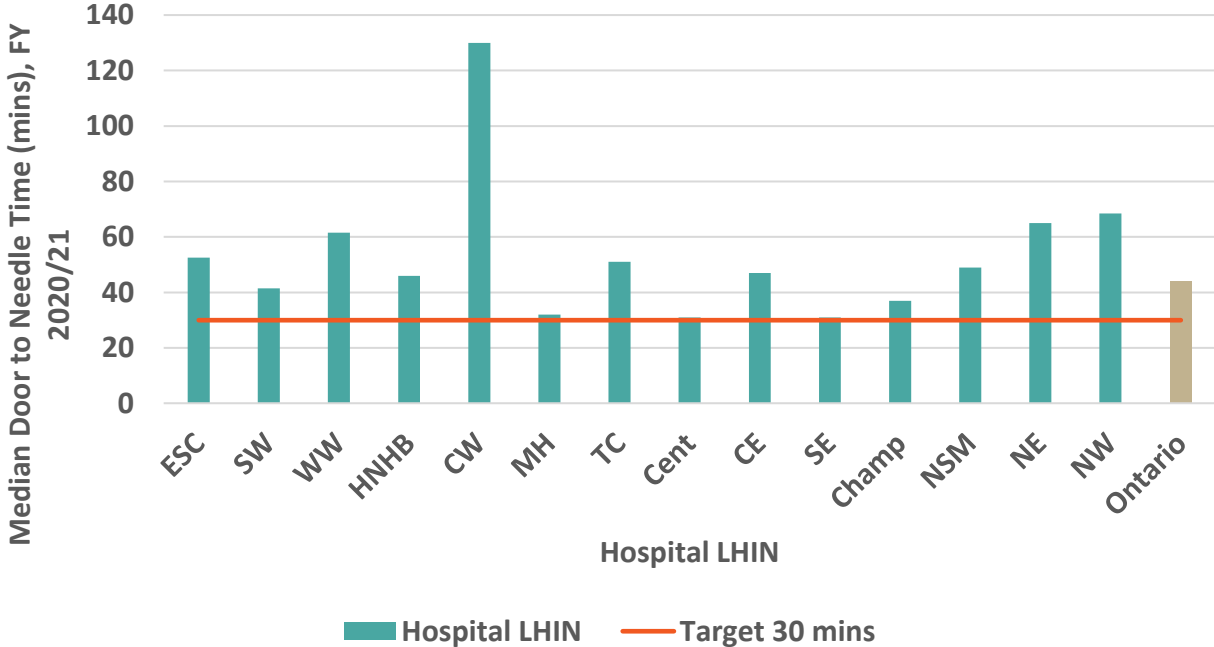
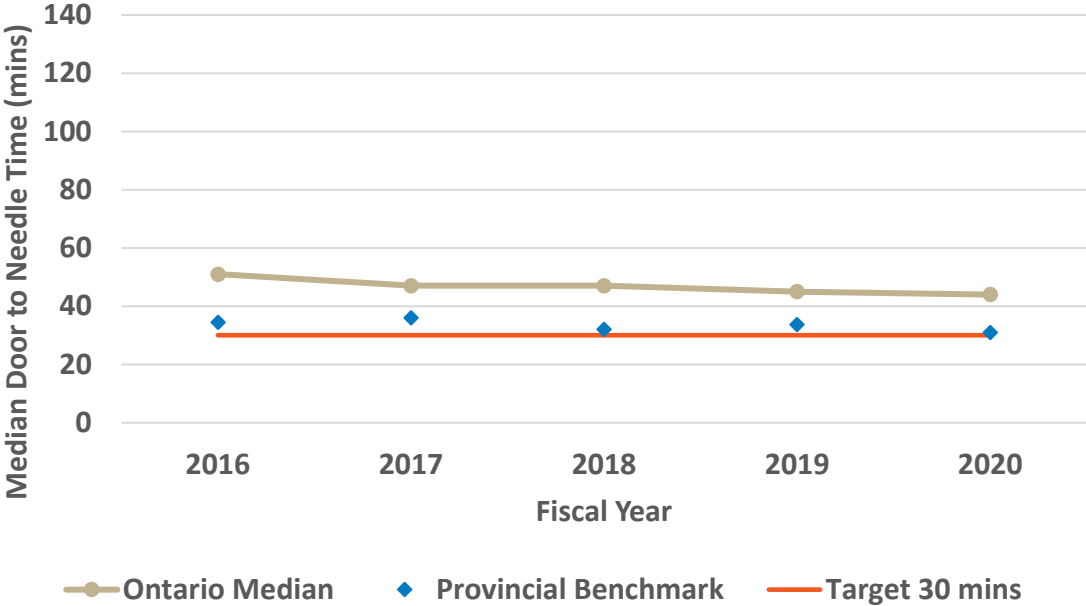
Desired directionality is higher. The provincial EVT treatment rate has had considerable growth in the past five fiscal years, from 2.6% in 2016 to approximately 6% in 2020; however, there is wide variation in access to EVT treatment in the LHINs. Regions should continue to work with partner organizations to optimize access to this treatment. The expansion of the EVT treatment window will assist growth in access. Access reflects care received in Ontario. Patients in select regions (i.e., NW, ESC) may receive access to EVT out of province; these data are not available and therefore not reflected in the results.

Chapter 2: Hyperacute Care Access and Outcomes for Ischemic Stroke

Indicator 2.2: Median Door-to-Needle Time for tPA Treatment (mins), FY 2020/21

Indicator Description:

The time, in minutes, between a stroke patient’s emergency department (ED) door time and the time thrombolysis with tissue plasminogen activator (tPA) was administered is referred to as door-to-needle (DTN) time. The target median door to needle time is 30 minutes.³



Interpretation Consideration:

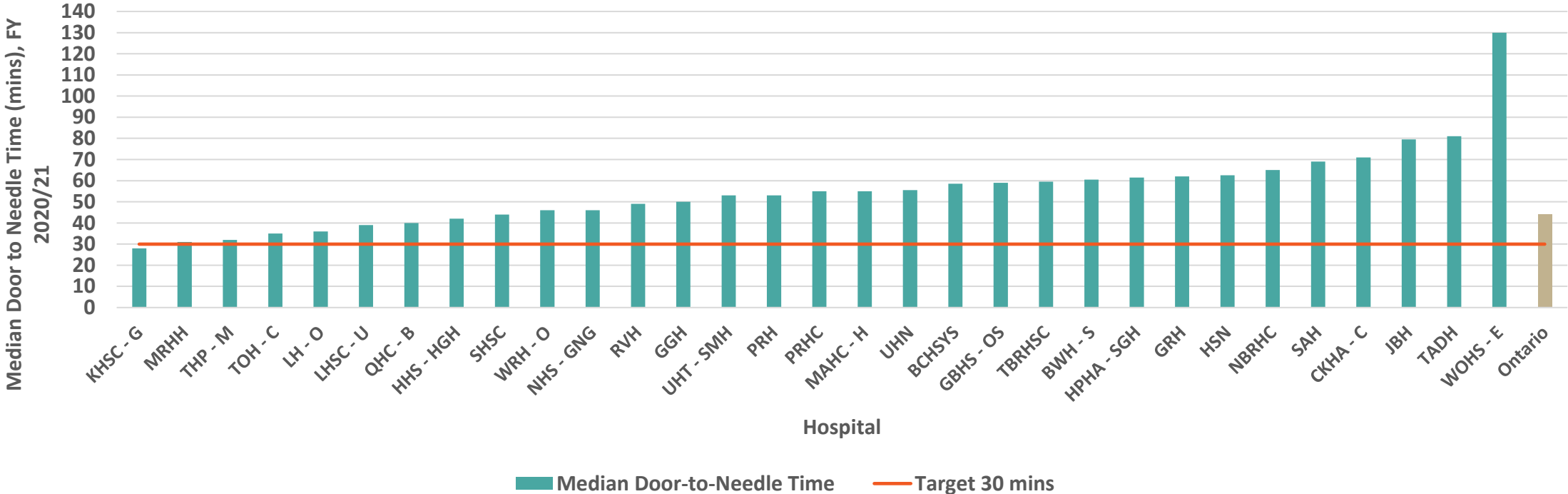
Desired directionality is lower. Start of the ED door time is defined as ED triage or ED registration time (which ever comes first). Provincially median DTN time has improved (declined) in the last five fiscal years from 51 minutes in 2016 to 44 minutes in 2020. Interestingly to note, in the first year of the pandemic, DTN time decreased by 1 minute from 2019 to 2020. There still remains variability across regions, and three LHINs (MH, Cent and SE) were very close to the target of 30 minutes.³

Chapter 2: Hyperacute Care Access and Outcomes for Ischemic Stroke

Indicator 2.2: Median Door-to-Needle Time for tPA Treatment (mins), FY 2020/21 – Hospital Level

Indicator Description:

The time, in minutes, between a stroke patient’s emergency department (ED) door time and the time thrombolysis with tissue plasminogen activator (tPA) was administered is referred to as door-to-needle (DTN) time. The target median door to needle time is 30 minutes.³



Interpretation Consideration:

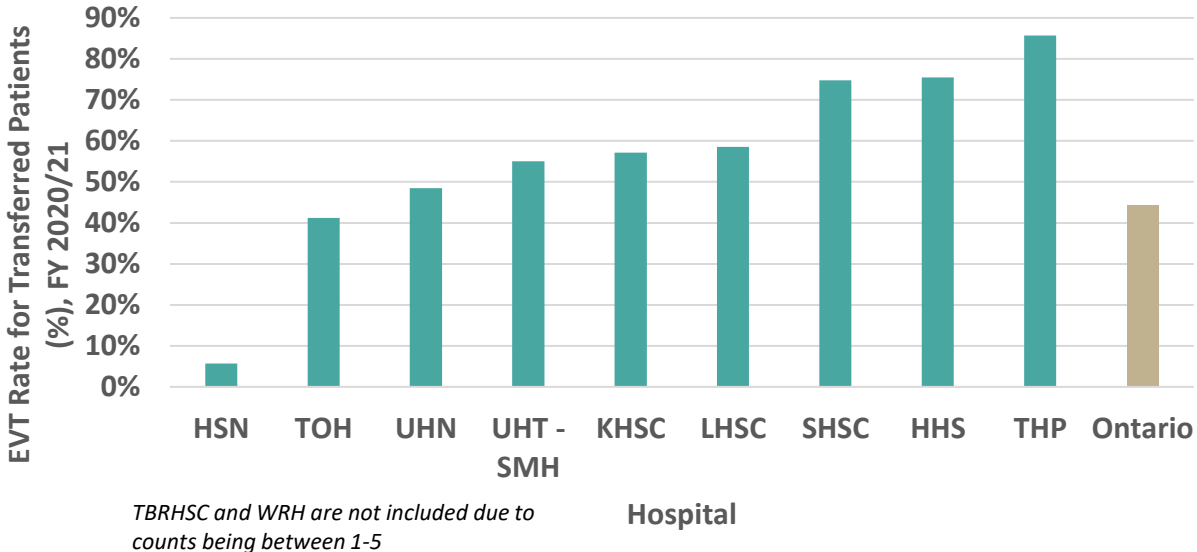
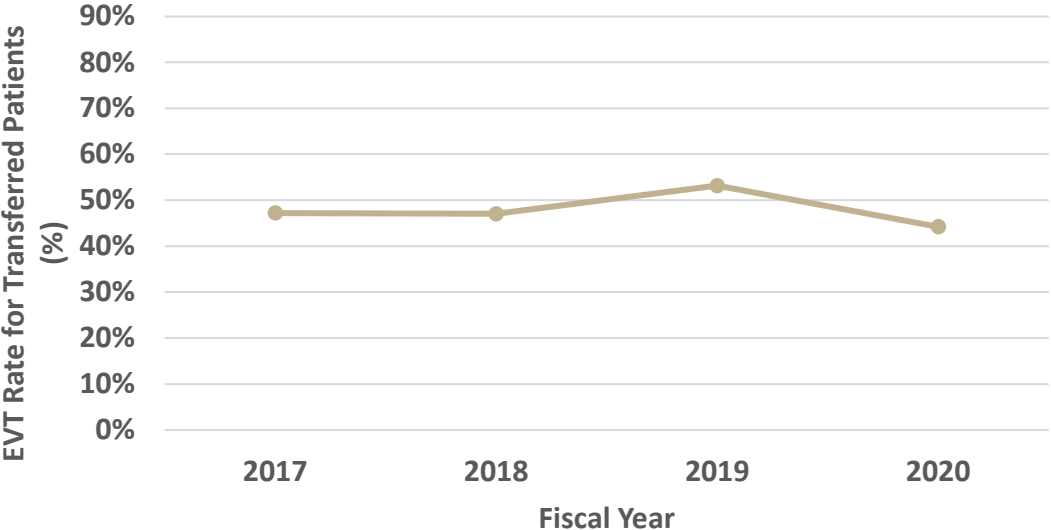
Desired directionality is lower. Start of the ED door time is defined as ED triage or ED registration time (whichever comes first). KHSC-G was the only hospital that achieved target time. Median door-to-needle time ranges from 28 minutes (KHSC-G) to 130 minutes (WOHS-E). Hospitals should be reviewing their processes of care to drive quality improvement on access to this time dependent treatment. Refer to [Appendix B](#) for hospital abbreviations.

Chapter 2: Hyperacute Care Access and Outcomes for Ischemic Stroke

Indicator 2.3: EVT Rate for Ischemic Stroke Patients Transferred From a District Stroke Centre (DSC) or tPA Hospital ED to an EVT Hospital, FY 2020/21

Indicator Description:

This indicator measures the rate of EVT treatment of ischemic stroke patients that were transferred from the Emergency Department of a District Stroke Centre (DSC) or tPA hospital to an EVT capable hospital.



Interpretation Consideration:

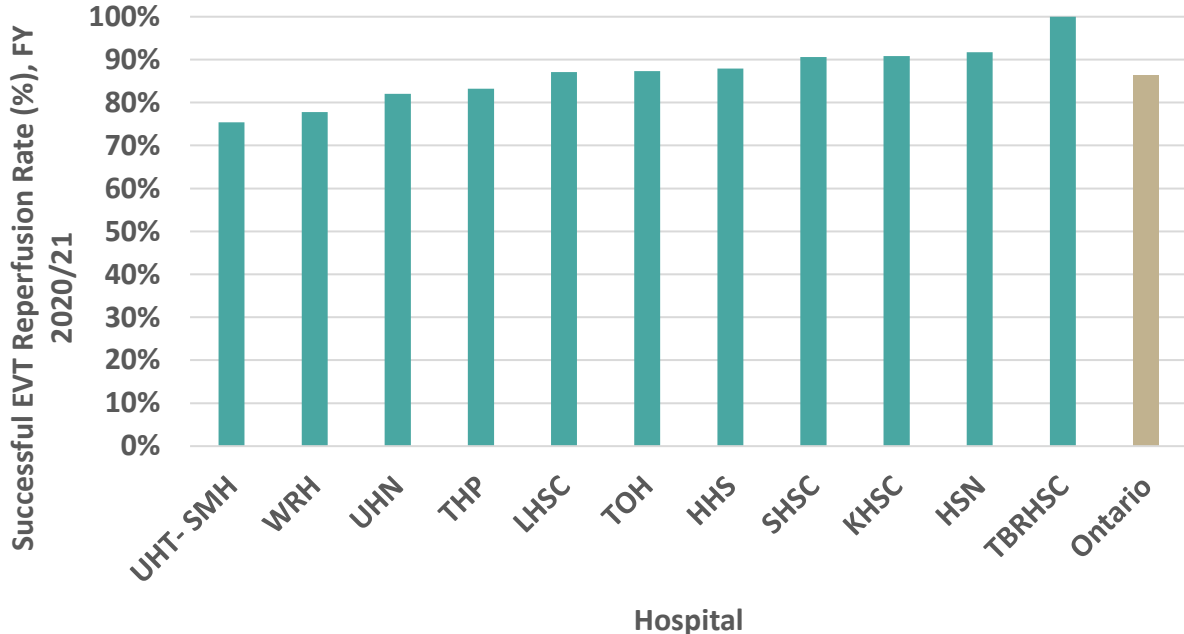
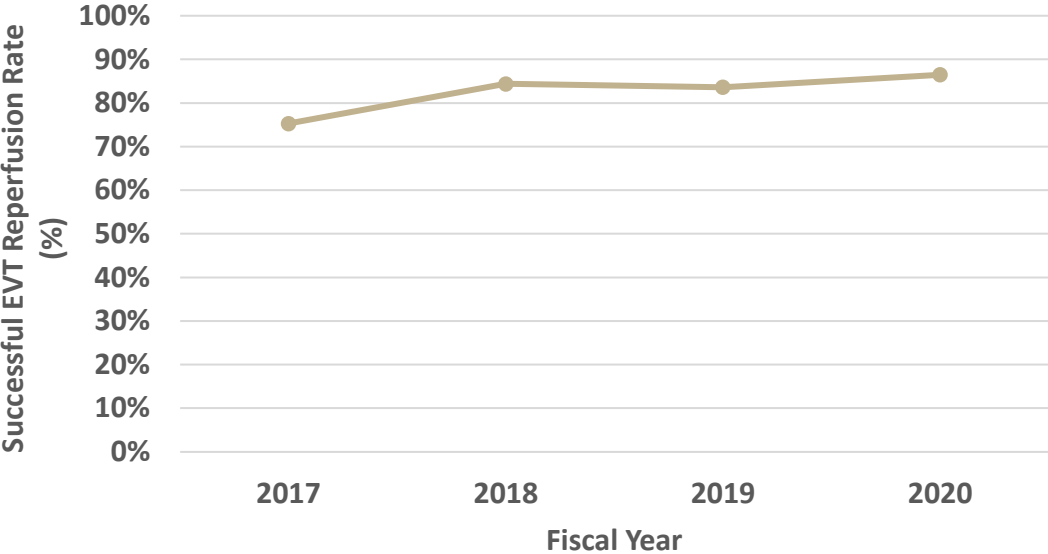
Desired directionality is higher. This indicator is not a measure of access but instead a measure of appropriate patient selection of patients presenting at referral sites, to support opportunities to receive EVT. This indicator does not include transfers of inpatients and is limited to patients with an ischemic stroke diagnosis criteria for the ED record at the DSC/tPA hospital. Patients who are transferred to an EVT site are assumed to be transferred for EVT, and it is possible that transfers may no longer be eligible for EVT, or they may be transferred for reasons other than EVT (e.g., stroke unit care).

Chapter 2: Hyperacute Care Access and Outcomes for Ischemic Stroke

Indicator 2.4: Successful Reperfusion Rate for Patients that Received EVT, FY 2020/21

Indicator Description:

Percentage of EVT patients with a Thrombolysis In Cerebral Infarction score (TICI score) of 2b or 3 documented at the conclusion of the EVT procedure.



Interpretation Consideration:

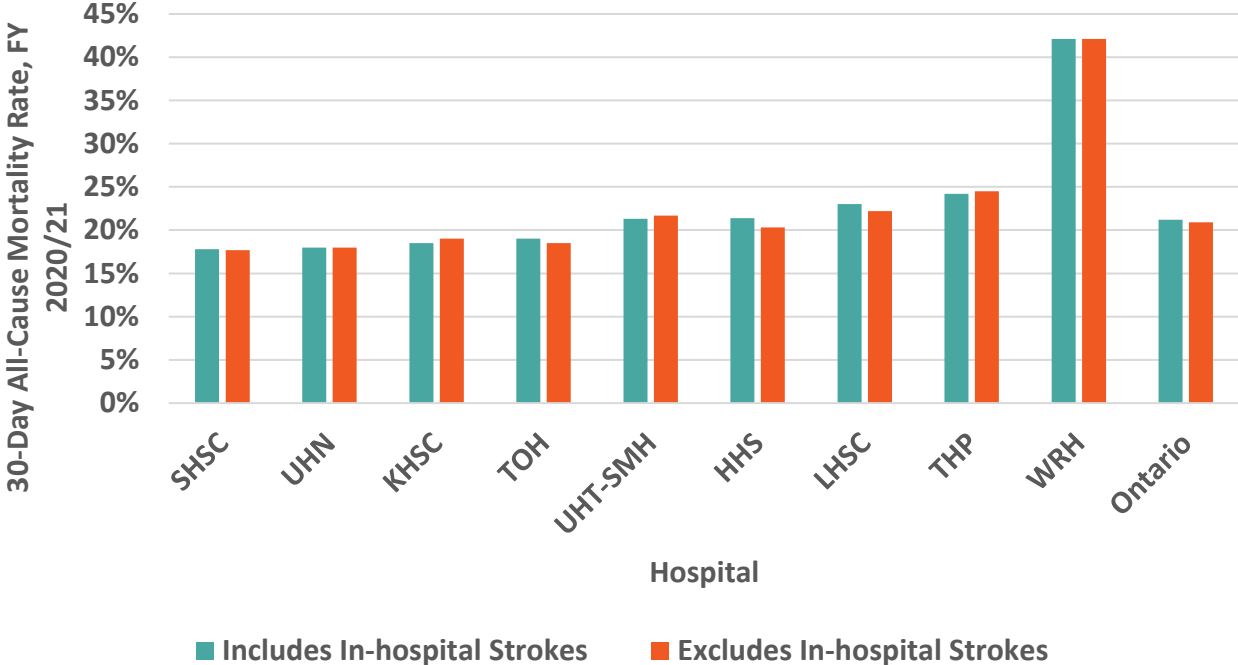
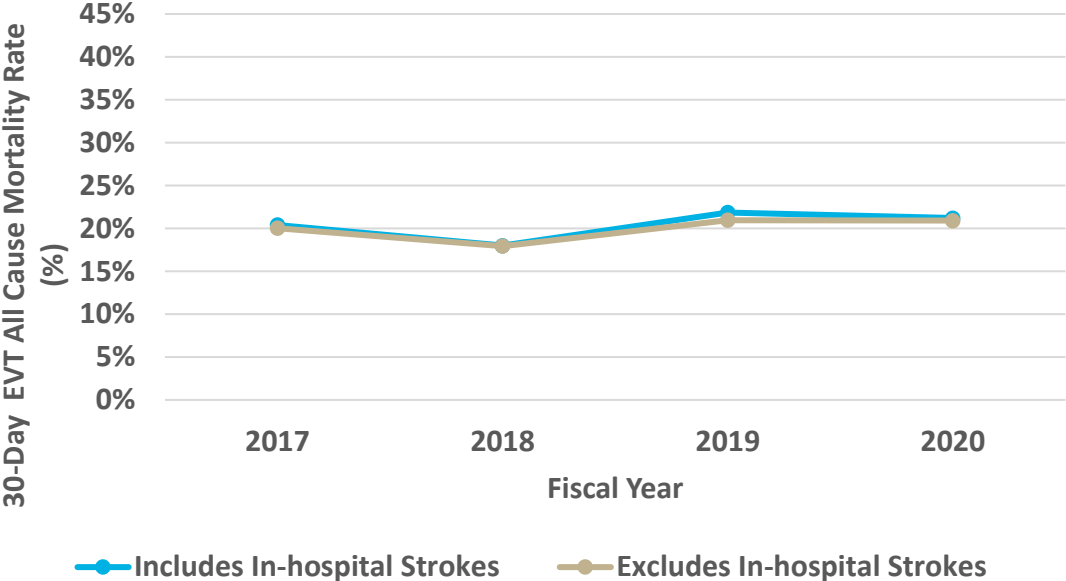
Desired directionality is higher. All EVT hospitals had a successful reperfusion rate of 75% or greater in 2020. EVT reperfusion rates align with, or in some instances are better than those reported in the literature.⁷⁻⁹ This indicator is not risk-adjusted and does not account for complexity of the patient.

Chapter 2: Hyperacute Care Access and Outcomes for Ischemic Stroke

Indicator 2.5: 30-Day All Cause Mortality Rate of Patients that Received an EVT, FY 2020/21

Indicator Description:

The 30-Day all cause mortality following EVT is a crude performance indicator. The cohort includes all ischemic stroke patients that had an EVT procedure and is stratified by including or excluding those who experience stroke while in-hospital.



HSN, and TBRHSC are not included due to counts being between 1-5

Interpretation Consideration:

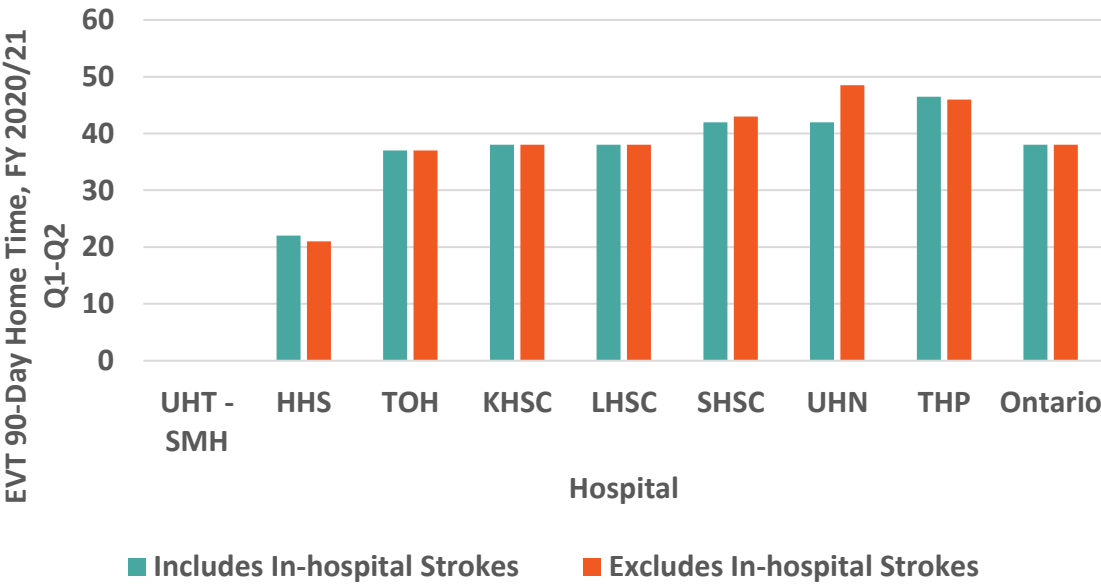
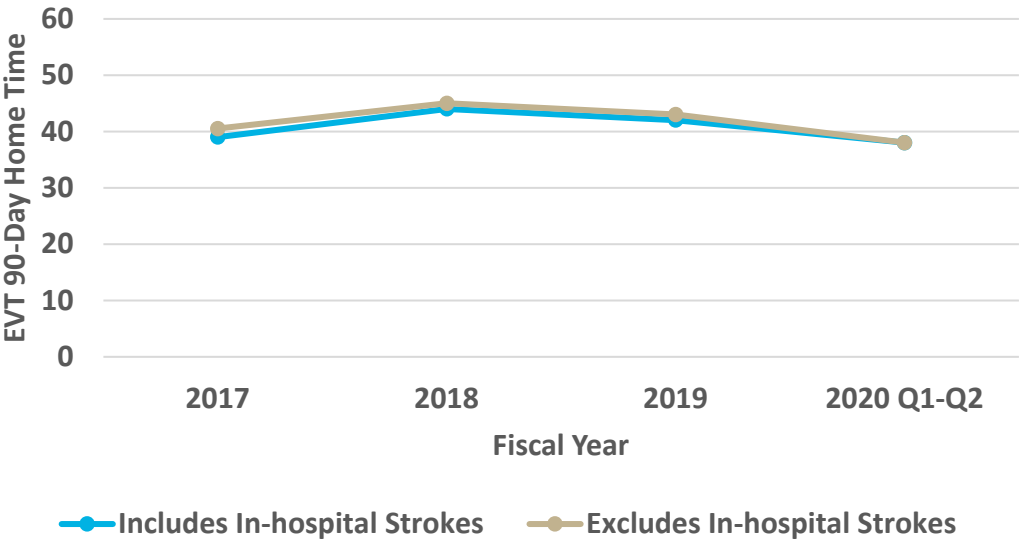
Desired directionality is lower. The indicator is not risk adjusted; hence, patient characteristics such as age, stroke severity, and comorbidities may contribute to the observed variation year over year. Mortality rates align with or are slightly higher than those reported in the literature.⁷⁻⁹

Chapter 2: Hyperacute Care Access and Outcomes for Ischemic Stroke

Indicator 2.6: Median Days at Home in the First 90-Days Following EVT, FY 2020/21 Q1-Q2

Indicator Description:

The number of days an EVT patient spent alive and outside of a health institution (hospital, inpatient rehab and/or skilled nursing facility) in the first 90 days after the EVT hospitalization and is stratified by including or excluding those who experience stroke while in-hospital stroke.



HSN, TBRHSC and WRH are not included due to counts being between 1-5

Interpretation Consideration:

Desired directionality is higher. Factors that contribute to lower days at home include: zero home time; in-hospital mortality; admission to CCC, LTC, or to inpatient rehabilitation versus home rehabilitation; ALC LOS; readmission and post discharge mortality. This creates a composite indicator of performance. This measure is used as a proxy for the Modified Rankin Scale, a measure of the degree of disability for patients' post-stroke.¹⁰ A limitation to this indicator is the inability to determine the level of assistance a patient requires, and the access/availability of social/community supports in order to keep the patient home.



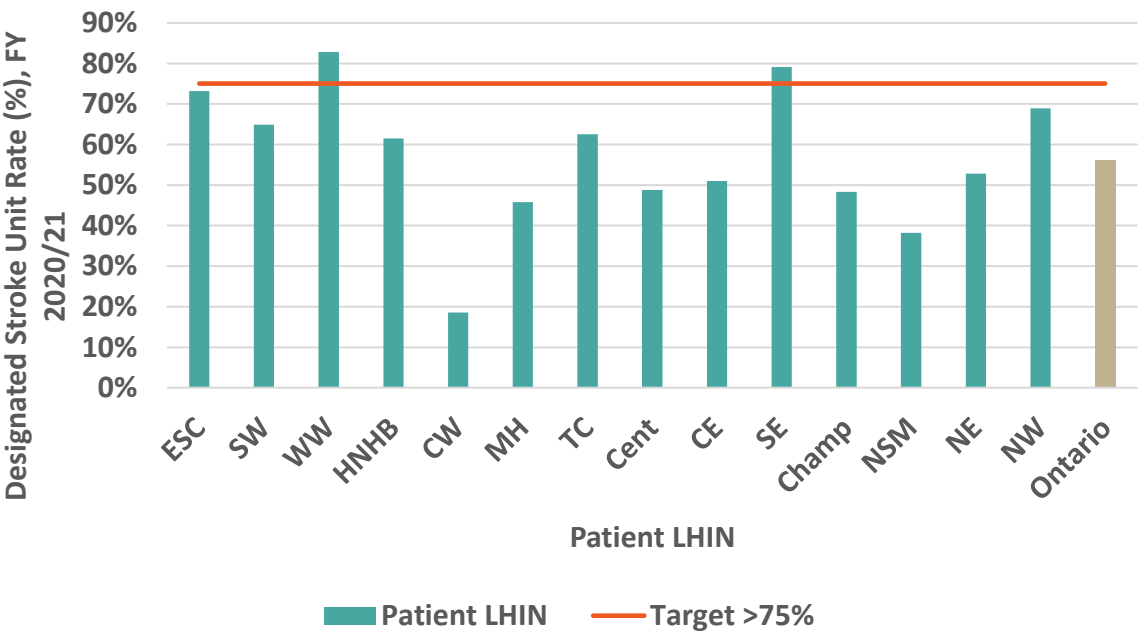
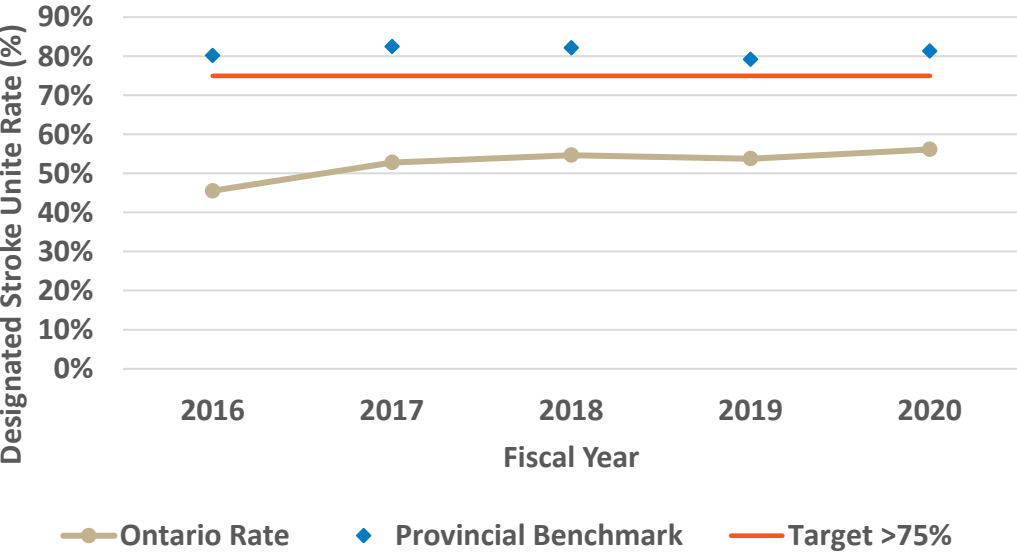
Chapter 3: Acute Care Access and Outcomes for Stroke and TIA

Chapter 3: Acute Care Access and Outcomes for Stroke and TIA

Indicator 3.1: Designated Stroke Unit Rate for Stroke/TIA Acute Patients, FY 2020/21

Indicator Description:

This indicator measures the proportion of stroke/TIA patients treated in a designated stroke unit for any part of their index (first) admission. Target is >75%³



Interpretation Consideration:

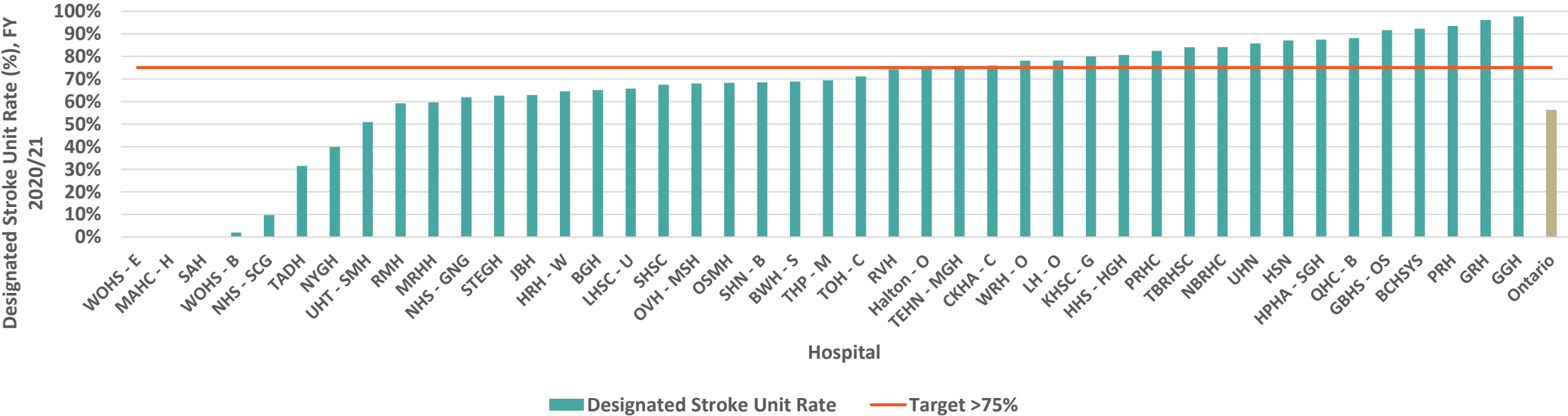
Desired directionality is high. If a patient receives stroke unit care at a non-index hospital (i.e., not the first acute hospital they were admitted to), this will not be captured in the metric. The Ontario rate of acute care treatment at a designated stroke unit increased from 54% in 2019 to 56% in 2020. Access to the stroke unit did not decrease in the pandemic, however the provincial rate is well below the target of >75%.³ The only patient LHINs to reach the target of >75% were WW and SE LHIN. There is geographic inequity in access to this best practice ranging from 19% (CW) to 83% (WW).

Chapter 3: Acute Care Access and Outcomes for Stroke and TIA

Indicator 3.1: Designated Stroke Unit Rate for Stroke/TIA Acute Patients, FY 2020/21 – Hospital Level

Indicator Description:

This indicator measures the proportion of stroke/TIA patients treated in a designated stroke unit for any part of their index (first) admission. Target is >75%³



Interpretation Consideration:

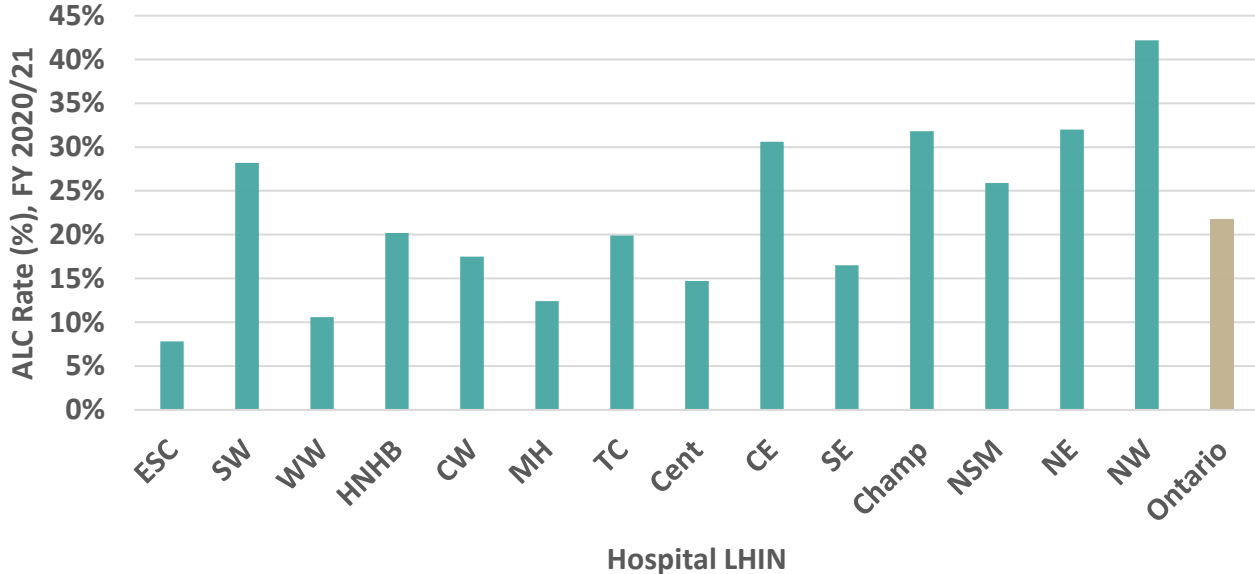
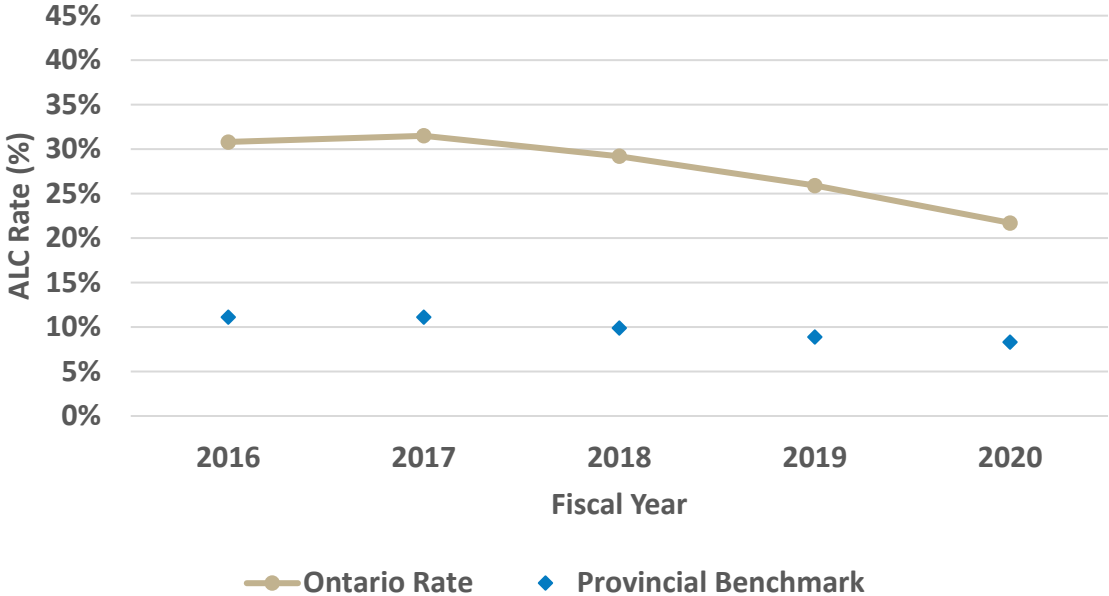
Desired directionality is high. Patients who receive stroke unit care are more likely to survive, return home and regain independence compared to patients who receive generalized care.² To optimize access and improve outcomes to this specialized care, consideration will need to be given to hospital (local) and regional level barriers and enablers. In addition, review and update of the indicator methodology may be helpful to ensure that measurement is reflective of the true performance within the system (e.g., patients not treated in a stroke unit at the index hospital, but are transferred and treated in a stroke unit at the receiving hospital are currently not counted). Refer to [Appendix B](#) for hospital abbreviations.

Chapter 3: Acute Care Access and Outcomes for Stroke and TIA

Indicator 3.2: Alternative Level of Care (ALC) Proportion of Total Days for Stroke and TIA Inpatients, FY 2020/21

Indicator Description:

This indicator measures the proportion of total acute hospital days that patients are designated as requiring an alternative level care (ALC).



Interpretation Consideration:

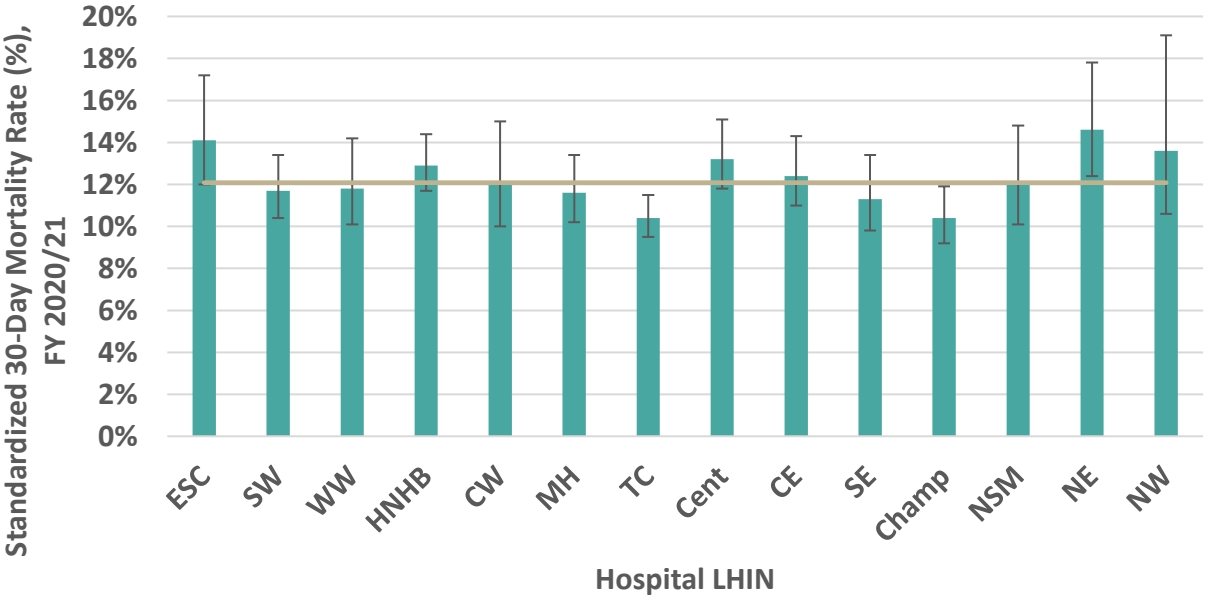
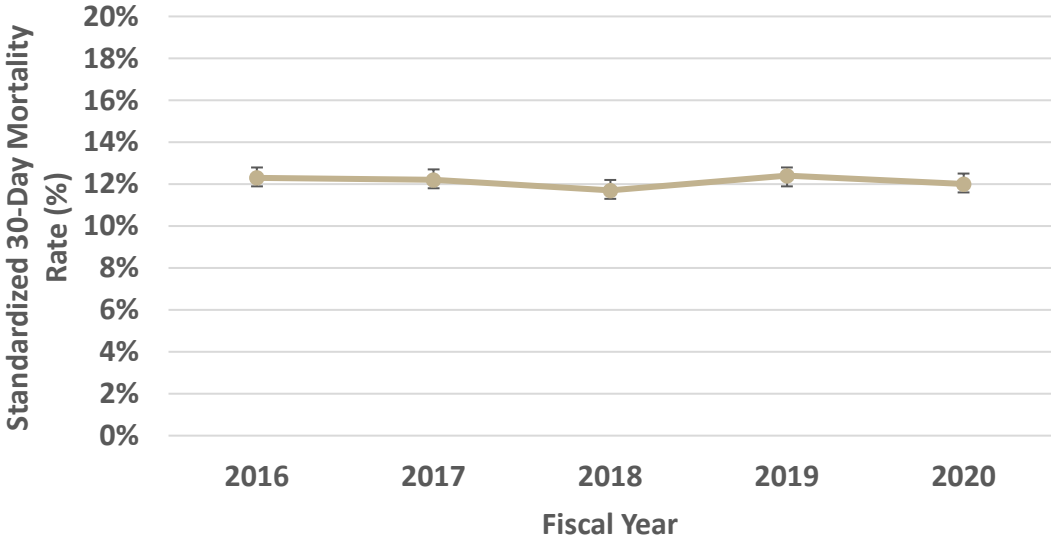
Desired directionality is low. The provincial ALC rate decreased in the last four fiscal years (including the year the pandemic started) to a rate of 21.7% in 2020. It will be interesting to see if this downward trend continues in the second year of the pandemic. There is wide variation across the LHINs with the ALC rate range of 8% (ESC LHIN) to 42% (NW LHIN). A higher proportion of ALC days relative to total length of stay can be interpreted as lack of access to long-term care beds, and post-stroke care including rehabilitation and homecare services.

Chapter 3: Acute Care Access and Outcomes for Stroke and TIA

Indicator 3.3: Standardized 30-Day All-Cause Mortality Rate of Stroke and TIA Admissions to Acute Care, FY 2020/21

Indicator Description:

This indicator measures the all-cause mortality rate in the 30-days following admission for stroke or TIA. This indicator is adjusted for patient age, stroke type, ambulance arrival and medical history factors including hypertension, atrial fibrillation, and a Charlson Comorbidity Index Score of 7+.



Standardized 30-Day Mortality Rate (Teal bars) Ontario Reference Rate (Gold line)

Interpretation Consideration:

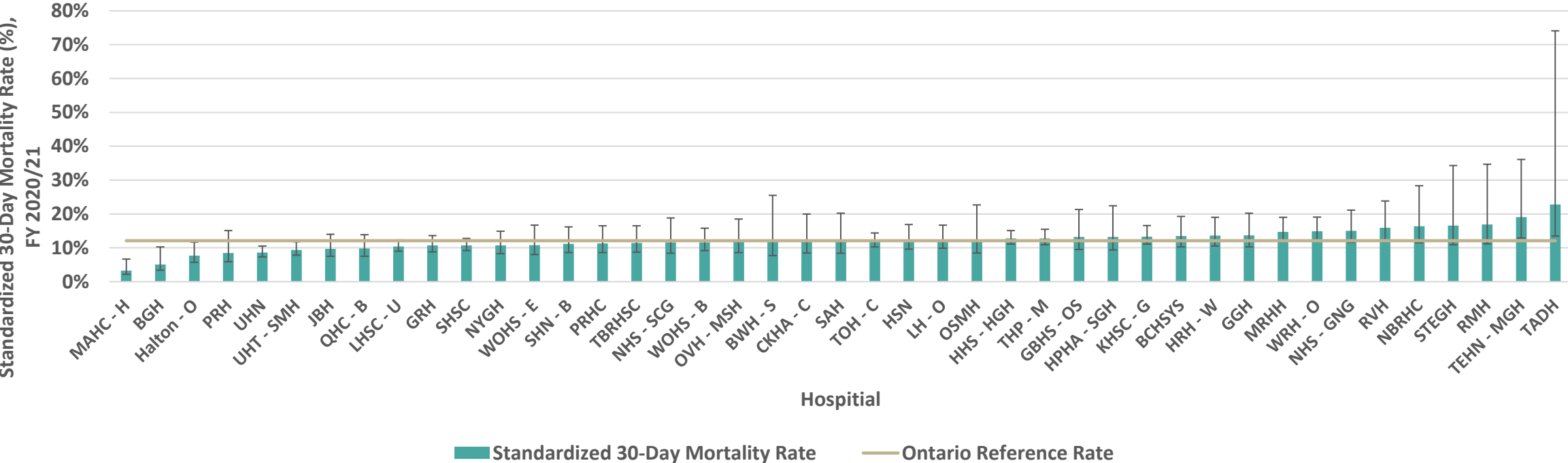
Desired directionality is low. The standardized mortality rate for Ontario has remained relatively flat for the past five years (including the first year of the pandemic) around 12%. There is variation amongst the LHINs, with TC and Champlain LHIN being significantly lower than the Ontario rate. This indicator measures all-cause mortality; therefore, death may not be related to the stroke event.

Chapter 3: Acute Care Access and Outcomes for Stroke and TIA

Indicator 3.3: Standardized 30-Day All-Cause Mortality Rate of Stroke and TIA Admissions to Acute Care, FY 2020/21 – Hospital Level

Indicator Description:

This indicator measures the all-cause mortality rate in the 30-days following admission for stroke or TIA. This indicator is adjusted for patient age, stroke type, ambulance arrival and medical history factors including hypertension, atrial fibrillation, and a Charlson Comorbidity Index Score of 7+.



Interpretation Consideration:

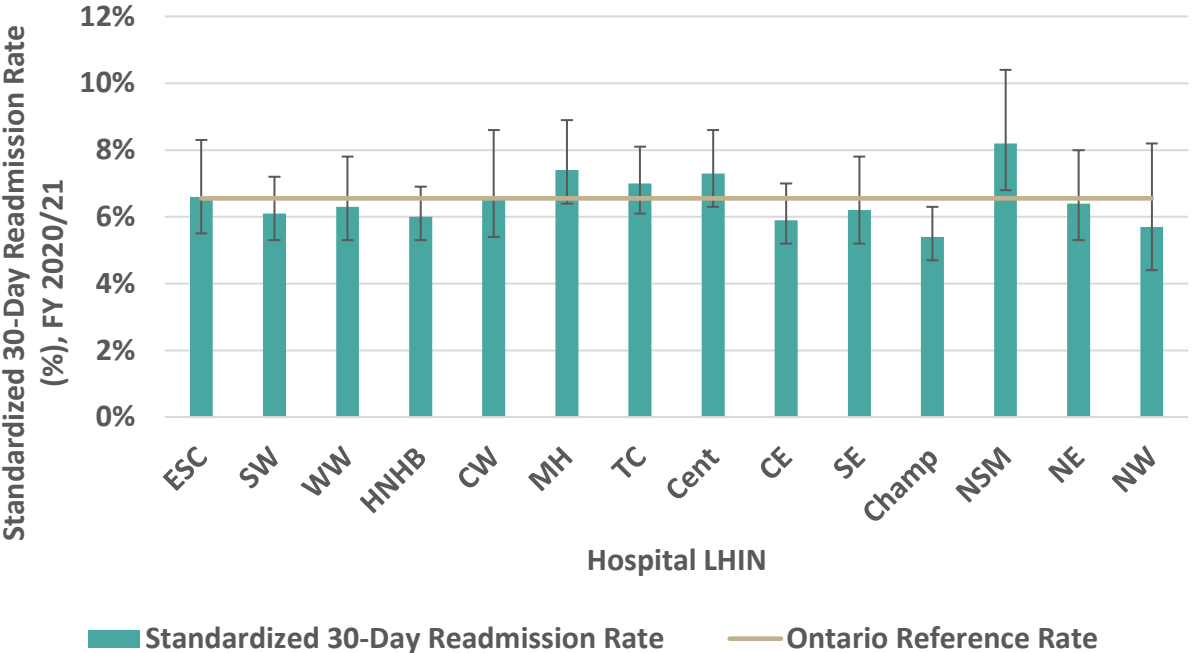
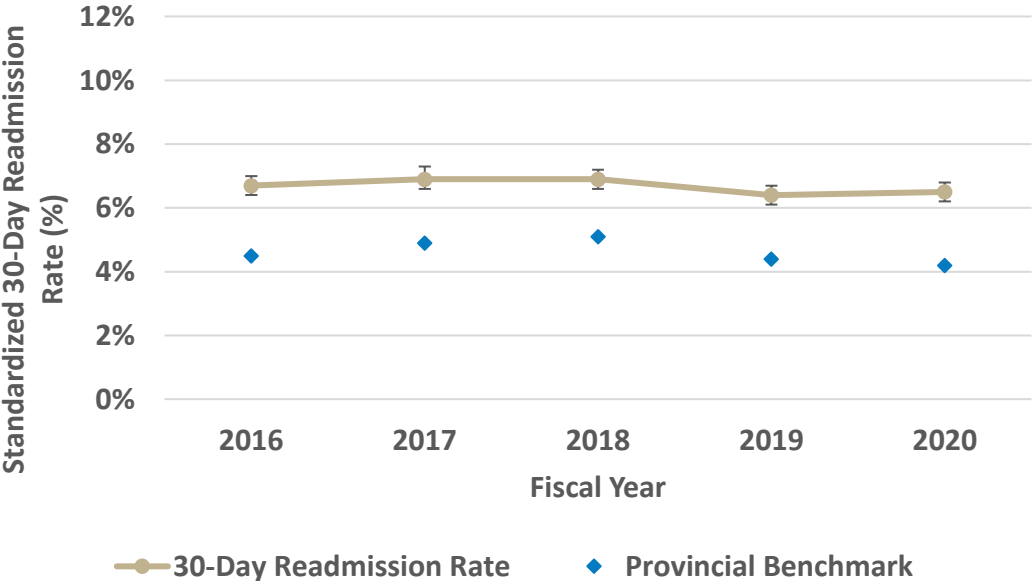
Desired directionality is low. In 2020, most of the hospitals were not statistically different than the Ontario rate, though some show more variance than others. There may be opportunity to improve consistency of outcomes within or across centres. This indicator measures all-cause mortality; therefore, death may not be related to the stroke event. Refer to [Appendix B](#) for hospital abbreviations.

Chapter 3: Acute Care Access and Outcomes for Stroke and TIA

Indicator 3.4: Standardized 30-Day All-Cause Readmission Rate, FY 2020/21

Indicator Description:

This indicator measures the rate at which TIA and stroke patients are readmitted for any cause in the 30-days following discharge from acute care or the emergency department. This indicator is adjusted for patient age and stroke type.



Interpretation Consideration:

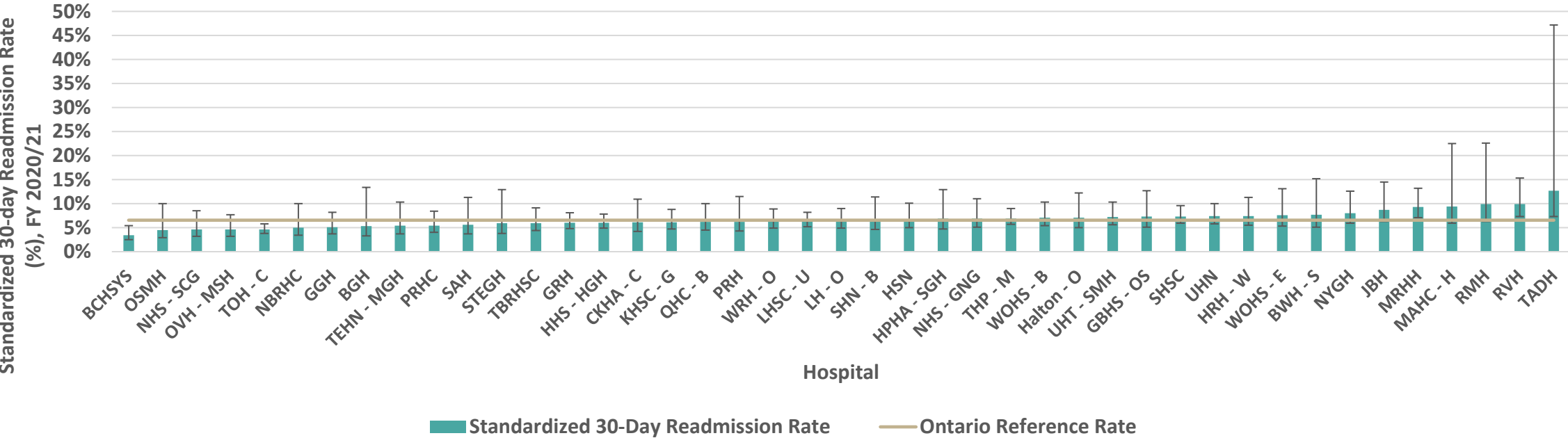
Desired directionality is low. This indicator is for all-cause readmission; therefore, a patient can be readmitted due to non-stroke related causes. In 2020, Champlain LHIN was the only LHIN that was statistically lower than the Ontario rate. For the past five fiscal years, readmission rate has remained relatively flat at under 7%.

Chapter 3: Acute Care Access and Outcomes for Stroke and TIA

Indicator 3.4: Standardized 30-Day All-Cause Readmission Rate, FY 2020/21 – Hospital Level

Indicator Description:

This indicator measures the rate at which TIA and stroke patients are readmitted for any cause in the 30-days following discharge from acute care or the emergency department. This indicator is adjusted for patient age and stroke type.



Interpretation Consideration:

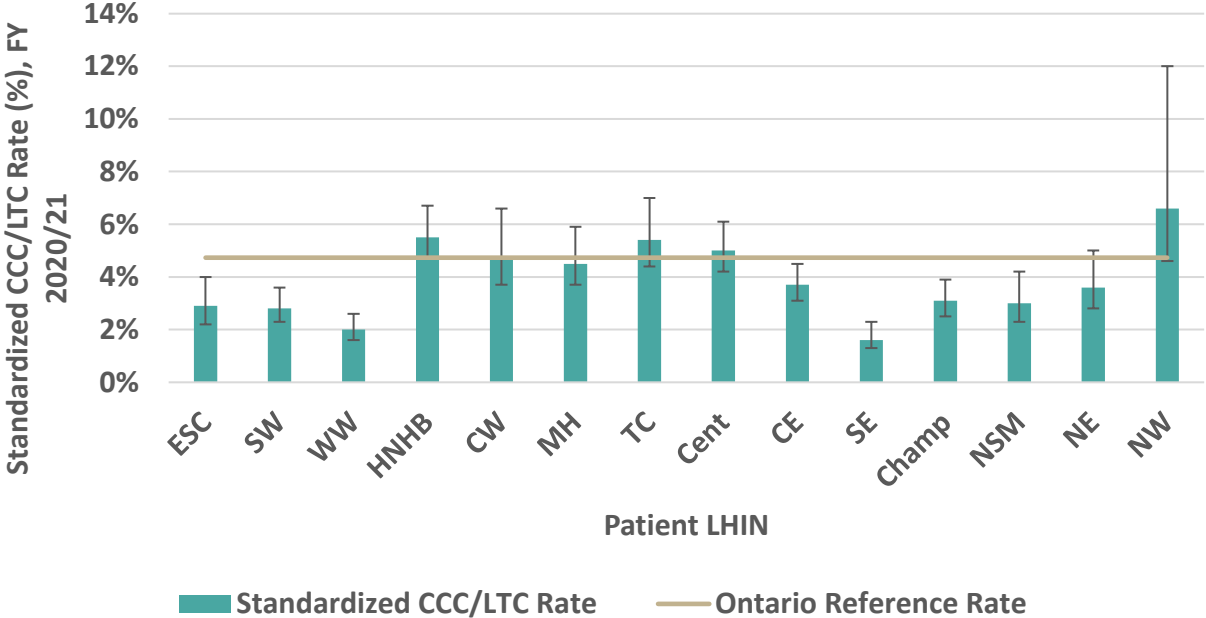
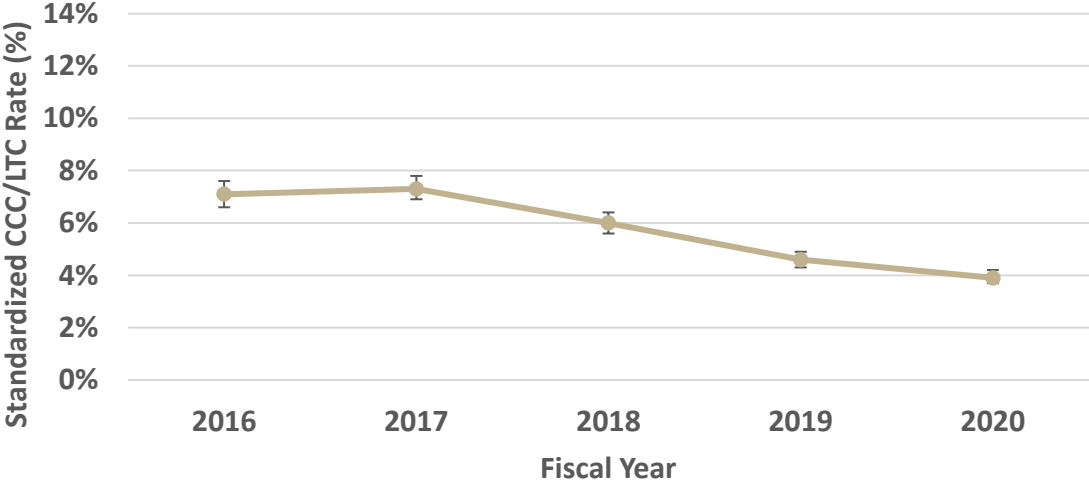
Desired directionality is low. This indicator is for all-cause readmission; therefore, a patient can be readmitted due to non-stroke related causes. In 2020, BCHSYS and TOH-C were the only two hospitals that were statistically lower than the Ontario rate. Some show more variance than others. There may be opportunity to improve consistency of outcomes within or across centres. Refer to [Appendix B](#) for hospital abbreviations.

Chapter 3: Acute Care Access and Outcomes for Stroke and TIA

Indicator 3.5: Standardized Rate of Discharge to Complex Continuing Care (CCC) or Long-Term Care (LTC), FY 2020/21

Indicator Description:

This indicator measures the proportion of acute stroke/TIA patients discharged from the index (first) acute care hospital to long-term care (LTC) or complex continuing care (CCC), excluding patients admitted to acute care from chronic hospitals, nursing homes, and homes for the aged. The indicator is adjusted for patient age and stroke type.



Interpretation Consideration:

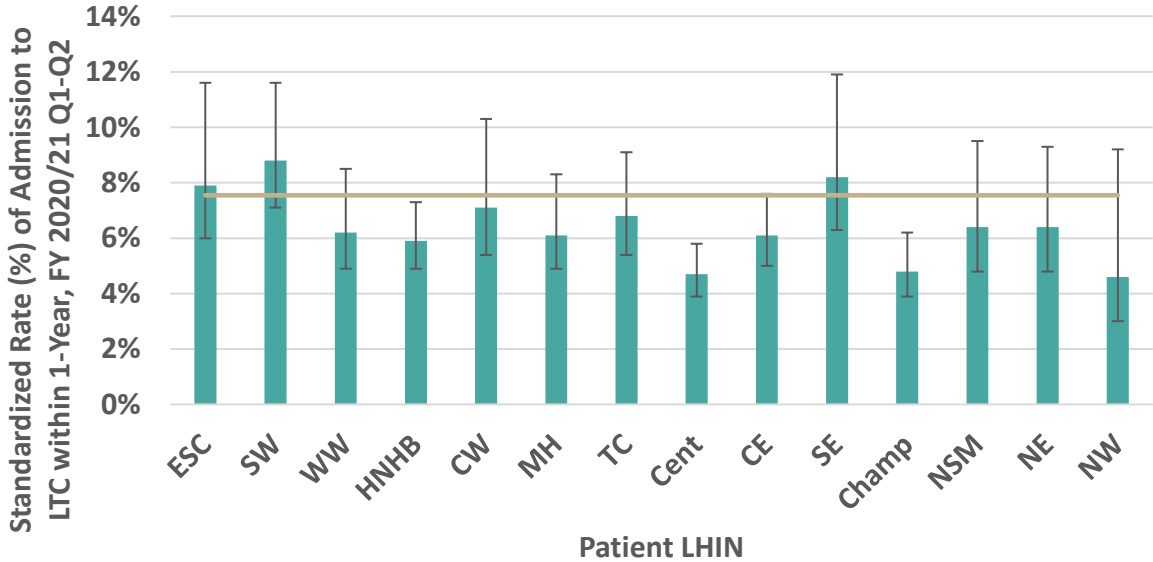
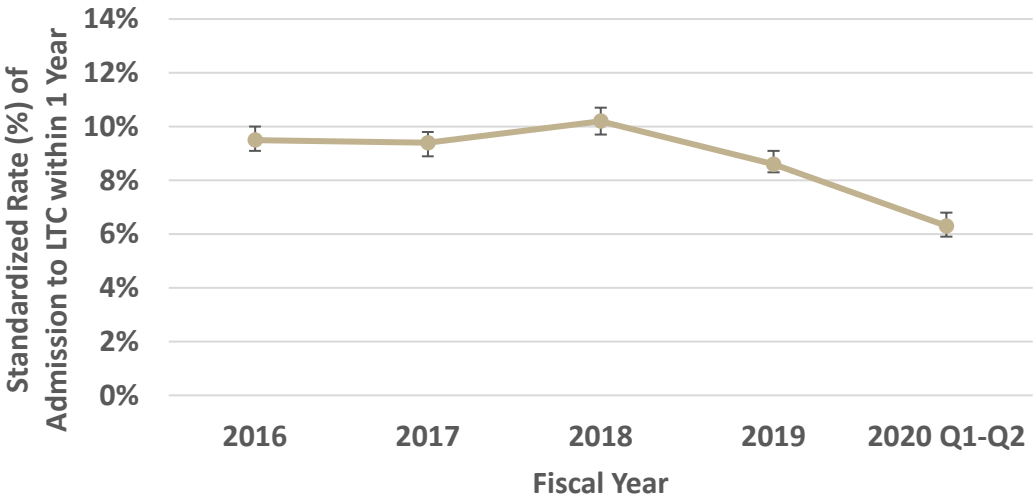
Desired directionality is low. Patients discharged home and waiting for admission to LTC are not included in the results. For the last four fiscal years (2017-2020), the rate of discharge to CCC/LTC has been decreasing (7.3% to 3.9%). The decline observed in 2020 may be partially due to some regions in the early stages of the pandemic not accepting patients into LTC. Variability is observed across the province, and this could be related to many factors including, variable access to LTC beds, inpatient rehabilitation and/or to home and community care support. CCC beds may be utilized in different ways across the province; this would require further investigation.

Chapter 3: Acute Care Access and Outcomes for Stroke and TIA

Indicator 3.6: Standardized Rate of Admission to Long-Term Care (LTC) within 1-Year, FY 2020/21 Q1-Q2

Indicator Description:

This indicator measures the proportion of stroke/TIA patients admitted into a long-term care facility within one year (365 days) following discharge from acute care. This indicator excludes patients admitted to acute care from chronic hospitals, nursing homes, and homes for the aged. The indicator is adjusted for patient age and stroke type.



Standardized 1-Yr LTC Admission Rate Ontario Reference Rate

Interpretation Consideration:

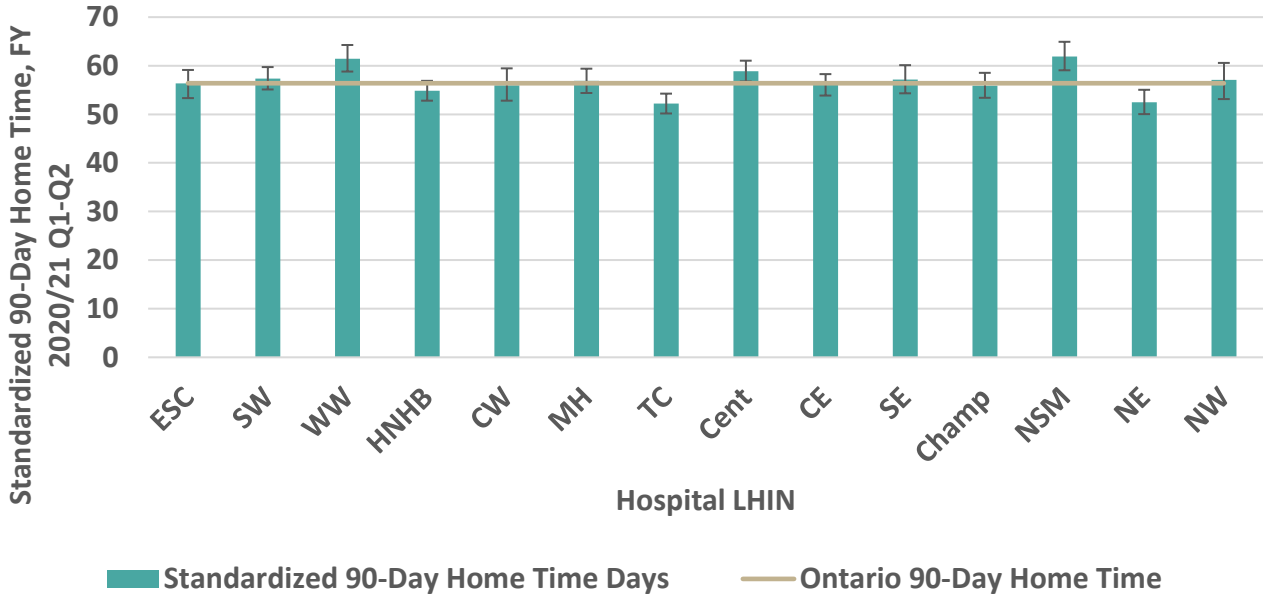
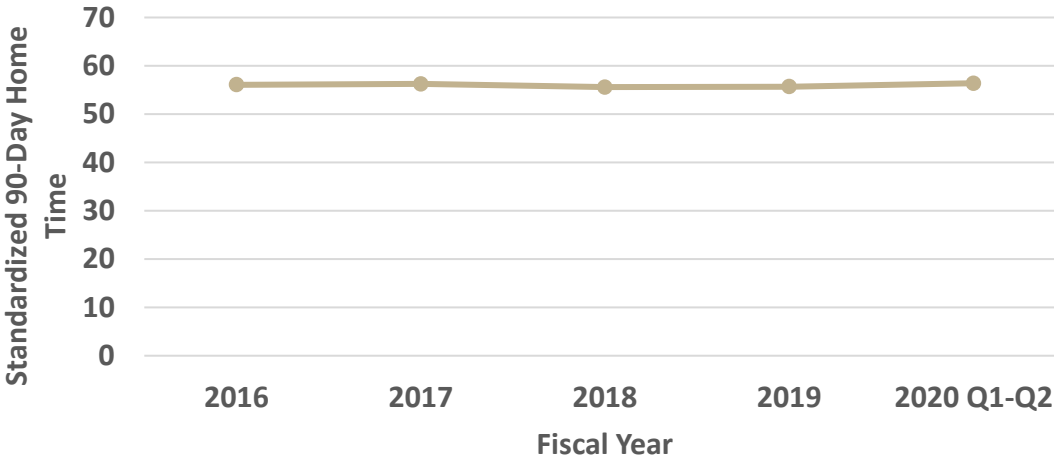
Desired directionality is low. Patients discharged home and waiting for admission to LTC are not included in the results. For the past two fiscal years, the provincial rate has been decreasing. The decline observed in 2020, may be partially due to some regions in the early stages of the pandemic were not accepting patients into LTC.

Chapter 3: Acute Care Access and Outcomes for Stroke and TIA

Indicator 3.7: Standardized Days at Home in the First 90-Days After Stroke/TIA Admission, FY 2020/21 Q1-Q2

Indicator Description:

This indicator measures the number of days spent at home in the 90-Days following index Stroke/TIA admission. The days at home indicator is standardized for patient age and stroke type.



Interpretation Consideration:

Desired directionality is high. Factors that contribute to lower days at home include: zero home time; in-hospital mortality; admission to CCC/LTC, or to inpatient rehabilitation versus home rehabilitation; ALC LOS; readmission; and post discharge mortality. This creates a composite indicator of performance. When standardized for patient age and stroke type, patients spent 56 days at home in the first 90 days following a stroke. Further analysis would be needed to understand why there appears to be less variation in this outcome indicator over other outcome indicators. A limitation to this indicator is the inability to determine the level of assistance a patient requires, and the access/availability of social/community supports in order to keep the patient home.



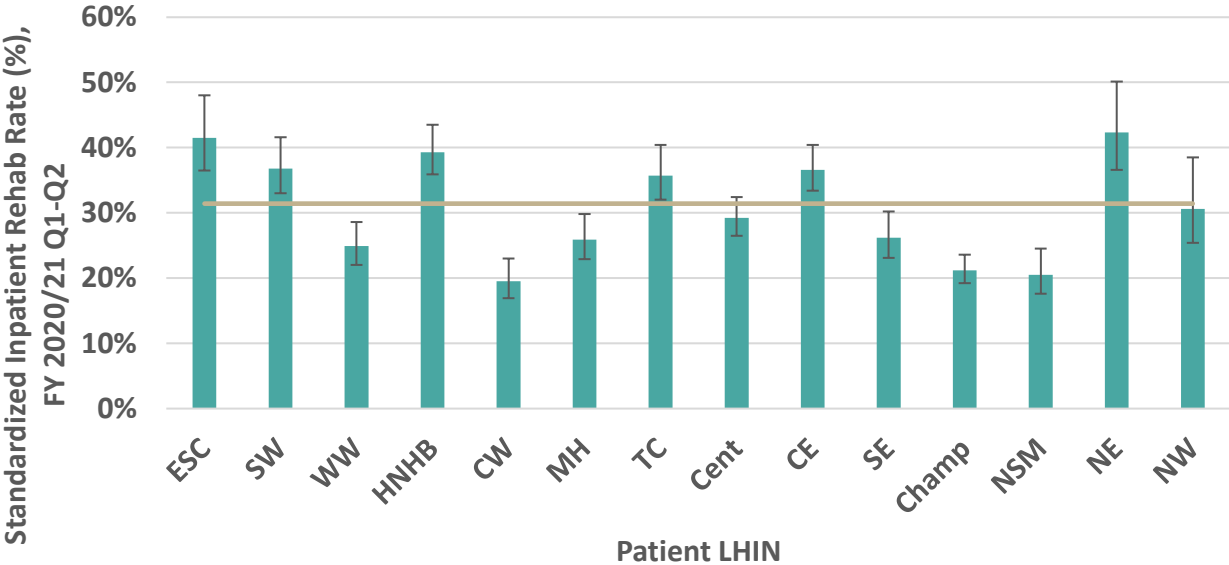
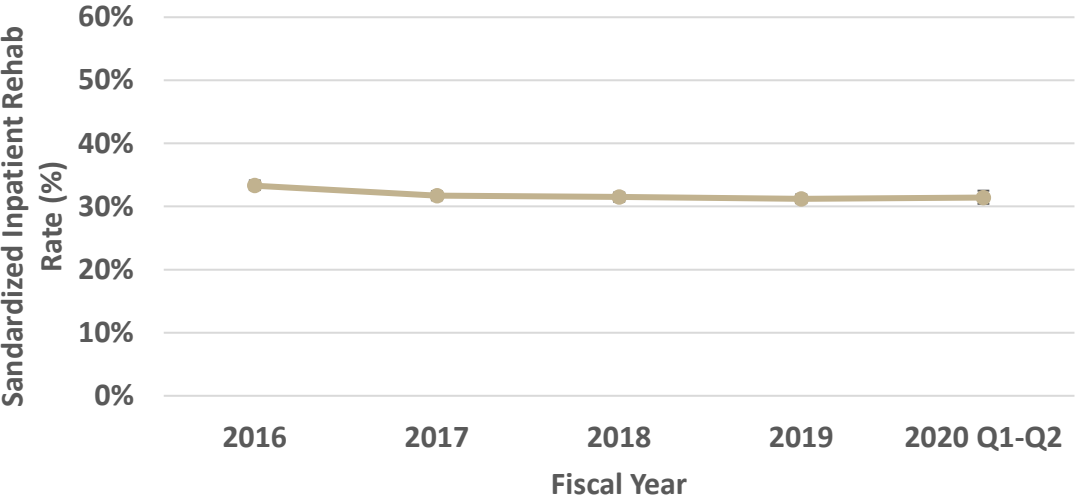
Chapter 4: Post-acute Stroke Rehabilitation Access and Timeliness

Chapter 4: Post-Acute Stroke Rehabilitation Access and Timeliness

Indicator 4.1.2: Standardized Rate of Access to Post-Acute Inpatient Rehabilitation, FY 2020/21 Q1-Q2

Indicator Description:

Proportion of stroke patients discharged alive from acute care who went into inpatient rehabilitation. The indicator is standardized for stroke type and AlphaFIM® instrument (AlphaFIM®) score which provides insight into the stroke severity (level of functional status and disability).



Standardized Post-acute IP Rehab Rate Ontario Reference Rate

Interpretation Considerations:

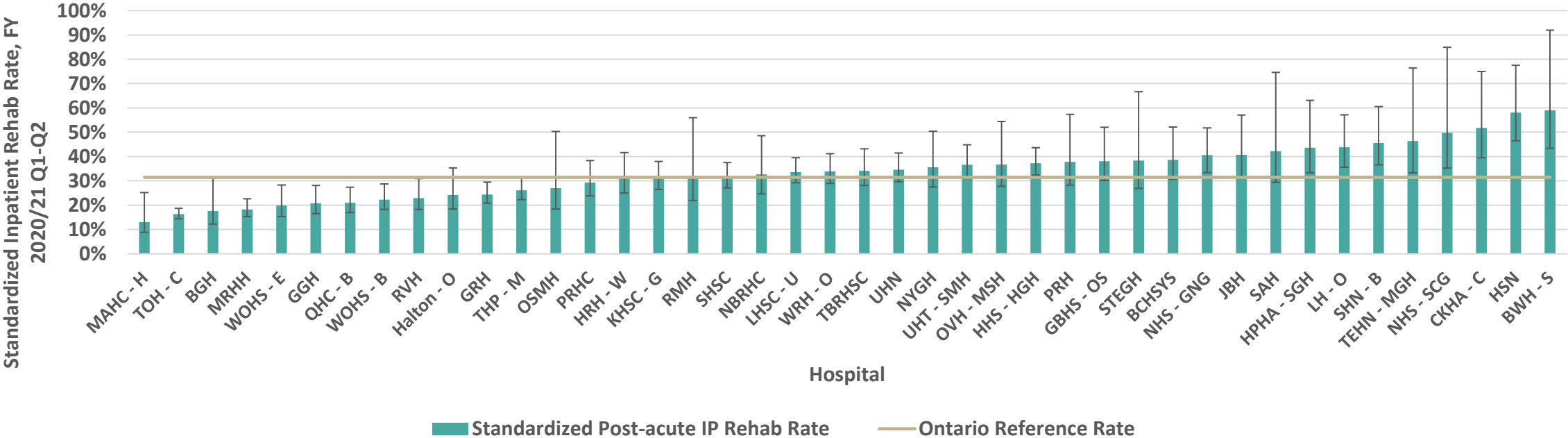
Inpatient rehab is most appropriate for stroke patients with moderate to severe disability. For the last four fiscal years (2017-2020), access to inpatient stroke rehabilitation has been relatively steady at around 31%. Interesting to note, in the early stages of the pandemic, access to inpatient stroke rehabilitation did not change. There is high variability of access to inpatient stroke rehabilitation across the LHINs. High rates may reflect lack of access to community-based rehabilitation, necessitating admission of stroke patients with milder disability to inpatient rehab programs. Regional context and availability of all rehabilitation services should be considered when interpreting this indicator.

Chapter 4: Post-Acute Stroke Rehabilitation Access and Timeliness

Indicator 4.1.2: Standardized Rate of Access to Post-Acute Inpatient Rehabilitation, FY 2020/21 Q1-Q2 – Hospital Level

Indicator Description:

Proportion of stroke patients discharged alive from acute care who went into inpatient (IP) rehabilitation. The indicator is standardized for stroke type and AlphaFIM® instrument (AlphaFIM®) score which provides insight into the stroke severity (level of functional status and disability).



Interpretation Considerations:

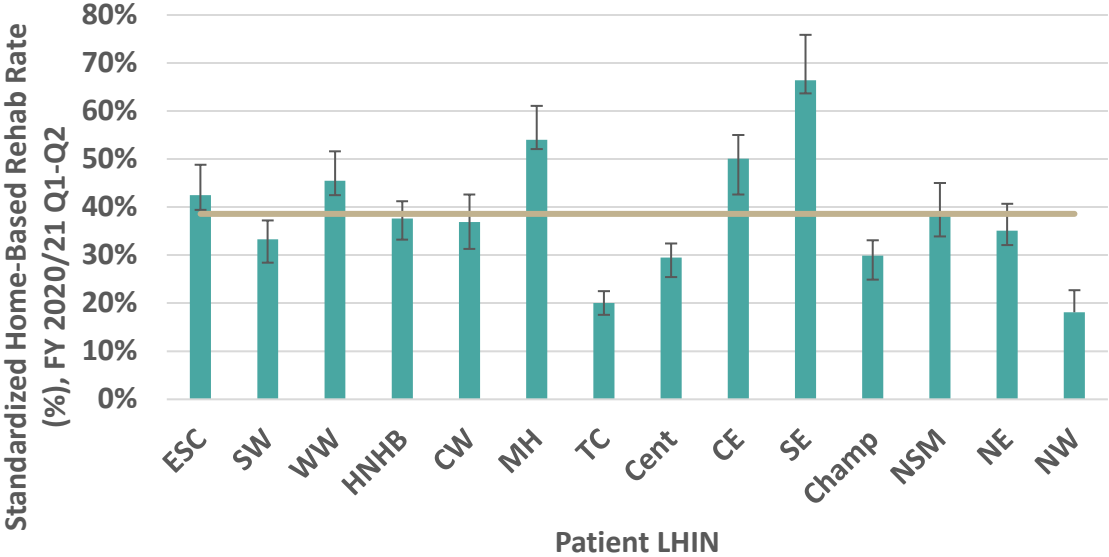
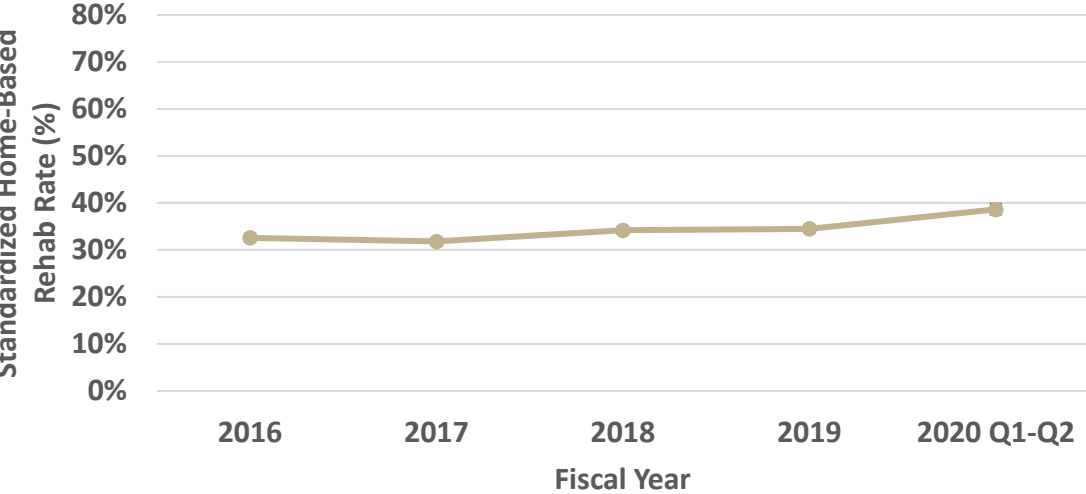
This indicator is reported by index (first) acute hospital i.e., if a patient is transferred from hospital A to hospital B, and is subsequently discharged to inpatient rehabilitation, that patient is attributed to hospital A. Across these acute hospitals there is high variability of access to inpatient rehabilitation beds for stroke patients. To optimize access to inpatient stroke rehabilitation care, all hospitals should continue to work with their system partners to ensure services, capacity, resources and pathways are adequate to meet patients’ needs across all rehabilitation settings. Refer to [Appendix B](#) for hospital abbreviations.

Chapter 4: Post-Acute Stroke Rehabilitation Access and Timeliness

Indicator 4.1.3: Standardized Rate of Access to Post-Acute Home-Based Rehabilitation, FY 2020/21 Q1-Q2

Indicator Description:

Proportion of stroke patients discharged alive from acute care who received at least 3 home-based rehabilitation visits. The indicator is standardized for stroke type and AlphaFIM® instrument (AlphaFIM®) score which provides insight into the stroke severity (level of functional status and disability).



Standardized Post-acute HB Rehab Rate Ontario Reference Rate

Interpretation Considerations:

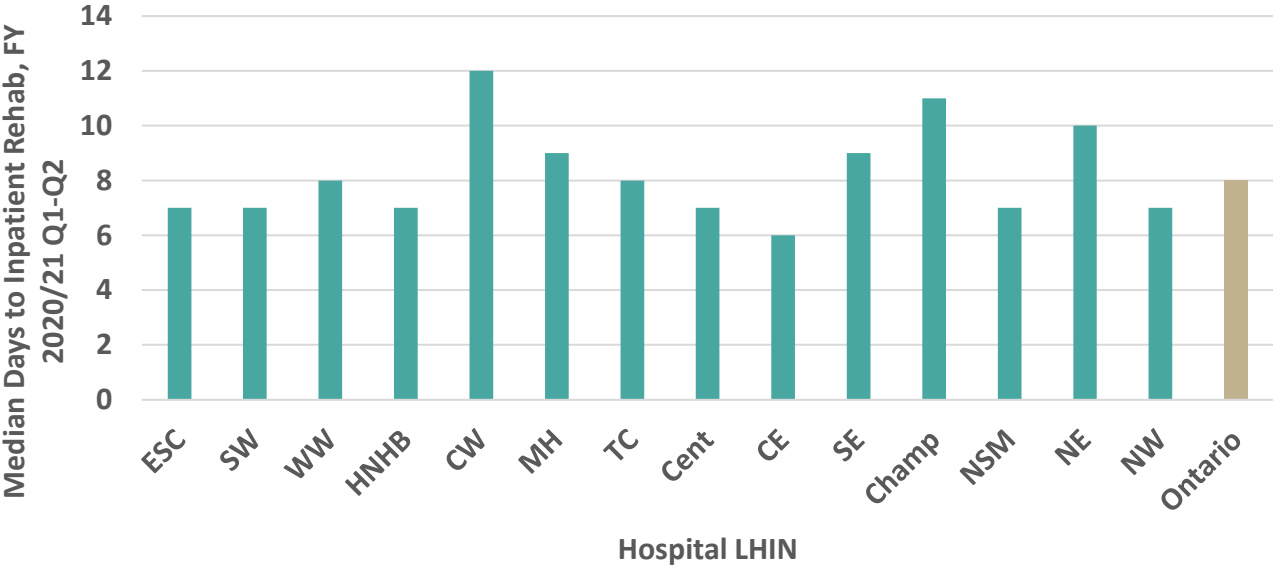
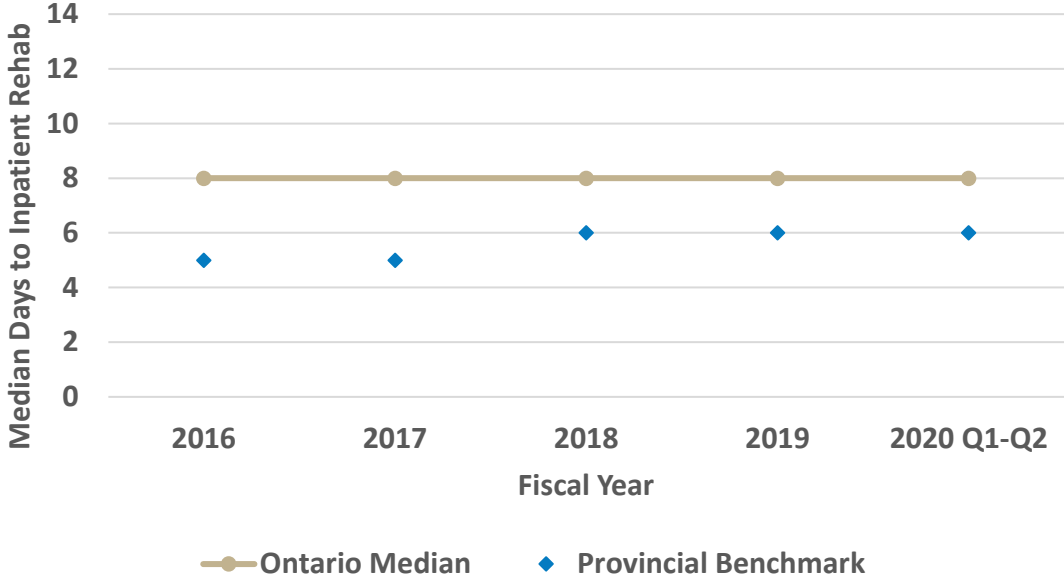
Provincial access to home-based rehabilitation increased from 33% in 2016 to 39% in 2020 Q1-Q2. Access to home-based rehabilitation increased in the first two quarters of the pandemic, and this is likely associated with the pandemic related outpatient rehabilitation closures.¹¹ When data are available for the last two quarters of 2020, it will be interesting to see if this increase is sustained. There is variability within the LHINs which may reflect availability of both inpatient and outpatient rehabilitation services; however, there is no standardized provincial system to capture outpatient rehabilitation data. Furthermore, home-based rehabilitation provided by hospitals, are not captured in the HCD (homecare database). For a listing of in-home Community Stroke Rehabilitation Programs across Ontario, see [Appendix E](#).

Chapter 4: Post-Acute Stroke Rehabilitation Access and Timeliness

Indicator 4.2.1: Median Days to First Post-Acute Inpatient Rehabilitation, FY 2020/21 Q1-Q2

Indicator Description:

Median time (days) from acute admission to post-acute inpatient rehabilitation admission. Metric includes stroke patients that were admitted to inpatient rehabilitation within one calendar day following discharge from acute care.



Interpretation Considerations:

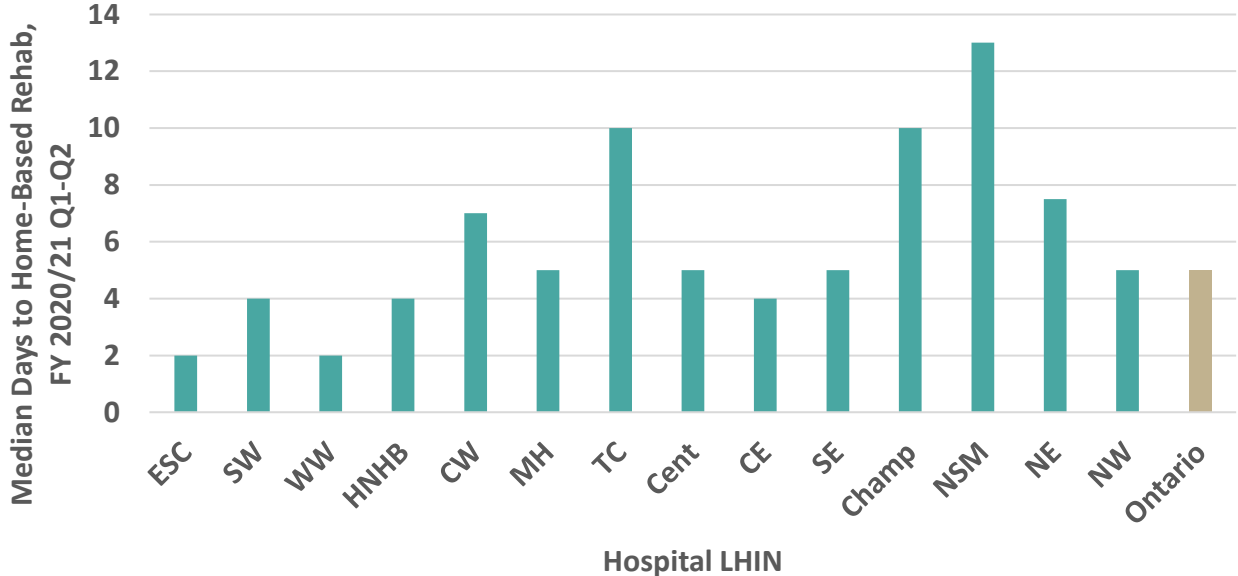
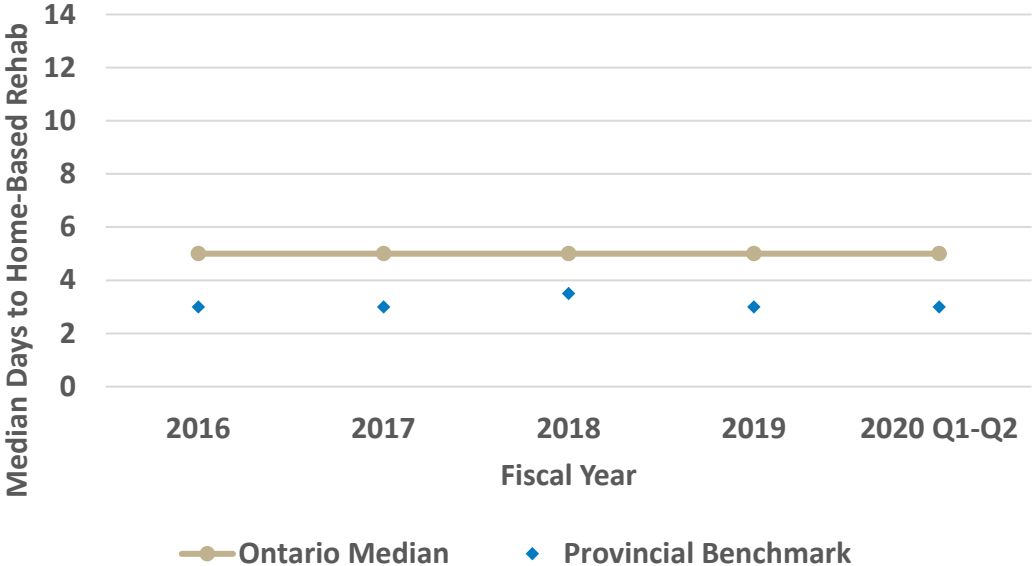
Best practice recommends that ischemic stroke patients should access inpatient rehabilitation by day 6 of acute admission, and hemorrhagic stroke patients should access inpatient rehabilitation by day 8 of their acute admission.⁵ Provincially, median days to inpatient rehabilitation was 8 days for the entire reporting period, and the early stages of the pandemic did not delay access to inpatient rehabilitation. There is regional variability which may reflect various factors e.g., inpatient and community-based rehabilitation capacity, referral processes, stroke type and medical complexities.

Chapter 4: Post-Acute Stroke Rehabilitation Access and Timeliness

Indicator 4.2.2: Median Days to First Post-Acute Home-Based Rehabilitation, FY 2020/21 Q1-Q2

Indicator Description:

Median time (days) from acute discharge to post-acute home-based rehabilitation visit (at least 3 home-based visits). Stroke patients admitted to inpatient rehabilitation are not included in this metric.



Interpretation Considerations:

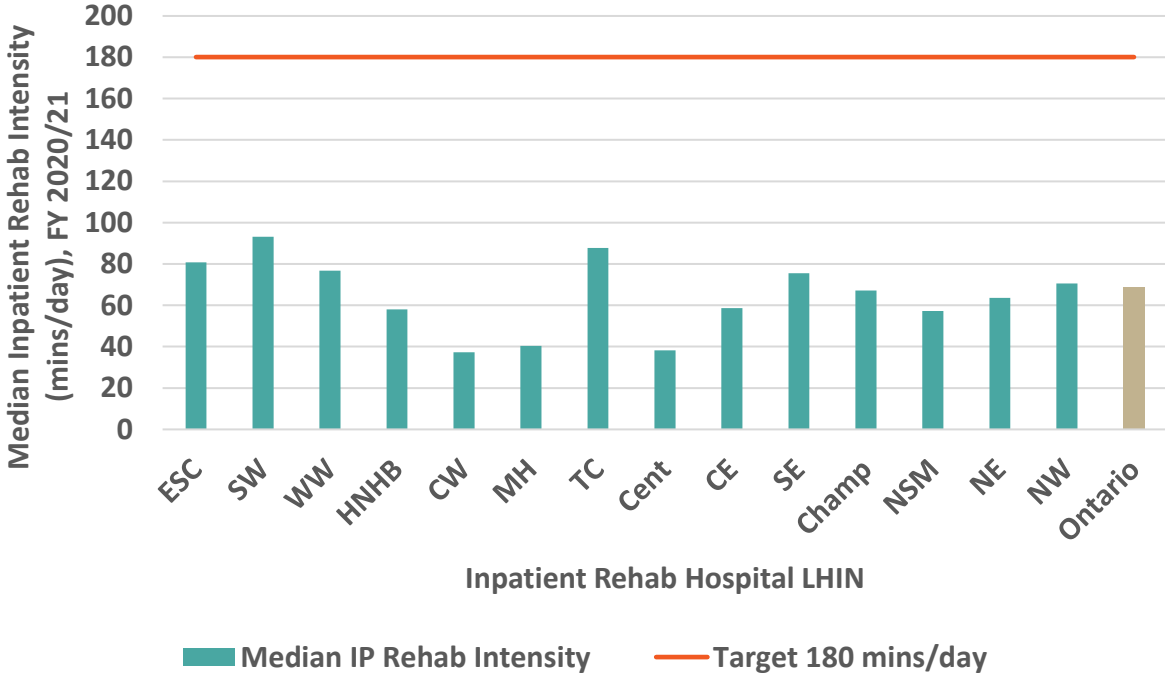
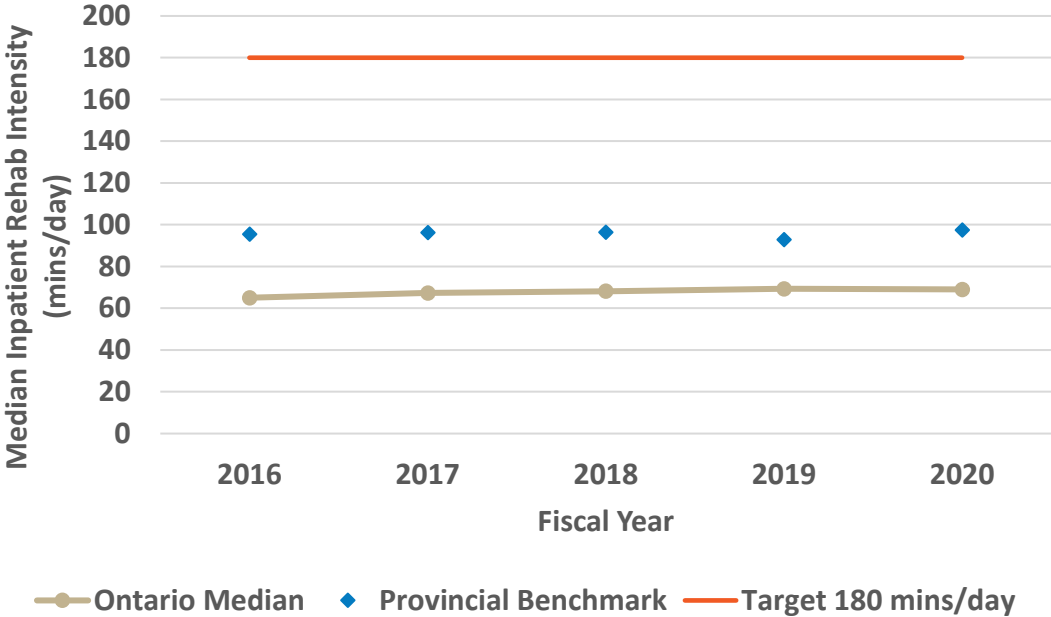
Home-based rehabilitation should be made available within 48 hours after discharge from acute care.¹⁰ This indicator only considers time to first visit (in-person or virtual) and does not reflect timeliness of subsequent visits. Provincially, median days to home-based rehabilitation visits was 5 days for the reporting period, and in the early stages of the pandemic did not delay access to home-based rehabilitation. There is regional variability which may reflect various factors e.g., existence of stroke specific home-based rehabilitation, capacity to admit, referral processes and first visit protocols. Furthermore, home-based rehabilitation provided by hospitals, are not captured in the HCD (homecare database). For a listing of in-home Community Stroke Rehabilitation Programs across Ontario, see [Appendix E](#).

Chapter 4: Post-Acute Stroke Rehabilitation Access and Timeliness

Indicator 4.5: Median Minutes per Day of Direct Inpatient Rehabilitation Therapy, FY 2020/21

Indicator Description:

This indicator measures number of minutes per day of direct therapy (OT, PT, SLP) received by stroke patients during their active inpatient rehab stay. Target is 180 minutes/day⁵



Interpretation Considerations:

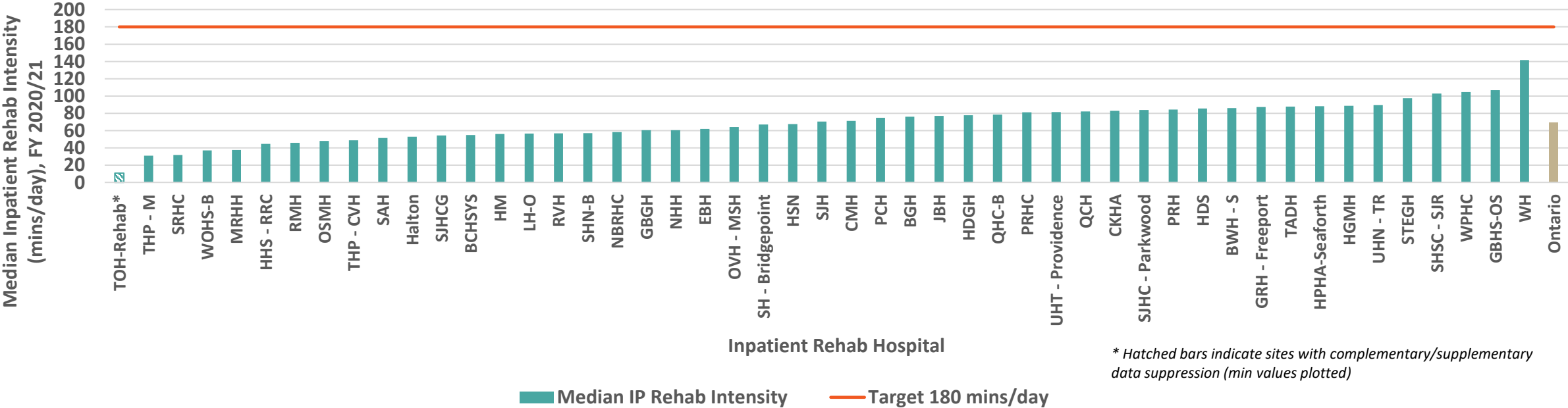
Desired directionality is high. Over the last five fiscal years, direct inpatient rehabilitation therapy in Ontario has only increased by 3.9 minutes. There is wide variation in LHIN performance in 2020 from 37.2 minutes per day in CW LHIN to 93.2 minutes per day in SW LHIN. All LHINs as well as the provincial performance are well below the target of 180 minutes per day of direct inpatient rehabilitation therapy. This metric excludes group therapy, and any rehabilitation assistant time that accounts for more than 33% of the total rehabilitation time.

Chapter 4: Post-Acute Stroke Rehabilitation Access and Timeliness

Indicator 4.5: Median Minutes per Day of Direct Inpatient Rehabilitation Therapy, FY 2020/21 – Hospital Level

Indicator Description:

This indicator measures number of minutes per day of direct therapy (OT, PT, SLP) received by stroke patients during their active inpatient rehab stay. Target is 180 minutes/day⁵



Interpretation Considerations:

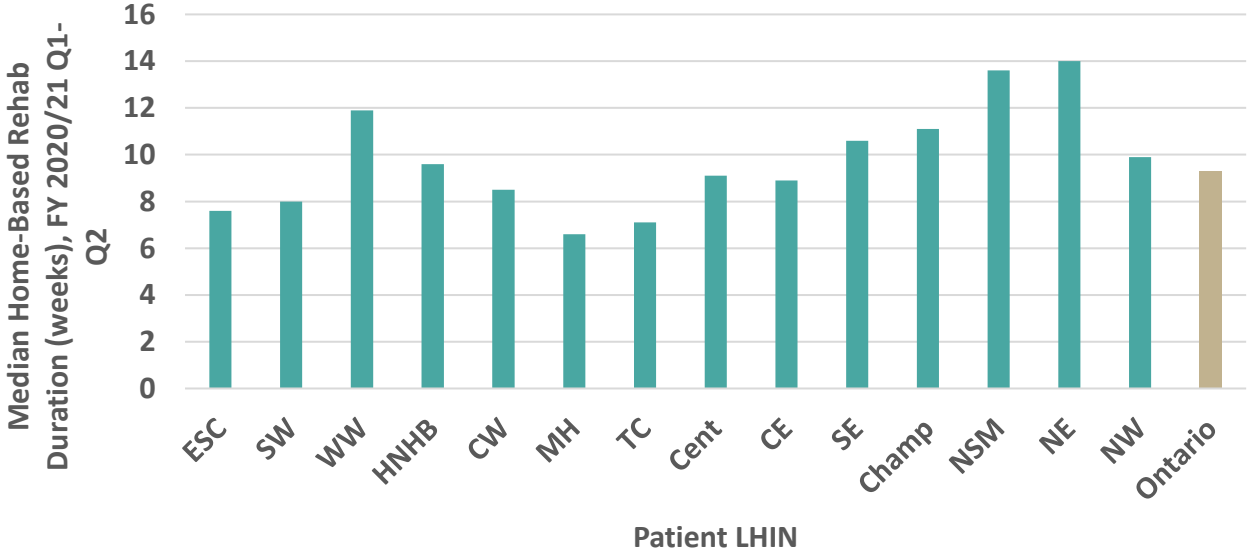
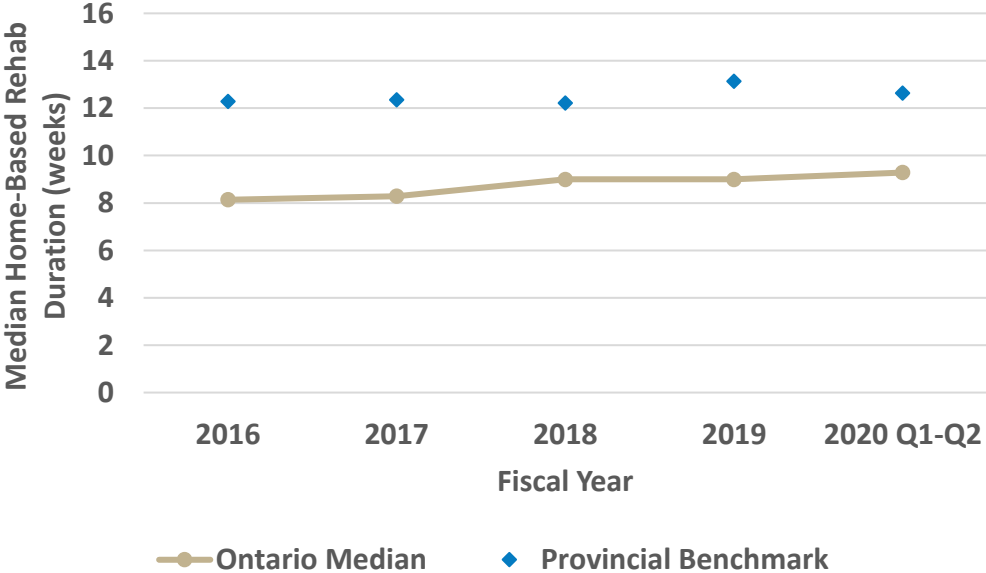
Desired directionality is high. There is wide variation in hospital performance in 2020 from 10.9 minutes per day for TOH-Rehab to 141.7 minutes per day for WH. All inpatient rehabilitation hospitals are below the target of 180 minutes per day of direct inpatient rehabilitation therapy.⁵ Factors influencing rehabilitation time require further investigation. This metric excludes group therapy, and any rehabilitation assistant time that accounts for more than 33% of the total rehabilitation time. Refer to [Appendix B](#) for hospital abbreviations.

Chapter 4: Post-Acute Stroke Rehabilitation Access and Timeliness

Indicator 4.6: Median Duration of Home-Based Rehabilitation (weeks), FY 2020/21 Q1-Q2

Indicator Description:

The number of weeks of home-based rehabilitation (PT, OT, SLP, and/or social work) following discharge from acute care or inpatient rehabilitation, up to a maximum of 180 days. The first home-based rehab visit must start within 60 days of discharge from acute or inpatient rehabilitation, and the patient must receive at least 3 home-based rehabilitation visits (in-person or virtual).



Interpretation Considerations:

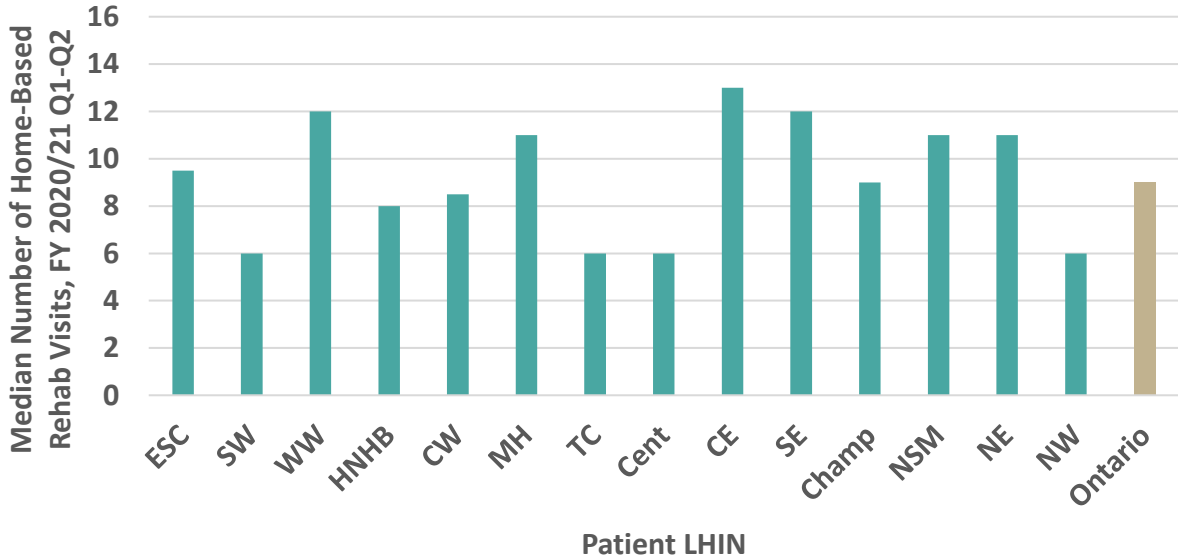
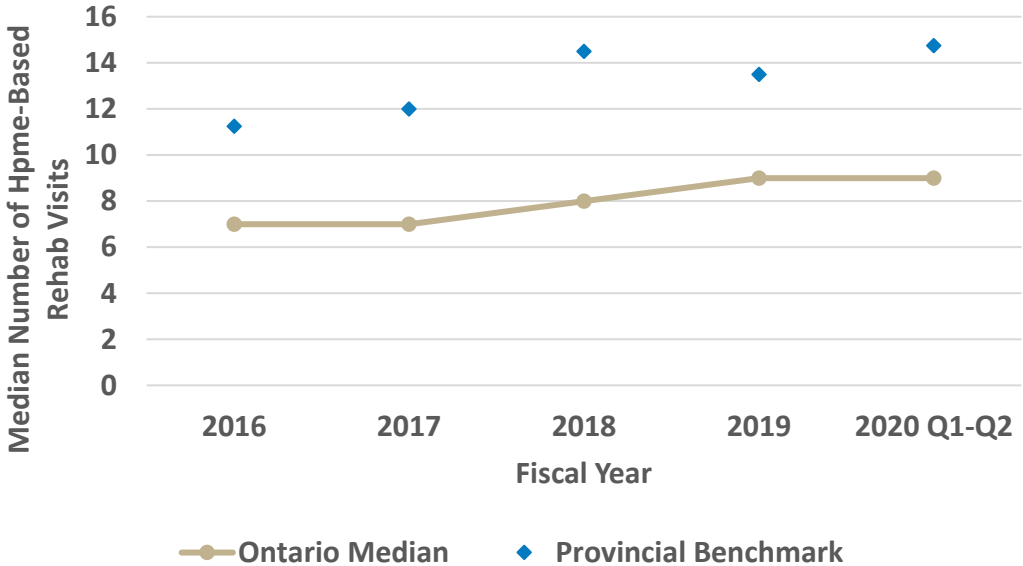
Desired directionality is high. Median duration of home-based rehabilitation slightly increased in 2020 Q1-Q2 to 9.3 weeks from 9 weeks in 2019. Best practice recommends 2-5 visits per week per discipline for a minimum of 8 weeks.¹² Regions providing home-based rehab therapy where there are planned or expected breaks between therapy visits will have a longer duration; therefore, longer duration may not equate to more visits. Home-based rehabilitation provided by hospitals are not captured in the HCD (homecare database). For a listing of in-home Community Stroke Rehabilitation Programs across Ontario, see [Appendix E](#).

Chapter 4: Post-Acute Stroke Rehabilitation Access and Timeliness

Indicator 4.7: Median Number of Home-Based Rehabilitation Visits, FY 2020/21 Q1-Q2

Indicator Description:

The number of home-based rehabilitation visits (PT, OT, SLP, and/or social work) among stroke patients who received at least 3 home-based rehabilitation visits (in-person or virtual) following discharge from acute care or inpatient rehabilitation.



Interpretation Considerations:

Desired directionality is high. In the last two fiscal years the number of home-based visits has remained at 9 visits and the number of visits did not decrease during the early stages of the pandemic. Further considerations for this indicator may be to stratify by mode of visit to see if in-person visits decreased during the early stages of the pandemic. When reviewing the results of this indicator, take into consideration the context of the number of weeks of home-based rehabilitation duration from indicator 4.6; hence, the Ontario rate is approximately one visit per week for 9 weeks. Best practice recommends 2-5 visits per week per discipline for a minimum of 8 weeks.¹² Home-based rehabilitation provided by hospitals are not captured in the HCD (homecare database). For a listing of in-home Community Stroke Rehabilitation Programs across Ontario, see [Appendix E](#).

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Appendix A: Ontario Hospitals with Acute Specialized Stroke Programs

Ontario Hospitals with Acute Specialized Stroke Programs

Site	Regional Stroke Centre	District Stroke Centre	Stroke Unit	tPA	EVT
Bluewater Health - Sarnia General		X	X	X	
Brant Community Healthcare Sys – Brantford		X	X	X	
Brockville General Hosp			X		
Chatham-Kent Health Alliance – Chatham		X	X	X	
Grand River Hospital Corp – Waterloo		X	X	X	
Grey Bruce Health Services - Owen Sound		X	X	X	
Guelph General Hospital			X	X	
Halton Healthcare Services Corp – Oakville			X	X	
Hamilton Health Sciences Corp – General	X		X	X	X
Health Sciences North – Laurentian	X		X	X	X
Humber River Hospital – Wilson			X		
Huron Perth Healthcare Alliance - Stratford General Hospital		X	X	X	
Joseph Brant Hospital			X	X	
Kingston Health Sciences Centre – General	X		X	X	X

Ontario Hospitals with Acute Specialized Stroke Programs

Site	Regional Stroke Centre	District Stroke Centre	Stroke Unit	tPA	EVT
Lakeridge Health Oshawa		X	X	X	
London Health Sciences Centre – University	X		X	X	X
Mackenzie Richmond Hill Hospital		X	X	X	
Muskoka Algonquin Healthcare – Huntsville		X		X	
Niagara Health System - Greater Niagara		X	X	X	
Niagara Health System - St. Catherine's General			X		
North Bay Regional Health Centre		X	X	X	
North York General Hospital			X		
Oak Valley Health – Markham Stouffville Hospital			X		
Orillia Soldier's Memorial Hospital			X		
Ottawa Hospital (The) – Civic	X		X	X	X
Pembroke Regional Hospital		X	X	X	
Peterborough Regional Health Centre		X	X	X	
Quinte Healthcare Corporation – Belleville		X	X	X	
Ross Memorial Hospital			X		

Ontario Hospitals with Acute Specialized Stroke Programs

Site	Regional Stroke Centre	District Stroke Centre	Stroke Unit	tPA	EVT
Royal Victoria Regional Health Centre	X		X	X	
Sault Area Hospital - Sault Ste Marie		X		X	
Scarborough Health Network – Birchmount			X		
St Thomas-Elgin General Hospital			X		
Sunnybrook Health Sciences Centre	X		X	X	X
Thunder Bay Regional Health Sciences Centre	X		X	X	X
Timmins & District General Hospital		X	X	X	
Toronto East Health Network – Michael Garron Hospital			X		
Trillium Health Partners – Mississauga	X		X	X	X
Unity Health Toronto - St. Michael's Hospital	X		X	X	X
University Health Network	X		X	X	X
William Osler Health System - Brampton (Civic)			X	X	
William Osler Health System – Etobicoke			X	X	
Windsor Regional Hospital - Ouellette Campus		X	X	X	X



Appendix B: Abbreviations

LHIN Abbreviations used in Report

Abbreviation	LHIN
ESC	Erie St. Clair
SW	South West
WW	Waterloo Wellington
HNHB	Hamilton Niagara Haldimand Brant
CW	Central West
MH	Mississauga Halton
TC	Toronto Central
Cent	Central
CE	Central East
SE	South East
Champ	Champlain
NSM	North Simcoe Muskoka
NE	North East
NW	North West

Acute Hospital (Sites) Abbreviations used in Report

Abbreviation	Site
BWH – S	Bluewater Health - Sarnia General
BCHSYS	Brant Community Healthcare Sys – Brantford
BGH	Brockville General Hosp
CKHA – C	Chatham-Kent Health Alliance – Chatham
GRH	Grand River Hospital Corp – Waterloo
GBHS – OS	Grey Bruce Health Services - Owen Sound
GGH	Guelph General Hospital
Halton – O	Halton Healthcare Services Corp – Oakville
HHS – HGH	Hamilton Health Sciences Corp – General
HSN	Health Sciences North – Laurentian
HRH – W	Humber River Hospital – Wilson
HPHA – SGH	Huron Perth Healthcare Alliance - Stratford General Hospital
JBH	Joseph Brant Hospital
KHSC – G	Kingston Health Sciences Centre – General

Acute Hospital (Sites) Abbreviations used in Report

Abbreviations	Site
LH – O	Lakeridge Health Oshawa
LHSC – U	London Health Sciences Centre – University
MRHH	Mackenzie Richmond Hill Hospital
MAHC – H	Muskoka Algonquin Healthcare – Huntsville
NHS – GNG	Niagara Health System - Greater Niagara
NHS – SCG	Niagara Health System - St. Catherine’s General
NBRHC	North Bay Regional Health Centre
NYGH	North York General Hospital
OVH – MSH	Oak Valley Health – Markham Stouffville Hospital
OSMH	Orillia Soldier's Memorial Hospital
TOH – C	Ottawa Hospital (The) – Civic
PRH	Pembroke Regional Hospital
PRHC	Peterborough Regional Health Centre
QHC – B	Quinte Healthcare Corporation – Belleville
RMH	Ross Memorial Hospital

Acute Hospital (Sites) Abbreviations used in Report

Abbreviations	Site
RVH	Royal Victoria Regional Health Centre
SAH	Sault Area Hospital - Sault Ste Marie
SHN – B	Scarborough Health Network – Birchmount
STEGH	St Thomas-Elgin General Hospital
SHSC	Sunnybrook Health Sciences Centre
TBRHSC	Thunder Bay Regional Health Sciences Centre
TADH	Timmins & District General Hospital
TEHN – MGH	Toronto East Health Network – Michael Garron Hospital
THP – M	Trillium Health Partners – Mississauga
UHT – SMH	Unity Health Toronto - St. Michael's Hospital
UHN	University Health Network
WOHS – B	William Osler Health System - Brampton (Civic)
WOHS – E	William Osler Health System – Etobicoke
WRH – O	Windsor Regional Hospital - Ouellette Campus

Inpatient Rehabilitation Hospital Abbreviations used in Report

Abbreviation	Site
BWH – S	Bluewater Health – Sarnia
BCHSYS	Brantford General Hospital
BGH	Brockville General Hospital
EBH	Bruyère CC - Elizabeth Bruyère Hospital
CMH	Cambridge Memorial Hospital
CKHA	Chatham-Kent Health Alliance
GBGH	Georgian Bay General Hospital
GRH – Freeport	Grand River Hospital – Freeport
GBHS – OS	Grey Bruce Health Services – Owen Sound
Halton	Halton Healthcare Services
HHS – RRC	Hamilton Health Sciences - Regional Rehab
HSN	Health Sciences North
HGMH	Hôpital Glengarry Memorial Hospital
HM	Hôpital Montfort
HDGH	Hotel Dieu Grace Healthcare
HDS	Hotel Dieu Shaver Health And Rehabilitation Centre

Inpatient Rehabilitation Hospital Abbreviations used in Report

Abbreviation	Site
HPHA – Seaforth	Huron Perth Healthcare Alliance - Seaforth
JBH	Joseph Brant Memorial Hospital
LH – O	Lakeridge Health – Oshawa
MRHH	Mackenzie Richmond Hill Hospital
NBRHC	North Bay Regional Health Centre
NHH	Northumberland Hills Hospital
OVH – MSH	Oak Valley Health – Markham Stouffville Hospital
OSMH	Orillia Soldiers Memorial Hospital
PRH	Pembroke Regional Hospital
PRHC	Peterborough Regional Health Centre
PCH	Providence Care Hospital
QCH	Queensway Carleton Hospital
QHC – B	Quinte Health Care
RMH	Ross Memorial Hospital
RVH	Royal Victoria Regional Health Centre
SAH	Sault Area Hospital
SHN – B	Scarborough Health Network – Birchmount

Inpatient Rehabilitation Hospital Abbreviations used in Report

Abbreviation	Site
SH – Bridgepoint	Sinai Health – Bridgepoint Active Healthcare
SRHC	Southlake Regional Health Center
SJHCG	St Joseph's Health Centre Guelph
SJHC – Parkwood	St. Joseph's Health Care - London-Parkwood Institute
SJH	St. Joseph's Hospital – Thunder Bay
STEGH	St Thomas Elgin General Hospital
SHSC – SJR	Sunnybrook Health Sciences Centre - St. John's Rehab
TADH	Timmins & District General Hospital
TOH – Rehab	TOH - The Rehabilitation Centre
THP – CVH	Trillium Health Partners - Credit Valley Hospital
THP – M	Trillium Health Partners - Mississauga Hospital
UHN – TR	University Health Network – Toronto Rehab
UHT – Providence	Unity Health Toronto - Providence Healthcare
WPHC	West Park Healthcare Centre
WOHS-B	William Osler Health System - Brampton (Civic)
WH	Woodstock General Hospital



Appendix C: Most Responsible Stroke Diagnosis (MRDx) ICD-10CA Codes

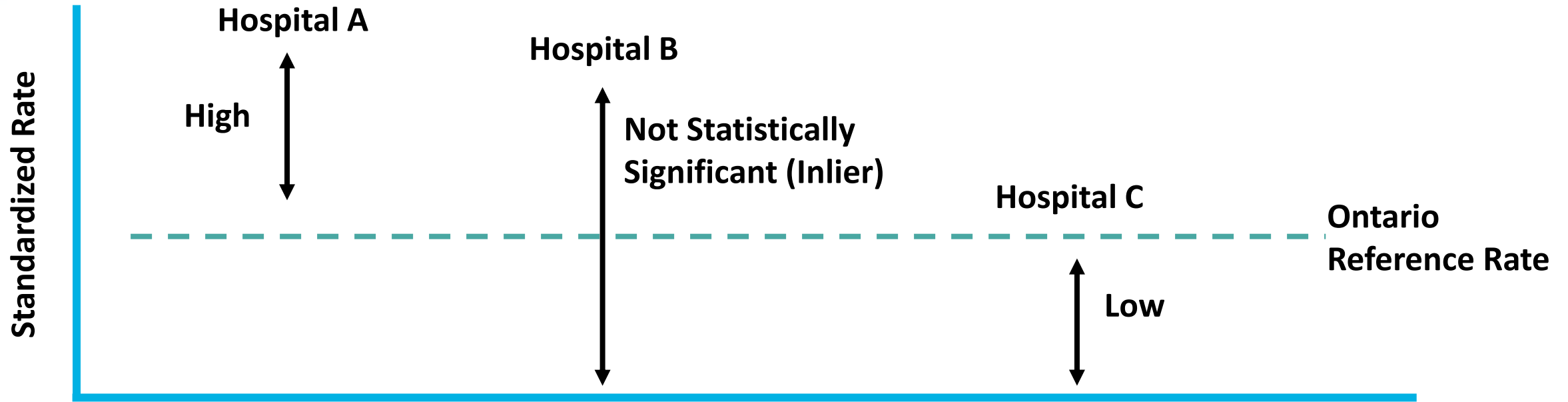
Most Responsible Stroke Diagnosis (MRDx) ICD-10CA Codes

Stroke Type	Code	Diagnosis Description
Hemorrhagic	I60	Subarachnoid haemorrhage
Hemorrhagic	I61	Intracerebral haemorrhage
Ischemic	H341	Central retinal artery occlusion
Ischemic	I63	Cerebral infarction
TIA	G45	Transient cerebral ischaemic attacks and related syndromes
TIA	H340	Transient retinal artery occlusion
Unspecified	I64	Stroke, not specified as haemorrhage or infarction
Excluded	G454	Transient global amnesia
Excluded	I608	Other subarachnoid haemorrhage
Excluded	I636	Cerebral infarction due to cerebral venous thrombosis, non-pyogenic



Appendix D: Interpretation of Performance Status for Standardized Indicators

Interpretation of Performance Status for Standardized Indicators



Notes:

- Arrows are 95% confidence intervals (CIs) centered around **hospital/regional** standardized rates.
- CI length is **inversely** proportional to cohort size
 - Shorter length → greater precision (trust)
 - Smaller hospitals have larger variability, and less precise data
- Outlier status is determined by comparing the Ontario reference rate to the hospital/regional standardized CIs. i.e. Does Ontario's reference rate fall inside the hospital/region's CI?



Appendix E: In-Home Community Stroke Rehabilitation Programs

In-Home Community Stroke Rehabilitation Programs

The following list of regions has been provided to support interpretation of in-home stroke rehabilitation indicators in 2020/21. The intent is to provide insight where there are coordinated programs available that are known to offer interprofessional in-home stroke specific rehabilitation services that at a minimum include physiotherapy, occupational therapy, and speech language pathology. These programs are in addition to the usual Home and Community Care Support Services that are available in all areas in Ontario.

LHIN Regions with Hospital Based - In-Home Stroke Specific Rehabilitation Program covering all or part of their region

(Data not reported in the Home Care Database (HCD), and not included in indicator data.)

- South West
- Erie St. Clair

LHIN Regions with Home and Community Care Based - In Home Stroke Specific Rehabilitation Programs covering all or part of their region

(Data reported in the HCD and included in indicator data)

- Erie St. Clair
- Waterloo Wellington
- Hamilton Niagara Haldimand Brant
- Central West
- Central East
- South East
- Champlain
- North Simcoe Muskoka

Note: The list may not be exhaustive of all programs that offer some in-home rehabilitation and program offerings may vary within or between LHIN regions.



Appendix F: Glossary

Glossary

Term/Acronym	Definition
ABC Benchmark Methodology	Achievable Benchmarks of Care methodology. Summarizes the performance among the highest performing facilities or sub-LHINs representing at least 20% of all patients eligible for the appropriate care.
ALC	Alternate level of care. An ALC patient is one who has finished the acute care phase of his/her treatment but remains in an acute bed. This classification is invoked when the patient's physician gives an order to change the level of care from acute care and requests a transfer for the patient.
AlphaFIM®	Standardized method of assessing patient disability/functional status in the acute care setting. AlphaFIM® is a registered trademark of Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc.
CCC	Complex continuing care
CIHI	Canadian Institute for Health Information
CIHI-CCRS	CIHI's Continuing Care Reporting System; contains client data collected from participating long-term care facilities and complex continuing care facilities
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-NACRS	CIHI's National Ambulatory Care Reporting System; contains data for all hospital- and community-based ambulatory care.
CIHI-NRS	CIHI's National Rehabilitation Reporting System; contains client data collected from participating adult inpatient rehabilitation facilities and programs across Canada.
District stroke centre (DSC)	A facility that has written stroke protocols for emergency services, emergency department care and acute care including transport and triage protocols; ability to offer thrombolytic therapy to suitable ischemic stroke patients; timely computed tomography (CT) scanning and expert interpretation; clinicians with stroke expertise; and linkages to rehabilitation and secondary prevention.
HCD	Home Care Database
Hospital LHIN	Examines the performance from the perspective of the hospitals within the LHIN of interest
Ischemic stroke	Stroke caused by the interruption of blood flow to the brain due to a blood clot.
LHIN	Local Health Integration Network; one of 14 not-for-profit corporations established in Ontario by the MOH, each with specific geographic boundaries.

Glossary (continued)

Term/Acronym	Definition
LOS	Length of stay
LTC	Long-term care
MOH	Ontario Ministry of Health
MRDx	Most Responsible Diagnosis, the diagnosis or condition that has the greatest length of stay or greatest use of resources
ODB	Ontario drug benefit claims database
Ontario Reference Rate	The rate used to determine inlier/outlier status of standardized indicators
OT	Occupational therapy
PT	Physiotherapy
Patient LHIN	Examines the performance from the perspective of which LHIN the patient lives in (i.e. Patient LHIN residence)
PCCF	Postal Code Conversion File
Provincial Benchmark	Using the ABC methodology to determine which hospitals or subregions, were the highest performing and accounted for at least 20% of the population
Regional stroke centre (RSC)	A facility that has all the requirements of a district stroke centre, plus neurosurgical facilities and interventional radiology.
RPDB	Registered Persons Database; provides basic demographic information about anyone who has ever received an Ontario health card number
SLP	Speech language pathology
Stroke	Occurs when a vessel in the brain ruptures or is blocked by a blood clot.
Sub-region	Smaller subdivisions for each of the 14 Local Health Integration Networks
Telestroke	Ontario Telemedicine Network and Critical Care provide stroke expertise via audio/video technology to facilities without stroke physician expertise available onsite
TIA	Transient ischemic attack or mini-stroke