

BC Stroke Strategy

Regional Stroke Action Plan

Appendix F – Northern Health Authority



Acknowledgements & Contributions

At the request of both the Ministry of Health Services and the health authorities, the Heart and Stroke Foundation of BC & Yukon has lead the BC Stroke Strategy (BCSS) initiative over the last five years, working in partnership with agencies and organizations representing those involved in stroke prevention and treatment and advancing the planning and prototyping phases for a number of priority areas, some of which are incorporated in this provincial plan.

The BCSS would like to acknowledge all the organizations and individuals who contributed to this work. Key contributors involved in the development or review of the Stroke Action Plan include but are not limited to the following:

Organization	Representative
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Ministry of Health Services – Medical Services Division	<ul style="list-style-type: none"> • Dr. Dean Kolodziejczyk
Ministry of Health Services – Primary & Community Care Division	<ul style="list-style-type: none"> • Val Tregillus • Darcy Eyres
BC Ambulance Service	<ul style="list-style-type: none"> • Dr. Karen Wanger
Fraser Health	<ul style="list-style-type: none"> • Barbara Korabek – Exec Sponsor • Susan Brown – Exec Sponsor • Michelle deMoor – Stroke Lead until spring 2010 • Heather Mash – Current Stroke Lead • Kevin Harrison – Regional Stroke Coordinator
Vancouver Coastal Health	<ul style="list-style-type: none"> • Dr. Patrick O'Connor – Exec Sponsor • Dr. Jeff Coleman – Exec Sponsor • Donna Stanton – Exec Sponsor • Lisa Hoefer – Stroke Lead until Spring 2010 • Dixie Butts – Current Stroke Lead
Vancouver Island Health	<ul style="list-style-type: none"> • Dr. Allan Meakes – Exec Sponsor • Marilyn Copes – Exec Sponsor • Dr. Wayne Shtybel – Regional Medical Lead • Leighanne Mackenzie – Stroke Lead until summer 2010 • Robert Crisp – Current Stroke Lead
Interior Health	<ul style="list-style-type: none"> • Darlene Arsenaault – Exec Sponsor • Lori Seeley – Current Stroke Lead
Northern Health	<ul style="list-style-type: none"> • Dr. David Butcher – Exec Sponsor • Ruby Fraser – Exec Sponsor • Rita Sweeney – Current Stroke Lead
Provincial Health Services (PHSA)	<ul style="list-style-type: none"> • David Babiuk – PHSA • Janis McGladrey – PHSA

Key messages / products of various working groups of the BCSS have been incorporated into this Provincial Plan. These groups include the following:

- The ACVS Clinical Consensus / Expert Group
- The ACVS Advisory Group
- The joint MoHS / BCSS Measurement & Evaluation Working Group
- The Rehabilitation and Reintegration Expert Advisory Group
- The TIA Rapid Assessment Advisory Group
- The Telestroke Advisory Group

In addition to individuals actively serving on BCSS working groups, numerous clinicians and operations managers at site levels were involved in identifying gaps in care and in strategizing on possible approaches / strategies to address these gaps. The input from these multiple sources is reflected in this Provincial Plan and detailed in the Regional Site Work Plans included in the Appendices. We would like to thank all those persons and organizations that contributed to this collaborative planning work.

Requests regarding access to Regional Appendices or to other documents referenced in this Provincial Stroke Action Plan should be directed to:

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NORTHERN HEALTH

Regional Snapshot – March 2010

NORTHERN HEALTH SNAPSHOT OF STROKE SERVICES AS OF MARCH 2010

Organizational Commitment to Stroke		Current Structures to Support Stroke	
Support in principle but not a priority for the organization and no resources available		Stroke Steering Committee formed in 2008 and continue to meet focusing on Emergency and Acute Rehab order sets Challenged in keeping physicians engaged and informed regarding best practices in stroke care	
Comprehensive Stroke Centres	Regional Stroke Centres	Primary Stroke Centres	
Tertiary centre providing a full range of services including neurosurgical/radiological interventions and rehabilitation n/a	Regional hospital providing CT, tPA, Telestroke links to Comprehensive Stroke Centre University Hospital of Northern BC (UHNBC - formerly Prince George Regional Hospital)	Provides CT, tPA and organized emergency care, links to Regional and Comprehensive Stroke Centres Dawson Creek and District GR Baker Memorial (Quesnel) Fort St. John Hospital and Health Centre Mills Memorial Hospital (Terrace)	
Current Emergency and Inpatient Focus			
Pre-hospital	Emergency	Inpatient	
By pass protocols and repatriation agreements required	Working on stroke order sets Moving forward on Rapid TIA Assessment Clinic plan	Working on stroke order sets Rehab is a patient priority but not in any organized or bed cohorted model Where patients admitted to UHNBC attempts made to keep patients on the same unit	
Current Inpatient Rehabilitation			
Comprehensive Rehab Stroke Centres	Regional Rehab Stroke Centres	Primary Rehab Stroke Centres	
Closest Comprehensive Rehab Stroke Centre is: GF Strong Centre, Vancouver, Acquired Brain Injury Program (ABI)	University Hospital of Northern BC: 22-bed inpatient general rehab unit, dedicated inter-disciplinary team for rehab unit PT/OT/SLP/SW/Pharmacy/Dietician and nursing	TBD	
Stroke Leads / Operations Leads		Medical Leads/Stroke Specialists	
Dr. David Butcher and Ruby Fraser – Executive Sponsors Rita Sweeney – Regional Stroke Lead (confirmed until March 31, 2011)		Dr. Jacqueline Pettersen, Neurologist	

NORTHERN HEALTH

Role Designation / Functional Capacity

NORTHERN HEALTH HOSPITAL ROLES AND FUNCTIONAL CAPACITY AS OF SPRING 2010

Grid does not necessarily reflect current capacity at some of the sites but represents the role the site could play once all necessary supports and systems are in place.

Hospitals / Facilities	CT scan	CT Tech	tPA enabled	Neurology/ Internal Medicine	Stroke Unit/ Cohorted	Require Telestroke Support	Catchment Stroke Center
Level 2: Regional Stroke Centre							
University of Hospital of Northern BC (UHNBC)	Y	Y	Y	24/7 IM	N	Part time	Y
Level 3: Primary Stroke Centre							
Dawson Creek & District	Y	Y	Y	24/7 IM ¹	N	Full time	Y
GR Baker Memorial	Y	Y	Y	24/7 IM ²	N	Full time	Y
Fort St. John Hospital	Y	Y	N	24/7 IM ³	N	Full time	Y
Mills Memorial	Y	Y	Y	24/7 IM ³	N	Full time	Y
Level 4: Non tPA Enabled Site							
Prince Rupert Regional	Y	Y	N	24/7 IM	N	Full time	Y
Atlin Lake	N	N	N	NA	N	NA	N
Bulkley Valley District	N	N	N	NA	N	NA	N
Chetwynd	N	N	N	NA	N	NA	N
Lakes District	N	N	N	NA	N	NA	N
Fort Nelson	N	N	N	NA	N	NA	N
Fraser Lake	N	N	N	NA	N	NA	N
Granisle Health Centre	N	N	N	NA	N	NA	N
Hudson Hope	N	N	N	NA	N	NA	N
Houston Health Centre	N	N	N	NA	N	NA	N
Kitimat Hospital	N	N	N	NA	N	NA	N
Mackenzie & District	N	N	N	NA	N	NA	N
Masset	N	N	N	NA	N	NA	N
McBride & District	N	N	N	NA	N	NA	N
Queen Charlotte Islands General	N	N	N	NA	N	NA	N
Stewart Health Centre	N	N	N	NA	N	NA	N
Stikine Health Centre	N	N	N	NA	N	NA	N
Stuart Lake	N	N	N	NA	N	NA	N
St. John Hospital	N	N	N	NA	N	NA	N
Tumbler Ridge	N	N	N	NA	N	NA	N
Wrinch Memorial	N	N	N	NA	N	NA	N
Valemount Health Centre	N	N	N	NA	N	NA	N
¹ No IM/Neurology coverage. Calls made to neurologist on call either in Alberta or UHNBC. ² IM coverage either on site or in consult with UHNBC. ³ Coverage based on two IM physicians as locums; third physician covers 10 days straight then returns to home on the Island.							

Stroke Management Criteria	Definitions / Scope
Telestroke	Require telehealth, clinicians and CT-associated network capabilities to support clinical processes across the stroke care continuum.
CT Scan / MRI	Timely neuroimaging.
Tech available	Trained techs on site.
Stroke Team	Stroke team in ED; protocols for acute stroke in ED; early and appropriate acute stroke care + tPA within 3 hours; non-tPA enabled sites have written protocols to transfer patients in timely way to the appropriate destination.
Neurology / Internal Medicine	Neurology and IM support available to manage acute strokes.
Neurosurgical / Neurointerventional	Medical and Diagnostic Imaging Specialists on site, available by phone or by Telestroke.
tPA enabled	Medical & diagnostic capabilities on site to enable / administer tPA.
Acute stroke pathway	Stroke pathway includes stroke order sets, patient flow processes, time-specific interventions.
Bypass Protocol/Rapid Transfer	EMS transport of suspected stroke patient to most appropriate site within 3.5 hour pre-hospital time window.
Stroke unit/ cohorted beds	Stroke unit or geographically designated beds; evidence-based pathways / protocols to ensure organized interventions, targeting prevention of complications and ensuring early mobilization and rehabilitation.
Catchment stroke center	Facility serves a defined geographic region.
Rehab	Standardized (system) screening evaluation to determine impairments and most appropriate level of rehabilitation; comprehensive rehab plan to initiate early, coordinated multidisciplinary stroke rehab. Recovering movement, daily activities, communication; early discharge planning and smooth transitions.
Secondary stroke prevention clinic	Stroke prevention services in a variety of settings including hospital or community-based settings.
Stroke Care Monitoring and Evaluation	Routine collection of performance measures for stroke care.

NORTHERN HEALTH

Priority Themes

NORTHERN HEALTH REGIONAL THEMES / PRIORITIES PRIORITY AREAS OF FOCUS (ONE TO THREE YEARS)

PRIORITY	Action Plans	Major Stakeholders
General	<ul style="list-style-type: none"> • Create Cardio / Cerebrovascular Program aligned with Safer Health Care Now and AMI / CHF 	<ul style="list-style-type: none"> • NH Executive • Clinicians
Engagement of General Practitioners	<ul style="list-style-type: none"> • Engagement of General Practitioners re. stroke order sets, stroke processes • Physician training and education 	<ul style="list-style-type: none"> • Physician Champions • Stroke Lead and Clinical Educator
Pre-Hospital Transport and Patient Movement	<ul style="list-style-type: none"> • Engage sites in discussion regarding community needs, functional capacity and proposed hospital / facility role designations • Bypass protocols for BCAS / EMS • Repatriation Agreements between northern health communities and other health regions 	<ul style="list-style-type: none"> • BC Ambulance Personnel • Stroke Leads in other HAs
Secondary Prevention	<ul style="list-style-type: none"> • Introduce TIA prevention clinics where volume / demand warrants • Cross-training of personnel 	<ul style="list-style-type: none"> • Primary Care • Health Promotion • TIA Clinic Working Group
Rehabilitation Service	<ul style="list-style-type: none"> • Framework and plan for access to rehab services in isolated rural and remote communities 	<ul style="list-style-type: none"> • Stroke Coordinator • Rehab Leads

NORTHERN HEALTH

Resource Estimates

MODELING RESOURCE INVESTMENT REQUIRED

Implementing Optimal Stroke Care in Northern Health									
Modeling Estimated Resources Required									
	Year 1 (2011/12)	Year 2 (2012/13)	Year 3 (2013/14)	3-Year Total	Year 4 (2014/15)	Year 5 (2015/16)	Year 6 (2016/17)	Year 7 (2017/18)	
<p><i>The cost estimates identified in this table are order of magnitude estimates based on a number of data modeling assumptions related to moving the BC health system to optimal stroke care over the next seven years, as detailed in the text of the Provincial Plan. The modeling is based on a staged implementation approach. The actual timing of implementation will likely vary for each Health Authority.</i></p>									
Change Management Resource Requirements									
Provincial				\$0					
Regional	\$606,446	\$621,640	\$637,289	\$1,865,375	\$523,764	\$508,944	\$490,623	\$470,744	
Sub-Total Change Management	\$606,446	\$621,640	\$637,289	\$1,865,375	\$523,764	\$508,944	\$490,623	\$470,744	
Modeling for Optimal Care - Operational Areas									
TIA Rapid Assessment Services (1)									
Proportion of Patients Receiving Optimal Care	0%	25%	40%		60%	80%	80%	80%	
Cost Estimate	\$0	\$37,078	\$61,104	\$98,182	\$94,406	\$129,651	\$133,540	\$137,547	
Enhanced tPA Utilization / Telestroke (2)									
Activity	Plan for expansion	Implement at 5 consulting sites	Implement at 9 referring sites		Implement at 8 referring sites	Ongoing operational costs			
% Receiving tPA (assumption)	2.42%	2.42%	6.00%		8.00%	10.00%	10.00%	10.00%	
Cost Estimate	\$202,306	\$291,869	\$655,957	\$1,150,133	\$734,980	\$483,437	\$484,920	\$489,631	
Organized Stroke Care (3)									
Proportion of Patients Receiving Optimal Care	0%	25%	50%		75%	80%	80%	80%	
Cost Estimate	\$0	\$256,356	\$528,093	\$784,449	\$815,904	\$896,406	\$923,298	\$950,997	
Early Home Supported Discharge (4)									
Proportion of Patients Receiving Optimal Care	0%	0%	10%		20%	30%	37%	37%	
Cost Estimate	\$0	\$0	\$98,756	\$98,756	\$203,437	\$314,310	\$399,278	\$411,257	
Sub-Total Modeling for Optimal Care	\$202,306	\$585,303	\$1,343,910	\$2,131,519	\$1,848,726	\$1,823,803	\$1,941,037	\$1,989,431	
Current Funding for the TIA Rapid Assessment Services ending after 2010//11	\$90,000			\$90,000					
Additional Funding to Maintain Current Capacity for the TIA Rapid Assessment Services		\$92,700	\$95,481	\$188,181	\$98,345	\$101,296	\$104,335	\$107,465	
Order of Magnitude Estimate	\$898,753	\$1,299,642	\$2,076,680	\$4,275,075	\$2,470,836	\$2,434,044	\$2,535,995	\$2,567,640	
<p>Notes:</p> <p>(1) Optimal care associated with TIA Rapid Assessment Services is defined as access within 72 hours for 80% of TIA/minor stroke patients in the province. Optimal care is currently not being provided to TIA/minor stroke patients living in the geographic boundaries of NH.</p> <p>(2) Optimal care associated with tPA utilization is defined as receipt by a maximum of 10% of incident ischemic stroke patients. tPA is currently being utilized by 2.42% of the incident ischemic stroke patients living within the geographic boundaries of NH.</p> <p>(3) Optimal care assumes that 80% of stroke patients admitted to acute care will have access to organized stroke care. Optimal care is currently not being provided to patients living within the geographic boundaries of NH.</p> <p>(4) An early home-supported discharge (EHSD) team is comprised of "physiotherapists and occupational therapists supported by speech therapists, physicians, nurses, and social workers whose teamwork is coordinated by regular meetings. Often the EHSD begins with one or more pre-discharge home visits, continues the day of discharge, and goes on with more home sessions per week based on a patient-held recovery plan. [However,] it should be emphasized that EHSD is not considered an alternate to a stroke unit". Larsen T, Olsen TS, Sorensen J. Early home-supported discharge of stroke patients: a health technology assessment. International Journal of Technology Assessment in Health Care. 2006; 22(3): 313-20.</p> <p>The literature suggests that an average of 37% of stroke patients admitted to acute care would be eligible for EHSD. Winkel A, Ekdahl C, Gard G. Early discharge to therapy-based rehabilitation at home in patients with stroke: a systematic review. Physical Therapy Reviews. 2008; 13(3): 167-87.</p> <p>No patients living within the geographic boundaries are currently receiving EHSD.</p> <p>Winkel A, Ekdahl C, Gard G. Early discharge to therapy-based rehabilitation at home in patients with stroke: a systematic review. Physical Therapy Reviews. 2008; 13(3): 167-87.</p>									

INDICATORS AND METRICS

By Health Authority and HSDA

INDICATORS AND METRICS

The BC Stroke Strategy Measurement and Evaluation Working Group have suggested five key indicators for tracking progress on ACVS care in the province as follows:

1. TIA volumes
 - Increase the volume of TIA / non-hospitalized strokes processed in TIA Rapid Assessment Clinics by **50%** between 2009/10 and 2013/14
2. tPA utilization¹
 - Increase the number of incident ischemic stroke patients appropriately receiving tPA to **10%** between 2008/09 and 2013/14
3. Incidence rate
 - Reduce the age-standardized incidence rate of both ischemic and hemorrhagic stroke by 10% between 2008/09 and 2013/14
4. Acute care days
 - Reduce acute care days for discharges in which an ischemic stroke is the principal diagnosis by **10%** between 2008/09 and 2013/14 (this includes a combination of reduced discharges and reduced average length of stay)
5. Death and dependency
 - Reduce the proportion of patients who die in hospital or are sent to a long-term care facility after being admitted/discharged (principal diagnosis) for ischemic stroke. *If only one composite measure is used to assess progress in stroke care, it would be this overall measure of death and dependency*

The following sections include:

- trend data for Northern Health for four of these five indicators (TIA volume data not available for this health authority); and
- trend data for three of the five indicators (incidence rate, acute care days, and death and dependency) for
 - Northwest HSDA
 - Northern Interior HSDA
 - Northeast HSDA

The majority of this data is from the updated Acute Cerebrovascular Syndrome (ACVS) Registry, with the exception of data for Indicator #1 which is provided by the health authorities.

¹ The original goal set prior to information on current results was 5%. Given a provincial average of 4.27%, the goal was reset at 10% in 2008/09.

NORTHERN HEALTH

Indicators and Metrics

NORTHERN HEALTH INDICATORS AND METRICS AS OF NOVEMBER 2010

Acute Cerebrovascular Syndrome Adults* Residing in the Northern Health Authority 2001/02 to 2008/09

	Fiscal Year								% Change 01/02 to 08/09
	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	
Number of Incident ACVS Patients									
Hospitalized Ischemic Stroke	186	214	178	197	207	205	218	207	11.3%
Hospitalized Hemorrhagic Stroke	42	36	50	42	50	50	46	65	54.8%
Sub-total	228	250	228	239	257	255	264	272	19.3%
Hospitalized TIA	101	82	89	84	58	96	91	79	-21.8%
Non-hospitalized TIA/Stroke	130	151	174	168	147	168	164	155	19.2%
Sub-total	231	233	263	252	205	264	255	234	1.3%
Number of Prevalent ACVS Patients									
Hospitalized Ischemic Stroke	1,110	1,180	1,220	1,281	1,351	1,417	1,468	1,532	38.0%
Hospitalized Hemorrhagic Stroke	236	251	283	294	323	350	360	394	66.9%
Sub-total	1,346	1,431	1,503	1,575	1,674	1,767	1,828	1,926	43.1%
Hospitalized TIA	609	634	672	709	701	748	773	792	30.0%
Non-hospitalized TIA/Stroke	824	915	1,009	1,103	1,156	1,247	1,309	1,371	66.4%
Sub-total	1,433	1,549	1,681	1,812	1,857	1,995	2,082	2,163	50.9%
Age-Standardized Incidence / 1,000 Population									
Hospitalized Ischemic Stroke	1.119	1.213	0.987	1.046	1.048	0.965	0.993	0.894	-20.1%
Hospitalized Hemorrhagic Stroke	0.207	0.165	0.234	0.189	0.218	0.213	0.200	0.260	25.4%
Sub-total	1.333	1.385	1.230	1.242	1.275	1.187	1.203	1.163	-12.7%
Hospitalized TIA	0.566	0.454	0.476	0.426	0.293	0.436	0.391	0.357	-37.0%
Non-hospitalized TIA/Stroke	0.709	0.819	0.870	0.831	0.680	0.740	0.691	0.637	-10.1%
Age-Standardized Prevalence / 1,000 Population									
Hospitalized Ischemic Stroke	6.120	6.230	6.203	6.276	6.342	6.343	6.284	6.236	1.9%
Hospitalized Hemorrhagic Stroke	1.067	1.091	1.214	1.235	1.319	1.382	1.384	1.463	37.1%
Sub-total	7.187	7.321	7.417	7.511	7.661	7.726	7.668	7.699	7.1%
Hospitalized TIA	3.372	3.376	3.430	3.491	3.323	3.382	3.312	3.260	-3.3%
Non-hospitalized TIA/Stroke	4.445	4.777	5.082	5.371	5.385	5.564	5.615	5.639	26.9%
Conversion Rate from TIA/Non-hospitalized Stroke to Hospitalized Stroke									
90-Day Conversion Rate									
365-Day Conversion Rate									
Utilization of tPA by Incident Acute Ischemic Stroke Patients									
Number Receiving tPA						6	4	5	
Total Number						205	218	207	
Proportion of Incident Hospitalized AIS Patients Receiving tPA						2.93%	<u>1.83%</u>	2.42%	
Utilization of Acute Care by Incident Ischemic Stroke Patients									
Discharges	186	214	178	197	207	205	218	207	11.3%
ALOS	27.41	26.77	30.84	39.93	31.90	37.73	36.77	22.39	-18.3%
Patient Days	5,099	5,728	5,489	7,866	6,603	7,735	8,016	4,635	-9.1%
Utilization of Acute Care by Incident Hemorrhagic Stroke Patients									
Discharges	42	36	50	42	50	50	47	65	54.8%
ALOS	21.86	21.92	32.04	19.62	25.60	28.42	20.62	31.11	42.3%
Patient Days	918	789	1,602	824	1,280	1,421	969	2,022	120.3%
Discharge Disposition following Acute Admissions for Incident Ischemic Stroke Patients									
Died	25.8%	20.6%	23.0%	18.3%	18.4%	20.0%	21.6%	21.3%	-17.6%
Discharged to Home	58.1%	63.6%	59.6%	57.4%	62.3%	63.4%	58.3%	67.1%	15.6%
Home with Support Services	3.8%	4.7%	4.5%	8.1%	5.8%	2.4%	3.7%	2.9%	-23.0%
Continuing Care Facility	5.4%	5.6%	8.4%	9.6%	8.2%	8.8%	10.6%	5.3%	-1.2%
Other	7.0%	5.6%	4.5%	6.6%	5.3%	5.4%	6.0%	3.4%	-51.6%
Discharge Disposition following Acute Admissions for Incident Hemorrhagic Stroke Patients									
Died	38.1%	47.2%	40.0%	38.1%	24.0%	28.0%	51.1%	27.7%	-27.3%
Discharged to Home	45.2%	30.6%	34.0%	40.5%	52.0%	48.0%	40.4%	40.0%	-11.6%
Home with Support Services	<u>4.8%</u>	0.0%	<u>4.0%</u>	0.0%	<u>8.0%</u>	<u>2.0%</u>	0.0%	<u>6.2%</u>	29.2%
Continuing Care Facility	0.0%	<u>5.6%</u>	<u>8.0%</u>	<u>4.8%</u>	<u>6.0%</u>	<u>4.0%</u>	<u>2.1%</u>	<u>4.6%</u>	
Other	11.9%	16.7%	14.0%	16.7%	10.0%	18.0%	<u>6.4%</u>	21.5%	80.9%
Mortality Following an Incident Stroke									
Hospitalized Ischemic Stroke									
Crude 30-day In-hospital Mortality Rate	22.6%	15.4%	19.7%	11.7%	11.1%	15.6%	15.1%	18.4%	-18.7%
Crude 31-365 Day Mortality Rate in 30-day In-hospital Survivors	16.0%	16.6%	14.0%	17.8%	26.1%	19.1%	15.7%	17.2%	7.4%
Hospitalized Hemorrhagic Stroke									
Crude 30-day In-hospital Mortality Rate	38.1%	41.7%	36.0%	38.1%	22.0%	26.0%	47.8%	24.6%	-35.4%
Crude 31-365 Day Mortality Rate in 30-day In-hospital Survivors	<u>0.0%</u>	23.8%	25.0%	<u>3.8%</u>	<u>5.1%</u>	27.0%	<u>12.5%</u>	16.3%	

Grey Shading = Not Applicable/Available

Underlined % are based on a numerator of less than 5

* Age 20 and older

NORTHERN HEALTH INDICATORS AND METRICS

The BC Stroke Strategy Measurement and Evaluation Working Group have suggested five key indicators for tracking progress on ACVS care in the province. The following includes trend data for **Northern Health** for four of these five indicators (data for the first indicator, volume of TIA / non-hospitalized strokes processed in TIA Rapid Assessment Clinics, is not available for this health authority). Data for the remaining four indicators is from the updated Acute Cerebrovascular Syndrome (ACVS) Registry. Note that the geographic location is based on the patient's residence, not necessarily the location of their treatment.

The focus of the graphs and charts is on provincial trends for the four key ACVS indicators.

Indicator #1 – TIA Volumes

Increase the volume of TIA / non-hospitalized strokes processed in TIA Rapid Assessment Clinics by **50%** between 2009/10 and 2013/14 (*data source*: provided by Health Authorities).

Data on TIA volumes not available for this region

Indicator #2 – tPA Utilization

Increase the number of incident ischemic stroke patients appropriately receiving tPA to **10%** between 2008/09 and 2013/14. [*Data source*: proportion is based on number of incident hospitalized ischemic stroke patients (based on the updated ACVS Registry definition) with intervention code 1.ZZ.35.HA-C1 (Pharmacotherapy, total body, percutaneous approach, [intramuscular, intravenous, subcutaneous, intradermal] using antithrombotic agent). This use of this code has only been mandatory in BC since 2006/07.]

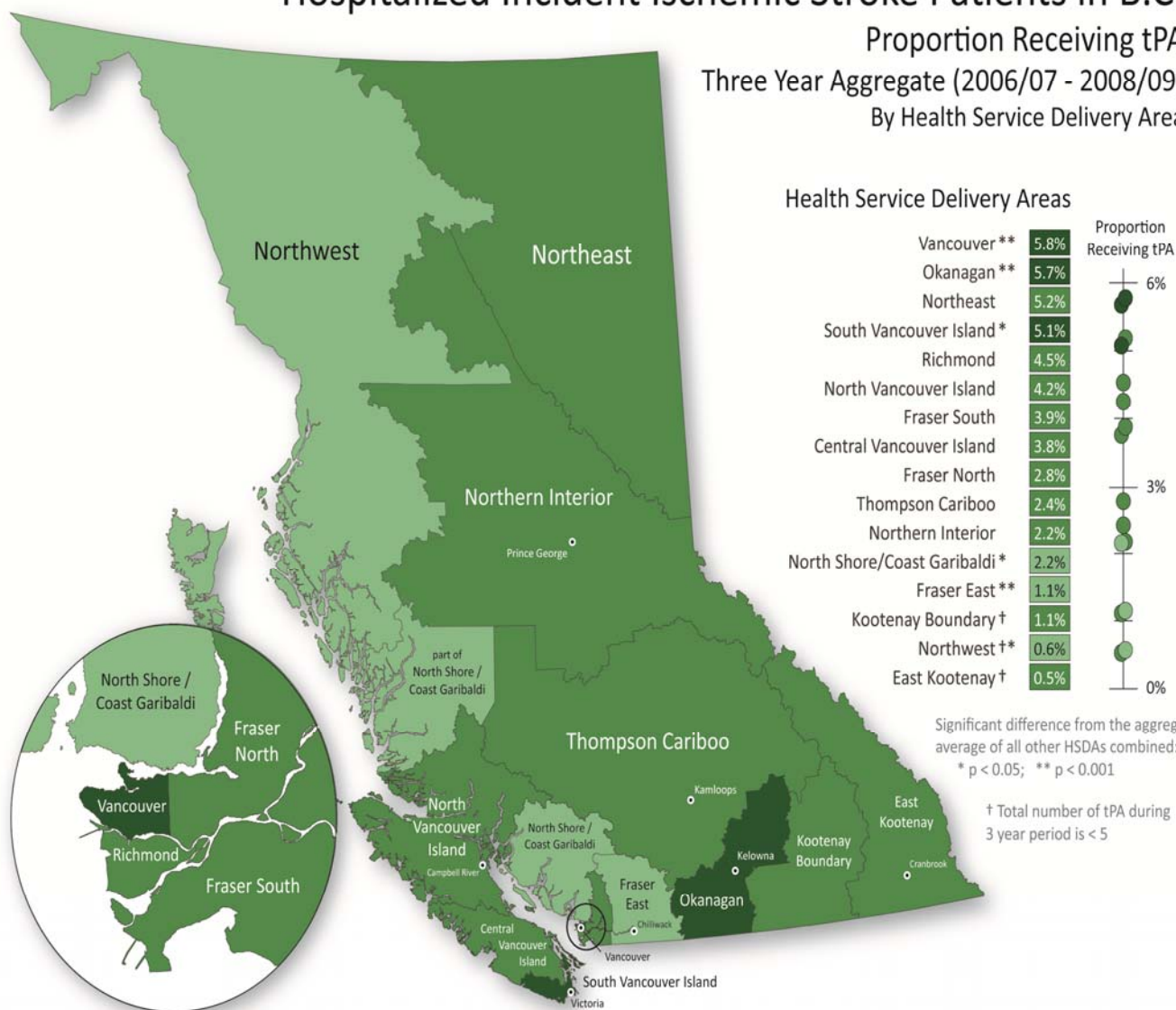
In Northern Health, utilization of tPA by incident hospitalized acute ischemic stroke (AIS) patients from 2006/07 to 2008/09 is as follows:

- 6 of 205 incident hospitalized AIS patients received tPA or 2.93% in 2006/07
- 4 of 218 incident hospitalized AIS patients received tPA or 1.83% in 2007/08
- 5 of 207 incident hospitalized AIS patients received tPA or 2.42% in 2008/09

In BC, there is considerable variation in use of tPA at the regional level, with a significantly higher proportion of AIS patients living in Vancouver, Okanagan and South Vancouver Island Health Service Delivery Areas (HSDAs) receiving tPA. Patients with an incident ischemic stroke living in the Fraser East, North Shore/Coast Garibaldi and Northwest HSDAs have a significantly lower probability of receiving tPA (see map on next page).

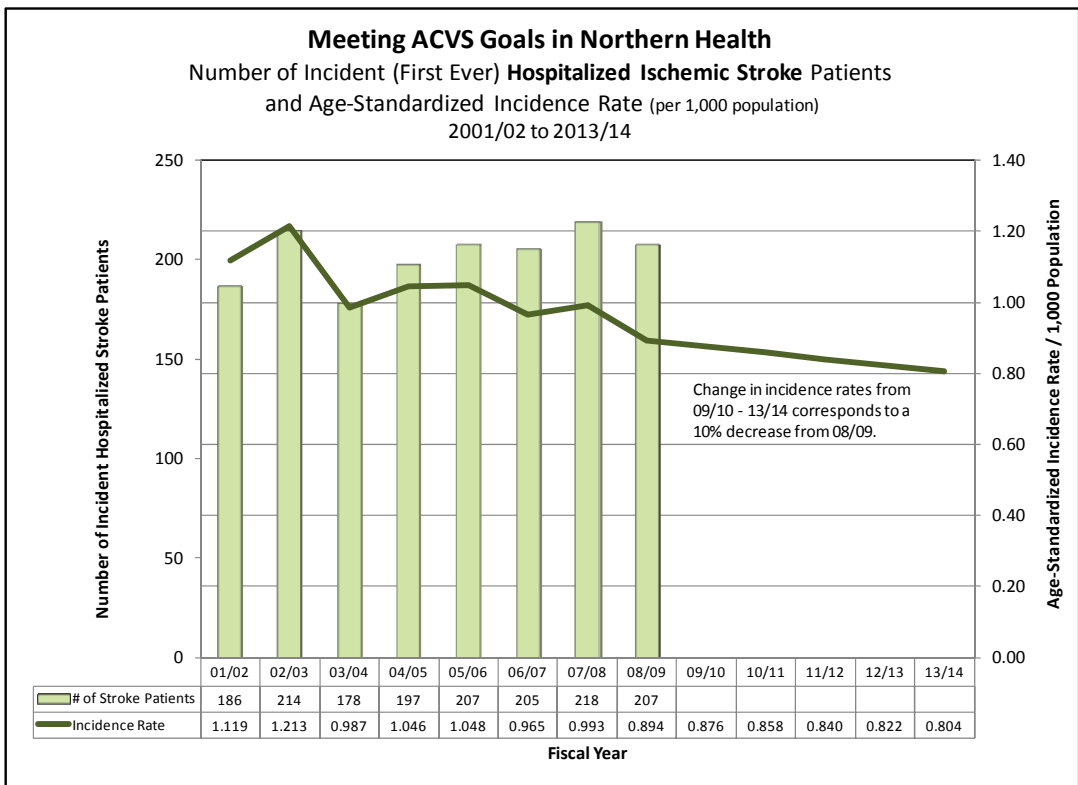
Hospitalized Incident Ischemic Stroke Patients in B.C.

Proportion Receiving tPA
 Three Year Aggregate (2006/07 - 2008/09)
 By Health Service Delivery Area

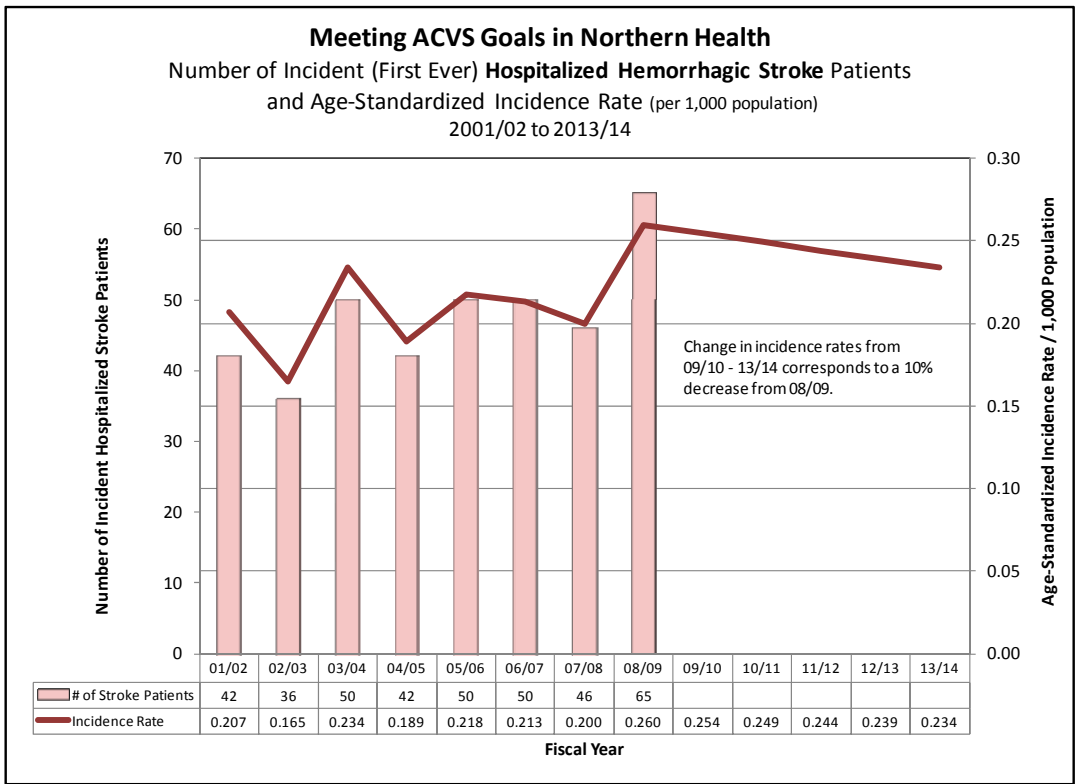


Indicator #3 – Incidence Rate

Reduce the age-standardized incidence rate of both ischemic and hemorrhagic stroke by **10%** between 2008/09 and 2013/14 (*data source: updated ACVS Registry*).



Ischemic Stroke



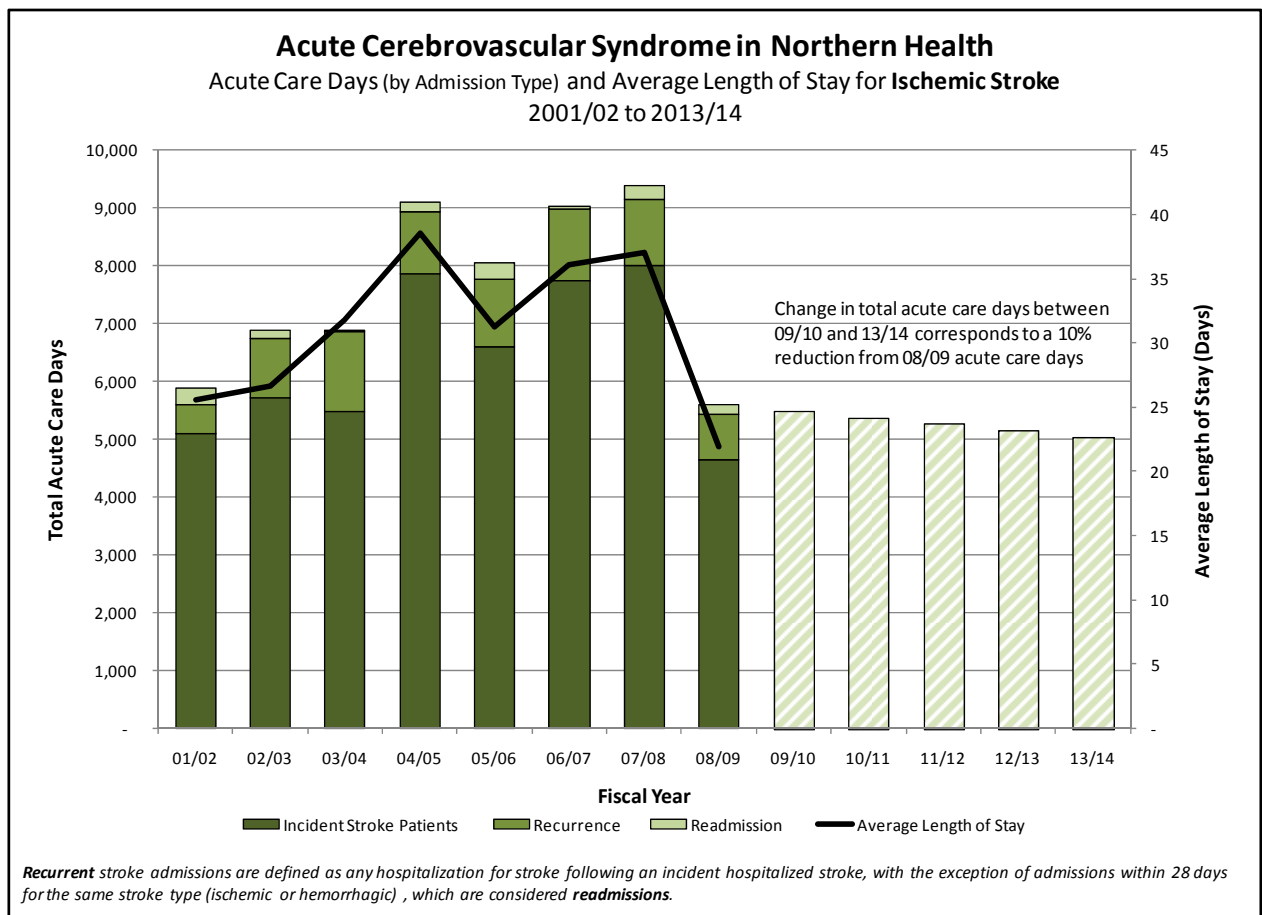
Hemorrhagic Stroke

Indicator #4 – Acute Care Days

Reduce acute care days for discharges in which an ischemic stroke is the principal diagnosis by **10%** between 2008/09 and 2013/14 (this includes a combination of reduced discharges and reduced average length of stay).

Data Source: Updated ACVS Registry for incident, re-admit and recurrent ischemic stroke discharges. Link to the Discharge Abstract Database (DAD) for number of hospital days associated with these discharges. **Recurrent** stroke admissions are defined as any hospitalization for stroke following an incident hospitalized stroke, with the exception of admissions within 28 days for the same stroke type (ischemic or hemorrhagic), which are considered **readmissions**.

Northern Health Authority – Acute Care Days and ALOS for Ischemic Stroke Patients



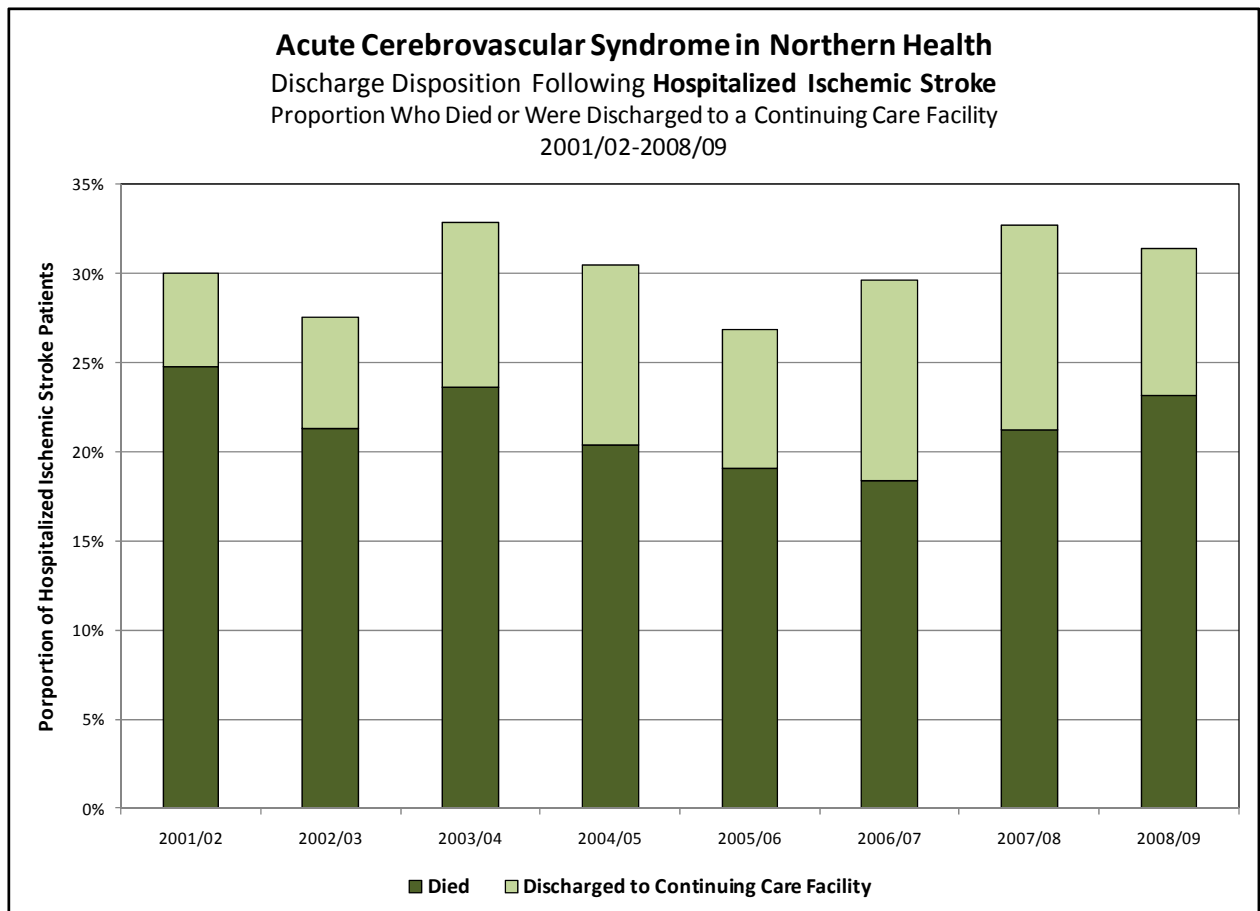
Hospitalization and ALOS for Stroke								
Adults* Residing in Northern Health Authority								
2001/02 to 2008/09								
	Fiscal Year							
	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Number of Stroke Hospitalizations								
Number of Incident Stroke Patients								
Hospitalized Ischemic Stroke	186	214	178	197	207	205	218	207
Hospitalized Hemorrhagic Stroke	42	36	50	42	50	50	47	65
Readmission								
Hospitalized Ischemic Stroke	11	9		6	10		6	8
Hospitalized Hemorrhagic Stroke	5			5				5
Recurrence								
Hospitalized Ischemic Stroke	33	35	35	33	40	41	30	40
Hospitalized Hemorrhagic Stroke	5	5			6	9		
Total Hospitalized Ischemic Stroke	230	258	216	236	257	250	254	255
Total Hospitalized Hemorrhagic Stroke	52	42	54	51	59	60	52	74
Total Number of Stroke Hospitalizations	282	300	270	287	316	310	306	329
Average Length of Stay in Acute Care								
Incident Stroke Patients								
Hospitalized Ischemic Stroke	27.41	26.77	30.84	39.93	31.90	37.73	36.77	22.39
Hospitalized Hemorrhagic Stroke	21.86	21.92	32.04	19.62	25.60	28.42	20.62	31.11
Readmission								
Hospitalized Ischemic Stroke	27.00	16.11	3.00	27.17	28.40	11.75	40.33	21.38
Hospitalized Hemorrhagic Stroke	20.00	86.00	5.00	45.40	14.33	8.00	347.00	18.80
Recurrence								
Hospitalized Ischemic Stroke	14.88	28.83	39.40	32.42	28.88	30.44	37.90	19.93
Hospitalized Hemorrhagic Stroke	73.40	49.60	57.33	13.50	30.50	5.33	6.50	26.50
Total Hospitalized Ischemic Stroke	25.60	26.67	31.84	38.56	31.29	36.12	36.99	21.97
Total Hospitalized Hemorrhagic Stroke	26.63	26.74	32.94	21.67	25.53	24.62	25.81	30.03
Total Number of Stroke Hospitalizations	25.79	26.68	32.06	35.55	30.22	33.89	35.09	23.78
Days in Acute Care								
Number of Incident Stroke Patients								
Hospitalized Ischemic Stroke	5,099	5,728	5,489	7,866	6,603	7,735	8,016	4,635
Hospitalized Hemorrhagic Stroke	918	789	1,602	824	1,280	1,421	969	2,022
Readmission								
Hospitalized Ischemic Stroke	297	145	9	163	284	47	242	171
Hospitalized Hemorrhagic Stroke	100	86	5	227	43	8	347	94
Recurrence								
Hospitalized Ischemic Stroke	491	1,009	1,379	1,070	1,155	1,248	1,137	797
Hospitalized Hemorrhagic Stroke	367	248	172	54	183	48	26	106
Total Days - Hospitalized Ischemic Stroke	5,887	6,882	6,877	9,099	8,042	9,030	9,395	5,603
Total Days - Hospitalized Hemorrhagic Stroke	1,385	1,123	1,779	1,105	1,506	1,477	1,342	2,222
Total Days	7,272	8,005	8,656	10,204	9,548	10,507	10,737	7,825
* Age 20 and older								
<i>Recurrent stroke admissions are defined as any hospitalization for stroke following an incident hospitalized stroke, with the exception of admissions within 28 days for the same stroke type (ischemic or hemorrhagic), which are considered readmissions.</i>								

Indicator #5 – Death and Dependency

Reduce the proportion of patients who die in hospital or are sent to a long-term care facility after being admitted/discharged (principal diagnosis) for ischemic stroke. *If only one composite measure is used to assess progress in stroke care, it would be this overall measure of death and dependency.*

Data Source: Updated ACVS Registry for hospitalized (incident, readmission and recurrent) ischemic stroke discharges. Discharge Abstract Database (DAD) for discharge disposition ('died', 'discharged to a Continuing Care facility').

Northern Health Authority – Discharge Disposition for Hospitalized Ischemic Stroke



Discharge Disposition Following a Hospitalization for Stroke
Patient Died or Was Discharged to a Continuing Care Facility
Adults* Residing in Northern Health Authority
2001/02 to 2008/09

	Fiscal Year							
	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Number of Stroke Hospitalizations								
Number of Incident Stroke Patients								
Hospitalized Ischemic Stroke	186	214	178	197	207	205	218	207
Hospitalized Hemorrhagic Stroke	42	36	50	42	50	50	47	65
Readmission								
Hospitalized Ischemic Stroke	11	9		6	10		6	8
Hospitalized Hemorrhagic Stroke	5			5				5
Recurrence								
Hospitalized Ischemic Stroke	33	35	35	33	40	41	30	40
Hospitalized Hemorrhagic Stroke	5	5			6	9		
Total Hospitalized Ischemic Stroke	230	258	216	236	257	250	254	255
Total Hospitalized Hemorrhagic Stroke	52	42	54	51	59	60	52	74
Total Number of Stroke Hospitalizations	282	300	270	287	316	310	306	329

Discharge Disposition - Number								
Incident Stroke Patients								
Hospitalized Ischemic Stroke								
Died	48	44	41	36	38	41	47	44
Discharged to a Continuing Care Facility	10	12	15	19	17	18	23	11
Hospitalized Hemorrhagic Stroke								
Died	16	17	20	16	12	14	24	18
Discharged to a Continuing Care Facility	-							
Readmission								
Hospitalized Ischemic Stroke								
Died								
Discharged to a Continuing Care Facility	-	-	-		-	-		
Hospitalized Hemorrhagic Stroke								
Died	-	-	-					
Discharged to a Continuing Care Facility	-	-	-					
Recurrence								
Hospitalized Ischemic Stroke								
Died	7	9	9	12	10	5	6	11
Discharged to a Continuing Care Facility			5		10	5	5	7
Hospitalized Hemorrhagic Stroke								
Died								
Discharged to a Continuing Care Facility								
Total Hospitalized Ischemic Stroke								
Died	57	55	51	48	49	46	54	59
Discharged to a Continuing Care Facility	12	16	20	24	20	28	29	21
Death and Disability	69	71	71	72	69	74	83	80
Total Hospitalized Hemorrhagic Stroke								
Died	17	18	21	18	15	17	26	22
Discharged to a Continuing Care Facility			5					
Death and Disability	18	22	26	21	18	19	28	25
Total Number of Stroke Hospitalizations								
Died	74	73	72	66	64	63	80	81
Discharged to a Continuing Care Facility	13	20	25	27	23	30	31	24
Death and Disability	87	93	97	93	87	93	111	105

Discharge Disposition - Proportion								
Incident Stroke Patients								
Hospitalized Ischemic Stroke								
Died	25.8%	20.6%	23.0%	18.3%	18.4%	20.0%	21.6%	21.3%
Discharged to a Continuing Care Facility	5.4%	5.6%	8.4%	9.6%	8.2%	8.8%	10.6%	5.3%
Hospitalized Hemorrhagic Stroke								
Died	38.1%	47.2%	40.0%	38.1%	24.0%	28.0%	51.1%	27.7%
Discharged to a Continuing Care Facility	0.0%	5.6%	8.0%	4.8%	6.0%	4.0%	2.1%	4.6%
Readmission								
Hospitalized Ischemic Stroke								
Died	18.2%	22.2%	33.3%	0.0%	10.0%	0.0%	16.7%	50.0%
Discharged to a Continuing Care Facility	0.0%	0.0%	0.0%	16.7%	0.0%	0.0%	16.7%	37.5%
Hospitalized Hemorrhagic Stroke								
Died	0.0%	0.0%	0.0%	20.0%	33.3%	100.0%	0.0%	40.0%
Discharged to a Continuing Care Facility	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Recurrence								
Hospitalized Ischemic Stroke								
Died	21.2%	25.7%	25.7%	36.4%	25.0%	12.2%	20.0%	27.5%
Discharged to a Continuing Care Facility	6.1%	11.4%	14.3%	12.1%	7.5%	24.4%	16.7%	17.5%
Hospitalized Hemorrhagic Stroke								
Died	20.0%	20.0%	33.3%	25.0%	33.3%	22.2%	50.0%	50.0%
Discharged to a Continuing Care Facility	20.0%	40.0%	33.3%	25.0%	0.0%	0.0%	0.0%	0.0%
Total Hospitalized Ischemic Stroke								
Died	24.8%	21.3%	23.6%	20.3%	19.1%	18.4%	21.3%	23.1%
Discharged to a Continuing Care Facility	5.2%	6.2%	9.3%	10.2%	7.8%	11.2%	11.4%	8.2%
Death and Disability	30.0%	27.5%	32.9%	30.5%	26.8%	29.6%	32.7%	31.4%
Total Hospitalized Hemorrhagic Stroke								
Died	32.7%	42.9%	38.9%	35.3%	25.4%	28.3%	50.0%	29.7%
Discharged to a Continuing Care Facility	1.9%	9.5%	9.3%	5.9%	5.1%	3.3%	3.8%	4.1%
Death and Disability	34.6%	52.4%	48.1%	41.2%	30.5%	31.7%	53.8%	33.8%
Total Number of Stroke Hospitalizations								
Died	26.2%	24.3%	26.7%	23.0%	20.3%	20.3%	26.1%	24.6%
Discharged to a Continuing Care Facility	4.6%	6.7%	9.3%	9.4%	7.3%	9.7%	10.1%	7.3%
Death and Disability	30.9%	31.0%	35.9%	32.4%	27.5%	30.0%	36.3%	31.9%

* Age 20 and older
Recurrent stroke admissions are defined as any hospitalization for stroke following an incident hospitalized stroke, with the exception of admissions within 28 days for the same stroke type (ischemic or hemorrhagic), which are considered readmissions.

**Indicator #5 –
 Death and
 Dependency
 (continued)**

*Northern Health
 Authority – Discharge
 Disposition Data
 Trends*

NORTHWEST HSDA

Indicators and Metrics

NORTHWEST HSDA INDICATORS AND METRICS AS OF NOVEMBER 2010

Acute Cerebrovascular Syndrome Adults* Residing in the Northwest HSDA 2001/02 to 2008/09

	Fiscal Year								% Change 01/02 to 08/09
	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	
Number of Incident ACVS Patients									
Hospitalized Ischemic Stroke	53	59	55	53	53	50	55	69	30.2%
Hospitalized Hemorrhagic Stroke	14	10	11	18	16	9	19	22	57.1%
Sub-total	67	69	66	71	69	59	74	91	35.8%
Hospitalized TIA	23	21	26	29	15	31	24	24	4.3%
Non-hospitalized TIA/Stroke	36	49	52	51	39	46	31	43	19.4%
Sub-total	59	70	78	80	54	77	55	67	13.6%
Number of Prevalent ACVS Patients									
Hospitalized Ischemic Stroke	367	387	396	412	435	449	452	482	31.3%
Hospitalized Hemorrhagic Stroke	95	100	105	116	124	127	133	145	52.6%
Sub-total	462	487	501	528	559	576	585	627	35.7%
Hospitalized TIA	187	191	202	220	215	232	233	240	28.3%
Non-hospitalized TIA/Stroke	288	324	346	371	384	400	403	418	45.1%
Sub-total	475	515	548	591	599	632	636	658	38.5%
Age-Standardized Incidence / 1,000 Population									
Hospitalized Ischemic Stroke	1.127	1.262	1.124	1.022	0.942	0.818	0.927	1.088	-3.5%
Hospitalized Hemorrhagic Stroke	0.214	0.165	0.180	0.275	0.243	0.145	0.309	0.302	41.2%
Sub-total	1.348	1.437	1.316	1.308	1.195	0.972	1.251	1.403	4.0%
Hospitalized TIA	0.399	0.416	0.526	0.539	0.255	0.520	0.353	0.405	1.6%
Non-hospitalized TIA/Stroke	0.722	0.934	0.926	0.903	0.634	0.736	0.476	0.682	-5.5%
Age-Standardized Prevalence / 1,000 Population									
Hospitalized Ischemic Stroke	7.341	7.452	7.339	7.312	7.405	7.275	7.032	7.156	-2.5%
Hospitalized Hemorrhagic Stroke	1.587	1.645	1.679	1.812	1.866	1.867	1.911	1.967	24.0%
Sub-total	8.928	9.097	9.018	9.124	9.270	9.142	8.942	9.124	2.2%
Hospitalized TIA	3.755	3.704	3.763	3.917	3.671	3.814	3.638	3.607	-4.0%
Non-hospitalized TIA/Stroke	5.557	6.017	6.147	6.434	6.360	6.430	6.273	6.269	12.8%
Conversion Rate from TIA/Non-hospitalized Stroke to Hospitalized Stroke									
90-Day Conversion Rate		0.00%			0.00%		11.54%		
365-Day Conversion Rate			10.53%				11.54%		
Utilization of tPA by Incident Acute Ischemic Stroke Patients									
Number Receiving tPA						-	-	1	
Total Number						50	55	69	
Proportion of Incident Hospitalized AIS Patients Receiving tPA						0.00%	0.00%	1.45%	
Utilization of Acute Care by Incident Ischemic Stroke Patients									
Discharges	53	59	55	53	53	50	55	69	30.2%
ALOS	25.09	20.61	43.75	52.53	46.11	48.36	31.58	21.96	-12.5%
Patient Days	1,330	1,216	2,406	2,784	2,444	2,418	1,737	1,515	13.9%
Utilization of Acute Care by Incident Hemorrhagic Stroke Patients									
Discharges	14	10	11	18	16	9	20	22	57.1%
ALOS	15.43	16.50	28.73	18.83	33.75	14.22	29.55	14.86	-3.7%
Patient Days	216	165	316	339	540	128	591	327	51.4%
Discharge Disposition following Acute Admissions for Incident Ischemic Stroke Patients									
Died	26.4%	28.8%	21.8%	13.2%	11.3%	16.0%	21.8%	20.3%	-23.2%
Discharged to Home	49.1%	55.9%	61.8%	58.5%	64.2%	58.0%	60.0%	65.2%	32.9%
Home with Support Services	11.3%	8.5%	<u>1.8%</u>	13.2%	13.2%	<u>4.0%</u>	<u>7.3%</u>	<u>2.9%</u>	-74.4%
Continuing Care Facility		<u>3.4%</u>	9.1%	<u>5.7%</u>	<u>5.7%</u>	14.0%	<u>5.5%</u>	<u>5.8%</u>	
Other	<u>13.2%</u>	<u>3.4%</u>	<u>5.5%</u>	9.4%	<u>5.7%</u>	<u>8.0%</u>	<u>5.5%</u>	<u>5.8%</u>	-56.1%
Discharge Disposition following Acute Admissions for Incident Hemorrhagic Stroke Patients									
Died	<u>28.6%</u>	50.0%	<u>36.4%</u>	<u>22.2%</u>	<u>12.5%</u>	<u>22.2%</u>	35.0%	27.3%	-4.5%
Discharged to Home	50.0%	<u>30.0%</u>	<u>36.4%</u>	44.4%	50.0%	<u>44.4%</u>	45.0%	36.4%	-27.3%
Home with Support Services	<u>7.1%</u>				<u>25.0%</u>			<u>4.5%</u>	-36.4%
Continuing Care Facility		<u>10.0%</u>	<u>9.1%</u>	<u>11.1%</u>			<u>5.0%</u>		
Other	<u>14.3%</u>	<u>10.0%</u>	<u>18.2%</u>	<u>22.2%</u>	<u>12.5%</u>	<u>33.3%</u>	<u>15.0%</u>	31.8%	122.7%
Mortality Following an Incident Stroke									
Hospitalized Ischemic Stroke									
Crude 30-day In-hospital Mortality Rate	20.8%	25.4%	16.4%	<u>7.5%</u>	9.4%	10.0%	14.5%	15.9%	-23.2%
Crude 31-365 Day Mortality Rate in 30-day In-hospital Survivors	14.3%	20.5%	10.9%	14.3%	12.5%	20.0%	17.0%	19.0%	32.8%
Hospitalized Hemorrhagic Stroke									
Crude 30-day In-hospital Mortality Rate	<u>28.6%</u>	<u>40.0%</u>	<u>36.4%</u>	<u>22.2%</u>	<u>6.3%</u>	<u>22.2%</u>	36.8%	22.7%	-20.5%
Crude 31-365 Day Mortality Rate in 30-day In-hospital Survivors	<u>0.0%</u>	<u>16.7%</u>	<u>14.3%</u>	<u>0.0%</u>	<u>13.3%</u>	<u>28.6%</u>	<u>16.7%</u>	<u>23.5%</u>	

Grey Shading = Not Applicable/Available

Underlined % are based on a numerator of less than 5

* Age 20 and older

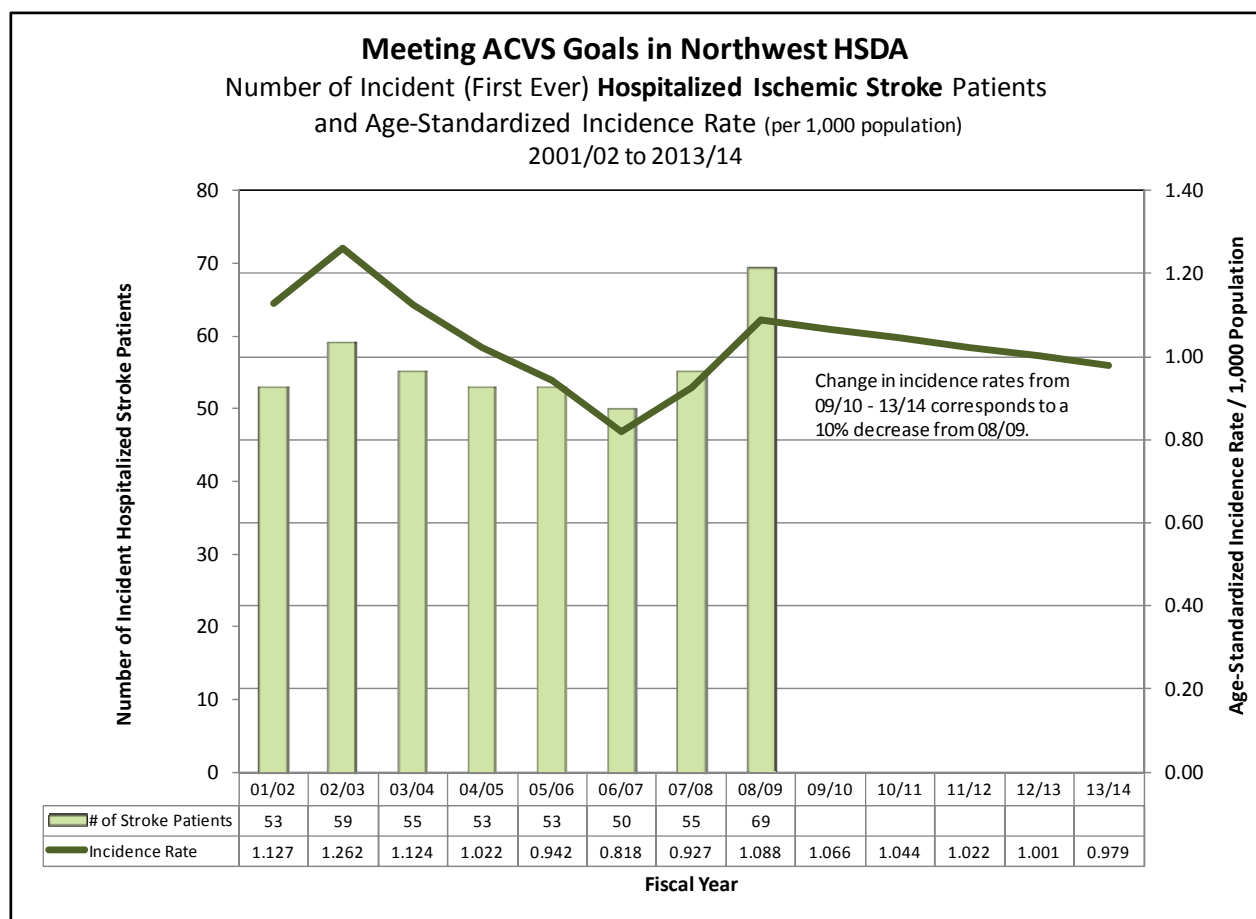
NORTHWEST HSDA INDICATORS AND METRICS

The BC Stroke Strategy Measurement and Evaluation Working Group have suggested five key indicators for tracking progress on ACVS care in the province. The following charts and tables include trend data for **Northwest HSDA** for three of these five indicators. The source of this data is from the updated Acute Cerebrovascular Syndrome (ACVS) Registry. Note that the geographic location is based on the patient's residence, not necessarily the location of their treatment.

Indicator #3 – Incidence Rate

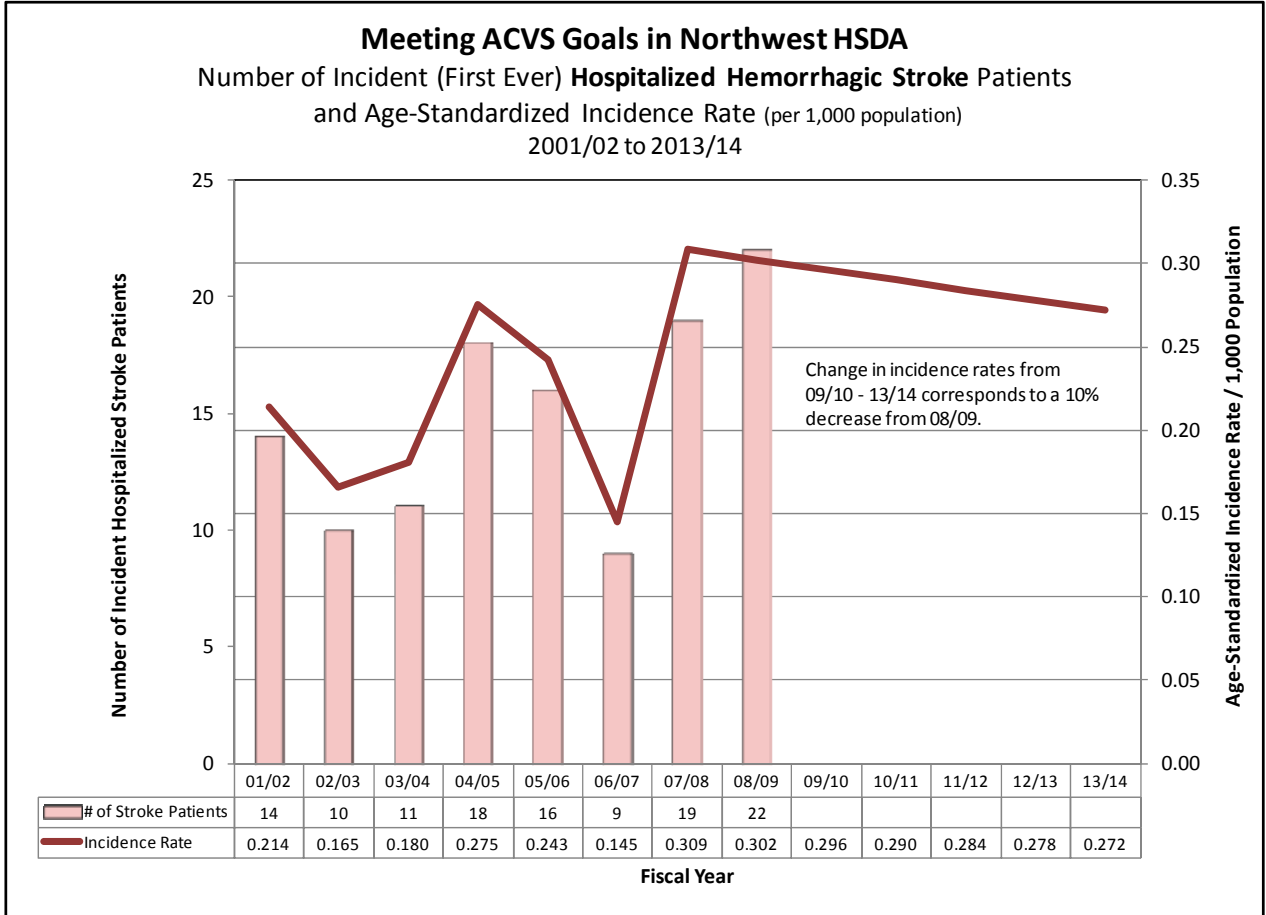
Reduce the age-standardized incidence rate of both ischemic and hemorrhagic stroke by **10%** between 2008/09 and 2013/14 (*data source*: updated ACVS Registry).

Northwest HSDA – Incident Hospitalized Ischemic Stroke Patients



Indicator #3 - Incidence Rate (continued)

Northwest HSDA – Incident Hospitalized Hemorrhagic Stroke Patients

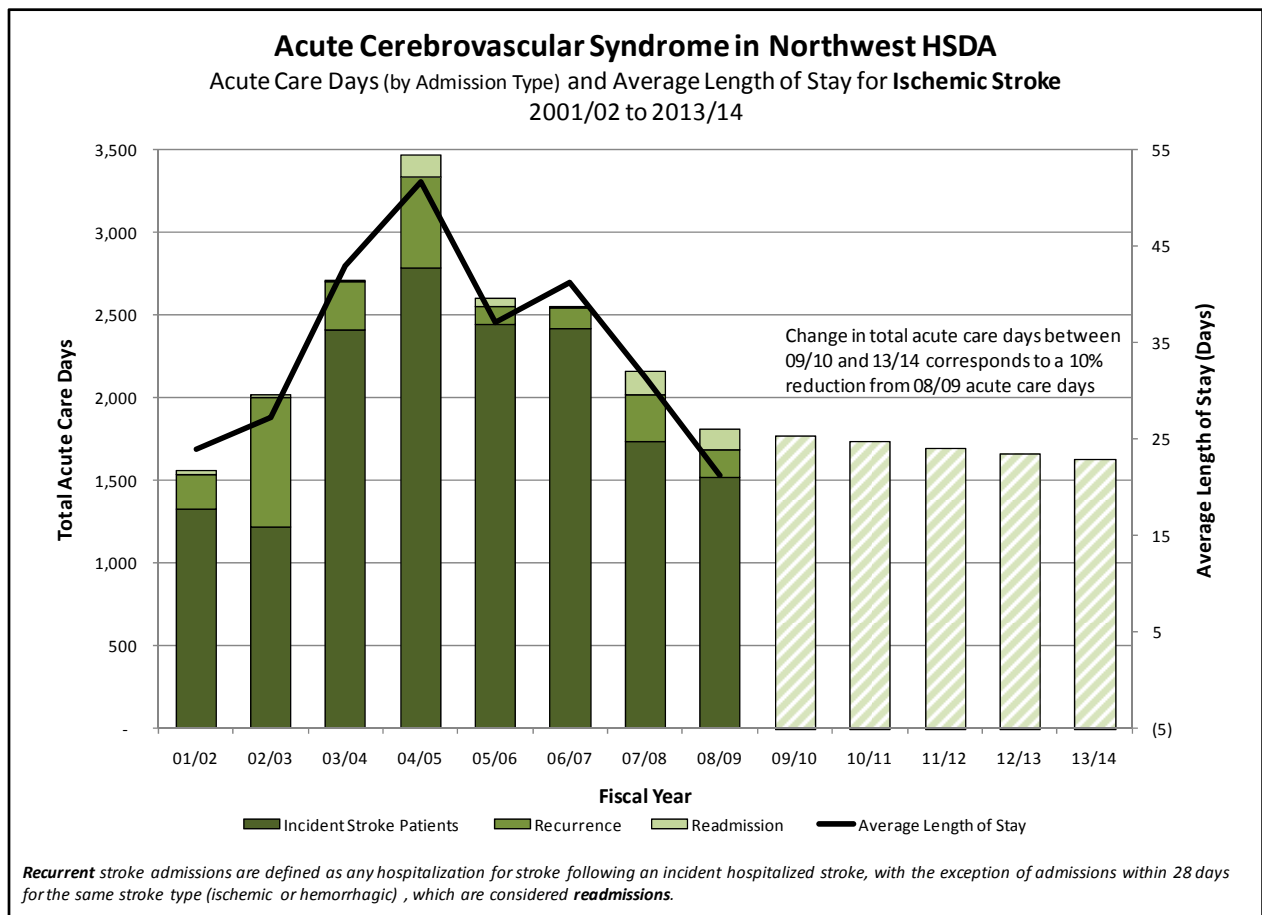


Indicator #4 – Acute Care Days

Reduce acute care days for discharges in which an ischemic stroke is the principal diagnosis by **10%** between 2008/09 and 2013/14 (this includes a combination of reduced discharges and reduced average length of stay).

Data Source: Updated ACVS Registry for incident, re-admit and recurrent ischemic stroke discharges. Link to the Discharge Abstract Database (DAD) for number of hospital days associated with these discharges. **Recurrent** stroke admissions are defined as any hospitalization for stroke following an incident hospitalized stroke, with the exception of admissions within 28 days for the same stroke type (ischemic or hemorrhagic), which are considered **readmissions**.

Northwest HSDA – Acute Care Days and ALOS for Ischemic Stroke Patients



Indicator #4 – Acute Care Days (continued)

Northwest HSDA – Hospitalization and ALOS Data Trends

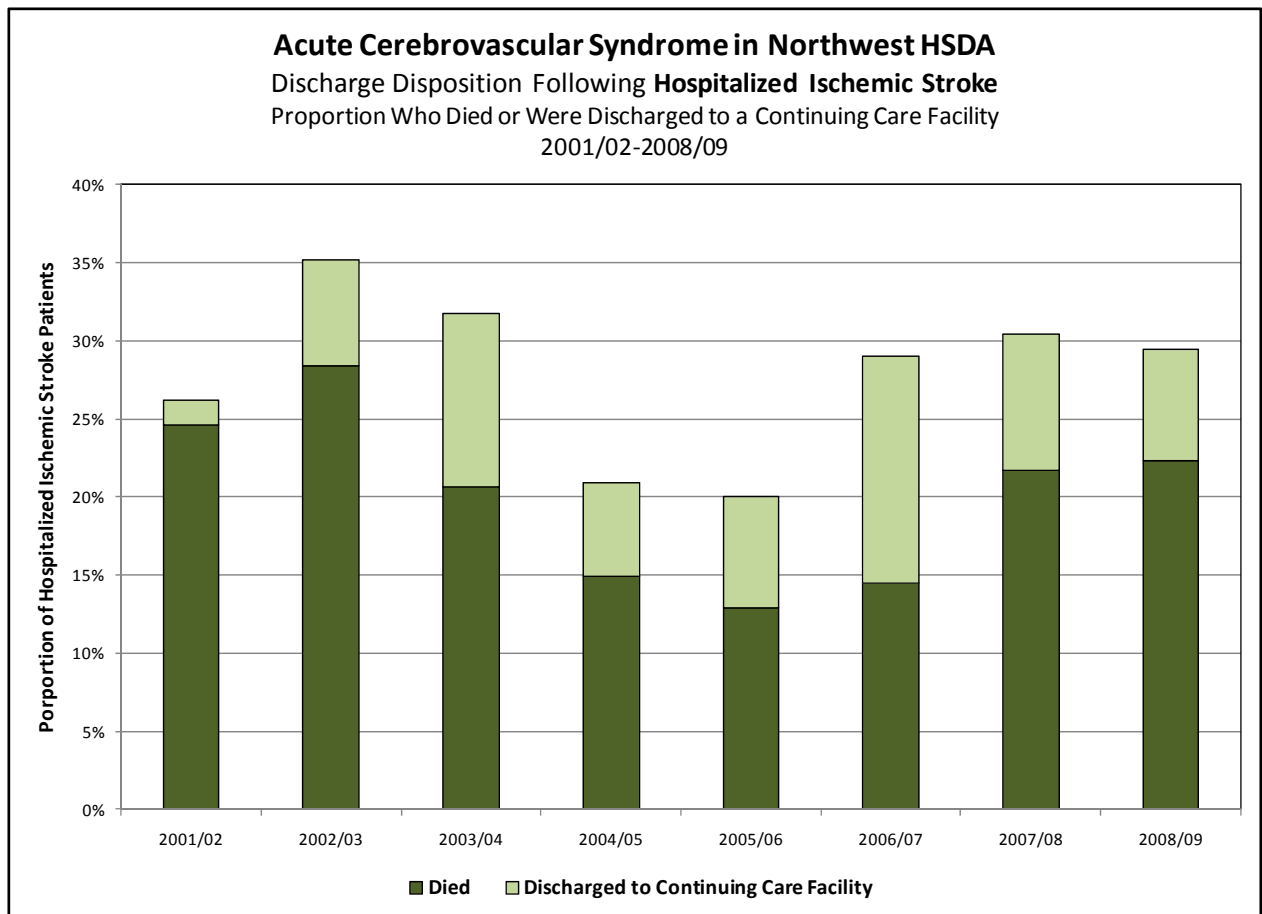
Hospitalization and ALOS for Stroke								
Adults* Residing in Northwest HSDA								
2001/02 to 2008/09								
	Fiscal Year							
	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Number of Stroke Hospitalizations								
Number of Incident Stroke Patients								
Hospitalized Ischemic Stroke	53	59	55	53	53	50	55	69
Hospitalized Hemorrhagic Stroke	14	10	11	18	16	9	20	22
Readmission								
Hospitalized Ischemic Stroke								
Hospitalized Hemorrhagic Stroke			-					
Recurrence								
Hospitalized Ischemic Stroke	9	13	7	11	14	10	11	14
Hospitalized Hemorrhagic Stroke								-
Total Hospitalized Ischemic Stroke	65	74	63	67	70	62	69	85
Total Hospitalized Hemorrhagic Stroke	17	12	12	22	19	14	23	26
Total Number of Stroke Hospitalizations	82	86	75	89	89	76	92	111
Average Length of Stay in Acute Care								
Incident Stroke Patients								
Hospitalized Ischemic Stroke	25.09	20.61	43.75	52.53	46.11	48.36	31.58	21.96
Hospitalized Hemorrhagic Stroke	15.43	16.50	28.73	18.83	33.75	14.22	29.55	14.86
Readmission								
Hospitalized Ischemic Stroke	6.33	8.50	4.00	43.00	17.00	5.50	48.00	63.50
Hospitalized Hemorrhagic Stroke	16.50	86.00		70.00	20.50	8.00	347.00	17.50
Recurrence								
Hospitalized Ischemic Stroke	23.00	60.46	42.29	50.18	7.50	12.50	25.55	11.93
Hospitalized Hemorrhagic Stroke	82.00	2.00	36.00	26.50	70.00	3.25	9.50	
Total Hospitalized Ischemic Stroke	23.94	27.28	42.95	51.72	37.14	41.19	31.33	21.28
Total Hospitalized Hemorrhagic Stroke	19.47	21.08	29.33	24.18	34.26	10.64	41.61	15.27
Total Number of Stroke Hospitalizations	23.01	26.42	40.77	44.91	36.53	35.57	33.90	19.87
Days in Acute Care								
Number of Incident Stroke Patients								
Hospitalized Ischemic Stroke	1,330	1,216	2,406	2,784	2,444	2,418	1,737	1,515
Hospitalized Hemorrhagic Stroke	216	165	316	339	540	128	591	327
Readmission								
Hospitalized Ischemic Stroke	19	17		129	51	11	144	127
Hospitalized Hemorrhagic Stroke	33	86	-	140	41	8	347	70
Recurrence								
Hospitalized Ischemic Stroke	207	786	296	552	105	125	281	167
Hospitalized Hemorrhagic Stroke	82		36	53	70	13	19	-
Total Days - Hospitalized Ischemic Stroke	1,556	2,019	2,706	3,465	2,600	2,554	2,162	1,809
Total Days - Hospitalized Hemorrhagic Stroke	331	253	352	532	651	149	957	397
Total Days	1,887	2,272	3,058	3,997	3,251	2,703	3,119	2,206
* Age 20 and older								
<i>Recurrent stroke admissions are defined as any hospitalization for stroke following an incident hospitalized stroke, with the exception of admissions within 28 days for the same stroke type (ischemic or hemorrhagic), which are considered readmissions.</i>								

Indicator #5 – Death and Dependency

Reduce the proportion of patients who die in hospital or are sent to a long-term care facility after being admitted/discharged (principal diagnosis) for ischemic stroke. *If only one composite measure is used to assess progress in stroke care, it would be this overall measure of death and dependency.*

Data Source: Updated ACVS Registry for hospitalized (incident, readmission and recurrent) ischemic stroke discharges. Discharge Abstract Database (DAD) for discharge disposition ('died', 'discharged to a Continuing Care facility').

Northwest HSDA – Discharge Disposition for Hospitalized Ischemic Stroke



Discharge Disposition Following a Hospitalization for Stroke
Patient Died or Was Discharged to a Continuing Care Facility
 Adults* Residing in Northwest HSDA
 2001/02 to 2008/09

	Fiscal Year							
	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Number of Stroke Hospitalizations								
Number of Incident Stroke Patients								
Hospitalized Ischemic Stroke	53	59	55	53	53	50	55	69
Hospitalized Hemorrhagic Stroke	14	10	11	18	16	9	20	22
Readmission								
Hospitalized Ischemic Stroke								
Hospitalized Hemorrhagic Stroke								
Recurrence								
Hospitalized Ischemic Stroke	9	13	7	11	14	10	11	14
Hospitalized Hemorrhagic Stroke								
Total Hospitalized Ischemic Stroke	65	74	63	67	70	62	69	85
Total Hospitalized Hemorrhagic Stroke	17	12	12	22	19	14	23	26
Total Number of Stroke Hospitalizations	82	86	75	89	89	76	92	111

Discharge Disposition - Number

Incident Stroke Patients								
Hospitalized Ischemic Stroke								
Died	14	17	12	7	6	8	12	14
Discharged to a Continuing Care Facility	-		5			7		
Hospitalized Hemorrhagic Stroke								
Died		5	4				7	6
Discharged to a Continuing Care Facility	-							
Readmission								
Hospitalized Ischemic Stroke								
Died								
Discharged to a Continuing Care Facility	-							
Hospitalized Hemorrhagic Stroke								
Died								
Discharged to a Continuing Care Facility	-							
Recurrence								
Hospitalized Ischemic Stroke								
Died								
Discharged to a Continuing Care Facility								
Hospitalized Hemorrhagic Stroke								
Died								
Discharged to a Continuing Care Facility	-							
Total Hospitalized Ischemic Stroke								
Died	16	21	13	10	9	9	15	19
Discharged to a Continuing Care Facility		5	7		5	9	6	6
Death and Disability	17	26	20	14	14	18	21	25
Total Hospitalized Hemorrhagic Stroke								
Died		5				5	9	8
Discharged to a Continuing Care Facility	-							
Death and Disability		7	5	7		5	11	8
Total Number of Stroke Hospitalizations								
Died	20	26	17	14	12	14	24	27
Discharged to a Continuing Care Facility		7	8	7	5	9	8	6
Death and Disability	21	33	25	21	17	23	32	33

Discharge Disposition - Proportion

Incident Stroke Patients								
Hospitalized Ischemic Stroke								
Died	26.4%	28.8%	21.8%	13.2%	11.3%	16.0%	21.8%	20.3%
Discharged to a Continuing Care Facility	0.0%	3.4%	9.1%	5.7%	5.7%	14.0%	5.5%	5.8%
Hospitalized Hemorrhagic Stroke								
Died	28.6%	50.0%	36.4%	22.2%	12.5%	22.2%	35.0%	27.3%
Discharged to a Continuing Care Facility	0.0%	10.0%	9.1%	11.1%	0.0%	0.0%	5.0%	0.0%
Readmission								
Hospitalized Ischemic Stroke								
Died	33.3%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%
Discharged to a Continuing Care Facility	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%	50.0%
Hospitalized Hemorrhagic Stroke								
Died	0.0%	0.0%	0.0%	0.0%	50.0%	100.0%	0.0%	50.0%
Discharged to a Continuing Care Facility	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
Recurrence								
Hospitalized Ischemic Stroke								
Died	11.1%	15.4%	14.3%	27.3%	21.4%	10.0%	27.3%	28.6%
Discharged to a Continuing Care Facility	11.1%	23.1%	28.6%	9.1%	14.3%	20.0%	18.2%	7.1%
Hospitalized Hemorrhagic Stroke								
Died	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%	100.0%	0.0%
Discharged to a Continuing Care Facility	0.0%	100.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%
Total Hospitalized Ischemic Stroke								
Died	24.6%	28.4%	20.6%	14.9%	12.9%	14.5%	21.7%	22.4%
Discharged to a Continuing Care Facility	1.5%	6.8%	11.1%	6.0%	7.1%	14.5%	8.7%	7.1%
Death and Disability	26.2%	35.1%	31.7%	20.9%	20.0%	29.0%	30.4%	29.4%
Total Hospitalized Hemorrhagic Stroke								
Died	23.5%	41.7%	33.3%	18.2%	15.8%	35.7%	39.1%	30.8%
Discharged to a Continuing Care Facility	0.0%	16.7%	8.3%	13.6%	0.0%	0.0%	8.7%	0.0%
Death and Disability	23.5%	58.3%	41.7%	31.8%	15.8%	35.7%	47.8%	30.8%
Total Number of Stroke Hospitalizations								
Died	24.4%	30.2%	22.7%	15.7%	13.5%	18.4%	26.1%	24.3%
Discharged to a Continuing Care Facility	1.2%	8.1%	10.7%	7.9%	5.6%	11.8%	8.7%	5.4%
Death and Disability	25.6%	38.4%	33.3%	23.6%	19.1%	30.3%	34.8%	29.7%

* Age 20 and older

Recurrent stroke admissions are defined as any hospitalization for stroke following an incident hospitalized stroke, with the exception of admissions within 28 days for the same stroke type (ischemic or hemorrhagic), which are considered readmissions.

Indicator #5 – Death and Dependency (continued)

Northwest HSDA – Discharge Disposition Data Trends

NORTHERN INTERIOR HSDA

Indicators and Metrics

NORTHERN INTERIOR HSDA INDICATORS AND METRICS AS OF NOVEMBER 2010

Acute Cerebrovascular Syndrome Adults* Residing in the Northern Interior HSDA 2001/02 to 2008/09

	Fiscal Year								% Change 01/02 to 08/09
	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	
Number of Incident ACVS Patients									
Hospitalized Ischemic Stroke	87	116	82	106	104	114	112	95	9.2%
Hospitalized Hemorrhagic Stroke	20	22	29	17	23	30	20	31	55.0%
Sub-total	107	138	111	123	127	144	132	126	17.8%
Hospitalized TIA	52	40	46	35	31	45	33	33	-36.5%
Non-hospitalized TIA/Stroke	72	68	90	95	81	96	91	83	15.3%
Sub-total	124	108	136	130	112	141	124	116	-6.5%
Number of Prevalent ACVS Patients									
Hospitalized Ischemic Stroke	525	562	579	618	647	695	724	744	41.7%
Hospitalized Hemorrhagic Stroke	104	114	130	130	145	164	168	185	77.9%
Sub-total	629	676	709	748	792	859	892	929	47.7%
Hospitalized TIA	288	297	318	327	329	351	357	357	24.0%
Non-hospitalized TIA/Stroke	437	466	512	572	602	666	703	735	68.2%
Sub-total	725	763	830	899	931	1,017	1,060	1,092	50.6%
Age-Standardized Incidence / 1,000 Population									
Hospitalized Ischemic Stroke	0.980	1.221	0.844	1.060	1.033	1.040	0.966	0.794	-18.9%
Hospitalized Hemorrhagic Stroke	0.191	0.189	0.250	0.148	0.198	0.244	0.160	0.252	32.0%
Sub-total	1.176	1.416	1.100	1.214	1.240	1.294	1.134	1.056	-10.2%
Hospitalized TIA	0.576	0.417	0.462	0.324	0.303	0.371	0.267	0.267	-53.7%
Non-hospitalized TIA/Stroke	0.753	0.697	0.863	0.890	0.728	0.792	0.741	0.636	-15.5%
Age-Standardized Prevalence / 1,000 Population									
Hospitalized Ischemic Stroke	5.473	5.588	5.551	5.721	5.774	5.935	5.902	5.787	5.7%
Hospitalized Hemorrhagic Stroke	0.875	0.910	1.023	1.008	1.113	1.219	1.214	1.325	51.4%
Sub-total	6.348	6.498	6.574	6.729	6.887	7.154	7.117	7.112	12.0%
Hospitalized TIA	3.019	2.979	3.063	3.039	2.957	2.984	2.869	2.729	-9.6%
Non-hospitalized TIA/Stroke	4.527	4.675	4.992	5.337	5.400	5.681	5.744	5.757	27.2%
Conversion Rate from TIA/Non-hospitalized Stroke to Hospitalized Stroke									
90-Day Conversion Rate					5.50%	5.67%			
365-Day Conversion Rate	6.61%	4.76%		4.65%	7.34%	7.09%	5.79%		
Utilization of tPA by Incident Acute Ischemic Stroke Patients									
Number Receiving tPA						4	1	2	
Total Number						114	112	95	
Proportion of Incident Hospitalized AIS Patients Receiving tPA						<u>3.51%</u>	<u>0.89%</u>	<u>2.11%</u>	
Utilization of Acute Care by Incident Ischemic Stroke Patients									
Discharges	87	116	82	106	104	114	112	95	9.2%
ALOS	25.95	31.78	27.21	34.97	29.61	30.39	42.63	18.96	-27.0%
Patient Days	2,258	3,686	2,231	3,707	3,079	3,465	4,775	1,801	-20.2%
Utilization of Acute Care by Incident Hemorrhagic Stroke Patients									
Discharges	20	22	29	17	23	30	20	31	55.0%
ALOS	29.70	23.32	20.48	24.00	22.22	34.37	10.95	36.68	23.5%
Patient Days	594	513	594	408	511	1,031	219	1,137	91.4%
Discharge Disposition following Acute Admissions for Incident Ischemic Stroke Patients									
Died	27.6%	13.8%	24.4%	20.8%	22.1%	20.2%	20.5%	23.2%	-16.1%
Discharged to Home	60.9%	68.1%	57.3%	55.7%	59.6%	65.8%	60.7%	67.4%	10.6%
Home with Support Services	0.0%	4.3%	7.3%	6.6%	<u>2.9%</u>	<u>2.6%</u>	<u>0.9%</u>	<u>3.2%</u>	
Continuing Care Facility	9.2%	7.8%	6.1%	10.4%	10.6%	6.1%	11.6%	<u>4.2%</u>	-54.2%
Other	<u>2.3%</u>	6.0%	<u>4.9%</u>	6.6%	4.8%	5.3%	6.3%	<u>2.1%</u>	-8.4%
Discharge Disposition following Acute Admissions for Incident Hemorrhagic Stroke Patients									
Died	45.0%	40.9%	44.8%	47.1%	26.1%	30.0%	60.0%	32.3%	-28.3%
Discharged to Home	50.0%	31.8%	34.5%	41.2%	65.2%	46.7%	40.0%	45.2%	-9.7%
Home with Support Services	<u>5.0%</u>		<u>3.4%</u>			<u>3.3%</u>		<u>6.5%</u>	29.0%
Continuing Care Facility		<u>4.5%</u>	<u>3.4%</u>		<u>4.3%</u>	<u>6.7%</u>		<u>9.7%</u>	
Other		22.7%	<u>13.8%</u>	<u>11.8%</u>	<u>4.3%</u>	<u>13.3%</u>		<u>6.5%</u>	
Mortality Following an Incident Stroke									
Hospitalized Ischemic Stroke									
Crude 30-day In-hospital Mortality Rate	26.4%	8.6%	20.7%	14.2%	10.6%	17.5%	15.2%	20.0%	-24.3%
Crude 31-365 Day Mortality Rate in 30-day In-hospital Survivors	20.3%	15.1%	18.5%	18.7%	32.3%	17.0%	14.7%	17.1%	-15.8%
Hospitalized Hemorrhagic Stroke									
Crude 30-day In-hospital Mortality Rate	45.0%	40.9%	41.4%	47.1%	26.1%	26.7%	55.0%	29.0%	-35.5%
Crude 31-365 Day Mortality Rate in 30-day In-hospital Survivors	<u>0.0%</u>	<u>15.4%</u>	29.4%	<u>11.1%</u>	<u>0.0%</u>	31.8%	<u>0.0%</u>	<u>18.2%</u>	

Grey Shading = Not Applicable/Available

Underlined % are based on a numerator of less than 5

* Age 20 and older

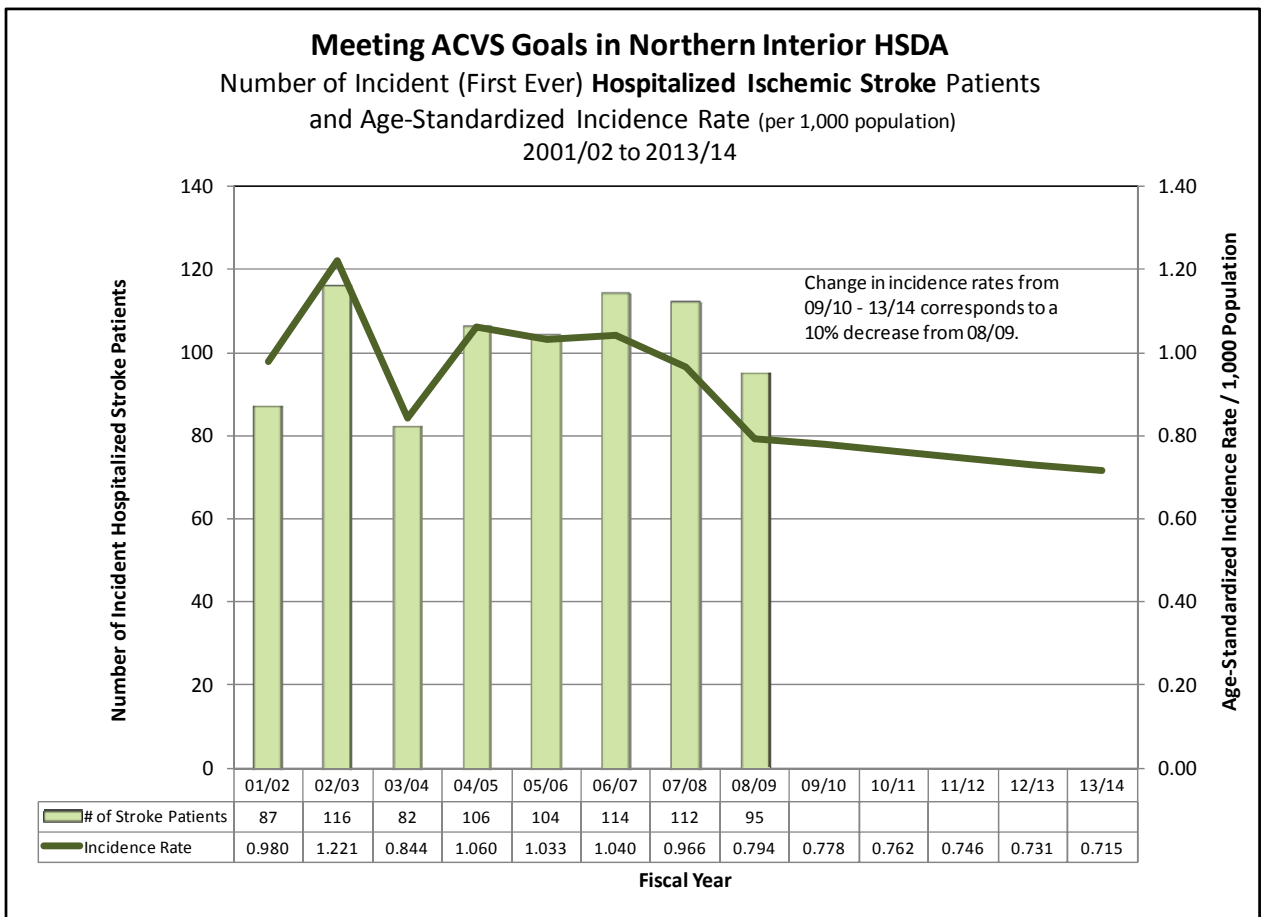
NORTHERN INTERIOR HSDA INDICATORS AND METRICS

The BC Stroke Strategy Measurement and Evaluation Working Group have suggested five key indicators for tracking progress on ACVS care in the province. The following charts and tables include trend data for **Northern Interior HSDA** for three of these five indicators. The source of this data is from the updated Acute Cerebrovascular Syndrome (ACVS) Registry. Note that the geographic location is based on the patient's residence, not necessarily the location of their treatment.

Indicator #3 – Incidence Rate

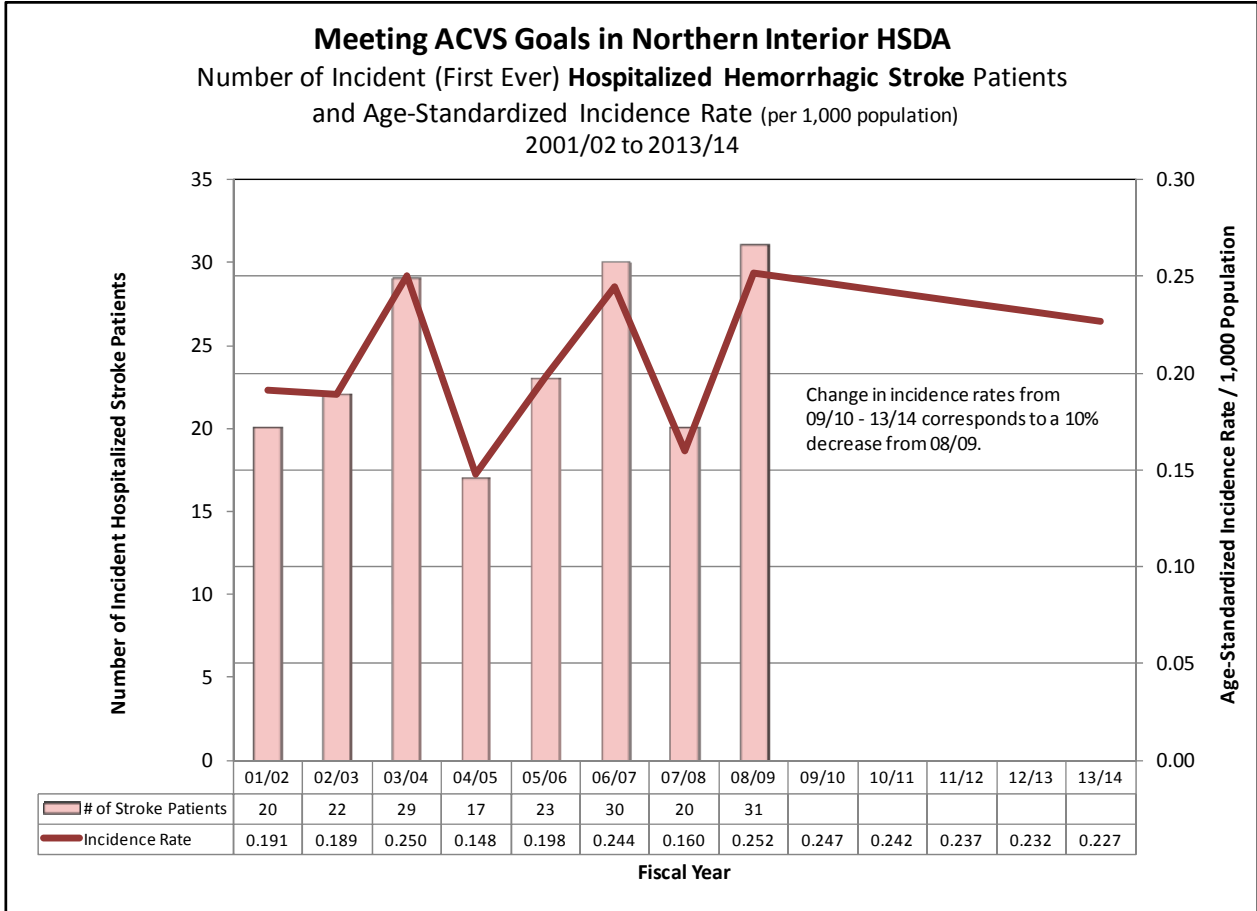
Reduce the age-standardized incidence rate of both ischemic and hemorrhagic stroke by **10%** between 2008/09 and 2013/14 (*data source*: updated ACVS Registry).

Northern Interior HSDA – Incident Hospitalized Ischemic Stroke Patients



Indicator #3 – Incidence Rate (continued)

Northern Interior HSDA – Incident Hospitalized Hemorrhagic Stroke Patients

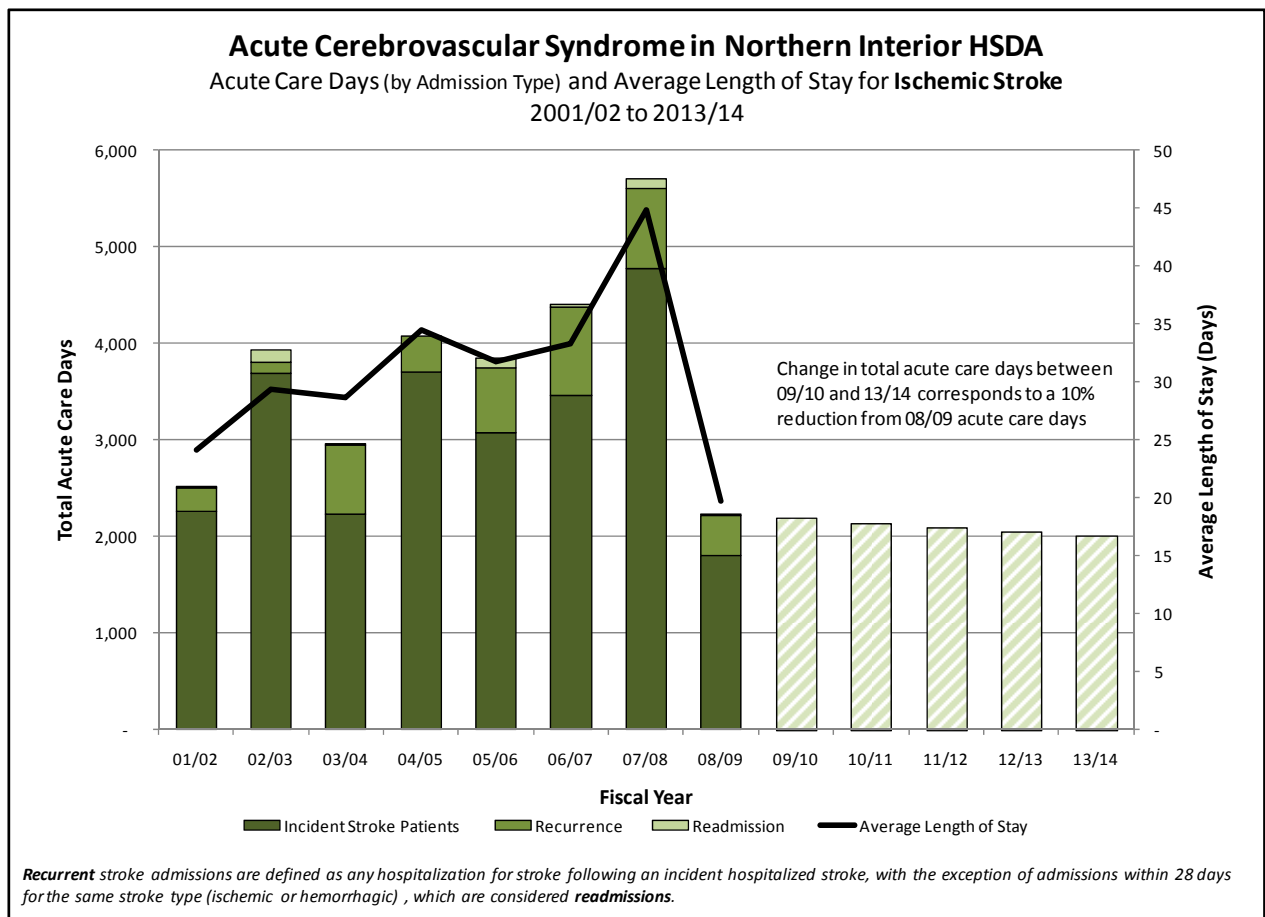


Indicator #4 – Acute Care Days

Reduce acute care days for discharges in which an ischemic stroke is the principal diagnosis by **10%** between 2008/09 and 2013/14 (this includes a combination of reduced discharges and reduced average length of stay).

Data Source: Updated ACVS Registry for incident, re-admit and recurrent ischemic stroke discharges. Link to the Discharge Abstract Database (DAD) for number of hospital days associated with these discharges. **Recurrent** stroke admissions are defined as any hospitalization for stroke following an incident hospitalized stroke, with the exception of admissions within 28 days for the same stroke type (ischemic or hemorrhagic), which are considered **readmissions**.

Northern Interior HSDA – Acute Care Days and ALOS for Ischemic Stroke Patients



Indicator #4 – Acute Care Days (continued)

Northern Interior HSDA – Hospitalization and ALOS Data Trends

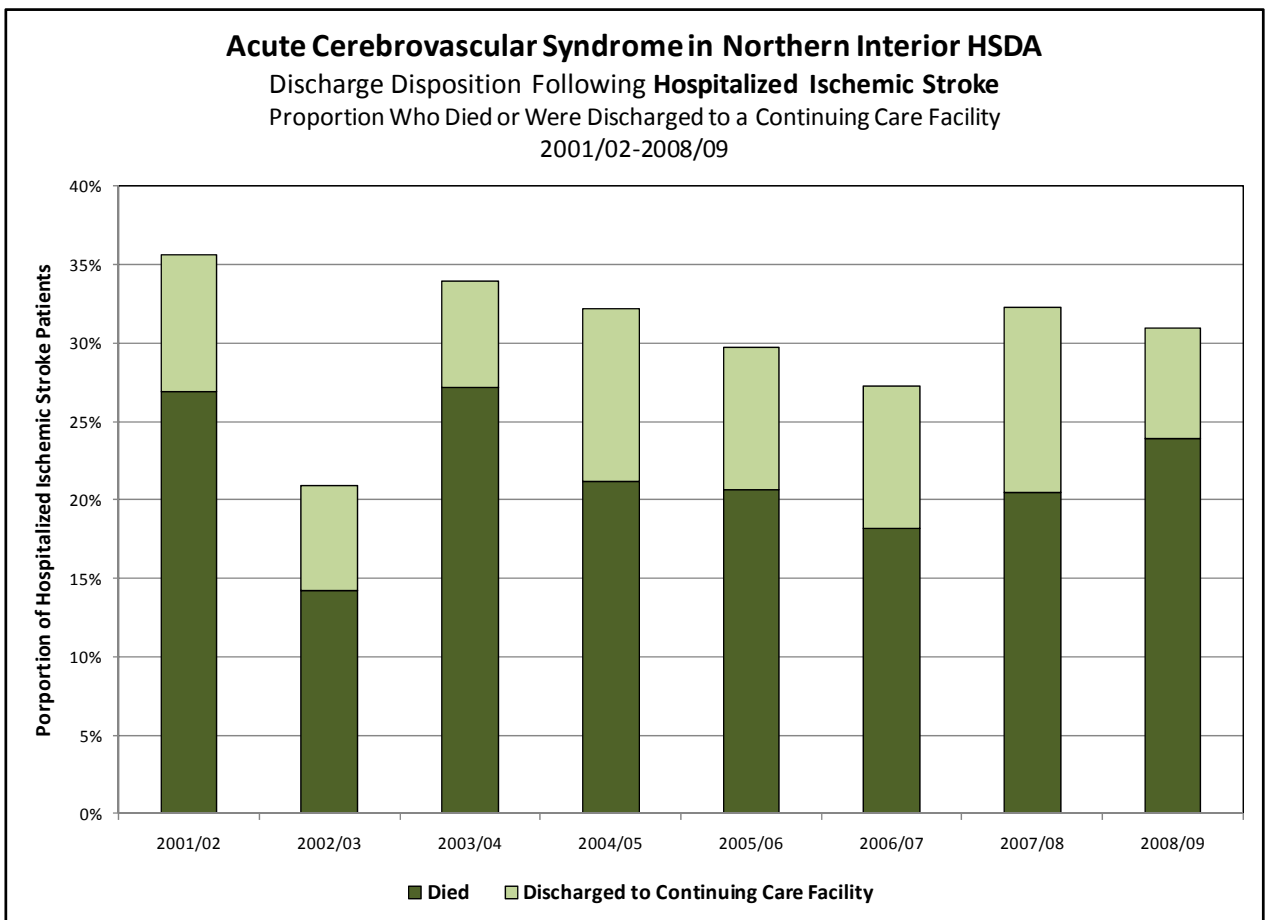
Hospitalization and ALOS for Stroke								
Adults* Residing in Northern Interior HSDA								
2001/02 to 2008/09								
	Fiscal Year							
	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Number of Stroke Hospitalizations								
Number of Incident Stroke Patients								
Hospitalized Ischemic Stroke	87	116	82	106	104	114	112	95
Hospitalized Hemorrhagic Stroke	20	22	29	17	23	30	20	31
Readmission								
Hospitalized Ischemic Stroke		5		-				
Hospitalized Hemorrhagic Stroke		-		-	-	-	-	-
Recurrence								
Hospitalized Ischemic Stroke	15	13	19	12	13	17	13	16
Hospitalized Hemorrhagic Stroke			-					
Total Hospitalized Ischemic Stroke	104	134	103	118	121	132	127	113
Total Hospitalized Hemorrhagic Stroke	25	25	30	19	26	31	22	35
Total Number of Stroke Hospitalizations	129	159	133	137	147	163	149	148
Average Length of Stay in Acute Care								
Incident Stroke Patients								
Hospitalized Ischemic Stroke	25.95	31.78	27.21	34.97	29.61	30.39	42.63	18.96
Hospitalized Hemorrhagic Stroke	29.70	23.32	20.48	24.00	22.22	34.37	10.95	36.68
Readmission								
Hospitalized Ischemic Stroke	7.00	24.80	2.50		26.00	28.00	47.50	6.00
Hospitalized Hemorrhagic Stroke	4.00		5.00					
Recurrence								
Hospitalized Ischemic Stroke	16.07	9.46	37.74	30.75	51.15	53.29	63.92	26.25
Hospitalized Hemorrhagic Stroke	71.25	12.33		0.50	24.67	-	3.50	26.50
Total Hospitalized Ischemic Stroke	24.16	29.35	28.67	34.54	31.80	33.33	44.89	19.76
Total Hospitalized Hemorrhagic Stroke	35.32	22.00	19.97	21.53	22.50	33.26	10.27	35.51
Total Number of Stroke Hospitalizations	26.33	28.19	26.71	32.74	30.16	33.31	39.78	23.49
Days in Acute Care								
Number of Incident Stroke Patients								
Hospitalized Ischemic Stroke	2,258	3,686	2,231	3,707	3,079	3,465	4,775	1,801
Hospitalized Hemorrhagic Stroke	594	513	594	408	511	1,031	219	1,137
Readmission								
Hospitalized Ischemic Stroke	14	124	5	-	104	28	95	12
Hospitalized Hemorrhagic Stroke		-	5	-	-	-	-	-
Recurrence								
Hospitalized Ischemic Stroke	241	123	717	369	665	906	831	420
Hospitalized Hemorrhagic Stroke	285	37	-		74	-	7	106
Total Days - Hospitalized Ischemic Stroke	2,513	3,933	2,953	4,076	3,848	4,399	5,701	2,233
Total Days - Hospitalized Hemorrhagic Stroke	883	550	599	409	585	1,031	226	1,243
Total Days	3,396	4,483	3,552	4,485	4,433	5,430	5,927	3,476
* Age 20 and older								
<i>Recurrent stroke admissions are defined as any hospitalization for stroke following an incident hospitalized stroke, with the exception of admissions within 28 days for the same stroke type (ischemic or hemorrhagic), which are considered readmissions.</i>								

Indicator #5 – Death and Dependency

Reduce the proportion of patients who die in hospital or are sent to a long- term care facility after being admitted/discharged (principal diagnosis) for ischemic stroke. *If only one composite measure is used to assess progress in stroke care, it would be this overall measure of death and dependency.*

Data Source: Updated ACVS Registry for hospitalized (incident, readmission and recurrent) ischemic stroke discharges. DAD for discharge disposition ('died', 'discharged to a Continuing Care facility').

Northern Interior HSDA – Discharge Disposition for Hospitalized Ischemic Stroke



Discharge Disposition Following a Hospitalization for Stroke									
Patient Died or Was Discharged to a Continuing Care Facility									
Adults* Residing in Northern Interior HSDA									
2001/02 to 2008/09									
	Fiscal Year								
	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	
Number of Stroke Hospitalizations									
Number of Incident Stroke Patients									
Hospitalized Ischemic Stroke	87	116	82	106	104	114	112	95	
Hospitalized Hemorrhagic Stroke	20	22	29	17	23	30	20	31	
Readmission									
Hospitalized Ischemic Stroke		5							
Hospitalized Hemorrhagic Stroke									
Recurrence									
Hospitalized Ischemic Stroke	15	13	19	12	13	17	13	16	
Hospitalized Hemorrhagic Stroke									
Total Hospitalized Ischemic Stroke	104	134	103	118	121	132	127	113	
Total Hospitalized Hemorrhagic Stroke	25	25	30	19	26	31	22	35	
Total Number of Stroke Hospitalizations	129	159	133	137	147	163	149	148	
Discharge Disposition - Number									
Incident Stroke Patients									
Hospitalized Ischemic Stroke									
Died	24	16	20	22	23	23	23	22	
Discharged to a Continuing Care Facility	8	9	5	11	11	7	13		
Hospitalized Hemorrhagic Stroke									
Died	9	9	13	8	6	9	12	10	
Discharged to a Continuing Care Facility									
Readmission									
Hospitalized Ischemic Stroke									
Died									
Discharged to a Continuing Care Facility									
Hospitalized Hemorrhagic Stroke									
Died									
Discharged to a Continuing Care Facility									
Recurrence									
Hospitalized Ischemic Stroke									
Died			7						
Discharged to a Continuing Care Facility						5			
Hospitalized Hemorrhagic Stroke									
Died									
Discharged to a Continuing Care Facility									
Total Hospitalized Ischemic Stroke	28	19	28	25	25	24	26	27	
Died	9	9	7	13	11	12	15	8	
Discharged to a Continuing Care Facility	37	28	35	38	36	36	41	35	
Total Hospitalized Hemorrhagic Stroke	10	10	13	9	7	9	12	12	
Died									
Discharged to a Continuing Care Facility									
Death and Disability	11	11	14	9	8	11	12	15	
Total Number of Stroke Hospitalizations	38	29	41	34	32	33	38	39	
Died	10	10	8	13	12	14	15	11	
Discharged to a Continuing Care Facility	48	39	49	47	44	47	53	50	
Death and Disability									
Discharge Disposition - Proportion									
Incident Stroke Patients									
Hospitalized Ischemic Stroke									
Died	27.6%	13.8%	24.4%	20.8%	22.1%	20.2%	20.5%	23.2%	
Discharged to a Continuing Care Facility	9.2%	7.8%	6.1%	10.4%	10.6%	6.1%	11.6%	4.2%	
Hospitalized Hemorrhagic Stroke									
Died	45.0%	40.9%	44.8%	47.1%	26.1%	30.0%	60.0%	32.3%	
Discharged to a Continuing Care Facility	0.0%	4.5%	3.4%	0.0%	4.3%	6.7%	0.0%	9.7%	
Readmission									
Hospitalized Ischemic Stroke									
Died	0.0%	0.0%	50.0%		25.0%	0.0%	50.0%	50.0%	
Discharged to a Continuing Care Facility	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	
Hospitalized Hemorrhagic Stroke									
Died	0.0%		0.0%						
Discharged to a Continuing Care Facility	0.0%		0.0%						
Recurrence									
Hospitalized Ischemic Stroke									
Died	26.7%	23.1%	36.8%	25.0%	7.7%	5.9%	15.4%	25.0%	
Discharged to a Continuing Care Facility	6.7%	0.0%	10.5%	16.7%	0.0%	29.4%	15.4%	25.0%	
Hospitalized Hemorrhagic Stroke									
Died	25.0%	33.3%		50.0%	33.3%	0.0%	0.0%	50.0%	
Discharged to a Continuing Care Facility	25.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	
Total Hospitalized Ischemic Stroke	26.9%	14.2%	27.2%	21.2%	20.7%	18.2%	20.5%	23.9%	
Died	8.7%	6.7%	6.8%	11.0%	9.1%	9.1%	11.8%	7.1%	
Discharged to a Continuing Care Facility	35.6%	20.9%	34.0%	32.2%	29.8%	27.3%	32.3%	31.0%	
Total Hospitalized Hemorrhagic Stroke	40.0%	40.0%	43.3%	47.4%	26.9%	29.0%	54.5%	34.3%	
Died	4.0%	4.0%	3.3%	0.0%	3.8%	6.5%	0.0%	8.6%	
Discharged to a Continuing Care Facility	44.0%	44.0%	46.7%	47.4%	30.8%	35.5%	54.5%	42.9%	
Total Number of Stroke Hospitalizations	29.5%	18.2%	30.8%	24.8%	21.8%	20.2%	25.5%	26.4%	
Died	7.8%	6.3%	6.0%	9.5%	8.2%	8.6%	10.1%	7.4%	
Discharged to a Continuing Care Facility	37.2%	24.5%	36.8%	34.3%	29.9%	28.8%	35.6%	33.8%	
Death and Disability									

* Age 20 and older
Recurrent stroke admissions are defined as any hospitalization for stroke following an incident hospitalized stroke, with the exception of admissions within 28 days for the same stroke type (ischemic or hemorrhagic), which are considered readmissions.

Indicator #5 – Death and Dependency (continued)

Northern Interior HSDA – Discharge Disposition Data Trends

NORTHEAST HSDA

Indicators and Metrics

NORTHEAST HSDA INDICATORS AND METRICS AS OF NOVEMBER 2010

Acute Cerebrovascular Syndrome Adults* Residing in the Northeast HSDA 2001/02 to 2008/09

	Fiscal Year								% Change 01/02 to 08/09
	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	
Number of Incident ACVS Patients									
Hospitalized Ischemic Stroke	46	39	41	38	50	41	51	43	-6.5%
Hospitalized Hemorrhagic Stroke	8	4	10	7	11	11	7	12	50.0%
Sub-total	54	43	51	45	61	52	58	55	1.9%
Hospitalized TIA	26	21	17	20	12	20	34	22	-15.4%
Non-hospitalized TIA/Stroke	22	34	32	22	27	26	42	29	31.8%
Sub-total	48	55	49	42	39	46	76	51	6.3%
Number of Prevalent ACVS Patients									
Hospitalized Ischemic Stroke	218	231	245	251	269	273	292	306	40.4%
Hospitalized Hemorrhagic Stroke	37	37	48	48	54	59	59	64	73.0%
Sub-total	255	268	293	299	323	332	351	370	45.1%
Hospitalized TIA	134	146	152	162	157	165	183	195	45.5%
Non-hospitalized TIA/Stroke	99	125	151	160	170	181	203	218	120.2%
Sub-total	233	271	303	322	327	346	386	413	77.3%
Age-Standardized Incidence / 1,000 Population									
Hospitalized Ischemic Stroke	1.462	1.123	1.186	1.068	1.267	0.963	1.159	0.890	-39.1%
Hospitalized Hemorrhagic Stroke	0.236	0.103	0.263	0.176	0.236	0.221	0.152	0.215	-8.6%
Sub-total	1.713	1.233	1.463	1.253	1.511	1.195	1.319	1.114	-35.0%
Hospitalized TIA	0.758	0.608	0.438	0.552	0.326	0.490	0.778	0.527	-30.6%
Non-hospitalized TIA/Stroke	0.592	0.990	0.815	0.575	0.626	0.608	0.854	0.579	-2.2%
Age-Standardized Prevalence / 1,000 Population									
Hospitalized Ischemic Stroke	6.162	6.248	6.375	6.357	6.445	6.169	6.267	6.187	0.4%
Hospitalized Hemorrhagic Stroke	0.873	0.825	1.099	1.066	1.137	1.179	1.136	1.152	31.9%
Sub-total	7.035	7.073	7.474	7.423	7.582	7.348	7.403	7.339	4.3%
Hospitalized TIA	3.775	3.980	3.939	4.105	3.822	3.843	4.026	4.171	10.5%
Non-hospitalized TIA/Stroke	2.682	3.325	3.850	4.003	3.992	4.049	4.383	4.496	67.6%
Conversion Rate from TIA/Non-hospitalized Stroke to Hospitalized Stroke									
90-Day Conversion Rate									
365-Day Conversion Rate									
Utilization of tPA by Incident Acute Ischemic Stroke Patients									
Number Receiving tPA						2	3	2	
Total Number						41	51	43	
Proportion of Incident Hospitalized AIS Patients Receiving tPA						<u>4.88%</u>	<u>5.88%</u>	<u>4.65%</u>	
Utilization of Acute Care by Incident Ischemic Stroke Patients									
Discharges	46	39	41	38	50	41	51	43	-6.5%
ALOS	32.85	21.18	20.78	36.18	21.60	45.17	29.49	30.67	-6.6%
Patient Days	1,511	826	852	1,375	1,080	1,852	1,504	1,319	-12.7%
Utilization of Acute Care by Incident Hemorrhagic Stroke Patients									
Discharges	8	4	10	7	11	11	7	12	50.0%
ALOS	13.50	27.75	69.20	11.00	20.82	23.82	22.71	46.50	244.4%
Patient Days	108	111	692	77	229	262	159	558	416.7%
Discharge Disposition following Acute Admissions for Incident Ischemic Stroke Patients									
Died	21.7%	28.2%	22.0%	18.4%	18.0%	24.4%	23.5%	18.6%	-14.4%
Discharged to Home	63.0%	61.5%	61.0%	60.5%	66.0%	63.4%	51.0%	69.8%	10.7%
Home with Support Services	<u>2.2%</u>	<u>0.0%</u>	<u>2.4%</u>	<u>5.3%</u>	<u>4.0%</u>	<u>0.0%</u>	<u>5.9%</u>	<u>2.3%</u>	7.0%
Continuing Care Facility	<u>4.3%</u>	<u>2.6%</u>	<u>12.2%</u>	<u>13.2%</u>	<u>6.0%</u>	<u>9.8%</u>	<u>13.7%</u>	<u>7.0%</u>	60.5%
Other	<u>8.7%</u>	<u>7.7%</u>	<u>2.4%</u>	<u>2.6%</u>	<u>6.0%</u>	<u>2.4%</u>	<u>5.9%</u>	<u>2.3%</u>	-73.3%
Discharge Disposition following Acute Admissions for Incident Hemorrhagic Stroke Patients									
Died	<u>37.5%</u>	<u>75.0%</u>	<u>30.0%</u>	<u>57.1%</u>	<u>36.4%</u>	<u>27.3%</u>	<u>71.4%</u>	<u>16.7%</u>	-55.6%
Discharged to Home	<u>25.0%</u>	<u>25.0%</u>	<u>30.0%</u>	<u>28.6%</u>	<u>27.3%</u>	54.5%	<u>28.6%</u>	<u>33.3%</u>	33.3%
Home with Support Services			<u>10.0%</u>					<u>8.3%</u>	
Continuing Care Facility			<u>20.0%</u>		<u>18.2%</u>				
Other	<u>37.5%</u>		<u>10.0%</u>	<u>14.3%</u>	<u>18.2%</u>	<u>18.2%</u>		41.7%	11.1%
Mortality Following an Incident Stroke									
Hospitalized Ischemic Stroke									
Crude 30-day In-hospital Mortality Rate	17.4%	20.5%	22.0%	<u>10.5%</u>	14.0%	17.1%	15.7%	18.6%	7.0%
Crude 31-365 Day Mortality Rate in 30-day In-hospital Survivors	<u>10.5%</u>	16.1%	<u>9.4%</u>	20.6%	27.9%	23.5%	16.3%	14.3%	35.7%
Hospitalized Hemorrhagic Stroke									
Crude 30-day In-hospital Mortality Rate	<u>37.5%</u>	<u>50.0%</u>	<u>20.0%</u>	<u>57.1%</u>	<u>36.4%</u>	<u>27.3%</u>	<u>57.1%</u>	<u>16.7%</u>	-55.6%
Crude 31-365 Day Mortality Rate in 30-day In-hospital Survivors	<u>0.0%</u>	<u>100.0%</u>	<u>25.0%</u>	<u>0.0%</u>	<u>0.0%</u>	<u>12.5%</u>	<u>33.3%</u>	<u>0.0%</u>	

Grey Shading = Not Applicable/Available

Underlined % are based on a numerator of less than 5

* Age 20 and older

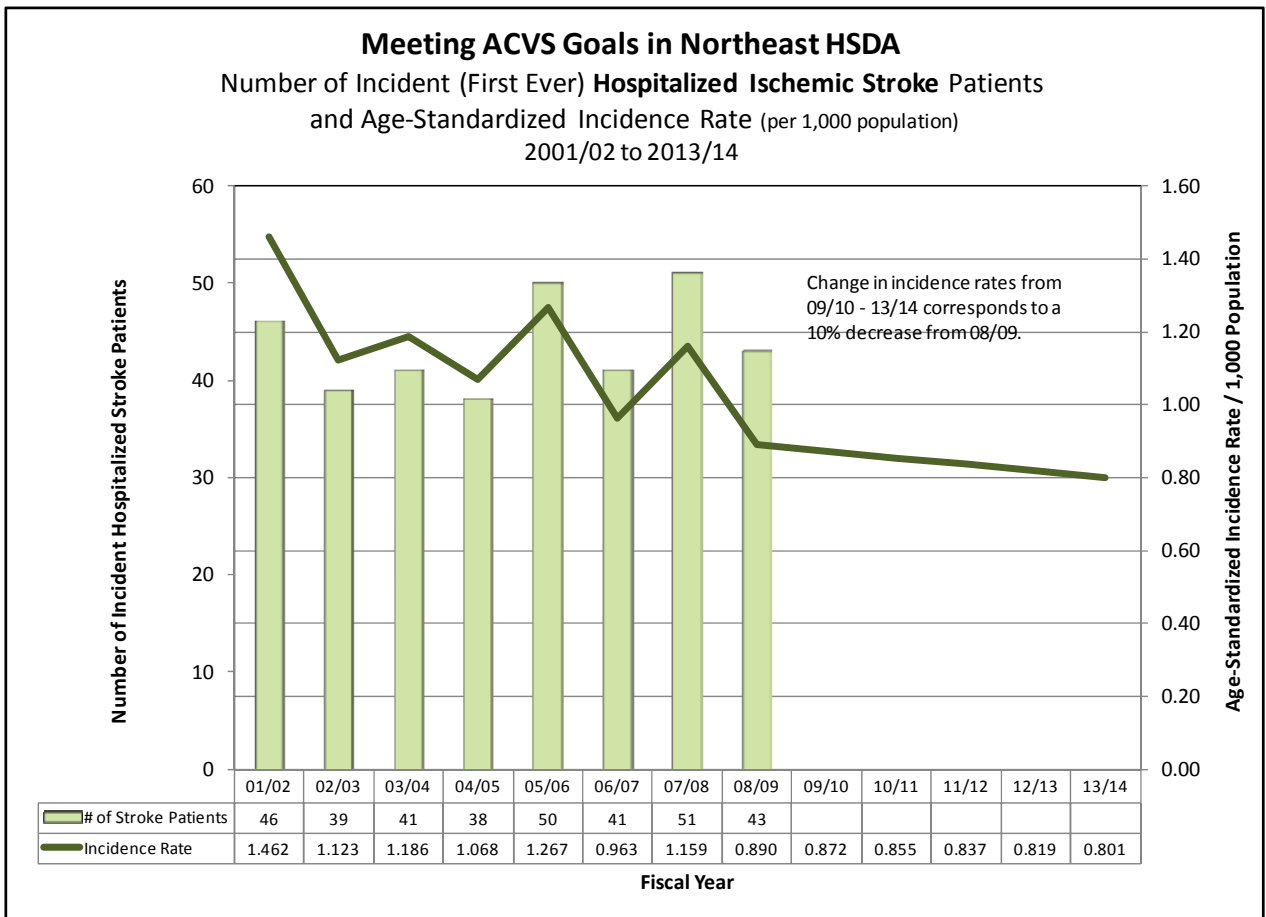
NORTHEAST HSDA INDICATORS AND METRICS

The BC Stroke Strategy Measurement and Evaluation Working Group have suggested five key indicators for tracking progress on ACVS care in the province. The following charts and tables include trend data for **Northeast HSDA** for three of these five indicators. The source of this data is from the updated Acute Cerebrovascular Syndrome (ACVS) Registry. Note that the geographic location is based on the patient's residence, not necessarily the location of their treatment.

Indicator #3 – Incidence Rate

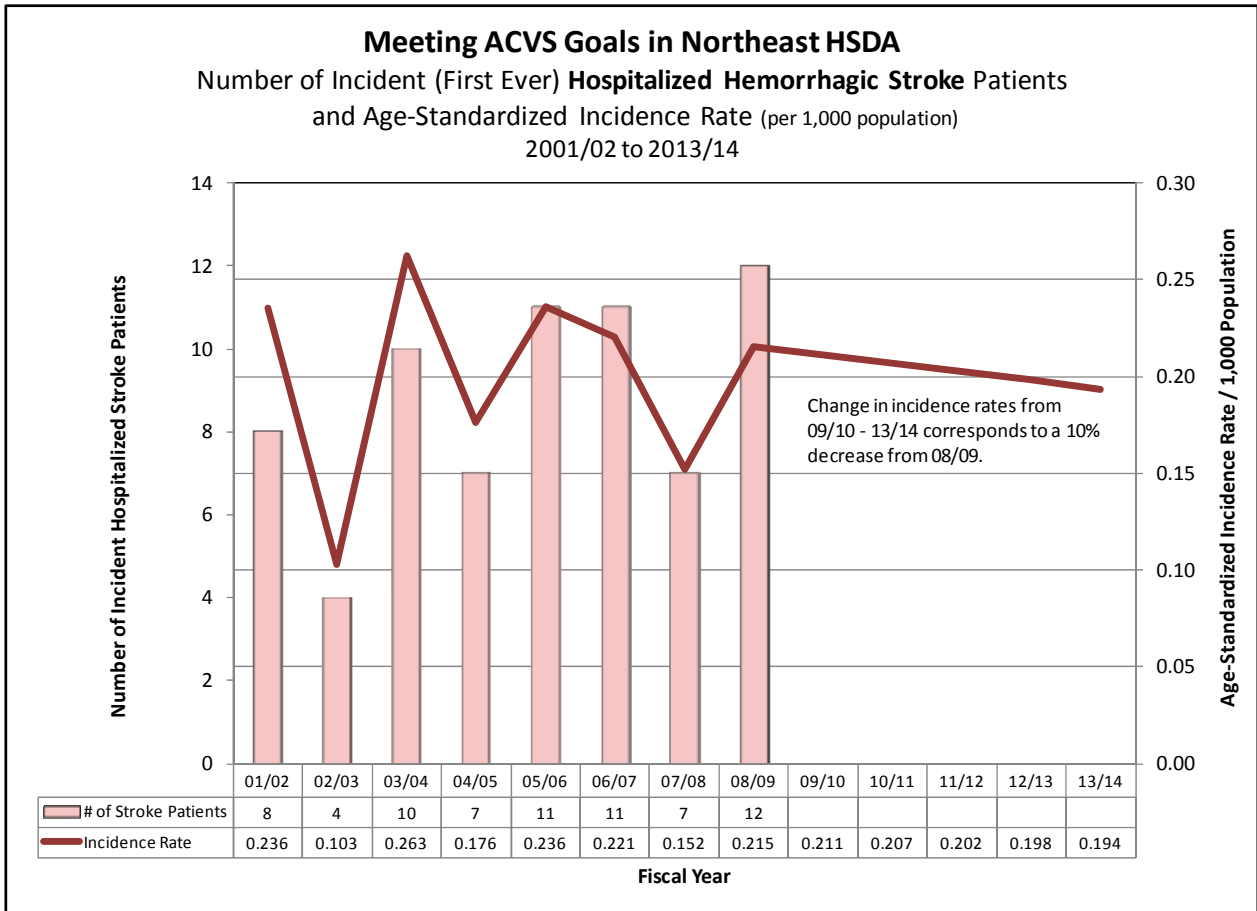
Reduce the age-standardized incidence rate of both ischemic and hemorrhagic stroke by **10%** between 2008/09 and 2013/14 (*data source*: updated ACVS Registry).

Northeast HSDA – Incident Hospitalized Ischemic Stroke Patients



Indicator #3 – Incidence Rate (continued)

Northeast HSDA – Incident Hospitalized Hemorrhagic Stroke Patients

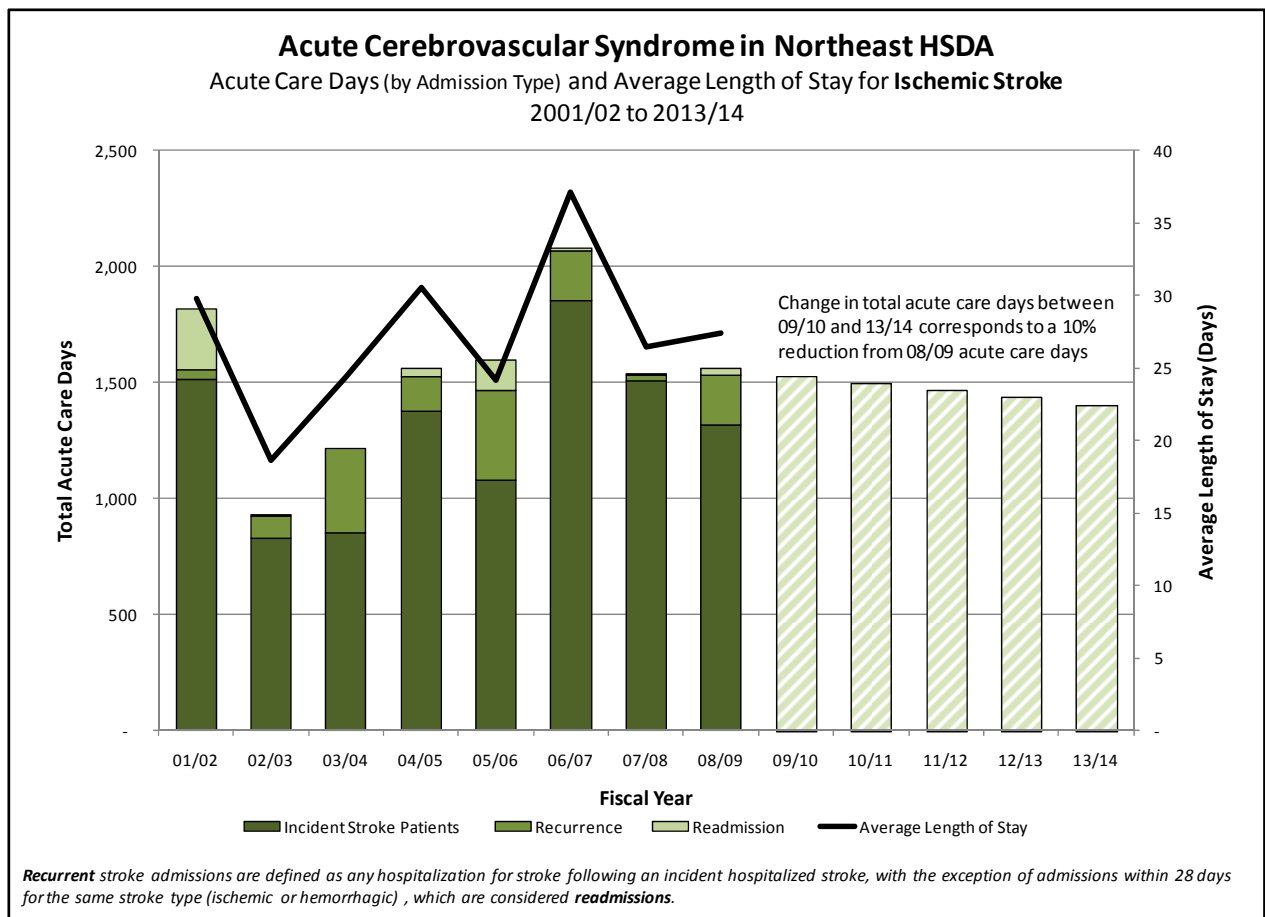


Indicator #4 – Acute Care Days

Reduce acute care days for discharges in which an ischemic stroke is the principal diagnosis by **10%** between 2008/09 and 2013/14 (this includes a combination of reduced discharges and reduced average length of stay).

Data Source: Updated ACVS Registry for incident, re-admit and recurrent ischemic stroke discharges. Link to the Discharge Abstract Database (DAD) for number of hospital days associated with these discharges. **Recurrent** stroke admissions are defined as any hospitalization for stroke following an incident hospitalized stroke, with the exception of admissions within 28 days for the same stroke type (ischemic or hemorrhagic), which are considered **readmissions**.

Northeast HSDA – Acute Care Days and ALOS for Ischemic Stroke Patients



Indicator #4 – Acute Care Days (continued)

Northeast HSDA – Hospitalization and ALOS Data Trends

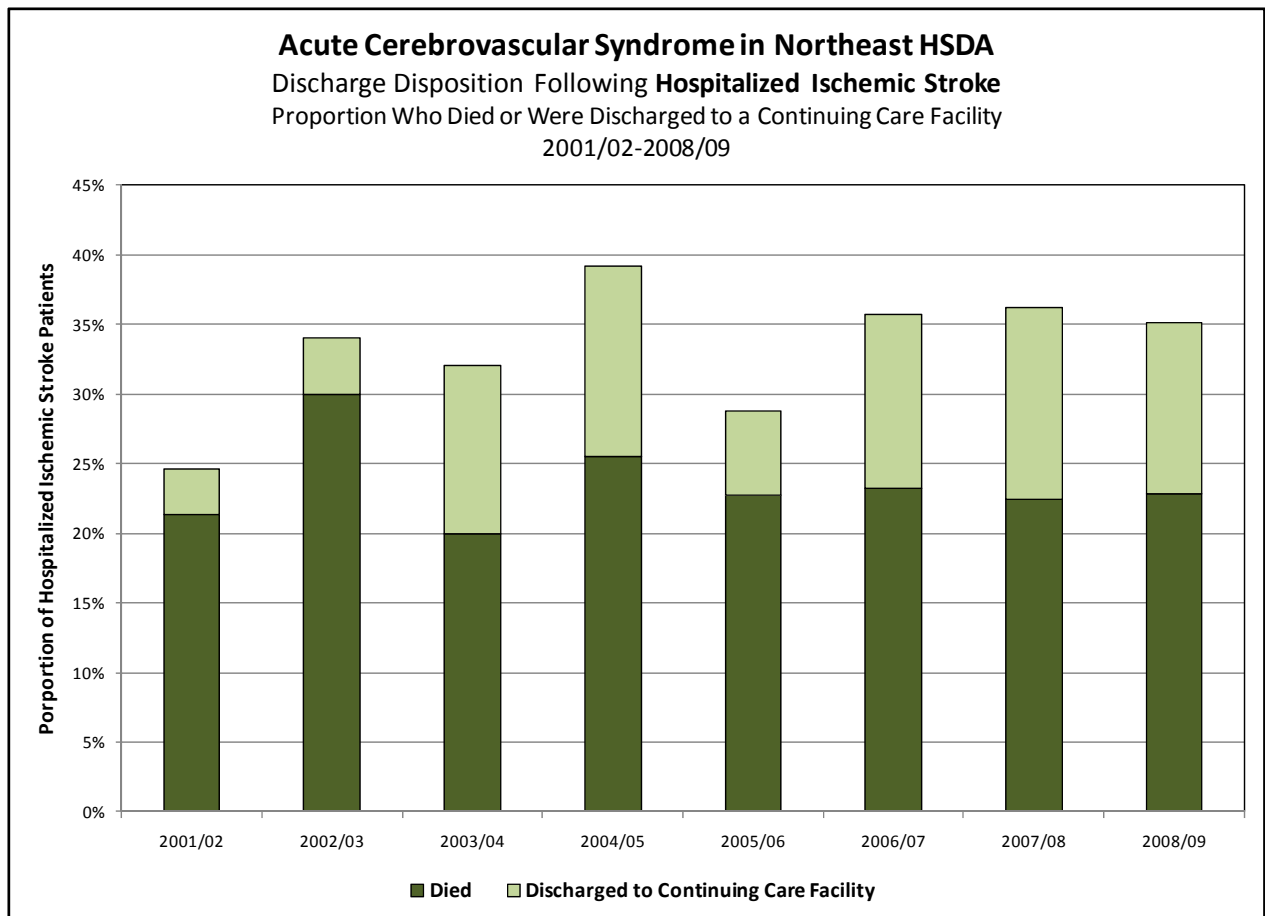
Hospitalization and ALOS for Stroke								
Adults* Residing in Northeast HSDA								
2001/02 to 2008/09								
	Fiscal Year							
	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Number of Stroke Hospitalizations								
Number of Incident Stroke Patients								
Hospitalized Ischemic Stroke	46	39	41	38	50	41	51	43
Hospitalized Hemorrhagic Stroke	8		10	7	11	11	7	12
Readmission								
Hospitalized Ischemic Stroke	6		-					
Hospitalized Hemorrhagic Stroke		-	-			-	-	
Recurrence								
Hospitalized Ischemic Stroke	9	9	9	10	13	14	6	10
Hospitalized Hemorrhagic Stroke	-			-			-	-
Total Hospitalized Ischemic Stroke	61	50	50	51	66	56	58	57
Total Hospitalized Hemorrhagic Stroke	10	5	12	10	14	15	7	13
Total Number of Stroke Hospitalizations	71	55	62	61	80	71	65	70
Average Length of Stay in Acute Care								
Incident Stroke Patients								
Hospitalized Ischemic Stroke	32.85	21.18	20.78	36.18	21.60	45.17	29.49	30.67
Hospitalized Hemorrhagic Stroke	13.50	27.75	69.20	11.00	20.82	23.82	22.71	46.50
Readmission								
Hospitalized Ischemic Stroke	44.00	2.00		11.33	43.00	8.00	3.00	8.00
Hospitalized Hemorrhagic Stroke	31.50			29.00	2.00			24.00
Recurrence								
Hospitalized Ischemic Stroke	4.78	11.11	40.67	14.90	29.62	15.50	4.17	21.00
Hospitalized Hemorrhagic Stroke		209.00	68.00		19.50	8.75		
Total Hospitalized Ischemic Stroke	29.80	18.60	24.36	30.55	24.15	37.09	26.41	27.39
Total Hospitalized Hemorrhagic Stroke	17.10	64.00	69.00	16.40	19.29	19.80	22.71	44.77
Total Number of Stroke Hospitalizations	28.01	22.73	33.00	28.23	23.30	33.44	26.02	30.61
Days in Acute Care								
Number of Incident Stroke Patients								
Hospitalized Ischemic Stroke	1,511	826	852	1,375	1,080	1,852	1,504	1,319
Hospitalized Hemorrhagic Stroke	108	111	692	77	229	262	159	558
Readmission								
Hospitalized Ischemic Stroke	264		-	34	129	8		32
Hospitalized Hemorrhagic Stroke	63	-	-	87		-	-	24
Recurrence								
Hospitalized Ischemic Stroke	43	100	366	149	385	217	25	210
Hospitalized Hemorrhagic Stroke	-	209	136	-	39	35	-	-
Total Days - Hospitalized Ischemic Stroke	1,818	930	1,218	1,558	1,594	2,077	1,532	1,561
Total Days - Hospitalized Hemorrhagic Stroke	171	320	828	164	270	297	159	582
Total Days	1,989	1,250	2,046	1,722	1,864	2,374	1,691	2,143
* Age 20 and older								
<i>Recurrent stroke admissions are defined as any hospitalization for stroke following an incident hospitalized stroke, with the exception of admissions within 28 days for the same stroke type (ischemic or hemorrhagic), which are considered readmissions.</i>								

Indicator #5 – Death and Dependency

Reduce the proportion of patients who die in hospital or are sent to a long-term care facility after being admitted/discharged (principal diagnosis) for ischemic stroke. *If only one composite measure is used to assess progress in stroke care, it would be this overall measure of death and dependency.*

Data Source: Updated ACVS Registry for hospitalized (incident, readmission and recurrent) ischemic stroke discharges. DAD for discharge disposition ('died', 'discharged to a Continuing Care facility').

Northeast HSDA – Discharge Disposition for Hospitalized Ischemic Stroke



Discharge Disposition Following a Hospitalization for Stroke
Patient Died or Was Discharged to a Continuing Care Facility
 Adults* Residing in Northeast HSDA
 2001/02 to 2008/09

	Fiscal Year							
	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Number of Stroke Hospitalizations								
Number of Incident Stroke Patients								
Hospitalized Ischemic Stroke	46	39	41	38	50	41	51	43
Hospitalized Hemorrhagic Stroke	8		10	7	11	11	7	12
Readmission								
Hospitalized Ischemic Stroke	6							
Hospitalized Hemorrhagic Stroke								
Recurrence								
Hospitalized Ischemic Stroke	9	9	9	10	13	14	6	10
Hospitalized Hemorrhagic Stroke	-	-	-	-	-	-	-	-
Total Hospitalized Ischemic Stroke	61	50	50	51	66	56	58	57
Total Hospitalized Hemorrhagic Stroke	10	5	12	10	14	15	7	13
Total Number of Stroke Hospitalizations	71	55	62	61	80	71	65	70
Discharge Disposition - Number								
Incident Stroke Patients								
Hospitalized Ischemic Stroke								
Died	10	11	9	7	9	10	12	8
Discharged to a Continuing Care Facility			5	5			7	
Hospitalized Hemorrhagic Stroke								
Died							5	
Discharged to a Continuing Care Facility								
Readmission								
Hospitalized Ischemic Stroke								
Died								
Discharged to a Continuing Care Facility								
Hospitalized Hemorrhagic Stroke								
Died								
Discharged to a Continuing Care Facility								
Recurrence								
Hospitalized Ischemic Stroke								
Died				6	6			
Discharged to a Continuing Care Facility								
Hospitalized Hemorrhagic Stroke								
Died								
Discharged to a Continuing Care Facility								
Total Hospitalized Ischemic Stroke								
Died	13	15	10	13	15	13	13	13
Discharged to a Continuing Care Facility			6	7		7	8	7
Death and Disability	15	17	16	20	19	20	21	20
Total Hospitalized Hemorrhagic Stroke								
Died				5	5		5	
Discharged to a Continuing Care Facility								
Death and Disability			7	5	7		5	
Total Number of Stroke Hospitalizations								
Died	16	18	14	18	20	16	18	15
Discharged to a Continuing Care Facility			9	7	6	7	8	7
Death and Disability	18	21	23	25	26	23	26	22
Discharge Disposition - Proportion								
Incident Stroke Patients								
Hospitalized Ischemic Stroke								
Died	21.7%	28.2%	22.0%	18.4%	18.0%	24.4%	23.5%	18.6%
Discharged to a Continuing Care Facility	4.3%	2.6%	12.2%	13.2%	6.0%	9.8%	13.7%	7.0%
Hospitalized Hemorrhagic Stroke								
Died	37.5%	75.0%	30.0%	57.1%	36.4%	27.3%	71.4%	16.7%
Discharged to a Continuing Care Facility	0.0%	0.0%	20.0%	0.0%	18.2%	0.0%	0.0%	0.0%
Readmission								
Hospitalized Ischemic Stroke								
Died	16.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%
Discharged to a Continuing Care Facility	0.0%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	50.0%
Hospitalized Hemorrhagic Stroke								
Died	0.0%		33.3%	0.0%				0.0%
Discharged to a Continuing Care Facility	0.0%		0.0%	0.0%				0.0%
Recurrence								
Hospitalized Ischemic Stroke								
Died	22.2%	44.4%	11.1%	60.0%	46.2%	21.4%	16.7%	30.0%
Discharged to a Continuing Care Facility	0.0%	11.1%	11.1%	10.0%	7.7%	21.4%	16.7%	20.0%
Hospitalized Hemorrhagic Stroke								
Died		0.0%	50.0%		50.0%	0.0%		
Discharged to a Continuing Care Facility		100.0%	50.0%			0.0%		
Total Hospitalized Ischemic Stroke								
Died	21.3%	30.0%	20.0%	25.5%	22.7%	23.2%	22.4%	22.8%
Discharged to a Continuing Care Facility	3.3%	4.0%	12.0%	13.7%	6.1%	12.5%	13.8%	12.3%
Death and Disability	24.6%	34.0%	32.0%	39.2%	28.8%	35.7%	36.2%	35.1%
Total Hospitalized Hemorrhagic Stroke								
Died	30.0%	60.0%	33.3%	50.0%	35.7%	20.0%	71.4%	15.4%
Discharged to a Continuing Care Facility	0.0%	20.0%	25.0%	0.0%	14.3%	0.0%	0.0%	0.0%
Death and Disability	30.0%	80.0%	58.3%	50.0%	50.0%	20.0%	71.4%	15.4%
Total Number of Stroke Hospitalizations								
Died	22.5%	32.7%	22.6%	29.5%	25.0%	22.5%	27.7%	21.4%
Discharged to a Continuing Care Facility	2.8%	5.5%	14.5%	11.5%	7.5%	9.9%	12.3%	10.0%
Death and Disability	25.4%	38.2%	37.1%	41.0%	32.5%	32.4%	40.0%	31.4%

* Age 20 and older

Recurrent stroke admissions are defined as any hospitalization for stroke following an incident hospitalized stroke, with the exception of admissions within 28 days for the same stroke type (ischemic or hemorrhagic), which are considered readmissions.

Indicator #5 – Death and Dependency (continued)

Northeast HSDA – Discharge Disposition Data Trends