Neurosurgery Scorecard User Guide

Technical Guide for Report Format, Indicator Definitions and Performance Standards

Version 1.0

January 2024

Version Control

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About Critical Care Services Ontario

Established in 2005, Critical Care Services Ontario (CCSO) led the implementation of Ontario's first Critical Care Strategy and now centrally coordinates and develops integrated system solutions for critical care (Adult, Paediatric and Neonatal) and specialty programs aligned with critical care (Neurosurgery, Trauma and Burns, and the Life or Limb Policy). CCSO's work is the result of an ongoing collaboration between critical care providers, hospital administrators, partners from the Ministry of Health, Ontario Health, and other health system leaders.

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Abbreviations

ALC	Alternative Level of Care
CACS	Comprehensive Ambulatory Care Classification System
CCSO	Critical Care Services Ontario
CHRP	Canadian Hospital Reporting Project
CIHI	Canadian Institute for Health Information
CMG	Case Mix Group
DAD	Discharge Abstract Database
HAB	Health Analytics Branch (Ministry of Health)
HBAM	Health Based Allocation Model
HIG	HBAM Inpatient Grouping
LHIN	Local Health Integration Network
LOS	Length of Stay
MOH	Ministry of Health
MRP	Most Responsible Provider
NACRS	National Ambulatory Care Reporting System
NRS	National Rehabilitation Reporting System
OH	Ontario Health
OR	Operating Room
ORBC	Operating Room Benchmarks Collaborative
PARR	Post Anaesthetic Recovery Room
PNAC	Provincial Neurosurgery Advisory Committee
RIW	Resource Intensity Weight
RPDB	Registered Persons Database
SETP	Surgical Efficiency Target Program
VNS	Vagal Nerve Stimulation
WTIS	Wait Times Information System

1. Purpose and Scope

In 2012, the Provincial Neurosurgery Advisory Committee (PNAC) was formed as a self-governing stakeholder board comprised of senior health leaders and system partners from across the province to enhance system coordination and planning for neurosurgery. Working in collaboration with CCSO, the PNAC identifies neurosurgery system issues and develops and implements strategic initiatives to enhance a patient-centred, integrated, inclusive and sustainable provincial neurosurgery system for patients and families in Ontario.

As part of the ongoing work of PNAC, the Performance Management Working Group was tasked with identifying a standardized set of neurosurgical performance metrics for the neurosurgical system and developing and utilizing a performance management framework to organize measures, identify priorities, and monitor hospital and system performance to ensure access, quality and integration.

About this Guide

This guide is intended to provide neurosurgical hospitals with the standardized definitions and methodology used to produce neurosurgery indicators that are included in the Neurosurgery Scorecard (Scorecard). The Scorecard includes facility level reporting of results for each of the 13 acute inpatient neurosurgical centres and 13 inpatient neurosurgery rehabilitation centres.

This document contains methodology information and performance standards (where established) for each of the indicators (see Section 2).

Note: This guide is not a replacement for any hospital, Ontario Health (OH) Region or Ministry reporting requirements or performance management programs.

Audience

This guide is designed for hospital administrators, clinical leaders and decision support/data analysts in Ontario neurosurgical programs. The intent of the guide is to summarize indicator-reporting processes and define indicators and data calculation methodology.

The Reporting Process

The Scorecard will be updated and available quarterly on the CCSO Data Analytics Platform. The data-reporting period for each indicator is based on the most current data available. The general timeframes for report release and data contained in reports is as follows:

Report Release	Data Reporting Period (DAD indicators)	Data Reporting Period (CritiCall, Hospital and WTIS based indicators)
November	Q1 (April to June)	Q2 (July to September)
February	Q2 (July to September)	Q3 (October to December)
May	Q3 (October to December)	Q4 (January to March)
August	Q4 (January to March)	Q1 (April to June)

Indicators that deviate from these reporting timelines, and the data release schedule include:

- A2. Average Wait Time for Neurosurgical Clinic Referral: released annually in May for previous fiscal year.
- Q1. Risk Adjusted Neurosurgery Mortality Rate: released annually in August for previous calendar year.

About the Indicators

In 2023, the Neurosurgery Scorecard Task Force comprised of representatives from neurosurgery centres and rehabilitation hospitals, was convened to review the Scorecard indicators and assess each indicator's relevance for measuring performance in the following domains: access, quality and system integration. The current Scorecard includes 8 neurosurgery, 4 inpatient rehabilitation and 8 intracranial aneurysm care indicators. The majority of data in the Scorecard is populated from existing provincial datasets (Canadian Institute for Health Information (CIHI) – Discharge Abstract Database (DAD), National Ambulatory Care Reporting System (NACRS) and National Rehabilitation Reporting System (NRS); Wait Times Information System (WTIS); and CritiCall Ontario). The considerations used in selecting data sources include:

- Where possible, the focus has been to rely upon standardized data sets and provincially available data to ensure consistency and comparability of data.
- Where timelines for reporting of data for accountability purposes do not allow for access to standardized data sets (e.g. delays in access to DAD data), attempts have been made to clearly define alternate data sources and provide clear direction on the method of indicator calculation.
- In some instances, there may be concerns with the underlying quality of the information reported into standardized data repositories used to generate indicators. It is acknowledged that these concerns exist. The indicator development and reporting process will be updated as needed to improve the quality of reported information and data supporting indicators.

A summary of the indicators reported is included below.

Indicator Domain	Indicator	Data Source	Age Group	
			Adult	Paediatric
Neurosurgery Indicators				
Access	A1.Provincial Neurosurgical Admissions Profile – Inpatient & Outpatient	DAD and NACRS	✓	✓
	A2. Average Wait Time for Neurosurgical Clinic Referral	WTIS, OH	✓	✓
	A3.Percent Neurosurgery Cases Completed within Wait Time Target (Reported for Priority Level 2)	WTIS, OH	✓	
Quality	Q1. Risk Adjusted Neurosurgery Mortality Rate	DAD and RPDB	✓	
	Q2.Unplanned Neurosurgical Readmission Rate within 30 Days for Any Reason to Any Hospital	DAD, CIHI	✓	✓
	Q3.Cerebrospinal Fluid (CSF) Shunt Infection Rate	Surgical / OR System		✓
Integration	S1.CritiCall R1 Neurosurgical Acceptance Rate	CritiCall Ontario	✓	✓
	S2.CritiCall R2 and Other Neurosurgical Acceptance Rate	CritiCall Ontario	✓	✓
Inpatient Neurosurgery Rehabilitation Indicators				
Access	R1.Inpatient Neurosurgery Rehabilitation Cases	NRS	✓	
Quality	R2.90th Percentile Wait Time for Inpatient Neurosurgery Rehabilitation Care	NRS	✓	
Integration	R3.Inpatient Neurosurgery Rehabilitation Average Active LOS	NRS	✓	
	R4.Inpatient Neurosurgery Rehabilitation Discharge Rate – Service Goals Met	NRS	✓	
Intracranial Aneurysm Care Indicators				
Access	IC1.Intracranial Aneurysm Care Volumes	DAD	✓	
	IC2.Volume by WFNS Grade of Aneurysmal Subarachnoid Hemorrhage	Hospital Reported	✓	
Quality	IC3.Procedural Complication Rate - Ischemic Stroke	Hospital Reported	✓	
	IC4.Procedural Complication Rate - Aneurysm Rebleeding	Hospital Reported	✓	
	IC5.Intracranial Aneurysm In-hospital Crude Mortality Rate	DAD	✓	
	IC6.Outcome - Discharge Modified Rankin Scale	Hospital Reported	✓	
	IC7.Intracranial Aneurysm Average Acute Length of Stay	DAD	✓	
	IC8.2nd Treatment Rate within 1 year	Hospital Reported	✓	

2. Indicator Definitions and Performance Standards

A1.Provincial Neurosurgical Admissions Profile – Inpatient and Outpatient

Indicator Name	Provincial Neurosurgical Admissions Profile – Inpatient and Outpatient
Indicator Domain	Access
Indicator Objective	Stability of local services
Performance Standard	Target is not yet established.
Indicator Definition	Overview of hospital neurosurgical admissions, including total volume of both inpatient and outpatient day surgery neurosurgery admissions combined, and percentage of volumes related to elective cases.
Indicator Formula	a) **Total # of cases** = Raw volumes of neurosurgery inpatient and day surgery discharges in reporting period b) **% Elective Cases** = [Elective cases] / [Total Volumes] c) **Total Weighted Case** = Total Resource Intensity Weight (CMG+ RIW) + Total CACS Weight for all neurosurgery cases
Method of Indicator Calculation	• **Inclusion**: Neurosurgery cases are defined as cases with a Most Responsible Provider Service = 00032 (Neurosurgery) or 0042 (Paediatric Neurosurgery) 　○ Adults: Age ≥ 18 years; Paediatrics: Age <18 years • **Grouping Methodology**: the CMG+ or CACS grouping methodology are reviewed and updated annually by CIHI. **# Neuro Cases**: Count of discharges 　○ From DAD, all discharges 　○ From NACRS, only day surgery cases **% Elective Cases:** a) **Numerator:** Number of Inpatient Cases (DAD) with: Admission Category = 'L - Elective/Planned Admission' and Outpatient Day Surgery Cases (NACRS) **Denominato**r: Total number of discharges b) **Calculation:** Sum of CMG+ RIW (DAD) and CACS RIW (NACRS)
Indicator Data Source	Discharge Abstract Database (DAD) & National Ambulatory Care Reporting System (NACRS)
Indicator Consideration	This indicator excludes spinal activity performed by orthopaedic surgeons.
Frequency	Quarterly
Report Generator	CCSO

A2. Average Wait Time for Neurosurgical Clinic Referral

Indicator Name	Average Wait Time for Neurosurgical Clinic Referral
Indicator Domain	Access
Indicator Objective	Provide timely care
Performance Standard	Provincial performance target is 182 days from referral date to consult date
Indicator Definition	Average wait time from date referral received by specialist to date of appointment (consult date) less days affecting readiness for consult (DARC) days
Indicator Formula	SUM([consult date] – [Initial referral date] – [DARC days])/[Volume of Cases]
Method of Indicator Calculation	• **Numerator:** Total Waiting Days = Sum of days waiting from date referral received to consult date less DARC days for all cases in reporting period • **Denominator:** Total Volume = total number of cases in reporting period ○ **Calculation:** [Total Waiting Days] / [Total Volume]
Inclusion Criteria	• **Inclusion**: Service Area = Neurosurgery
Exclusion Criteria	• **Exclusions**: Total volume excludes missing priorities designation
Indicator Data Source	Wait Time Information System (WTIS), Ontario Health (OH)
Indicator Considerations	• There is a noted challenge in appropriately capturing and excluding DARC days • Indicator includes information only for those patients proceeding to surgery
Frequency of Reporting	Quarterly
Report Generator	CCSO (from WTIS)

A3. Percent Neurosurgical Cases Completed within Wait Time Target (Priority Level 2)

Indicator Name	Percent Neurosurgical Cases Completed within Priority Level Wait Time Target (Adult)
Indicator Domain	Access
Indicator Objective	Provide timely care
Performance Standard	Provincial performance target is 90% of neurosurgical cases completed within wait time target for priority level 2
Indicator Definition	Percent of completed neurosurgery cases within access wait time target for priority level 2
Indicator Formula	[Within Target Volume] / [Total Volume]
Method of Indicator Calculation	• **Numerator**: Within Target Volume = volume of cases completed within their prescribed target • **Denominator**: Total Volume = total volume of neurosurgery procedures completed in a fully equipped operating room in Ontario for a prescribed target wait time group • **Access targets**: ○ **Priority Level 2**: 7 days
Inclusion Criteria	• **Inclusion**: Service Area = Neurosurgery; Adults: Age ≥ 18 years
Exclusion Criteria	• **Exclusions**: Total volume excludes missing priorities designation
Indicator Data Source	Wait Time Information System (WTIS), Ontario Health (OH)
Indicator Considerations	• By presenting at a composite level for neurosurgery program, some specificity in terms of pressure points will only be available by drill down investigation • Indicator includes benign and malignant tumour removal cases
Frequency of Reporting	Quarterly
Report Generator	CCSO (from WTIS)

Q1.Risk Adjusted Neurosurgery Mortality Rate - Cranial

Indicator Name	Risk Adjusted Neurosurgery Mortality Rate - Cranial
Indicator Domain	Quality
Indicator Objective	Deliver safe care
Performance Standard	Provincial performance target has not yet been established.
Indicator Definition	Risk adjusted 30 day mortality rate for neurosurgery patients (cranial cases)
Method of Indicator Calculation	• **Numerator:** total cases from Neurosurgery cohort that died within 30 days after admission • **Denominator:** total cases meeting the inclusion criteria for Neurosurgery cohort • **Event of interest captured by indicator**: death in any hospital or in the community within 30 days after admission. • **Risk adjustment**: age; gender; Charlson Comorbidity Index; previous admissions within 90 days; admission category; case mix • **Grouping methodology**: HBAM Inpatient Grouping (HIG) 2023

Inclusion Criteria	• **Inclusion**:
	  ○ Adults: Age ≥ 18 years
	  ○ Neurosurgery cohort consists of cases that satisfy one of the two following criteria:
	    1. Cases with the following HIGs: 001, 002, 003, 004, 005, 006, 009, 010, 011, 025, 038, 042, 308, 309, 347, 420, 752, 764, 765
	    2. Cases with Most Responsible Provider service code is Neurosurgeon (0032 or 0042), and the following HIGs: 026, 027, 041, 145, 185, 213, 780, 806, 815
	  ○ Cases from Neurosurgical centres (see Appendix A)

Exclusion Criteria	• **Exclusion**:
	  ○ Trauma patients: patient with an external case code (diagnosis type '9') coded as V01-Y36, Y85-Y87, Y89, excluding natural or environmental (W42-W43, W53-W64, W92-W99, X20-X39, X1-X57), overexertion (X50), poisoning (X40-X49, X60-X69, X85-X90, Y10-Y19, Y35.2) and suffocation (W75-W84, X70, X91, Y20)
	  ○ Paediatric patients (age<18 years)
	  ○ Palliative care patients (Most Responsible Diagnosis coded as Z51.5)
	  ○ Organ donors (Project No. 302 = 'Yes')
	  ○ Patients without a valid OHIP health card number
	  ○ Cases where discharge and admission dates are missing
	  ○ Gender is not male or female
	  ○ Discharge Disposition is '06 – Left Against Medical Advice'

Indicator Data Source	• Discharge Abstract Database (DAD), Registered Persons Database (RPDB)
Indicator Consideration	• Indicator is calculated by Health Data Science Branch at MOH
Frequency of Reporting	Annually
Report Generator	Health Data Science Branch at the Ministry of Health (MOH)

Q2.Unplanned Neurosurgical Readmission Rate within 30 Days for Any Reason to Any Hospital

Indicator Name	Unplanned Neurosurgical Readmission Rate within 30 Days for Any Reason to Any Hospital
Indicator Domain	Quality
Indicator Objective	Deliver safe care
Performance Standard	Provincial performance target is 10% reduction from the previous year readmission rate of provincial neurosurgery centres.
Indicator Definition	Measures the rate of unplanned readmission, to any hospital, within 30 days of discharge, for any diagnosis, for a neurosurgical intervention episode of care. Readmission is attributed to the first hospital at which the patient had the initial inpatient stay.
Method of Indicator Calculation	• **Numerator**: Cases within the denominator with an urgent/emergent readmission within 30 days of discharge • **Denominator**: Discharges by CMGs identified, in period

Inclusion Criteria	• **Inclusion**:
	    ○ Adults: Age ≥ 18 years; Paediatrics: Age <18 years
	    ○ Neurosurgery cases are defined by CMGs 001, 002, 004 thru 011, 305, 313, 314, 420, 731, 732, 735, 764, and 765. (CMG+ 2023 Grouping Methodology)
	    ○ (CMGs listed are also provided in the Appendix B)

Exclusion Criteria	• **Exclusion**: ○ Deaths
Indicator Data Source	• Discharge Abstract Database (DAD)
Indicator Consideration	• At this time, this indicator only includes inpatient-to-inpatient readmissions.
Frequency of Reporting	Quarterly
Report Generator	CCSO

Q3. Cerebrospinal Fluid (CSF) Shunt Infection Rate

Indicator Name	Cerebrospinal Fluid (CSF) Shunt Infection Rate
Indicator Domain	Quality
Indicator Objective	Deliver safe care
Performance Standard	Provincial performance target is 0%
Indicator Definition	Number of CSF shunt infections (excluding surgical site infections) relative to total number of CSF shunts inserted or revised for patients less than 18 years of age at time of admission
Method of Indicator Calculation	• **Numerator**: Number of CSF Shunt Infections • **Denominator**: Total number of shunt surgical cases
Inclusion Criteria	• **Inclusion**: Paediatrics Age < 18 years
Exclusion Criteria	• **Exclusion**: none
Indicator Data Source	• Hospital data collected using 'Neurosurgery CSF Data Submission' template submitted quarterly to CCSO
Indicator Consideration	• CSF shunt infections normally occur within 6 months to a year post surgery and are not related to the surgical site. • Using coded data, it is not possible to attribute the source of infection to a shunt, as the ICD 10 code is related to infection due to an implant or graft and thus may be related to another procedure (e.g. vascular access, etc.). For this reason, hospitals will manually collect and submit data for this indicator.
Frequency of Reporting	Quarterly
Report Generator	CCSO

S1. CritiCall R1 Neurosurgical Acceptance Rate

Indicator Name	CritiCall R1 Neurosurgical Acceptance Rate
Indicator Domain	System Integration
Indicator Objective	Optimize patient flow
Performance Standard	Provincial performance target is 90% for CritiCall R1 neurosurgical acceptance rate
Indicator Definition	Percentage of neurosurgical patients accepted by each site compared to total requested transfers when the site was most responsible from within referral area as per the approved algorithm for neurosurgery patients.
Method of Indicator Calculation	• **Numerator**: Acceptance indicates how often the site accepted a referral when that site was the most responsible as per the approved algorithm • **Denominator**: Requested Transfer indicates how often the site was requested when that site was the most responsible

Inclusion Criteria	• **Inclusion**:
	  ○ Adults: Age ≥ 18 years; Paediatrics: Age <18 years
	  ○ Specialty = Neurosurgery

Exclusion Criteria	• **Exclusion**: none
Indicator Data Source	• CritiCall Ontario
Indicator Consideration	• Excludes cases not referred by CritiCall Ontario
Frequency of Reporting	Quarterly
Report Generator	CCSO (from CritiCall Ontario)

S2.CritiCall R2 & Other Neurosurgical Acceptance Rate

Indicator Name	CritiCall R2 & Other Neurosurgical Acceptance Rate
Indicator Domain	System Integration
Indicator Objective	Optimize patient flow
Performance Standard	Provincial performance target is 90% for CritiCall R2 & Other neurosurgical acceptance rate
Indicator Definition	Percentage of neurosurgical patients accepted by each site from another referral area compared to total requested transfers, as per the approved algorithm for R2-R4 transfers.
Method of Indicator Calculation	• **Numerator**: Acceptance indicates how often the site accepted a referral when that site was the most responsible as per the approved algorithm • **Denominator**: Requested Transfer indicates how often the site was requested when that site was the most responsible

Inclusion Criteria	• **Inclusion**:
	  ○ Adults: Age ≥ 18 years; Paediatrics: Age <18 years
	  ○ Specialty = Neurosurgery

Exclusion Criteria	• **Exclusion**: none
Indicator Data Source	• CritiCall Ontario
Indicator Consideration	• Excludes cases not referred by CritiCall Ontario
Frequency of Reporting	Quarterly
Report Generator	CCSO (from CritiCall Ontario)

R1.Inpatient Neurosurgery Rehabilitation Cases

Indicator Name	Inpatient Neurosurgery Rehabilitation Cases
Indicator Domain	Access
Indicator Objective	Optimize patient flow
Performance Standard	Provincial performance target and Baseline have not yet been established
Indicator Definition	Total number of inpatient rehabilitation cases in special or general rehabilitation hospitals or in designated rehabilitation beds or units (CIHI description) after care for a neurosurgical diagnosis in acute care
Method of Indicator Calculation	• Total count of discharged inpatient neurosurgery rehabilitation cases adhering to RCG and ICD 10 codes in inclusion list (Please see Appendices for list of codes for inclusion)

Inclusion Criteria	• **Inclusion**:
	   o Rehabilitation centres that receive at least 20% of the rehabilitation transfers from an acute neurosurgery program. The list of included rehabilitation centres can be found in Appendix A.
	   o Admit Age ≥ 18 years
	   o Rehabilitation cases from Rehab Client Groups (RCGs) from inclusion list that is most associated with neurosurgical patients. This inclusion list can be found in Appendix C.
	   o Rehabilitation cases from filter RCG inclusion list with select ICD-10 codes from the inclusion list (representing most responsible health condition) that are associated with a large proportion of neurosurgical patients. This inclusion list can be found in Appendix D.
	   o Inpatient neurosurgery rehabilitation cases that have been discharged.

Exclusion Criteria	• **Exclusion:** none
Indicator Data Source	• National Rehabilitation Reporting System (via IntelliHEALTH)
Indicator Consideration	• Report broken down by the predefined Rehab Groupings in NRS to facilitate patient population comparison at each facility: o Rehab Groupings: Stroke, Brain dysfunction, Spinal cord dysfunction, Other orthopaedic conditions, Major multiple trauma, Other Disabilities
Frequency of Reporting	Quarterly
Report Generator	CCSO

R2.90th Percentile Wait Time for Inpatient Neurosurgery Rehabilitation Care

Indicator Name	90th Percentile Wait Time for Inpatient Neurosurgery Rehabilitation Care
Indicator Domain	Access
Indicator Objective	Optimize patient flow
Performance Standard	Provincial performance target and Baseline have not yet been established.
Indicator Definition	The maximum number of days within which 90% of the patients requiring inpatients neurosurgery rehabilitation care had to wait for admission once medically ready. Most patients will have a shorter wait, but 10% of patients will wait longer than this wait time for admission to inpatient rehabilitation care.
Method of Indicator Calculation	• 90th percentile of [(Date of admission) – (Date medically ready for admission)] for all inpatient neurosurgery rehabilitation discharges with a valid ready for admission date.
Inclusion Criteria	• **Inclusion**: ○ Rehabilitation centres that receive at least 20% of the rehabilitation transfers from an acute neurosurgery program. The list of included rehabilitation centres can be found in Appendix A. ○ Admit Age ≥ 18 years ○ Rehabilitation cases from Rehab Client Groups (RCGs) from inclusion list that is most associated with neurosurgical patients. This inclusion list can be found in Appendix C. ○ Rehabilitation cases from filter RCG inclusion list with select ICD-10 codes from the inclusion list (representing most responsible health condition) that are associated with a large proportion of neurosurgical patients. This inclusion list can be found in the Appendix D. ○ Inpatient neurosurgery rehabilitation cases that have been discharged.
Exclusion Criteria	• **Exclusion**: Cases without a valid "Ready for Admission" date
Indicator Data Source	• National Rehabilitation Reporting System (via IntelliHEALTH)
Indicator Consideration	• Based on geographic locations and other factors, pressures affecting admissions can vary significantly between facilities.
Frequency of Reporting	Quarterly
Report Generator	CCSO

R3.Inpatient Neurosurgery Rehabilitation Average Active LOS

Indicator Name	Inpatient Neurosurgery Rehabilitation Average Active LOS
Indicator Domain	Access
Indicator Objective	Optimize patient flow
Performance Standard	Provincial performance target and Baseline have not yet been established
Indicator Definition	This value is the difference between Date Ready for Discharge and Admission Date for all records submitted. It describes the average period of time (in days) that clients are considered to be in active rehabilitation. As such, service interruptions and days waiting for discharge are not included.
Method of Indicator Calculation	• **Numerator**: Active rehabilitation length of stay days for discharged cases. This excludes service interruption days or days waiting for discharge • **Denominator**: Total number of discharged inpatient neurosurgery rehabilitation cases.

Inclusion Criteria	• **Inclusion**:
	    ○ Rehabilitation centres that receive at least 20% of the rehabilitation transfers from an acute neurosurgery program. The list of included rehabilitation centres can be found in Appendix A.
	    ○ Admit Age ≥ 18 years
	    ○ Rehabilitation cases from Rehab Client Groups (RCGs) from inclusion list that is most associated with neurosurgical patients. This inclusion list can be found in Appendix C.
	    ○ Rehabilitation cases from filter RCG inclusion list with select ICD-10 codes from the inclusion list (representing most responsible health condition) that are associated with a large proportion of neurosurgical patients. This inclusion list can be found in Appendix D.
	    ○ Inpatient neurosurgery rehabilitation cases that have been discharged.

Exclusion Criteria	• **Exclusion**: Service interruption days and days waiting for discharge
Indicator Data Source	• National Rehabilitation Reporting System (via IntelliHEALTH)
Indicator Consideration	• This indicator can be influenced by complexity of the cases accepted by the facility, client characteristics, as well as availability of staffing resources and other factors. • Large variances in LOS for patients within one Rehab Group requires further breakdown of patients using RPGs.
Frequency of Reporting	Quarterly
Report Generator	CCSO

R4.Inpatient Neurosurgery Rehabilitation Discharge Rate – Service Goals Met

Indicator Name	Inpatient Neurosurgery Rehabilitation Discharge Rate – Service Goals Met
Indicator Domain	Quality
Indicator Objective	Deliver Effective Care
Performance Standard	Provincial performance target and Baseline have not yet been established.
Indicator Definition	The percentage of inpatient neurosurgery rehabilitation discharges meeting service goals from all discharged inpatient neurosurgery rehabilitation cases.
Method of Indicator Calculation	• **Numerator**: Number of inpatient rehabilitation discharges with discharge reason of service goals met • **Denominator**: Total number of inpatient rehabilitation discharges in the same period

Inclusion Criteria	• **Inclusion**:
	    o Rehabilitation centres that receive at least 20% of the rehabilitation transfers from an acute neurosurgery program. The list of included rehabilitation centres can be found in Appendix A
	    o Admit Age ≥ 18 years
	    o Rehabilitation cases from Rehab Client Groups (RCGs) from inclusion list that is most associated with neurological patients. This inclusion list can be found in Appendix C.
	    o Rehabilitation cases from filter RCG inclusion list with select ICD-10 codes from the inclusion list (representing most responsible health condition) that are associated with a large proportion of neurosurgical patients. This inclusion list can be found in Appendix D.

Exclusion Criteria	• **Exclusion**: Cases with "Reason for Discharge" = Not available and/or Unknown
Indicator Data Source	• National Rehabilitation Reporting System (via IntelliHEALTH)
Indicator Consideration	• To facilitate patient population comparison, the data is reported based on the predefined Rehab Groupings in NRS.
Frequency of Reporting	Quarterly
Report Generator	CCSO

IC1.Intracranial Aneurysm Care Volumes

Indicator Name	Intracranial Aneurysm Care Volumes
Indicator Domain	Access
Indicator Objective	Stability of local services
Performance Standard	Provincial performance target and Baseline have not yet been established
Indicator Definition	Total number of discharges of patients with a most responsible diagnosis of intracranial aneurysm, with surgical treatment, broken down by ruptured and unruptured aneurysm cases, and further broken down by technique – coiling, clipping, flow diverter and other percutaneous approach
Method of Indicator Calculation	Total count of discharged intracranial aneurysm cases adhering to the Intracranial Aneurysm Diagnoses & Treatment lists (see Appendices E & F)

Inclusion Criteria	• **Inclusion**:
	    ○ Most responsible diagnosis is intracranial aneurysm (see *Appendix E* – 'Intracranial aneurysm diagnoses - ICD10 codes')
	    ○ Intracranial aneurysm treatment, any occurrence (See *Appendix F* – 'Intracranial aneurysm treatment - Canadian Classification of Health. Interventions (CCI) codes')

Exclusion Criteria	• **Exclusion**: Interventions flagged as 'Out of Hospital'
Indicator Data Source	• Discharge Abstract Database (DAD)
Indicator Consideration	• Volumes include cases flagged as abandoned
Frequency of Reporting	Quarterly
Report Generator	CCSO

IC2.Volume by Grade of Aneurysmal Subarachnoid Haemorrhage

Indicator Name	Volume by Grade of Aneurysmal Subarachnoid Haemorrhage
Indicator Domain	Access
Indicator Objective	Profile of coiled ruptured aneurysms
Performance Standard	Provincial performance target and Baseline have not yet been established
Indicator Definition	Volume of ruptured intracranial aneurysms treated with coiling, categorized by the severity of subarachnoid haemorrhage
Method of Indicator Calculation	Number of intracranial aneurysms cases under each World Federation of Neurological Societies (WFNS) grade level Severity of subarachnoid haemorrhage is based on the GCS level, which measures the presence of focal neurological deficits The GCS grading levels are as follows: WFNS grade GCS Motor deficit I 15 Absent II 14-13 Absent III 14-13 Present IV 12-7 Absent/Present V 6-3 Absent/Present

Inclusion Criteria	• **Inclusion**:
	    o Intracranial aneurysms, ruptured only
	    o Aneurysm repair with procedure type = Coiling

Exclusion Criteria	• **Exclusion**: None
Indicator Data Source	• Hospital data collected using 'Patient Outcome Datasheet' and submitted to CCSO in submission file format from 'Data Collection Tool' provided by CCSO
Indicator Consideration	• None
Frequency of Reporting	Quarterly
Report Generator	CCSO

IC3.Procedural Complication Rate - Ischemic Stroke

Indicator Name	Procedural Complication Rate - Ischemic Stroke
Indicator Domain	Quality
Indicator Objective	Deliver safe care
Performance Standard	Provincial performance target and Baseline have not yet been established
Indicator Definition	Percentage of intracranial aneurysm cases treated with coiling with a procedural complication that led to ischemic stroke
Method of Indicator Calculation	• **Numerator**: Number of cases with procedural complications that led to ischemic stroke • **Denominator**: Total number of coiled intracranial aneurysm cases

Inclusion Criteria	• **Inclusion**:
	    ○ Intracranial aneurysm cases, grouped by ruptured and unruptured, broken down by aneurysm grade
	    ○ Aneurysm repair with procedure type = Coiling

Exclusion Criteria	• **Exclusion**: None
Indicator Data Source	• Hospital data collected using 'Patient Outcome Datasheet' and submitted to CCSO in submission file format from 'Data Collection Tool' provided by CCSO
Indicator Consideration	• None
Frequency of Reporting	Quarterly
Report Generator	CCSO

IC4.Procedural Complication Rate - Aneurysm Rebleeding

Indicator Name	Procedural Complication Rate - Aneurysm Rebleeding
Indicator Domain	Quality
Indicator Objective	Deliver safe care
Performance Standard	Provincial performance target and Baseline have not yet been established
Indicator Definition	Percentage of intracranial aneurysm cases treated with coiling with a procedural complication that led to aneurysm rebleeding (for ruptured aneurysms) or aneurysm bleeding (for unruptured aneurysms)
Method of Indicator Calculation	For ruptured aneurysms: • **Numerator**: Number of cases with procedural complications that led to aneurysm rebleeding • **Denominator**: Total number of coiled intracranial aneurysm cases For unruptured aneurysms: • **Numerator**: Number of cases with procedural complications that led to aneurysm bleeding • **Denominator**: Total number of coiled intracranial aneurysm cases

Inclusion Criteria	• **Inclusion**:
	    ○ Intracranial aneurysm cases, grouped by ruptured and unruptured
	    ○ Aneurysm repair with procedure type = Coiling

Exclusion Criteria	• **Exclusion**: None
Indicator Data Source	• Hospital data collected using 'Patient Outcome Datasheet' and submitted to CCSO in submission file format from 'Data Collection Tool' provided by CCSO
Indicator Consideration	• None
Frequency of Reporting	Quarterly
Report Generator	CCSO

IC5.Intracranial Aneurysm In-hospital Crude Mortality Rate

Indicator Name	Intracranial Aneurysm In-hospital Crude Mortality Rate
Indicator Domain	Quality
Indicator Objective	Deliver safe care
Performance Standard	Provincial performance target and Baseline have not yet been established
Indicator Definition	Percentage of intracranial aneurysm coiling cases with discharge disposition of deceased.
Method of Indicator Calculation	• **Numerator**: Intracranial aneurysm coiling cases with discharge status of deceased • **Denominator**: Total intracranial aneurysm coiling cases

Inclusion Criteria	• **Inclusion**:
	   ○ Most responsible diagnosis is intracranial aneurysm
	    (see Appendix E – 'Intracranial aneurysm diagnoses - ICD10 codes')
	   ○ Intracranial aneurysm treatment (any occurrence) treated with coiling
	    (see Appendix F – 'Intracranial aneurysm treatment - CCI codes')
	   ○ Numerator includes coiling cases with a discharge disposition of "72 – Died in Facility"

Exclusion Criteria	• **Exclusion**: None
Indicator Data Source	• Hospital data collected using 'Patient Outcome Datasheet' and submitted to CCSO in submission file format from 'Data Collection Tool' provided by CCSO
Indicator Consideration	• None
Frequency of Reporting	Quarterly
Report Generator	CCSO

IC6.Outcome - Discharge Modified Rankin Scale

Indicator Name	Outcome - Discharge Modified Rankin Scale
Indicator Domain	Quality
Indicator Objective	Deliver safe care
Performance Standard	Provincial performance target and Baseline have not yet been established
Indicator Definition	Percentage of intracranial aneurysm coiling cases by outcome measure, based on the modified Rankin Scale (mRS) at discharge
Method of Indicator Calculation	• **Numerator**: Number of cases under each mRS level • **Denominator**: Total number of coiled intracranial aneurysm cases Modified Rankin Scale (mRS) is a measure of patient outcome. The mRS levels are as follows: 0. No symptoms. 1. No significant disability. Able to carry out all usual activities, despite some symptoms. 2. Slight disability. Able to look after own affairs without assistance, but unable to carry out all previous activities. 3. Moderate disability. Requires some help, but able to walk unassisted. 4. Moderately severe disability. Unable to attend to own bodily needs without assistance or unable to walk unassisted. 5. Severe disability. Requires constant nursing care and attention, bedridden. * Modified Rankin Scale (mRS) is captured on the 'Patient Outcome Datasheet' at discharge or at 30 days post-treatment, whichever is sooner.

Inclusion Criteria	• **Inclusion**:
	    ○ Intracranial aneurysm cases, grouped by ruptured and unruptured
	    ○ Aneurysm repair with procedure type = Coiling

Exclusion Criteria	• **Exclusion**: None
Indicator Data Source	• Hospital data collected using 'Patient Outcome Datasheet' and submitted to CCSO in submission file format from 'Data Collection Tool' provided by CCSO
Indicator Consideration	• None
Frequency of Reporting	Quarterly
Report Generator	CCSO

IC7.Intracranial Aneurysm Average Acute Length of Stay

Indicator Name	Intracranial Aneurysm Average Acute Length of Stay
Indicator Domain	Quality
Indicator Objective	Deliver safe care
Performance Standard	Provincial performance target and Baseline have not yet been established
Indicator Definition	Average acute length of stay for intracranial aneurysm coiling cases
Method of Indicator Calculation	• **Numerator**: Total actual acute length of stay • **Denominator**: Total number of discharges in same period

Inclusion Criteria	• **Inclusion**:
	  ○ Most responsible diagnosis is intracranial aneurysm (see Appendix E – 'Intracranial aneurysm diagnoses - ICD10 codes')
	  ○ Intracranial aneurysm treatment (any occurrence) by coiling (see Appendix F – 'Intracranial aneurysm treatment - CCI codes')
	  ○ Only 'Typical' cases (Case Mix Groups+ (CMG+) Atypical Status = 'Typical' or 'Long Stay')

Exclusion Criteria	• **Exclusion**:
	  ○ Patients with discharge disposition of "72 – Died in Facility"
	  ○ Invalid/unavailable discharge disposition

Indicator Data Source	• Discharge Abstract Database (DAD)
Indicator Consideration	• None
Frequency of Reporting	Quarterly
Report Generator	CCSO

IC8. Second Treatment Rate within 1 year

Indicator Name	Second Treatment Rate within 1 year
Indicator Domain	Quality
Indicator Objective	Deliver safe care
Performance Standard	Provincial performance target and Baseline have not yet been established
Indicator Definition	Percentage of intracranial aneurysm cases treated with coiling with a second treatment at the same or different hospital within one year after discharge from initial coiling treatment
Method of Indicator Calculation	• **Numerator**: 'Revision/ Second treatment' = Yes • **Denominator**: Total number of intracranial aneurysm cases

Inclusion Criteria	• **Inclusion**:
	    ○ Intracranial aneurysm cases, grouped by ruptured and unruptured
	    ○ Aneurysm repair with procedure type = Coiling

Exclusion Criteria	• **Exclusion**: None
Indicator Data Source	• Hospital data collected using 'Patient Outcome Datasheet' and submitted to CCSO in submission file format from 'Data Collection Tool' provided by CCSO
Indicator Consideration	• None
Frequency of Reporting	Quarterly
Report Generator	CCSO

Appendices

Appendix A: Facility Codes Used in Analysis

Neurosurgery Centres

Facility Code	Facility
933	Windsor Regional Hospital - Ouellette Site (DGH)
936	London Health Sciences Centre
942	Hamilton Health Sciences Centre
975	Trillium Health Partners
980	Unity Health Toronto
953	Sunnybrook Health Sciences Centre
947	University Health Network
837	The Hospital for Sick Children
978	Kingston Health Sciences Centre
958	The Ottawa Hospital
751	Children's Hospital for Sick Children
959	Health Sciences North
935	Thunder Bay Regional Health Sciences Centre

Rehabilitation Hospitals

Facility Code	Facility
927	Hotel-Dieu Grace Healthcare
714	St Joseph's Health Care, London - Parkwood
942	Hamilton Health Sciences - Regional Rehabilitation Centre
975	Trillium Health Partners
980	Providence Healthcare, Toronto
976	Sinai Health System - Bridgepoint Active Healthcare
953	St. John's Rehab – Sunnybrook Hospital
947	University Health Network - Toronto Rehabilitation Institute
613	West Park Healthcare Centre
695	Providence Care Centre, Kingston
958	The Ottawa Hospital Rehabilitation Centre
959	Health Sciences North - Ramsey Lake Health Centre
781	St. Joseph's Care Group - Thunder Bay

Appendix B: CMG+ Codes for Inclusion Criteria (30 Day Unplanned Readmission Indicator)

CMG	CMG+ Description
001	Intracranial Vessel Intervention except Extraction, Open Approach
002	Intracranial Vessel Intervention except Extraction, Percutaneous Approach
004	Craniotomy for Drainage
005	Insertion of Shunt/Brain Monitor
006	Cranium Intervention
007	Thoracic/Major Intervention on Spine/Spinal Canal/Vertebra
008	Other Site/Non-Major Intervention on Spine/Spinal Canal/Vertebra
009	Excision/Repair of Brain
010	Drainage/Release of Brain
011	Management of Nervous System Device/Other Minor Intervention
305	Craniofacial Bone Intervention with Malignant Neoplasm
308	Other Musculoskeletal Intervention with Malignant Neoplasm
309	Other Major MSK Intervention with Malignant Neoplasm
313	Spinal Vertebrae Intervention
314	Other Intervention on Back/Neck
420	Pituitary/Pineal Gland Intervention
731	Spinal Intervention with Trauma/Complication of Treatment
732	Intracranial Intervention with Trauma/Complication of Treatment
735	Skull Intervention with Trauma/Complication of Treatment
752	Skull/Intracranial Intervention with Trauma/Complication of Treatment
764	Multiple Intracranial Injury
765	Single Intracranial Injury

Appendix C: NRS RCG Codes for Inclusion Criteria (Inpatient Neurosurgery Rehabilitation)

RCG #	RCG Name (RCG is the health condition that best describes the primary reason for patient admission into rehab)	Include any patient, regardless of MRHC	Patient inclusion dependent on relevant MRHC (see Appendix D)
Stroke			
1.1	Left Body Involvement (Right Brain)		x
1.2	Right Body Involvement (left Brain)		x
1.3	Bilateral Involvement		x
1.4	No Paresis		x
Brain Dysfunction			
2.1	Non-traumatic		x
2.11	Non-traumatic, Open Injury		x
2.12	Non-traumatic, Closed Injury		x
2.2	Traumatic	x	
2.21	Traumatic, Open Injury	x	
2.22	Traumatic, Closed Injury	x	
Spinal Cord Dysfunction			
4.1	Non-traumatic Spinal Cord Dysfunction		x
4.11	Non-traumatic Spinal Cord Dysfunction, Paraplegia, Unspecified		x
4.111	Non-traumatic Spinal Cord Dysfunction, Paraplegia, Incomplete		x
4.112	Non-traumatic Spinal Cord Dysfunction, Paraplegia, Complete		x
4.12	Non-traumatic Quadriplegia, Unspecified		x
4.1211	Non-traumatic Spinal Cord Dysfunction, Quadriplegia, Incomplete C1-4		x
4.1212	Non-traumatic Spinal Cord Dysfunction, Quadriplegia, Incomplete C5-8		x
4.1221	Non-traumatic Quadriplegia, Complete C1-4		x
4.1222	Non-traumatic Quadriplegia, Complete C5-8		x
4.13	Other Non-traumatic Spinal Cord Dysfunction		x
4.2	Traumatic Spinal Cord Dysfunction	x	
4.21	Traumatic Spinal Cord Dysfunction, Paraplegia, Unspecified	x	
4.211	Traumatic Spinal Cord Dysfunction, Paraplegia, Incomplete	x	
4.212	Traumatic Spinal Cord Dysfunction, Paraplegia, Complete	x	
4.22	Traumatic Spinal Cord Dysfunction, Quadriplegia, Unspecified	x	
4.2211	Traumatic Spinal Cord Dysfunction, Quadriplegia, Incomplete C1-4	x	
4.2212	Traumatic Spinal Cord Dysfunction, Quadriplegia, Incomplete C5-8	x	
4.2221	Quadriplegia, Complete C1-4	x	
4.2222	Quadriplegia, Complete C5-8	x	
4.23	Other Traumatic Spinal Cord	x	
Orthopedic Conditions			
8.9	Other Orthopedic		x
Major Multiple Trauma			
14.1	Brain + Spinal Cord Injury	x	

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14.2	Brain + Multiple Fracture/Amputation	x	
14.3	Spinal Cord + Multiple Fracture/Amputation	x	
14.9	Other Multiple Trauma		x
Debility			
16.1	Debility		x
Medically Complex			
17.2	Neoplasm		x
17.9	Other Medically Complex Conditions		x

Appendix D: ICD 10 (MRHC) Codes for NRS Inclusion Criteria

ICD-10 Code	Most Responsible Health Condition (MRHC) ICD-10 Code Description (MRHC is the one etiological diagnosis which describes the most significant condition which causes the patient's rehab stay)
C41.2	Malignant neoplasm of vertebral column
C70.1	Malignant neoplasm of spinal meninges (cord)
C71	Malignant Neoplasm of the Brain
C72.9	Malignant neoplasm of central nervous system, unspecified
C79.3	Sec malgt neoplm brain and cerebral meninges
C79.4	Secondary [metastasis] malignant neoplasm of other and unspecified parts of nervous system (Includes: Meninges, Spinal Meninges, Spinal Cord, Spinal Dura (mater))
D32.0	Benign neoplasm of cerebral meninges
D32.1	Benign neoplasm of spinal meninges
D33.2	Benign neoplasm of brain, unspecified
D33.4	Benign neoplasm of spinal cord
D33.9	Benign neoplasm of central nervous system, unspecified (Includes: Nervous system (central) NOS)
D36	Benign neoplasm of other and unspecified sites
D43.2	Neoplasm of uncertain or unknown behaviour of brain, unspecified (Includes: Brain NOS)
D43.4	Neoplasm of uncertain or unknown behaviour of spinal cord
F07.2	Postconcussional syndrome
G06.0	Intracranial abscess and granuloma
G06.1	Intraspinal abscess and granuloma
G07	Intracranial and intraspinal abscess and granuloma in diseases classified elsewhere
G54.2	Cervical root disorders, not elsewhere classified
G82.0	Flaccid paraplegia
G82.320	Flaccid quadriplegia, incomplete at cervical spine level C1 to C4
G82.510	Quadriplegia, unspecified type, complete at cervical spine level C1 to C4
G82.520	Quadriplegia, unspecified type, incomplete at cervical spine level C1 to C4
G82.521	Quadriplegia, unspecified type, incomplete at cervical spine level C5 to C7 (Includes: level unspecified)
G83.4	Cauda equina syndrome
G83.8	Other specified paralytic syndromes
G91	Hydrocephalus
G95.0	Syringomyelia and syringobulbia
G95.1	Vascular myelopathies (Includes: acute infarction of spinal cord)
G95.2	Cord Compression unspecified
G97.9	Postprocedural disorder of nervous system, unspecified
I60	Subarachnoid haemorrhage (Includes: ruptured cerebral aneurysm; subarachnoid hemorrhage)
I61	Intracerebral haemorrhage (Excludes: sequelae of intracerebral haemorrhage/hemorrhage (I69.1))
I62	Other nontraumatic intracranial haemorrhage
I62.0	Subdural haemorrhage (acute)(nontraumatic) (Includes: Subdural hemorrhage)
I62.1	Nontraumatic extradural haemorrhage (Includes: Nontraumatic epidural haemorrhage/hemorrhage)
I62.9	Intracranial haemorrhage (nontraumatic), unspecified (Includes: Intracranial hemorrhage (nontraumatic), unspecified)
I67.1	Cerebral aneurysm, nonruptured (Includes: Cerebral: aneurysm NOS, arteriovanous fistual, acquired)
I67.5	Moyamoya disease
I69.0	Sequelae of subarachnoid haemorrhage
I69.1	Sequelae of intracerebral haemorrhage

ICD-10 Code	Most Responsible Health Condition (MRHC) ICD-10 Code Description (MRHC is the one etiological diagnosis which describes the most significant condition which causes the patient's rehab stay)
M41.1	Juvenile idiopathic scoliosis
M41.2	Other idiopathic scoliosis
M41.3	Thoraacogenic scoliosis
M41.8	Other forms of scoliosis (Includes: Infantile idiopathic scoliosis, Juvenile idiopathic scoliosis, Other idiopathic scoliosis, Thoracogenic scoliosis, Neuromuscular scoliosis, Scoliosis secondary to cerebral palsy)
M41.9	Scoliosis, unspecified
M43.1	Spondylolisthesis
M43.2	Other fusion of spine
M47.1	Other spondylosis with myelopathy
M47.8	Other spondylosis (Includes: Cervical spondylosis, lumbosacral spondylosis, Thoracic spondylosis without myelopathy or radiculopathy)
M48.00	Spinal stenosis, multiple sites in spine
M48.02	Spinal stenosis, cervical region
M48.04	Spinal stenosis, thoracic region
M48.05	Spinal stenosis, thoracolumbar region
M48.06	Spinal stenosis, lumbar region
M48.07	Spinal stenosis, lumbosacral region
M48.09	Spinal stenosis, unspecified site
M48.9	Spondylopathy, unspecified
M50	Cervical disc disorder with myelopathy (Includes: cervical disc disorders with cervicalgia, cervicothoracic disc disorders)
M51	Other intervertebral disc disorders (Includes: thoracic, thoracolumbar and lumbosacral disorders)
M53.2	Spinal instabilities
M54.1	Radiculopathy (Includes: Neuritis or radiculitis: brachial NOS, lumbar NOS, thoracic NOS, Radiculitis NOS) (Excludes: neuralgia and neuritis NOS (M79.2), radiculopathy with: cervical disc disorder (M50), lumbar and other intervertebral disc disorder
M80.4	Drug-induced osteoporosis with pathological fracture **See note below
Q07.0	Arnold-Chiari syndrome
Q67.5	Congenital deformity of spine (Includes: Congenital Scoliosis NOS, Congenital scoliosis postural)
Q85.0	Neurofibromatosis (nonmalignant) (Includes: Von Recklinghausen`s disease)
S02.100	Fracture of base of skull, closed
S02.101	Fracture of base of skull, open
S02.700	Multiple fractures involving skull and facial bones; closed
S02.701	Multiple fractures involving skull and facial bones; open
S02.900	Fracture of skull and facial bones, part unspecified, closed
S02.901	Fracture of skull and facial bones, part unspecified, open
S06.1	Traumatic cerebral oedema
S06.2	Diffuse brain injury (Includes: cerebral contusion NOS, cerebral laceration NOS)
S06.4	Epidural haemorrhage (Includes: traumatic, Epidural hemorrhage)
S06.5	Traumatic subdural haemorrhage (Includes: Traumatic subdural hemorrhage)
S06.6	Traumatic subarachnoid haemorrhage (Includes: Traumatic subarachnoid hemorrhage)
S06.8	Other intracranial injuries
S06.9	Intracranial injury, unspecified
S12.20	Fracture of C3 - C4 vertebra
S12.21	Fracture of C5 - C7 vertebra
S12.7	Multiple fractures of cervical spine
S13.0	Traumatic rupture of cervical intervertebral disc
S14.11	Central cord lesion of cervical spinal cord

ICD-10 Code	Most Responsible Health Condition (MRHC) ICD-10 Code Description (MRHC is the one etiological diagnosis which describes the most significant condition which causes the patient's rehab stay)
S14.18	Other injuries of cervical spinal cord (Includes: Incomplete spinal cord lesion)
S15	Injury of blood vessels at neck level
S22.00	Fracture of thoracic vertebra T1 - T6
S22.01	Fracture of thoracic vertebra T7- T12
S22.1	Multiple fractures of thoracic spine
S23.1	Dislocation of thoracic vertebra
S24.10	Complete lesion of thoracic spinal cord
S24.18	Other injuries of thoracic spinal cord (Includes: Incomplete spinal cord lesion)
S32.00	Fracture of lumbar vertebra, L1 level
S32.01	Fracture of lumbar vertebra, L2 level
S32.02	Fracture of lumbar vertebra, L3 level
S32.03	Fracture of lumbar vertebra, L4 level
S34.18	Other injuries of lumbar spinal cord (Includes: Incomplete spinal cord lesion)
S34.19	Unspecified lesion of lumbar spinal cord
S34.3	Injury of cauda equina
T90.0	Sequelae of superficial injury of head
T90.5	Sequelae of intracranial injury
T90.8	Sequelae of other specified injuries of head
T90.9	Sequelae of unspecified injury of head
T91.3	Sequelae of injury of spinal cord

Appendix E: Intracranial Aneurysm Diagnoses - ICD10 codes

International Classification of Diseases (ICD10) codes for intracranial aneurysm

Type	ICD10 Code	Description
Intracranial aneurysm		
Ruptured	I600	Subarachnoid haemorrhage from carotid siphon and bifurcation
	I601	Subarachnoid haemorrhage from middle cerebral artery
	I602	Subarachnoid haemorrhage from anterior communicating artery
	I603	Subarachnoid haemorrhage from posterior communicating artery
	I604	Subarachnoid haemorrhage from basilar artery
	I605	Subarachnoid haemorrhage from vertebral artery
	I606	Subarachnoid haemorrhage from other intracranial arteries
	I607	Subarachnoid haemorrhage from intracranial artery, unspecified
	I608	Other subarachnoid haemorrhage
	I609	Subarachnoid haemorrhage, unspecified
Unruptured	I670	Dissection of cerebral arteries, nonruptured
	I671	Cerebral aneurysm, nonruptured
	I720	Aneurysm and dissection of carotid artery
	I725	Aneurysm and dissection of other precerebral arteries
	I726	Aneurysm and dissection of vertebral artery
	Q280	Arteriovenous malformation of precerebral vessels
	Q281	Other malformations of precerebral vessels
	Q282	Arteriovenous malformation of cerebral vessels
	Q283	Other malformations of cerebral vessels

Appendix F: Intracranial Aneurysm Treatment - CCI codes

Canadian Classification Intervention (CCI) codes for intracranial aneurysm treatment

Technique	CCI Code	Description
		Intracranial Aneurysm Treatment
Coiling	1JE51GQGE	Occlusion, carotid artery using percutaneous transluminal approach and [detachable] coils
	1JW51GQGE	Occlusion, intracranial vessels percutaneous transluminal approach using (detachable) coils
	1JX51GPGE	Occlusion, other vessels of head, neck and spine nec percutaneous transluminal approach and [detachable] coils
Clipping	1JW51SZFF	Occlusion, intracranial vessels open craniotomy flap approach using clips
Flow Diverter	1JE50GQNR	Dilation, carotid artery using percutaneous transluminal (arterial) approach and (endovascular) stent (insertion)
	1JW50GQNR	Dilation, intracranial vessels percutaneous transluminal (arterial) approach [e.g. endovascular] using stent
	1JW80GPW3	Repair, intracranial vessels nec using percutaneous transluminal approach and fibrin glue
	1JW80GQW3	Repair, intracranial vessels percutaneous transluminal (arterial) approach [e.g. endovascular] using fibrin glue
	1JX80GPW3	Repair, other vessels of head, neck and spine nec percutaneous transluminal approach (e.g. endovascular) using fibrin glue
Other Percutaneous Approach	1JW51GQER	Occlusion, intracranial vessels percutaneous transluminal (arterial) approach using [detachable] balloon
	1JW51GQGF	Occlusion, intracranial vessels percutaneous transluminal (arterial) approach using vascular (nitinol) mesh plug
	1JW51GQGX	Occlusion, intracranial vessels percutaneous transluminal (arterial) approach using device
	1JW51GQW0	Occlusion, intracranial vessels percutaneous transluminal (arterial) approach using synthetic agent [e.g. silk particles, polymer]
	1JW51SZGX	Occlusion, intracranial vessels open craniotomy flap approach using device nec