Ontario Health
CorHealth Ontario

Stroke Report Technical Specifications

FY2019/20 to FY2024/25

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Section 1: Cohort Methodology

Hyperacute Care Cohorts

The cohorts for Stroke Report Chapter 2: Hyperacute Care Access and Outcomes for Ischemic Stroke, the hyperacute care indicators are fundamentally different from the cohorts used for acute care stroke and TIA performance. The stroke and TIA acute care cohorts are defined to enhance the homogeneity of cohort patients by focusing only on the first (index) stroke or TIA admission in a given fiscal year that has an MRDx of stroke or TIA and the stroke or TIA occurred prior to admission to acute care.

The hyperacute care 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 occurred after admission to acute care.

Therefore, the cohorts and methdologies are defined separately for hyperacute care performance indicators in the stroke report, with the exception of Median Door-to-Needle Time Among Stroke/TIA Patients who Received tPA. This indicator does not use the stroke definition in the Hyperacute cohort. It instead uses the cohorts for all other Peformance Indicators.

Hyperacute Care EVT Cohort

Description	Adult ischemic stroke cases residing in Ontario who received an endovascular thrombectomy/therapy (EVT) procedure
Data Source(s)	Discharge Abstract Database (DAD)

Inclusion Criteria	Records meeting **all** of the following criteria:
	• Discharge dates within reporting period
	• Valid Ontario health card number and responsibility for payment
	• 18 <= Age <=108
	• Procedures from EVT hospitals with an institution number in Error! Reference source not found.
	• ICD-10-CA any diagnosis (DX_CODE) = **I63*** (including all sub-codes except **I636**), **I64*** or **H341**
	• CCI Intervention Codes in any intervention field **(FY2012/13 - FY2017/18)**:
	  ○ **1.JW.57.GP.GX** (Extraction, other vessels of head, neck and spine NEC, using percutaneous transluminal approach and device NEC)
	  ○ **1.JX.57.GP.GX** (Extraction, intracranial vessels using percutaneous transluminal approach and device NEC. Includes mechanical thrombectomy), or
	  ○ **1.JE.57.GQ*** (Extraction, carotid artery using percutaneous transluminal approach. Includes mechanical thrombectomy)
	• CCI codes in any intervention field **(**as of **FY2018/19):**
	  ○ **1.JE.57.GQ*** (Extraction, carotid artery using percutaneous transluminal approach Includes mechanical thrombectomy, carotid artery)
	  ○ **1.JW.57.GQ*** (Extraction, intracranial vessels using percutaneous transluminal approach and device NEC. Includes mechanical thrombectomy, intracranial artery)
	  ○ **1.JX.57.GP*** (Extraction, other vessels of head, neck and spine NEC, using percutaneous transluminal approach and device NEC, Includes Mechanical Thrombectomy, extracranial vessels of head neck and spine)

Exclusion Criteria	Out of hospital interventions
Other Notes	• NACRS also had EVT records but all were also recorded in DAD on the same day. Therefore, no new EVT cases was added in the cohort. • KHSC operated 24/7 in September 2017. TBRHSC started operating in 2018 and is not 24/7. WRH operated 24/7 in 2020 and HSN operated 24/7 in 2021. All other EVT hospitals operated 24/7 from FY2017/18 to present.

Hyperacute Care Emergency Department Cohort

Description	Visits to the emergency department (ED) for ischemic stroke within the fiscal year based on registration date for adults living in Ontario
Data Source(s)	National Ambulatory Care Reporting System (NACRS)
Inclusion Criteria	Records meeting **all** of the following criteria: • Registration dates within reporting period • Visit functional centre (VFC) codes for an ED visit ('71310', '72310', '73310') • Valid Ontario health card number and responsibility for payment • 18 <= Age <= 108 • ICD-10-CA any diagnosis as **I63** (including all sub-codes except I63.6), **I64** or **H34.1**
Exclusion Criteria	Records meeting **any** of the following criteria: • ICD-10-CA any diagnosis as **I63.6** • Cases when any diagnosis of **I63*** (exclude **I63.6**) or **I64*** or **H34.1** is recorded by the physician as questionable and no other ischemic stroke diagnosis • Scheduled visits
Other Notes	

Hyperacute Care Acute Inpatient Cohort

Description	Acute inpatient admissions for ischemic stroke within the fiscal year based on discharge date for adults living in Ontario
Data Source(s)	Discharge Abstract Database (DAD)
Inclusion Criteria	Records meeting **all** of the following criteria: • Discharge dates within reporting period • Valid Ontario health card number and responsibility for payment • 18 <= Age <= 108 • ICD-10-CA any diagnosis as **I63** (including all sub-codes except **I63.6**), **I64** or **H34.1**
Exclusion Criteria	Records meeting **any** of the following criteria: • ICD-10-CA any diagnosis as **I63.6** • Exclude Type 3 Diagnosis (Secondary Diagnosis). Hierarchy of diagnosis type: M>1>2>3>others, so no repeat cases were counted
Other Notes	

Cohorts for all Other Performance Indicators

Emergency Department Cohort

Description	Visits to the emergency department (ED) for the first stroke/TIA event within the fiscal year based on registration date for adults living in Ontario
Data Source(s)	National Ambulatory Care Reporting System (NACRS)
Inclusion Criteria	Records meeting **all** of the following criteria: • Registration dates within reporting period • Any of the following most responsible diagnosis (MRDx) ICD-10CA codes: G45, H340, H341, I60, I61, I63, or I64 ○ See **Appendix Table 1** for details • Management Information System (MIS) visit functional centre maps to ED: 71310, 72310, or 73310 • First stroke/TIA event in fiscal year based on registration date

Exclusion Criteria	Records meeting **any** of the following criteria:
	• Age less than 18 at time of ED visit
	• Non-Ontario funding or non-Ontario health card
	• Any of the following MRDx codes: G454, I608, or I636
	  ○ See **Appendix Table 1** for details
	• Questionable diagnosis
	• Scheduled ED Visits
	• Disposition codes indicating sign-outs against medical advice or left before being seen
	  ○ See the 'Sign-out' category in **Appendix Table 2**

Other Notes	• Follow-up for indicator outcomes may extend beyond the index fiscal year

Acute Inpatient Cohort

Description	Acute inpatient admissions for the first stroke/TIA event within the fiscal year based on discharge date for adults living in Ontario
Data Source(s)	Discharge Abstract Database (DAD)
Inclusion Criteria	Records meeting **all** of the following criteria: • Discharge dates within reporting period • Any of the following most responsible diagnosis (MRDx) ICD-10CA code: G45, H340, H341, I60, I61, I63, or I64 ○ See **Appendix Table 1** for details • First stroke/TIA event in fiscal year based on discharge date

Exclusion Criteria	Records meeting **any** of the following criteria:
	• Age less than 18 at time of admission into acute care
	• Non-Ontario funding or non-Ontario health card
	• Any of the following MRDx: G454, I608, or I636
	  ○ See **Appendix Table 1** for details
	• In-hospital or post-admission stroke diagnosis (Type 2 diagnosis)
	• Elective admission
	• Palliative care diagnosis prior to admission
	  ○ ICD-10CA = Z515 in any of the 25 diagnosis fields
	  ○ Corresponding diagnosis prefix code = 8

Other Notes	• Follow-up for post-acute indicator outcomes may extend beyond the index fiscal year

Measurement of AlphaFIM Stroke Severity in the Acute Inpatient Cohort

<table>
<tr><td>Description</td><td>A measure of disability from stroke in acute care based on the AlphaFIM</td></tr>
<tr><td>Data Source(s)</td><td>DAD</td></tr>
<tr><td>Methodology</td><td>Stroke severity groups are mutually exclusive subsets of the index stroke cohort derived from the Special Project 740 field, as structured:

<table>
<tr><td>Position</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr>
<tr><td>Value</td><td>Y/N</td><td colspan="4">Year</td><td colspan="2">Month</td><td colspan="2">Day</td><td colspan="2">MR</td><td colspan="2">CR</td></tr>
</table>

• Among the 25 special project number variables in DAD, identify the variable containing ‘740’
• Use the corresponding special project field variable to calculate the date of assessment using the following:
  ○ Convert characters in positions 2-5 to a 4-digit year if they do not contain ‘99’ or ‘9999’
  ○ Convert characters in positions 6-7 to a month where ‘01’ corresponds to January, ‘02’ corresponds to February and ‘12’ corresponds to December
  ○ Convert characters in positions 8-9 to days of the month
• Use the corresponding special project field variable to calculate the AlphaFIM (stroke severity) score based on the following:
  ○ Documentation of Alpha FIM Scores (first position) = ‘Y’
  ○ Convert characters in positions 10-11 to a projected motor rating score between 13 and 91 (inclusive)
  ○ Convert characters in positions 12-13 to a projected cognitive rating score between 5 and 25 (inclusive)
  ○ If both motor rating and cognitive rating scores are not missing, sum them to derive AlphaFIM
• If the date components correspond to a proper date that is between admission and discharge, map the AlphaFIM score to severity group in Appendix Table 3</td></tr>
<tr><td>Other Notes</td><td>• The AlphaFIM may not be completed at the index hospital if the stroke patient only stayed 24-48 hours. It will be completed at the receiving acute hospital within that admission.</td></tr>
</table>

Post-acute Sub-cohort

Description	This is a subset of the acute inpatient cohort excluding patients who died during the acute inpatient admission at either the **index** or transfer hospital. Only patients discharged alive are applicable to outcomes that require follow-up post-discharge.
Data Source(s)	DAD
Inclusion / Exclusion Criteria	**Inclusion/Exclusion:** Same as Acute Inpatient Cohort **Additional Exclusions:** • Disposition codes in 'Death' category in **Appendix Table 2** in any acute record related to the first stroke/TIA event Note: Some patients may be transferred multiple times during their acute care related to the first stroke event**.** The **final discharge date** is based on the last discharge from acute care.

Post-acute Rehabilitation-Eligible Cohort

Description	The Rehabilitation Eligible cohort is a subset of the Post-acute sub-cohort, further excluding patients who died in-hospital or signed themselves out at either the index or transfer acute hospital. Only these patients are considered eligible for post-acute rehab, and thus, included for the post-acute rehab indicators.
Data Source(s)	DAD
Inclusion / Exclusion Criteria	**Inclusion/Exclusion:** Same as Post-acute Sub-cohort **Additional Exclusions**: • In-hospital deaths at either index or transfer acute hospital • Sign-out from either index or transfer hospital as determined by their discharge disposition (See **Appendix Table 2)** • TIA strokes Notes: See **Figure 1** for a diagram of the hierarchy of stroke cohorts
Other Notes	• Some patients are transferred to another acute facility prior to admission to IP rehab. To maximize the capture of these patients, the final discharge date from acute care is used.

Post-acute Rehabilitation Cohort

<table>
<tr><td>Description</td><td>The post-acute rehabilitation cohort includes patients who received any of the following:
Inpatient Rehab (IP Rehab)
Home-based Rehab (HB Rehab)</td></tr>
<tr><td>Data Source(s)</td><td>National Rehabilitation Reporting System (NRS)
Home Care Database (HCD), Client Health and Related Information System (CHRIS)</td></tr>
<tr><td>Inclusion / Exclusion Criteria</td><td>
IP Rehab Cohort
Patients satisfying all of the following criteria:
Rehabilitation client group (RCG) indicates stroke (values ’1.1’ to ‘1.9’)
Admission Class Code is not “4 = [Un]planned Discharge without assessment”
FIM Motor Score
The sum of admitting FIM motor components related to eating, grooming, bathing, dressing upper body, dressing lower body, bowel, bladder, transferring to bed, transferring to toilet, locomotion and locomotion on stairs

FIM Cognitive Score
The sum of admitting FIM cognitive components related to comprehension, expression, social interaction, problem solving and memory

The final stroke disability at admission into IP rehab is based on the following mapping:
<table>
<tr><th>FIM Motor Score</th><th>FIM Cognitive Score</th><th>Age</th><th>RPG</th><th>Disability</th></tr>
<tr><td>69 to 84</td><td>30 to 35</td><td>-</td><td>1160</td><td>Mild</td></tr>
<tr><td>51 to 68</td><td>30 to 35</td><td>-</td><td>1150</td><td>Mild</td></tr>
<tr><td>> 50</td><td>26 to 29</td><td>-</td><td>1140</td><td>Moderate</td></tr>
<tr><td>> 50</td><td>5 to 25</td><td>-</td><td>1130</td><td>Moderate</td></tr>
<tr><td>39 to 50</td><td>-</td><td>-</td><td>1120</td><td>Moderate</td></tr>
<tr><td>12 to 38</td><td>-</td><td>69+</td><td>1110</td><td>Severe</td></tr>
<tr><td>12 to 38</td><td>-</td><td>< 69</td><td>1100</td><td>Severe</td></tr>
</table>
Source: CIHI (2016). RPG Grouping Methodology and Weights, 2016–2017 NRS Version

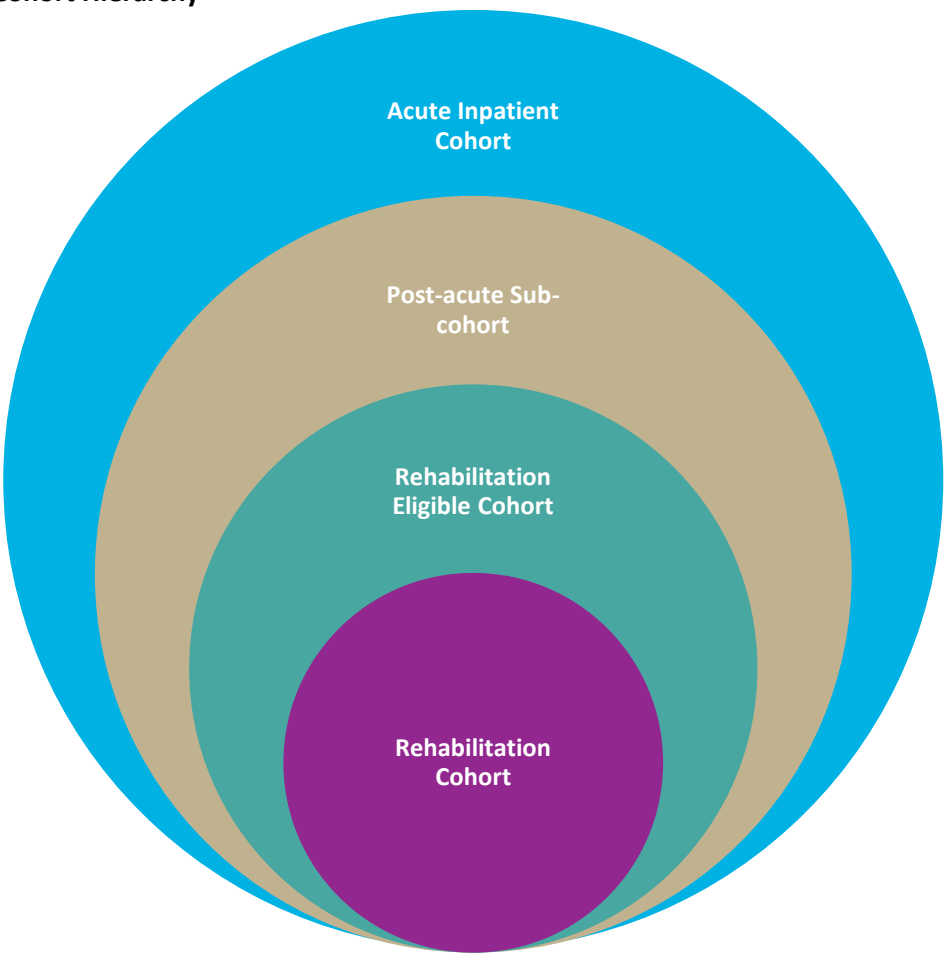
Note: The FIM motor score used to calculate RPG does not include the component for “Transferring to shower.” This was previously noted as a subtraction instead of exclusion in prior Stroke Report Cards.

HB Rehab Cohort
Patients satisfying all of the following criteria:
Received their first HB rehab visit within 60 days following the final discharge from acute care or IP rehab
</td></tr>
</table>

	• Received **at least three** HB rehab visits within 180 days following first HB rehab visit
	• Included HB rehab services for stroke:
	  ○ 5 = Physiotherapy (PT)
	  ○ 6 = Occupational therapy (OT
	  ○ 7 = Speech language therapy (SLP)
	  ○ 8 = Social work (SW)
	
	Notes: See **Figure 1** for a diagram of the hierarchy of stroke cohorts

Other Notes	• For FY2024/25 and prior, outpatient rehab (OP rehab) data are not available for stroke patients in NACRS Clinic-Lite. For these fiscal years, post-acute rehab captures only IP rehab and HB Rehab. • HB rehab in CHRIS only captures home care provided by Ontario Health at Home. • HCD records indicate that some visits occur while a patient is still admitted in an IP rehab facility. • Post-acute rehab activity may occur in the index and subsequent fiscal year (i.e., span multiple fiscal years). • This cohort is generally a subset of post-acute rehab-eligible cohort, except for "Standardized Active Length of Stay in Inpatient Rehabilitation" and "Median Number of Minutes per Day of Direct Therapy Received by IP Rehab Patients" which can include patients not directly admitted from acute care • A minimum of 3 HB rehab visits were implemented to exclude patients who most likely received only assessment visits and not actual rehab visits. This criterion will lead to a reduction in the number of patients receiving HB rehab, but an increase in the mean number of visits.

Figure 1: Cohort Hierarchy



Section 2: Indicator Methodologies

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

SR1-1: Standardized Stroke and TIA Admission Rate to Acute Care per 1000 Population

Indicator Definition	Age and sex standardized inpatient admission rate for acute stroke and transient ischemic attack (TIA) per 1,000 population
Data Source(s)	• Discharge Abstract Database (DAD) • Registered Persons Database (RPDB)
Denominator	Number of Ontario residents in RPDB 18 years old or older, and alive as of July 1 of each fiscal year.
Numerator	Number of patients (index admissions) in the acute inpatient stroke cohort
Calculation	**Crude (unadjusted) rate (per age-sex category) =** $$\frac{\text{Number of patients in acute inpatient stroke cohort}}{\text{Number of alive adults in Ontario}} \times 1000$$ **Adjusted rate (direct standardization) =** $$\sum_{\substack{\text{All Age}-\text{Sex}\\ \text{Groups}}} (\text{Crude Rate}) \times \text{Provincial Population Proportion}$$
Unit of Analysis	Patients (Stroke Acute Admissions)
Adjustment	Age and sex direct standardization to the Ontario July 1, 2020, population Age groups for provincial results: 18-49, 50-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89 and 90+ Age groups for Ontario Health Region results: 18-59, 60-69, 70-79, 80-89, 90+
Reporting Level(s)	Province, and Patient Ontario Health Region
Target/Benchmark	N/A
Interpretation	The rate of admission reflects population demographics and the effectiveness of primary and secondary prevention programs. A lower rate is desired.
Limitation(s)	• Only the first stroke/TIA event a patient had in the fiscal year is included.
Other Notes	• This is a population-based indicator. The patient's postal code is used to report Regional performance. • The rate of admission to hospital reflects population demographics and primary prevention efforts, for example, control of hypertension and smoking cessation programs. • Excludes cases under 18, cases with non-Ontario postal code, cases with missing postal code or cases with invalid postal code (not mapped to Ontario regions) • Cases from the stroke cohort are matched to the ON population for the same fiscal year first. If match is not found, ON population for the pervious fiscal year, and following fiscal year is searched for the match. • For matched cases, patient information from the stroke cohort is used for analysis

SR1-2: Rate of Stroke Prevention Services Referral of Stroke & TIA ED Visits Discharged Home

Indicator Definition	Proportion of ischemic stroke and transient ischemic attack (TIA) patients discharged from ED who were referred to stroke prevention services (SPS), per 100 persons
Data Source(s)	National Ambulatory Care Reporting System (NACRS)
Denominator	Number of stroke/TIA patients from the stroke ED cohort, with these additional inclusion and exclusion criteria: **Inclusion**: Patients discharged home alive, based on the following Visit Disposition codes: • '01' = Discharged Home (private dwelling, not an institution; no support services) – FY2017/18 and earlier • '16' = Home with Support/Referral – FY2018/19 and after • '17' = Private Home – FY2018/19 and after
Numerator	The number of acute ischemic stroke/TIA patients identified in the denominator who were given an SPS referral on discharge from the ED: • Among the 25 special project number field, identify the variable containing '340' • Using the corresponding special project data field, a value of the second character = 'Y'
Calculation	$\frac{\text{Number of patients who referred to secondary prevention}}{\text{Number of ED stroke patients discharged home alive}}$
Unit of Analysis	Patient (Stroke ED Visit)
Adjustment	No
Reporting Level(s)	Province, Facility Ontario Health Region, and Index ED Site
Target/Benchmark	Benchmarks are provided
Interpretation	A higher rate is desired
Limitation(s)	• Only the first stroke or TIA visit to the ED that a patient had in the fiscal year is considered for potential inclusion. • This indicator compiles the number of referrals made but cannot determine the number of patients seen in secondary prevention clinics and/or who received secondary prevention services.
Other Notes	• Patients with missing special project 340 information (i.e., records with no value of '340' in any of the 25 special project number fields) were previously excluded from reporting. In the updated methodology, these patients are assumed to **not** have received secondary prevention referral.

SR1-3: Anticoagulant Rx within 90 Days for Ischemic Stroke or TIA Patients 65+ with AFIB

This indicator was not calculated for this year's release.

Indicator Definition	The rate per 100 ischemic stroke and transient ischemic attack (TIA) patients 65 years and older with atrial fibrillation who filled a prescription for oral anticoagulant therapy within 90 days of discharge from acute care.
Data Source(s)	• Discharge Abstract Database (DAD) • Ontario Drug Benefit (ODB) • Registered Persons Database (RPDB)

Denominator	Number of stroke patients discharged alive from acute care and meeting all the following criteria:
	• Aged 65 or older at time of admission
	• Has a 3-year history of atrial fibrillation (Afib) in acute care
	  ○ Previous acute discharge is within 1,095 days of index stroke acute discharge
	  ○ An ICD10-CA code of 'I48' in any of diagnosis code field

Numerator	Number of patients (from the denominator) that filled a prescription for anticoagulant therapy within 90 days of acute discharge • ODB service date is within 90 days of acute discharge (inclusive) • Drug Identification Number (DIN) maps to an oral anticoagulant drug in **Appendix Table 6**
Calculation	$\frac{\text{Number of patients prescribed anticoagulants after discharge}}{\text{Number of acute stroke patients } 65+ \text{ with Afib and discharged alive}}$
Unit of Analysis	Patient (Stroke Acute Admissions)
Adjustment	No
Reporting Level(s)	Province, Patient Ontario Health Region, Patient sub-Region, and Index Acute Site
Target/Benchmark	Benchmarks are provided
Interpretation	A higher rate is desired
Limitation(s)	• Prescription drug information data are not available for those under 65 years of age. • Patients with contraindications for anticoagulants are included.
Other Notes	• This is a population-based indicator. The patient's postal code is used to report Regional performance. • Includes stroke diagnosis I64 ('unspecified').

SR1-4: Carotid Imaging Rate for Ischemic Stroke Patients Admitted to Acute Care

Indicator Definition	The proportion of acute ischemic stroke patients who received any one of the following carotid imaging procedures during their inpatient stay: carotid Doppler, carotid computed tomography angiography (CTA), carotid magnetic resonance angiography (MRA) or carotid angiography, per 100 acute ischemic stroke discharges
Data Source(s)	• Discharge Abstract Database (DAD) • National Ambulatory Care Reporting System (NACRS) • Ontario Health Insurance Plan (OHIP)
Denominator	Number of **ischemic** patients in the acute inpatient stroke cohort
Numerator	Number of patients who received carotid imaging as identified in either OHIP or NACRS. OHIP records meeting all of the following: • Billing (fee) code maps to carotid imaging in **Appendix Table 4** • Service date between acute admission and discharge (inclusively) NACRS records meeting all of the following: • Procedure (CCI) code within any of the intervention code fields mapping to carotid imaging in **Appendix Table 5** • Registration date is within 1 day prior to acute admission
Calculation	$\frac{\text{Number of patients who received carotid imaging}}{\text{Number of acute ischemic stroke patients}}$
Unit of Analysis	Patients (Stroke Acute Admissions)
Adjustment	No
Reporting Level(s)	Province, Facility Ontario Health Region, and Index Acute Site
Target/Benchmark	Benchmarks are provided
Interpretation	A higher rate is desired
Limitation(s)	• Coding of diagnostic imaging in NACRS is mandatory while optional in DAD unless the procedure is the sole intervention performed in the presence of an anesthetist.
Other Notes	• Carotid imaging is necessary when endovascular therapy (EVT) is being considered. Even in patients not considered candidates for EVT or intravenous thrombolysis, vascular imaging is recommended to guide management for secondary prevention of future stroke. • Includes stroke diagnosis I64 (‘unspecified’).

SR1-5: Standardized Rate of Ambulance Arrival to the Emergency Department

Indicator Definition	The rate per 100 stroke/TIA visits that arrive by ground, or a combination of ground and air ambulance to the emergency department (ED)
Data Source(s)	• National Ambulatory Care Reporting System (NACRS) • Registered Persons Database (RPDB)
Denominator	Number of stroke/TIA patients from the stroke ED cohort
Numerator	The number of stroke/TIA patients identified in the denominator arriving to the ED by ambulance where the arrival code is any of the following: • 'A' (Air ambulance) • 'C' (Combination of ground and air ambulance) • 'G' (Ground ambulance) • 'W' (Water Ambulance) [applicable prior to 2003/04]
Calculation	**Crude (unadjusted) rate =** $\frac{\text{Number of patients who arrived by ambulance}}{\text{Number of ED stroke patients}}$ **Model-based risk-adjusted rate (indirect standardization) =** (Crude Rate/Expected Rate) * Provincial Crude Rate
Unit of Analysis	Patient Stroke ED
Adjustment	Indirect adjustment for Stroke Type
Reporting Level(s)	Province, Patient Ontario Health Region, Patient sub-Region, and Index ED Site
Target/Benchmark	Benchmarks are provided
Interpretation	Suspected stroke/TIA requires immediate medical attention. Ambulance transport is quicker than other modes of transportation. A higher proportion of patients arriving by ambulance suggests patients have a better chance of receiving timely medical care.
Limitation(s)	Only the first stroke or TIA visit to the ED that a patient had in the fiscal year is included.
Other Notes	• This is a population-based indicator. The patient's postal code is used to report Regional performance.

Chapter 2: Hyperacute Care Access and Outcomes for Ischemic Stroke

SR2-1: Ischemic Stroke Hyperacute Treatment Rate

Indicator Definition	The percentage of ischemic stroke patients who received hyperacute therapy which includes endovascular thrombectomy/therapy (EVT) and/or thrombolysis, reported as 3 sub-indicators: • SR2-1.1: Standardized Hyperacute (EVT and/or thrombolysis) Treatment Rate • SR2-1.2: Standardized thrombolysis Treatment Rate • SR2-1.3: EVT Treatment Rate
Data Source(s)	• Discharge Abstract Database (DAD) • National Ambulatory Care Reporting System (NACRS)

Denominator	Number of unique ischemic stroke patients in the Hyperacute Cohort, based on the following hierarchy:
	1. Among those who received EVT, select the first admission where EVT was provided even if it is not the first stroke of the fiscal year
	2. Among those who did not receive EVT, select the first acute inpatient admission of the fiscal year
	3. First ischemic stroke visit to ED within the fiscal year meeting an of the following criteria:
	  • Patients got discharged back to home/community i.e., not admitted to inpatient bed in the facility where the ED is located:
	  ○ Visit disposition in (01, 04, 05, 15) for FY2017/18
	  ○ Visit disposition in (16, 17, 30, 40, 90) for FY2018/19 & after
	  • Death on arrival or died in facility:
	  ○ Visit disposition = 10 or 11 for FY2017/18
	  ○ Visit disposition = 71 or 72 for FY2018/19 & after
	
	Classify stroke patients based on Ontario Health Region and Sub-Region
	• Use patient postal code to convert to sub-Region
	• Take the first 2 digits of sub-Region and then assign them to an Ontario Health Region

Numerator	Number of stroke patients who meet any of the following criteria: • Received thrombolysis only • Received EVT only • Received both thrombolysis and EVT Treatment of tPA is determined by the following: • Among the 25 special project number variables, identify the variable containing '340' • Using the corresponding special project field variable, a value of the character in position 3 = 'Y' Treatment of EVT is determined by the presence in the EVT Cohort (as described above).
Calculation	**Crude (unadjusted) rate =** $\frac{\text{Number of ischemic stroke patients who received hyperacute therapy}}{\text{Number of unique ischemic stroke patients}}$

	Model-based risk-adjusted rate (indirect standardization) = (Crude Rate/Expected Rate) × Provincial Crude Rate
Unit of Analysis	Patient
Adjustment	Hyperacute care and thrombolysis rates are indirectly adjusted for stroke diagnosis type II and whether ischemic stroke was MRDx. EVT rates are crude.
Reporting Level(s)	Province, Patient Ontario Health Region, Patient sub-Region, and Index ED/Acute Site
Target/Benchmark	Benchmarks are provided for Hyperacute care and thrombolysis rates.
Interpretation	A higher value is desired.
Limitations	Patients with invalid or missing postal codes are not included in the Patient Ontario Health Region or Subregion results but are included in the provincial analysis.

Other Notes	• This indicator is a combination of two indicators:
	  ○ Current EVT Performance Measuring and Monitoring (PMM) Indicator 1: Proportion of ischemic stroke patients who received an EVT procedure
	  ○ Current Stroke Report Card (SRC) Indicator 7: Proportion of ischemic stroke patients who received intravenous thrombolysis
	• Currently, SRC Indicator 7 excludes patients with missing special project 340 data. This indicator does not exclude patients with missing SP340 data. With the improvement of the SP340 data entry, the Stroke Reporting Working Group meeting agreed that cases with missing data were mostly cases who did not receive thrombolysis
	• The occurrence of thrombolysis and/or EVT may not occur in the record qualifying for cohort inclusion. The hyperacute treatment may occur in a different DAD or NACRS record related to the same episode of care (either before and/or after the cohort-qualifying record). Records for the same episode of care are identified by admission dates or registration dates that are within 1 day of a previous ED or acute inpatient discharge. The documentation of tPA may occur on a record **without** a stroke diagnosis during the same episode of care.
	• Some hospitals refer patients to multiple EVT hospitals as they share the same rotation. E.g., Markham Stouffville Hospital – Uxbridge site refers stroke patients to SHSC, UHN or UHT.
	• If the patient had both an ED visit and an inpatient hospitalization in the same year, the DAD record is kept.
	• The denominator will include patients who were not hospitalized for stroke at any point in the fiscal year but did visit an ED for stroke.

SR2-2: Median Door-to-Needle Time Among Stroke/TIA Patients who Received Thrombolysis

<table>
<tr><td>Indicator Definition</td><td>The median time, in minutes, between a stroke or TIA patient's registration in the emergency department (ED) and the time intravenous thrombolysis was administered. This indicator is referred to as door-to-needle (DTN) time.</td></tr>
<tr><td>Data Source(s)</td><td>• Discharge Abstract Database (DAD)
• National Ambulatory Care Reporting System (NACRS)</td></tr>
<tr><td>Cohort</td><td>Number of unique patients in the Stroke Cohort who received thrombolysis, based on the following hierarchy:
• Patients in the acute inpatient cohort
• Patients in the ED cohort with no stroke MRDx acute inpatient admission in the same fiscal year

Data of the administration of tPA is captured from the Special Project 340 field positions 3 to 12, as structured:
<table>
<tr><th>Position</th><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td></tr>
<tr><th>Value</th><td></td><td></td><td>tPA Y/N</td><td colspan="2">tPA Month</td><td colspan="2">tPA Day</td><td colspan="2">tPA Hour</td><td colspan="2">tPA Minute</td></tr>
</table>

Inclusions:
• Admissions and ED visits at thrombolysis hospitals – See List of Stroke Hospitals in Ontario with RSC/DSC or Thrombolysis or DSU Status in the Appendix
• Receipt of thrombolysis at the admitting hospital
  ○ Among the 25 special project fields, identify the field containing special project number '340'
  ○ Third position of data component (tPA) = 'Y'
• Valid time:
  ○ Month is a value from '01' to '12'
  ○ Day is a value from '01' to '31' – conditional on month & year
  ○ Hour is a value from '00' to '24'
  ○ Minute is a value from '00' to '59'</td></tr>
<tr><td>Calculation</td><td>ED Door Time:
• For patients who received thrombolysis in DAD, link to the related ED record by matching Patient Token Number:
  ○ ED registration date and inpatient admission is within 1 day
  ○ Visit functional centre maps to ED ('71310' '72310' '73310')
  ○ Unscheduled ED visit = '1'
  ○ AM institution number corresponds to the same hospital as the acute inpatient admission
• Use earliest of ED triage/registration time

Exclusions:
• Patients who received thrombolysis and bypassed the ED of the hospital
• ED door time is after thrombolysis administration time
• thrombolysis time occurs more than 1 day after ED door time (new criterion)</td></tr>
</table>

	Door-to-Needle (DTN) = (Time of tPA Administration) – (ED Door Time)
Unit of Analysis	Patient
Adjustment	No
Reporting Level(s)	Province, Facility Ontario Health Region, and Index ED/Acute Site
Target/Benchmark	• Target: 30 minutes • Benchmarks are provided
Interpretation	• This indicator provides information on hospital response time following patient arrival at an ED with symptoms of stroke. Median values are compared to the provincial DTN target recommendation of 30 minutes. • Reference: Quality of Stroke Care in Canada. Stroke Key Quality Indicators and Stroke Case Definitions. Update 2016. Canadian Stroke Best Practices. Stroke Quality Advisory Committee. Heart and Stroke Foundation. August 2016.
Limitation(s)	• In some cases, non-ischemic stroke patients are identified as receiving thrombolysis. This is likely an issue of stroke type misclassification in the DAD. • A patient's first stroke/TIA event in the fiscal year is included in the cohort regardless of whether thrombolysis was administered. Patients who had a subsequent event where thrombolysis was administered will not be included. • The DAD (project 340) date and time of thrombolysis administration variable in the 2012/13 data was compared to the Ontario Stroke Audit (OSA) 2012 tPA date and time variable and their agreement calculated. Agreement was below 75% for all hospital types except for Telestroke sites where agreement between data sources was 82%.

Other Notes	• This indicator now uses:
	  ○ Using the earlier ED triage or ED registration time as the start of ED door time
	  ○ Exclusion of thrombolysis administration time that occurs more than 1 day after ED door time (which assumes DQ error in SP340 data), leading to a decrease in mean DTN time
	• This indicator does not use the stroke definition in the Hyperacute cohort. It instead uses the same definition in the previous Stroke Report Card.
	• CIHI special project 340 was mandated in Ontario as of April 1, 2012. Refer to CIHI coding directives for information on coding of 340 data.

SR2-3: EVT Rate for Ischemic Stroke Patients Transferred from a DSC/thrombolysis ED to an EVT Facility

Indicator Definition	Percentage of ischemic stroke patients transferred from the ED of a designated stroke centre (DSC) or tPA hospital to an EVT hospital who received an EVT
Data Source(s)	• Discharge Abstract Database (DAD) • National Ambulatory Care Reporting System (NACRS)

Denominator	Number of ischemic stroke patients who had an ED visit from the Hyperacute cohort
	
	Include:
	• Records with an AM institution number from the list of DSC/thrombolysis hospitals in **List of Stroke Hospitals in Ontario**
	• Cases who were transferred to an EVT hospital in Error! Reference source not found.
	  ○ NACRS records with registration time at EVT hospital within 24 hours of registration time at DSC hospital
	  ○ DAD records with admission time at EVT hospital within 24 hours of registration time at DSC hospital

Numerator	Number of ischemic stroke cases who received an EVT
Calculation	$\frac{\text{Number of cases who received an EVT}}{\text{Number of ischemic stroke cases transferred to an EVT hospital}}$
Unit of Analysis	Transferred cases
Adjustment	N/A
Reporting Level(s)	Province, and EVT Site
Target/Benchmark	N/A
Interpretation	
Limitations	There is a small possibility that some patients were discharged home from a DSC/thrombolysis hospital and admitted themselves into an EVT hospital within 1 day.
Other Notes	• Reported only for FY2017/18 and after • Ischemic stroke diagnosis criteria is applied only for the ED record at the DSC/tPA hospital. Some patients may not have a record with an ischemic stroke diagnosis at the receiving EVT hospital.

SR2-4: Successful Reperfusion Rate for Patients that Received EVT

Indicator Definition	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
Data Source(s)	• Discharge Abstract Database (DAD) • National Ambulatory Care Reporting System (NACRS)
Denominator	Number of ischemic stroke cases who had an EVT procedure (EVT cohort) **Include:** • Special project 440 filled **Exclude:** • Special project 440 not filled
Numerator	Number of EVT cases with a Thrombolysis in cerebral infarction (TICI) score of 2B (complete filling of all of the expected vascular territory is visualized but the filling is slower than normal) or 3 (complete perfusion): • Special project 440 Field 23 = 'Y'
Calculation	$\frac{\text{Number of EVT cases successfully reperfused}}{\text{Number of EVT cases had SP440 filled}}$
Unit of Analysis	EVT case
Adjustment	No
Reporting Level(s)	Province, and EVT Site
Target/Benchmark	N/A
Interpretation	A higher value is desired
Limitations	
Other Notes	• Reported only for FY2017/18 and after • Special project 440 data were entered retrospectively for FY2017/18. As THP did not enter data regarding reperfusion for that fiscal year, it was excluded from the indicator for that fiscal year.

SR2-5: 30-Day Mortality of Patients that Received EVT

Indicator Definition	The percentage of deaths occurring within 30 days after an EVT procedure
Data Source(s)	• Discharge Abstract Database (DAD) • National Ambulatory Care Reporting System (NACRS) • Registered Persons Database (RPDB)
Denominator	Number of ischemic stroke cases who had an EVT procedure (EVT cohort)

Numerator	Number of cases who died within 30 days following EVT procedure, defined as cases meeting all of the following criteria:
	• Death indicated in DAD, NACRS, or RPDB
	• Any of the following discharge dispositions in DAD (acute care) or visit dispositions in NACRS (ambulatory care):
	  ○ '07' = Died (FY17/18)
	  ○ '10' = Death after Arrival (FY17/18)
	  ○ '11' = Death on Arrival (FY17/18)
	  ○ '72' = Died in Facility (FY18/19 and after)
	  ○ '73' = Medical Assistance in Dying (MAID) (FY18/19 and after)
	  ○ '74' = Suicide in Facility (FY18/19 and after)
	• 0 <= (death date – EVT date) <= 30
	
	Notes:
	• Date of death is based on the following hierarchy: DAD, NACRS, RPDB
	• Death dates in DAD are derived from discharge date
	• Death dates in NACRS are derived from disposition date
	• If PTNs are associated with multiple death dates in the same data source, use the earliest date

Calculation	$\frac{\text{Number of cases who died within 30 days}}{\text{Number of cases who had an EVT procedure}}$
Unit of Analysis	EVT case
Adjustment	No
Reporting Level(s)	Province, and EVT Site ○ Including and excluding in-hospital strokes
Target/Benchmark	N/A
Interpretation	A lower value is desired.
Limitations	• There may be too few deaths to calculate on a biannual or annual bases. Few deaths may also limit ability to do risk-adjustment.
Other Notes	• Some HCNs were associated with multiple death dates within a single data source. The earliest death date was used. • Reported only for FY2017/18 and after

SR2-6: Median Days at Home in the First 90 days Following EVT

Indicator Definition	The number of days EVT patients spent alive and outside of a health institution (hospital, inpatient rehab and/or LTC/CCC facility) in the first 90 days after the EVT hospitalization

Data Source(s)	• Discharge Abstract Database (DAD)
	• National Ambulatory Care Reporting System (NACRS)
	• Registered Persons Database (RPDB)
	• National Rehabilitation Reporting System (NRS)
	• Continuing Care Reporting System (CCRS)
	  ○ Long Term Care (LTC)
	  ○ Continuing Complex Care (CCC)

Cohort	Ischemic stroke cases who had an EVT procedure (EVT cohort)
	
	Exclude:
	• Cases who were admitted to an LTC or CCC immediately prior (at baseline) to their EVT procedure
	• Cases who had **any** DAD record for the EVT procedure or within the subsequent 90 days with any of the following discharge disposition:
	  ○ '06' = sign-out (left against medical advice or absent without leave) (FY2017/18)
	  ○ '12' = did not return from a pass (FY2017/18)
	  ○ '61' = absent without leave (FY2018/19 and after)
	  ○ '62' = left against medical advice (FY2018/19 and after)
	  ○ '65' = did not return from a pass (FY2018/19 and after)

Calculation	Number of days not institutionalized in the first 90 days after the EVT procedure, defined as: **Home Time** = (Maximum Home Time) – (Non-Home Time) Non-Home (NH) time is the sum (total) of the following up to the maximum home time cut-off date: • Length of stay until discharge for EVT procedure (DAD) • Length of stay for inpatient re-admissions following discharge for EVT procedure (DAD) • NACRS for admissions with at least 1 overnight stay • Length of stay in a long-term care (LTC) facility • Length of stay in a complex continuing care (CCC) facility • Length of stay in a rehabilitation (NRS) facility Maximum Home Time = Minimum of 90 days or days alive after EVT Methodology: 1. Include records for admissions after the EVT procedure 2. Include records for admissions within the maximum home time cut-off (noted above) 3. Include records where the discharge date is at least one day after the admission date or empty

<table>
<tr><td></td><td>
4. Sort NH records, admission date and discharge date
5. Append NH records from all sources, setting by the sorted variables
6. Using the lag function, check if patients have NH time overlapping in multiple facilities
7. Count overlapping NH times only once

Hypothetical example 1
<table>
<tr><th>HCN</th><th>EVT Date</th><th>NH Adm.</th><th>NH Dis.</th><th>NH Time</th></tr>
<tr><td>1</td><td>2017-05-13</td><td>2017-05-14</td><td>2017-07-31</td><td>78</td></tr>
<tr><td>1</td><td>2017-05-13</td><td>2017-07-24</td><td>2017-08-07</td><td>7</td></tr>
</table>
Hypothetical example 2
<table>
<tr><th>HCN</th><th>EVT Date</th><th>NH Adm.</th><th>NH Dis.</th><th>NH Time</th></tr>
<tr><td>2</td><td>2017-05-13</td><td>2017-05-14</td><td>2017-07-31</td><td>78</td></tr>
<tr><td>2</td><td>2017-05-13</td><td>2017-07-24</td><td>2017-07-25</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>Adjustment</td><td>No</td></tr>
<tr><td>Unit of Analysis</td><td>Day per EVT case</td></tr>
<tr><td>Reporting Level(s)</td><td>Province, and EVT Site
○ Including and excluding in-hospital strokes</td></tr>
<tr><td>Target/Benchmark</td><td>N/A</td></tr>
<tr><td>Interpretation</td><td>A higher value is desired</td></tr>
<tr><td>Limitations</td><td>• EVT cases require at least 90 days of follow-up following their EVT. Thus, calculation of indicator 6 will be delayed by one biannual reporting cycle (6 months).
• Because acute care (DAD) data is based on discharge date, re-admissions into acute care with a length of stay greater than two quarters will not be captured.</td></tr>
<tr><td>Other Notes</td><td>Reported only for FY2017/18 and after</td></tr>
</table>

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

SR3-1: Designated Stroke Unit Rate for Stroke/TIA Acute Patients

Indicator Definition	Proportion of stroke patients treated in a designated stroke unit (DSU) among those admitted into an acute care hospital
Data Source(s)	• Discharge Abstract Database (DAD) • Registered Persons Database (RPDB)
Denominator	Number of patients in the acute inpatient stroke cohort excluding patients with missing special project 340 information
Numerator	Number of stroke patients who were treated in a DSU at any time at admitting acute hospital • Among the 25 special project number variables in DAD, identify the variable containing '340' • Using the corresponding special project field variable, a value of the second character = 'Y' For a list of DSUs, see Appendix for **List of Stroke Hospitals in Ontario.**
Calculation	$\frac{\text{Number of patients treated in a designated stroke unit}}{\text{Number of patients in acute inpatient stroke cohort}}$
Unit of Analysis	Patients (Stroke Acute Admissions)
Adjustment	No
Reporting Level(s)	Province, Patient Ontario Health Region, Patient sub-Region, and Index Acute Site
Target/Benchmark	Benchmarks are provided
Interpretation	A higher rate is desired
Limitation(s)	• This does not consider if patients were transferred to and treated in the DSU of another acute hospital • This indicator is unadjusted for the duration and intensity of stroke unit care. • The DAD (project 340) stroke unit variable in the 2012/13 data was compared to the Ontario Stroke Audit (OSA) 2012 stroke unit variable and their agreement calculated. Agreement was > 85% for all hospital types except Regional Stroke Centres where agreement between the DAD and the OSA on whether stroke unit care was provided was 82%.
Other Notes	• This indicator leverages the Ontario stroke unit definition. The Stroke Report uses year-specific hospital DSU status.

SR3-2: ALC Proportion of Total Inpatient Days in Acute Care for Stroke/TIA Patients

Indicator Definition	Proportion of days in alternative level care (ALC) relative to the total length of stay (LOS) among stroke/TIA patients admitted into an acute care hospital
Data Source(s)	Discharge Abstract Database (DAD)
Cohort	Patients in the acute inpatient stroke cohort
	 **Total LOS** = Acute discharge – Admission into acute care **ALC LOS** = ALC days from index acute hospital
Denominator	Sum of total LOS days per reporting level
Numerator	Sum of ALC LOS days per reporting level
Calculation	$\frac{\text{Sum of ALC LOS days}}{\text{Sum of total LOS days}}$ 95% confidence intervals were based on bootstrap sampling with 1000 replicates.
Unit of Analysis	Days
Adjustment	No
Reporting Level(s)	Province, Facility Ontario Health Region, and Index Acute Site
Target/Benchmark	Benchmarks are provided
Interpretation	A higher proportion of ALC days relative to total length of stay could be interpreted as lack of access to post-stroke care including rehabilitation and homecare services. ALC days are frequently encountered for patients that require long-term care.
Limitation(s)	• Only the first stroke or TIA event a patient had in the fiscal year is included. • For patients who were transferred to another acute hospital, this indicator does not consider the stay at subsequent hospitals. • ALC days is not a mandatory data element in DAD and therefore may underreport days spent waiting for alternate care.
Other Notes	• A patient is designated Alternate Level of Care (ALC) by a physician or his/her delegate when the patient is occupying a bed in a hospital and does not require the intensity of resources/services provided in the current care setting (acute, complex continuing care, mental health or rehabilitation). The ALC wait period starts at the time of designation and ends at the time of discharge/transfer to a discharge destination (or when the patient's needs or condition changes and the ALC designation no longer applies). The standardized provincial ALC definition was implemented across all acute care facilities in Ontario on July 1, 2009.

SR3-3: Risk-Adjusted 30-Day All-Cause Mortality Rate for Stroke/TIA Patients

Indicator Definition	Risk-adjusted mortality rate within 30 days of admission for acute stroke or transient ischemic attack (TIA) per 100 patients
Data Source(s)	• Registered Persons Database (RPDB) • Discharge Abstract Database (DAD) • National Ambulatory Care Reporting System (NACRS)
Denominator	Number of acute stroke patients, excluding those who have death dates erroneously recorded as being before acute care admission

Numerator	Subset of the denominator that includes patients who died within 30 days of admission into the index acute hospital for stroke
	• Death identified in any of the following sources
	  ○ Registered Persons Database (RPDB)
	  ○ Discharge Abstract Database (DAD)
	  ○ National Ambulatory Care Reporting System (NACRS)
	  ○ Disposition code in the Death category in **Appendix Table 2** at in an acute care hospital for either the index admission, transfer, or re-admission
	  ○ ED registration ED (NACRS) with any disposition code in the Death category in **Appendix Table 2**
	• 0 <= (death date - index admission) <= 30 days
	
	Notes:
	• Use the following hierarchy: DAD, NACRS, RPDB
	• Death dates in DAD are derived from discharge date
	• Death dates in NACRS are derived from disposition date
	• If Patient Token Number (PTNs) are associated with multiple death dates, use the earliest date

Calculation	**Crude (unadjusted) rate =** $\frac{\text{Number of patients who died within 30 days of admission}}{\text{Number of patients in acute inpatient stroke cohort}}$ **Model-based risk-adjusted rate (indirect standardization) =** (Crude Rate/Expected Rate) × Provincial Crude Rate
Unit of Analysis	Patients (Stroke Acute Admissions)
Adjustment	Indirect adjustment using logistic regression models for TIA, Hemorrhagic Stroke and Ischemic Stroke adjusting for the following factors and significant interactions: age, ambulance arrival, medical history of AFIB and/or Hypertension, a Charlson Index of 7+ and, in the case of hemorrhagic stroke, whether the MRDx was subarachnoid versus intracranial hemorrhage. See the SR3.3 workbook for full specifications.
Reporting Level(s)	Province, Facility Ontario Health Region, and Index Acute Site
Interpretation	A lower rate is desired
Limitation(s)	
Other Notes	

SR3-4: Risk-Adjusted 30-Day All-Cause Readmission Rate for Stroke/TIA Patients

Indicator Definition	Risk-adjusted 30-day all-cause readmission rate following discharge from acute care or the ED for stroke or transient ischemic attack (TIA), per 100 patients
Data Source(s)	• Discharge Abstract Database (DAD) • National Ambulatory Care Reporting System (NACRS)
Denominator	Number of unique patients in the Stroke Cohort discharged alive, based on the following hierarchy: 1. Patients in the post-acute sub-cohort 2. Patients in the ED cohort meeting **all** the following criteria: Visit disposition code was not in the 'Death' category in **Appendix Table 2** and no stroke MRDx acute admission in the same fiscal year
Numerator	Patients re-admitted into acute care following the index event discharge • For acute patients, discharge is from admitting hospital • For ED patients, discharge is time patient left ED **Inclusions:** • Readmission to hospital less than or equal to 30 days from discharge of index event **Exclusions:** • Transfers to another acute hospital related to the index admission • Elective re-admissions (Admit category = 'L') • Re-admissions within 24 hours of discharge
Calculation	**Crude (unadjusted) rate =** $\frac{\text{Number of patients readmitted within 90 days of discharge}}{\text{Number of stroke patients discharged alive}}$ **Model-based risk-adjusted rate (indirect standardization) =** (Crude Rate/Expected Rate) * Provincial Crude Rate
Unit of Analysis	Patients (Stroke ED/Acute Admissions)
Adjustment	Age, Sex and Stroke Type
Reporting Level(s)	Province, Facility Ontario Health Region, and Index ED/Acute Site
Target/Benchmark	
Interpretation	• A lower rate is desired. • The risk-adjusted readmission rate is one measure of the effectiveness of hospital care and discharge planning.
Limitation(s)	• Each index patient requires at least 30 days of follow-up data from time of discharge
Other Notes	• Not all re-admissions are avoidable, and this indicator does not capture which re-admissions were avoidable and the underlying reasons. The indicator captures hospital re-admission only and does not capture return visits to the emergency department.

SR3-5: Standardized Rate of Discharge to CCC/LTC for Stroke/TIA Patients

Indicator Definition	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)
Data Source(s)	• Continuing Care Reporting System (CCRS) • Discharge Abstract Database (DAD)
Denominator	Number of patients discharged alive from acute care, excluding patients admitted from chronic hospitals, nursing homes and homes for the aged which corresponds to the following Institution from Type codes: • '03' = CCC • '04' = LTC • '09' = Inpatient palliative care facility

Numerator	Number of stroke patients meeting all of the following criteria:
	• Acute discharge disposition indicates facility transfer
	  ○ '01', '02', '03' for FY2017/18 and earlier
	  ○ '10', '30', '40' for FY2018/19
	• Acute discharge Institution to Type is a chronic facility code:
	  ○ '03' = CCC
	  ○ '04' = LTC
	  ○ '09' = Inpatient palliative care facility
	
	See **Appendix Table 2** for descriptions of discharge disposition codes

Calculation	$\frac{\text{Number of patients discharged to CCC/LTC}}{\text{Number of acute stroke patients discharged alive}}$
Unit of Analysis	Patient (Stroke Acute Admissions)
Adjustment	Age and Stroke Type
Reporting Level(s)	Province, Patient Ontario Health Region, Patient sub-Region, and Index Acute Site
Target/Benchmark	N/A
Interpretation	Patients admitted from the community with stroke or TIA and discharged to long-term or complex continuing care may indicate a shortage of rehabilitation options at time of discharge
Limitation(s)	• Patients discharged home and waiting for admission to LTC are not included. • Patients transferred to another acute care hospital and then admitted to a CCC or LTC facility are not included.
Other Notes	• This is a population-based indicator. The patient's postal code is used to report Regional performance.

SR3-6: Standardized Rate of Admission to Long-term Care One-Year Post-discharge

Indicator Definition	Proportion of stroke/TIA patients admitted into a long-term care facility within one year (365 days) following discharge from acute care
Data Source(s)	• Continuing Care Reporting System (CCRS)
Denominator	Number of patients discharged alive from acute care, excluding patients admitted from chronic hospitals, nursing homes and homes for the aged which corresponds to the following Institution from Type codes: • '3' = CCC • '4' = LTC • '9' = Inpatient palliative care facility
Numerator	Number of stroke patients admitted into a long-term care facility within one year (365 days) following the **index** discharge from acute care • 0 <= (LTC admission date – index acute discharge) <= 365 days • CCRS Sector = 'LTC'
Calculation	$\frac{\text{Number of patients admitted into LTC within 1 year}}{\text{Number of acute stroke patients discharged alive}}$
Unit of Analysis	Patient (Stroke Acute Admissions)
Adjustment	Age and Stroke Type
Reporting Level(s)	Province, Patient Ontario Health Region, Patient sub-Region, and Index Acute Site
Target/Benchmark	N/A
Interpretation	A lower value is desired
Limitation(s)	Patient who are wait-listed for long-term care are not captured in the numerator.
Other Notes	• This is a population-based indicator. The patient's postal code is used to report Regional performance. • Patients first discharged home from acute care and then admitted to LTC within a year are included. • Patients transferred to another acute care hospital and then admitted to a LTC facility are included. • Due to the 1-year follow-up requirement, the last reporting fiscal year includes only acute discharges from Q1 & Q2 (April – September).

SR3-7: Standardized Days at Home in the 90-days Following Stroke or TIA Admission

Indicator Definition	The number of days stroke/TIA patients spent alive and outside of a health institution (hospital, inpatient rehab and/or skilled nursing facility) in the first 90 days after admission into acute care

Data Source(s)	• Discharge Abstract Database (DAD)
	• National Ambulatory Care Reporting System (NACRS)
	• Registered Persons Database (RPDB)
	• National Rehabilitation Reporting System (NRS)
	• Continuing Care Reporting System (CCRS)
	  ○ Long Term Care (LTC)
	  ○ Continuing Complex Care (CCC)

Cohort	Patients in the acute inpatient stroke cohort, excluding:
	• Patients from chronic hospitals, nursing homes and homes for the aged which corresponds to the following Institution from Type codes:
	  ○ '03' = CCC
	  ○ '04' = LTC
	  ○ '09' = Inpatient palliative care facility
	• Patients who have death dates erroneously recorded as being before acute care admission

Calculation	Number of days not institutionalized in the first 90 days after the index admission into an acute hospital, defined as: **Home-time** = (Maximum Home-time) – (Non-Home Time) Non-Home (NH) time is the sum (total) of the following up to the maximum home time cut-off date: • Length of stay until discharge for index acute admission (DAD) • Length of stay for inpatient re-admissions (DAD) • NACRS for admissions with at least 1 overnight stay • Length of stay in a long-term care (LTC) facility • Length of stay in a complex continuing care (CCC) facility • Length of stay in a rehabilitation (NRS) facility Maximum Home-time = Minimum of 90 days or days alive after admission Methodology: 8. Include records for admissions after index acute admission and within the maximum home time cut-off (noted above) 9. Include records where the discharge date is at least one day after the admission date or empty 10. Sort by admission date and discharge date 11. Append non-home records from all sources, by sorted variables 12. Using the lag function, check for overlapping institution time 13. Count overlapping institution time only once Hypothetical example 1

<table>
<tr><td></td><td>
<table>
<tr><th>HCN</th><th>Acute Admission</th><th>Non-Home Admission</th><th>Non-Home Discharge</th><th>Non-Home Time</th></tr>
<tr><td>1</td><td>2017-05-13</td><td>2017-05-14</td><td>2017-07-31</td><td>78</td></tr>
<tr><td>1</td><td>2017-05-13</td><td>2017-07-24</td><td>2017-08-07</td><td>7</td></tr>
</table>

Hypothetical example 2
<table>
<tr><th>HCN</th><th>Acute Admission</th><th>Non-Home Admission</th><th>Non-Home Discharge</th><th>Non-Home Time</th></tr>
<tr><td>2</td><td>2017-05-13</td><td>2017-05-14</td><td>2017-07-31</td><td>78</td></tr>
<tr><td>2</td><td>2017-05-13</td><td>2017-07-24</td><td>2017-07-25</td><td>0</td></tr>
</table>

95% confidence intervals were based on bootstrap sampling with 1000 replicates.
</td></tr>
<tr><td>Adjustment</td><td>Stroke type and patient age</td></tr>
<tr><td>Unit of Analysis</td><td>Days per stroke patient</td></tr>
<tr><td>Reporting Level(s)</td><td>Province, Facility Ontario Health Region, and Index Acute Site</td></tr>
<tr><td>Target/Benchmark</td><td>N/A</td></tr>
<tr><td>Interpretation</td><td>A higher value is desired</td></tr>
<tr><td>Limitations</td><td>• Patients require at least 90 days (1 quarter) of follow-up following their admission into acute care. Post-acute activity may span multiple quarters.</td></tr>
<tr><td>Other Notes</td><td></td></tr>
</table>

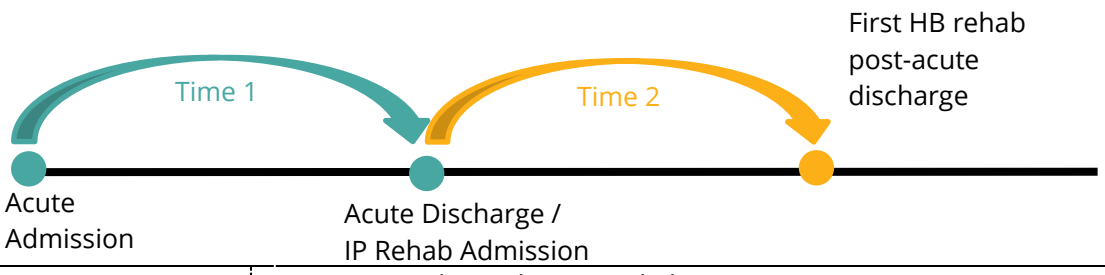
Chapter 4: Post-acute Stroke Rehabilitation Access and Timeliness

SR4-1: Proportion of Stroke Patients who Received Post-acute Rehabilitation

Indicator Definition	Proportion of stroke patients discharged alive from acute care who were admitted into IP rehab and/or received at least 3 HB rehab visits, reported as 3 sub-indicators: • SR4-1.1: Proportion of Stroke Patients who Received Post-acute Rehabilitation • SR4-1.2: Proportion of Stroke Patients who Received Inpatient Rehabilitation • SR4-1.3: Proportion of Stroke Patients who Received Home-based Rehabilitation
Data Source(s)	• National Rehabilitation Reporting System (NRS) • Home Care Database (HCD), Client Health and Related Information System (CHRIS)
Denominator	Number of stroke patients who are eligible for rehab meeting all of the following criteria: • Discharged alive from the final acute care hospital • Did not self-sign-out from the final acute care hospital • Stroke type is ischemic or hemorrhagic or unknown
Numerator	Subset of the denominator who satisfied any of the following criteria: • Admitted into IP rehab within 1 day following final discharge from acute care • Received at least 3 HB rehab visits for the following services: ○ 5 = Physiotherapy (PT) ○ 6 = Occupational therapy (OT ○ 7 = Speech language therapy (SLP) ○ 8 = Social work (SW)
Calculation	**Proportion Receiving IP and/or Home-Based Rehab**: $\frac{\text{Number of patients receiving IP or HB rehab}}{\text{Number of rehab} - \text{eligible stroke patients}}$ Proportion receiving either modality separately computed analogously. Note: Patients can appear in multiple rehab care settings, but they are included only once in the numerator for each calculation.
Unit of Analysis	Patient (Stroke Acute Admissions)
Adjustment	Stroke type and severity
Reporting Level(s)	Province, Patient Ontario Health Region, Patient sub-Region, and Index Acute Site
Target/Benchmark	Benchmarks are provided
Interpretation	A higher value is desired
Limitation(s)	• Stroke OP rehab data are currently not available. • Post-acute rehab activity may occur in multiple fiscal years.

Other Notes	• This indicator is an update to the old Stroke Report Card indicator #11 (admitted into IP rehab). It now also reports the proportion who received HB rehab, and proportion who received **any** post-acute rehab. • Due to missing outpatient rehab data, sub-indicator SR4-1.1 is on pause as decided by Stroke Evaluation Quality Committee

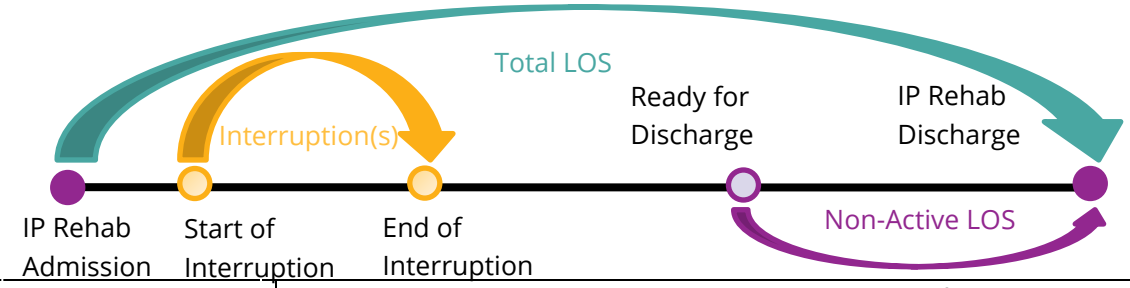
SR4-2: Median Time to First Post-Acute IP and HB Rehabilitation

Indicator Definition	There are two-time measurements for this indicator. For patients discharged to IP rehab, Time 1 is the number of days from acute admission to IP rehab admission. Among those who were **not** admitted IP rehab, Time 2 is the number of days from the final acute discharge to the first HB rehab visit.
Data Source(s)	• National Rehabilitation Reporting System (NRS) • Home Care Database (HCD), Client Health and Related Information System (CHRIS)
Cohort	Stroke patients in the Rehabilitation cohort • Admitted into IP rehab within 1 day following the final discharge from acute care • Received at least 3 HB rehab visits
	
Calculation	For patients admitted into IP rehab: **Time 1** = (IP Rehab Admission) – (Acute Care Admission) For patients who received HB Rehab, and not admitted into IP rehab: **Time 2** = (First HB Rehab) – (Acute Care Discharge)
Unit of Analysis	Days
Adjustment	No
Reporting Level(s)	Province, Facility Ontario Health Region, and Index Acute Site
Target/Benchmark	• Time 1 - Ischemic Target: 6 days • Time 1 - Hemorrhagic Target: 8 days • Time 2 Target: 48 hours (2 days) *Source: Health Quality Ontario; Ministry of Health and Long-Term Care. Quality-based procedures: clinical handbook for stroke (acute and post-acute). Toronto: Health Quality Ontario; 2016 December.*
Interpretation	Individual patient factors may influence the time to post-acute rehabilitation.
Limitation(s)	• Stroke OP rehab data are currently not available. • Post-acute rehab activity may occur in both the index and subsequent fiscal year. Due to insufficient follow-up IP rehab data, the last reporting fiscal year includes only acute discharges from Q1 & Q2 (April – September).
Other Notes	• This indicator is an update to the old Stroke Report Card indicator #13: Days from onset to IP rehab admission. It now reports on three different time measurements. The starting point is no longer onset as identified in NRS but is conditional on the time measurement. • A consideration for future reporting is a third time measurement from IP rehab discharge to the first HB rehab visit.

SR4-3: Best-practice Rehabilitation Setting within Target Time

Indicator Definition	Proportion of stroke patients who received post-acute rehab at the care setting and within recommended times as determined by stroke severity, according to current best practices
Data Source(s)	• National Rehabilitation Reporting System (NRS) • Home Care Database (HCD), Client Health and Related Information System (CHRIS)
Denominator	Number of stroke patients who are eligible for rehab meeting all of the following criteria: • Discharged alive from the final acute care hospital • Did not self-sign-out from the final acute care hospital • Stroke type is ischemic or hemorrhagic or unknown • Stroke severity is not unknown
Numerator	• Discharged to best-practice rehab care setting based on severity at acute care as identified in **Appendix Table 3** • Admitted to or received the first post-acute care rehab within the recommended time based on stroke severity as identified in **Appendix Table 3**
Calculation	$\frac{\text{Number of patients discharged to best} - \text{practice rehab care setting within target time}}{\text{Number of rehab} - \text{eligible stroke patients}}$
Unit of Analysis	Patient (Stroke Acute Admissions)
Adjustment	No
Reporting Level(s)	Province, Facility Ontario Health REGION, and Index Acute Site
Target/Benchmark	Benchmarks are provided
Interpretation	A higher rate is desired
Limitation(s)	• Due to the non-availability of outpatient stroke rehab data, this indicator is currently on pause, as decided by Stroke Evaluation Quality Committee.
Other Notes	• *The UDSMR AlphaFIM Instrument guide asserts: "The AlphaFIM® instrument and associated algorithms should not be used as the sole source of information upon which admission and discharge decisions are made but should supplement rather than replace good clinical care and medical judgement." Thus, we do not expect 100% compliance to the best-practice post-acute rehab discharge destination.*

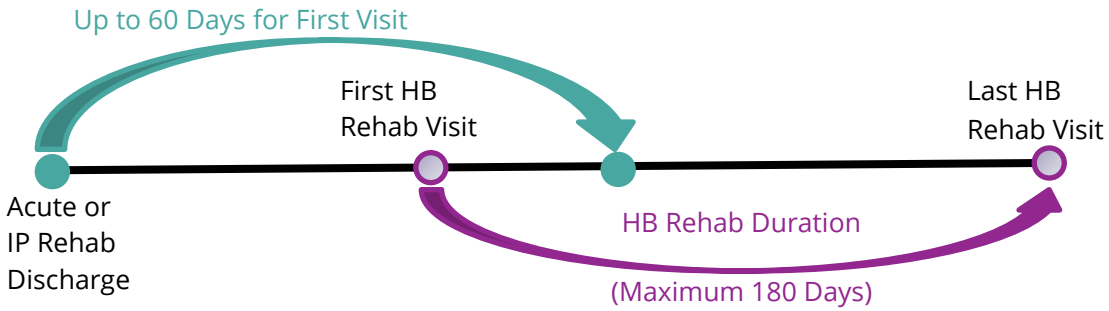
SR4-4: Standardized Active Length of Stay in Inpatient Rehabilitation

Indicator Definition	The number of days at inpatient rehabilitation excluding non-active length of stay (LOS) and all service interruptions
Data Source(s)	National Rehabilitation Reporting System (NRS)
Cohort	Patients in IP rehab cohort which can include any of the following: • Admitted into IP rehab within 1 day following final acute discharge • Admitted from non-acute facility such as CCC
	
Calculation	The stay at IP rehab may not be continuous at a single facility. The active LOS excludes from the total LOS the sum of the first three interruptions in stay and non-active days. **IP Rehab Active LOS (Crude)** $= \text{Total LOS} - (\text{Non} - \text{Active LOS}) - \text{Interruptions}$ $= (\text{Discharge Date} - \text{Admission Date})$ $- (\text{Discharge Date} - \text{Ready for Discharge Date})$ $- \sum_{i=1 \text{ to } 3} (\text{End of Interruption} - \text{Start of Interruption})_i$
Unit of Analysis	Days
Adjustment	• Indirect adjustment using RPG FIM motor and cognitive score • 95% confidence intervals were based on bootstrap sampling with 1000 replicates.
Reporting Level(s)	Province, Facility Ontario Health Region, and IP Rehab Site
Target/Benchmark	No target is provided as this indicator is adjusted for RPG FIM motor and cognitive score, and individual targets of each RPG is no longer applicable.
Interpretation	Patient's length of stay in post-acute inpatient rehabilitation is based on patient's needs.
Limitation(s)	Indicator currently is not reported in the Stroke Report and will be replaced in the future with another LOS indicator. Although there are targets LOS, there is ambiguity regarding whether they are maximum or minimum thresholds.
Other Notes	• Reporting period is based on fiscal year of IP rehab discharge date. • Up to five service interruptions are reportable in NRS. As the majority of NRS records reported patients as having no service interruption, there was a negligible difference in active LOS.

SR4-5: Median Minutes Per Day of Direct Therapy in Inpatient Rehabilitation

Indicator Definition	The number of minutes per day of direct therapy received by stroke patients during their active inpatient rehab stay
Data Source(s)	National Rehabilitation Reporting System (NRS)
Cohort	Patients in IP rehab cohort which can include any of the following: • Admitted into IP rehab within 1 day following the final discharge from acute care • Admitted from non-acute facility such as CCC
Calculation	$\text{Therapist Activity} = \begin{matrix}\text{Physiotherapy (PT) minutes} \\ + \text{Occupational Therapy (OT) minutes} \\ + \text{Speech} - \text{Language Pathology (SLP) minutes}\end{matrix}$ $\text{Therapy Assistant (TA) Activity} = \text{PT} + \text{OT} + \text{CD Assistant minutes}$ $\text{Total Reported Therapy (TRT)} = \text{Therapist Activity} + \text{TA Activity}$ $\text{TA Cutoff} = (\text{TRT}) \times 0.33$ $\text{Pro} - \text{rated IP Rehab} = \begin{matrix}\text{minimum (TRT,} \\ \text{Therapist Activity} + \text{TA Cutoff)}\end{matrix}$ **Patient-level Rehab Intensity**: $\text{IP Rehab Intensity} = \frac{\text{Pro} - \text{rated IP Rehab}}{\text{IP Rehab Active LOS}}$ Note 1: Rehab time or activity values that contain '999' or '9999' or '99999' are ignored in the above Note 2: Indicator is median intensity
Unit of Analysis	Minutes per Day, per Patient
Adjustment	No
Reporting Level(s)	Province, Facility Ontario Health Region, and IP Rehab Site
Target/Benchmark	Target: 180 minutes per day (Health Quality Ontario, Ministry of Health and Long-Term Care. *Quality-Based Procedures: Clinical Handbook for Stroke (Acute and Postacute)*. Toronto, ON: HQO; December 2016. Accessed April 15, 2019 at http://health.gov.on.ca/en/pro/programs/ecfa/docs/qbp_stroke.pdf)
Interpretation	A higher rate is desired
Limitation(s)	IP rehab therapy minutes only include direct (face-to-face) rehab time and excludes group sessions.
Other Notes	• Reporting period is based on fiscal year of IP rehab discharge date. Therapy minutes data are available for FY2015/16 and after.

SR4-6: Median Duration of Home-based Rehab (Weeks)

Indicator Definition	The number of weeks of home-based (HB) rehab following discharge from acute care or inpatient (IP) rehab, up to a maximum of 180 days. The first HB rehab visit must start within 60 days of discharge.
Data Source(s)	Home Care Database (HCD), Client Health and Related Information System (CHRIS)
Cohort	Stroke patients who received at least 3 HB rehab visits following discharge from acute care or IP rehab
	
Calculation	**HB Rehab Duration** = (Last visit within 180 days following first visit − Date of first visit within 60 days following discharge) /7 Included HB rehab services for stroke: ○ 5 = Physiotherapy (PT) ○ 6 = Occupational therapy (OT ○ 7 = Speech language therapy (SLP) ○ 8 = Social work (SW) Indicator is median
Unit of Analysis	Weeks
Adjustment	No
Reporting Level(s)	Province, Patient Ontario Health Region, Patient Subregion, and Index Acute Site
Target/Benchmark	Benchmarks are provided
Interpretation	Longer duration of rehab-associated home care visits implies greater intensity of services directed to recovery from stroke.
Limitation(s)	• This indicator requires up to 240 days of follow-up in the home care data, so post-acute rehab activity may occur in both the index and subsequent fiscal year. • Regions providing HB rehab therapy where there are planned or expected gaps between therapy visits will have a longer duration.
Other Notes	• HCD records indicate that some visits occurred while a patient was still admitted in an IP rehab facility. These are not considered HB rehab visits and are excluded from this indicator.

SR4-7: Median Number of Home-based Rehab Visits

Indicator definition	The number of home-based (HB) rehab visits among stroke patients who received at least 3 HB rehab visits following discharge from acute care or inpatient rehab
Data source(s)	Home Care Database (HCD), Client Health and Related Information System (CHRIS)
Cohort	Stroke patients who received at least 3 HB rehab visits following discharge from acute care or IP rehab
Calculation	The total number of HB rehab visits among the following services for stroke: ○ 5 = Physiotherapy (PT) ○ 6 = Occupational therapy (OT ○ 7 = Speech language pathology (SLP) ○ 8 = Social work (SW) Indicator is median
Unit of analysis	Visits
Adjustment	No
Reporting level(s)	Province, Patient Ontario Health Region, Patient Subregion, and Index Acute Site
Target/Benchmark	Benchmarks are provided
Interpretation	More rehab-associated home care visits imply greater intensity of services directed to recovery from stroke.
Limitation(s)	This indicator requires up to 240 days of follow-up in the home care data after discharge, so post-acute rehab activity may occur in both the index and subsequent fiscal year. Thus, the last reporting fiscal year includes only acute discharges from Q1 & Q2 (April – September).
Other Notes	• A new inclusion criterion of a minimum 3 HB rehab visits was implemented to exclude patients who most likely received only assessment visits and not actual rehab visits. This criterion will lead to a reduction in the number of patients as receiving HB rehab, but an increase in the mean number of visits. • HCD records indicate that some visits occurred while a patient was still admitted in an IP rehab facility. These are not considered HB rehab visits and are excluded from this indicator.

Chapter 5: Reporting Considerations

Benchmarks

Where applicable, the bottom and top performer values were provided using the ABC methodology. The top performers were identified as follows:

1. Care providers (hospitals or sub-Regions) were ranked in order of performance on the indicator.
2. Beginning with the highest-performing care provider, the providers were added until at least 20% of the total number of patients were represented (in the denominator). It is important to note that some of the indicators, low values are desired.
3. The benchmark is the indicator result of interest for the subset of eligible patients.

To ensure that high-performing care providers with low numbers of patients did not unduly influence the benchmark rates, hospitals or sub-Regions that had a cohort size (denominator) of less than 30 were not included in the benchmark calculations. A similar process was implemented to identify the bottom performance based on the lowest performing sites/Regions that accounted for 20% of the indicator cohort of interest.

Data Suppression

Data suppression is the masking of results as a requirement of Ontario's Personal Health Information Protection Act (PHIPA). There are three main scenarios where data suppression will be applied within the Stroke Report:

1. Non-reportable (NR): Volumes (counts) are between 1-5 ("small cell") in the denominator (cohort) or numerator of the original unmasked results. Masked results will appear with NR as a prefix, and ranges of possible values are provided where appropriate.
2. Complementary Suppression (CS): This is applicable only to proportion/rate type indicators where the difference between the denominator and the numerator is between 1-5. In other words, the absence of the event/outcome is a "small cell." Masked results will appear with a 'CS' prefix and ranges of possible values in the numerator and observed rate.
3. Supplementary Suppression (SS): This is applicable only when multiple levels of reporting are provided, where one level is a subset of the other. For example, the sum of all hospital/subregion results will equal the Ontario Health REGION result. For each year, if there is only one site/subregion/OH REGION with data suppression (or multiple results have NR or CS suppression, but the sum is still a "small cell"), then the lowest value greater than 5 will have results appear with an 'SS' prefix and ranges of possible values. (This is based on the numerator for proportion-rate type indicators and denominator for median-type indicators.

Performance Status

For applicable indicators, performance status (significant testing) was provided relative to Ontario's performance. Status can be "High," "Low" or "Inlier" and is based on the following algorithm:

- **High**: Observed rate exceeds the upper 95% confidence limit of the expected rate
- **Inlier**: Observed rate is within the 95% confidence interval of the expected rate
- **Low**: Observed rate is less than the lower 95% confidence limit of the expected rate

For indicators where the Expected values are not provided, but the median or standardized values are provided, the following algorithm is applied:

- **High**: Ontario value < Ontario Health Region/site/subregion's lower 95% confidence limit
- **Inlier**: Ontario value lies within the Ontario Health Region/site/subregion's 95% confidence interval
- **Low**: Ontario value > Ontario Health Region/site/subregion's upper 95% confidence limit

Additional considerations for performance status:

- Only provided for sites/subregions with at least 30 patients in the cohort (denominator)
- Based on actual results and not suppressed results
- Not provided for sites/Regions where the lower 95% confidence limit (CL) of the expected rate is 0
- Not relative to a target but may change in future stroke reporting

Appendix

Disclaimers and Acknowledgements

The aggregate data incorporated in the indicator reports and/or analytics products was provided by Ontario Health, a crown agency under the Ministry of Health. These reports, including any underlying source data or supplemental data and/or information, should not be shared with or disclosed to any individual or organization outside your regional stroke network partners, or re-printed or published, without seeking Ontario Health's prior written approval.

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Ontario Ministry of Health LHIN Sub-Region crosswalk file, which contains data copied under the license from the Canada Post Corporation and Statistics Canada.

Table of Acronyms

Acronym	Description
ALC	Alternate Level of Care
CABG	Coronary Artery Bypass Grafting
CCC	Complex Continuing Care
CCI	Canadian Classification of Health Interventions
CCRS	Continuing Care Reporting System
CHRIS	Client Health and Related Information System
CIHI	Canadian Institute for Health Information
DAD	Discharge Abstract Database
DSC	Designated Stroke Centre
DSU	Designated Stroke Unit
DTN	Door-to-needle (tPA)
ED	Emergency Department
EVT	Endovascular Thrombectomy/Therapy
HB	Home-based (Rehab)
HCD	Home Care Database
HCN	Health Card Number
ICD-10CA	International Classification of Diseases – Version 10 (Canada)
IP Rehab	Inpatient Rehabilitation
LOS	Length of Stay
LTC	Long-term Care
MCC	Major Clinical Category
MIS	Management Information System
MRDx	Most Responsible Diagnosis
NACRS	National Ambulatory Care Reporting System
NRS	National Rehabilitation Reporting System
ODB	Ontario Drug Benefit
OHIP	Ontario Health Insurance Plan
OP Rehab	Outpatient Rehab
OT	Occupational therapy / Occupational therapist
PCI	Percutaneous Coronary Intervention (angioplasty with stent)
PT	Physiotherapy / Physiotherapist
PTN	Patient Token Number
QBP	Quality-based Procedures
RPDB	Registered Persons Database
RSC	Regional Stroke Centre
SLP	Speech-Language Pathology
SW	Social Work(er)
tPA	Tissue Plasminogen Activator

List of EVT Hospitals in Ontario

Facility Name	Site Providing EVT	Facility Number	Institution Abbreviation	Institution AM Number	Institution AT Number	EVT Coverage Period (Fiscal)
Hamilton Health Sciences Corporation	General Site	942	HHSC	4231	1982	2017-2022
Health Sciences North	Laurentian	959	HSN	4063	4059	2020-2022
Kingston Health Sciences Centre	Kingston General	693	KHSC	4105	1100	2016-2017
Kingston Health Sciences Centre	Kingston General	693	KHSC	4832	4831	2018-2022
London Health Sciences Centre	University Hospital	936	LHSC	4310	3850	2017-2022
Sunnybrook Health Sciences Centre	Sunnybrook Health Sciences Centre	953	SHSC	4205	3936	2017-2022
The Ottawa Hospital	Civic Site	958	TOH	4079	4046	2017-2022
Thunder Bay Regional Health Sciences Centre	Thunder Bay Regional Health Sciences Centre	935	TBRHSC	4315	3853	2018-2022
Trillium Health Partners	Mississauga Site	975	THP	4756	4752	2017-2022
Unity Health Toronto	St. Michael's Hospital	852	UHT	3985	1444	2017-2017
Unity Health Toronto	St. Michael's Hospital	852	UHT	4864	4865	2018-2022
University Health Network	Toronto Western	947	UHN	4266	3910	2017-2022
Windsor Regional Hospital	Ouellette Campus	933	WRH	4774	4773	2017-2022

Note 1: Starting in FY2018/19, St. Michael's Hospital merged with St. Joseph and Providence to form Unity Health Toronto.
Note 2: Health Sciences North-Laurentian became an EVT site in FY2019/20 Q4. Operated 24/7 starting in 2021.
Note 3: Windsor Regional Hospital became an EVT site in 2020
Note 4: Kingston Health Sciences Centre was issued a new facility number in 2018.

List of Stroke Hospitals in Ontario with RSC/DSC or Thrombolysis or DSU Status

Institution Name	Ambulatory (AM) Number	Acute (AT) Number	Facility Number	RSC or DSC	Thrombolysis Status	Stroke Unit Status During Report Period (Effective Date)
Alexandra Marine and General Hospital	4082	1206	663		Y	
Bluewater Health - Sarnia General Site	4109	4415	966	DSC	Y	Y
Brant Community Healthcare Sys - Brantford	4679	4675	970	DSC	Y	Y
Brightshores Health System - Owen Sound	4131	3944	955	DSC	Y	Y
Brockville General Hosp - Charles St Site	4186	1273	619		Y	Y
Chatham Kent Health Alliance - Chatham (Public General Hosp Society Of Chatham)	4238	1223	628	DSC	Y	Y
Chatham Kent Health Alliance - Chatham (FY2018/19)	4870	4871	981	DSC	Y	Y
Cornwall Community Hospital	4452	4451	967	DSC	Y	FY2021/22 Q3
Dryden Regional Health Centre	4248	2103	647		Y	
Grand River Hospital Corp - Waterloo Site	4107	3734	930	DSC	Y	Y
Guelph General Hospital	4044	1946	665		Y	Y
Halton Healthcare Services Corp – Oakville	4192	3926	950		Y	FY2016/17
Hamilton Health Sciences – General	4231	1982	942	RSC	Y	Y
Hawkesbury And District General Hospital	4268	1777	800		Y	
Health Sciences North - Laurentian	4063	4059	959	RSC	Y	FY2017/18
Hopital Montfort	4130	1661	753			FY2023/24
Humber River Hospital - Wilson (FY2015/16)	4802	4799	941			Y
Huron Perth Healthcare Alliance - Stratford General	7557	7558	983	DSC	Y	Y
Joseph Brant Hospital	4144	1160	718		Y	FY2019/20
Kingston Health Sciences Centre - General	4105	1100	693	RSC	Y	Y
Kingston Health Sciences Centre - General (FY2017/18)	4832	4831	978	RSC	Y	Y
Lake-Of-The-Woods District Hospital	4200	2110	826		Y	
Lakeridge Health - Ajax (Rouge Valley Health System)	4140	4014	954		Y	
Lakeridge Health - Ajax (FY2017/18)	4845	4844	952		Y	
Lakeridge Health - Oshawa	4171	3932	952	DSC	Y	Y

Institution Name	Ambulatory (AM) Number	Acute (AT) Number	Facility Number	RSC or DSC	Thrombolysis Status	Stroke Unit Status During Report Period (Effective Date)
London Health Sciences Centre - University	4310	3850	936	RSC	Y	Y
London Health Sciences Centre - Victoria	4247	4359	936	RSC	Y	
Mackenzie Health – Cortelluucci Vaughan Hospital	5468	5469	701	DSC	Y	Y
Muskoka Algonquin Healthcare - Huntsville	4618	4616	968	DSC	Y	
Niagara Health System - Greater Niagara	3982	4213	962	DSC	Y	Y
Niagara Health System - St Catherine's Gen	4045	4224	962			FY2016/17 – FY2021/22
North Bay Regional Health Centre	4734	4730	974	DSC	Y	FY2016/17
Notre Dame Hospital (Hearst)	4169	2082	681		Y	
North York General Hospital	4233	1330	632			Y
Oak Valley Health - Markham Stouffville Hospital	4235	3587	905			FY2017/18
Orillia Soldiers' Memorial Hospital	4108	1853	745			FY2017/18
Pembroke Regional Hospital Inc.	4071	1804	763	DSC	Y	Y
Peterborough Regional Health Centre	4073	1768	771	DSC	Y	Y
Quinte Healthcare Corporation - Belleville	4097	3988	957	DSC	Y	Y
Riverside Health Care Fac - La Verendrye	4124	2150	900		Y	
Ross Memorial Hospital	4177	1893	707			Y
Royal Victoria Regional Health Centre	3987	1825	606	RSC	Y	FY2016/17
Sault Area Hospital - Sault Ste Marie	3972	4407	965	DSC	Y	FY2021/22 Q2
Scarborough Health Network - Birchmount	3984	4154	979			FY2020/21
Scarborough Health Network - Centenary (Rouge Valley Health System - Centenary)	4139	3943	951			Up to FY2016/17
Scarborough Health Network - Centenary (FY2017/18)	4837	4836	979			FY2017/18 Only
Scarborough Health Network - General	3975	4152	960			Up to FY2016/17
Scarborough Health Network - General (FY2017/18)	4839	4840	979			Up to FY2019/20
Sioux Lookout Meno-Ya-Win Health Centre	4137	4353	964		Y	
Southlake Regional Health Centre	4001	2038	736			Y

Institution Name	Ambulatory (AM) Number	Acute (AT) Number	Facility Number	RSC or DSC	Thrombolysis Status	Stroke Unit Status During Report Period (Effective Date)
St Thomas-Elgin General Hospital	4076	1059	793			FY2016/17
Sunnybrook Health Sciences Centre	4205	3936	953	RSC	Y	Y
Temiskaming Hospital	4264	2207	888		Y	
The Ottawa Hospital – Civic	4079	4046	958	RSC	Y	FY2016/17
The Ottawa Hospital – General	4085	4048	958		Y	
Thunder Bay Regional Health Sciences Centre	4315	3853	935	RSC	Y	Y
Timmins & District General Hospital	4123	3414	907	DSC	Y	FY2016/17
Toronto East Health Network - Michael Garron	4209	1302	858			FY2020/21
Trillium Health Partners - Credit Valley	4751	4747	975		Y	
Trillium Health Partners - Mississauga	4756	4752	975	RSC	Y	Y
Unity Health Toronto-St Joseph's Health Centre	4857	4858	980			Y
Unity Health Toronto-St. Michael's Hospital	3985	1444	852	RSC	Y	Y
Unity Health Toronto-St. Michael's Hospital (FY2018/19 and after)	4864	4865	980	RSC	Y	Y
University Health Network-Toronto Western	4266	3910	947	RSC	Y	Y
University Of Ottawa Heart Institute	4303	4164	961		Y	
Weeneebayko Area Health Authority – Moose Factory	4699	4698	973		Y	
William Osler Health System - Brampton	4685	4681	951		Y	FY2018/19
William Osler Health System - Etobicoke	4245	3929	951		Y	FY2018/19
Windsor Regional Hospital - Ouellette	4774	4773	933	DSC	Y	Y

Note: Some institutions are listed multiple times to include all institution and facility numbers due to recent mergers. Reporting will reflect current institution numbers and names.

Technical Appendix

Appendix Table 1: 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 Table 2: Discharge and Visit Disposition Codes

Disposition	Code	Discharge or Visit Disposition Description
Transfer	01	Transferred to an acute care inpatient institution (FY2017/18 and earlier)
Transfer	02	Transferred to continuing care (FY2017/18 and earlier)
Transfer	03	Transferred to other (FY2017/18 and earlier)
Transfer	10	Inpatient Care
Transfer	30	Residential Care
Transfer	40	Group/Supportive Living
Death	07	DAD - Died (FY2017/18 and earlier)
Death	10	NACRS - Death after Arrival (FY2017/18 and earlier)
Death	11	NACRS - Death on Arrival (FY2017/18 and earlier)
Death	71	NACRS - Death on Arrival
Death	72	Died in Facility
Death	73	Medical Assistance in Dying (MAID)
Death	74	Suicide in Facility
Sign-out	06	Sign-out (left against medical advice or absent without leave) (FY2017/18 and earlier)
Sign-out	12	DAD - Did not return from a pass (FY2017/18 and earlier)
Sign-out	61	Absent without leave
Sign-out	62	Left against medical advice
Sign-out	65	Did not return from a pass
Sign-out	66	Died While on Pass/Leave
Sign-out	67	Suicide out of Facility

Appendix Table 3: Appropriate Level Care and Recommended Time

Stroke Type	AlphaFIM Range	Stroke Severity	Appropriate Rehab Care Setting	Recommended Time to First Rehab Treatment
Ischemic	81 and up	Mild	Home-based or outpatient (ie in community)	Within 48 hours following discharge from acute care
Ischemic	40 – 80	Moderate	Inpatient	Within 6 days following admission into acute care
Ischemic	Less than 40	Severe	Inpatient	Within 6 days following admission into acute care
Hemorrhagic	81 and up	Mild	Home-based or outpatient (ie in community)	Within 48 hours following discharge from acute care
Hemorrhagic	40 – 80	Moderate	Inpatient	Within 8 days following admission into acute care
Hemorrhagic	Less than 40	Severe	Inpatient	Within 8 days following admission into acute care

Patients following the trajectory of inpatient rehab and on to outpatient or home-based rehab should access these services within 72 hours of inpatient rehab discharge.

Appendix Table 4: OHIP Billing Codes for Carotid Imaging

Service Type	Fee Code
Carotid Doppler	J189, J190, J191, J192, J195, J201, J489, J490, J491, J492, J501
Carotid CTA	X404, X417
Carotid MRA	X431, X435
Carotid Angiography	J021, J022, X140, X165, X179, X180, X181, X182

Appendix Table 5: Procedure (CCI) Codes for Carotid Imaging

CCI Code	Description
3JE10	X-ray, carotid artery
3JE20	CT carotid artery
3JE30	Ultrasound, carotid artery
3JE40	MRI – carotid artery

Appendix Table 6: Oral Anticoagulant Drugs

Generic Name	Drug Identification Number (DIN)
APIXABAN	02377233, 02397714, 09857463
DABIGATRAN ETEXILATE	02312433, 02312441, 02358808, 02468891, 102468905, 02468913
EDOXABAN	02458640, 02458659, 02458667
RIVAROXABAN	02316986, 02378604, 02378612, 02480808
WARFARIN	COUMADIN: 01918311, 01918338, 01918346, 01918354, 01918362, 02007959, 02240205, 02240206 TARO-WARFARIN: 02242680, 02242681, 02242682, 02242683, 02242684, 02242685, 02242686, 02242687 APO-WARFARIN: 02242924, 02242925, 02242926, 02242927, 02242928, 02242929, 02245618

Sources:
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https://www.formulary.health.gov.on.ca/formulary/results.xhtml?q=edoxaban&type=1
https://www.formulary.health.gov.on.ca/formulary/results.xhtml?q=rivaroxaban&type=1
Note: DINs not listed in the Ontario Drug Benefit Formulary are excluded