

Integrated Stroke Care Across a Province – Is it possible?

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Abstract

Using a patient's perspective on her journey through the care continuum, this article describes Alberta's newly integrated provincial stroke system. It then explains the integrative system development that has occurred both within the Edmonton area and the province to allow this patient's successful post-stroke experience.

Introduction – Case Outline

Helen Jones is a 55-year-old woman who lives 140 km south-east of Edmonton. She developed stroke-like symptoms, so the ambulance bypassed her local hospital, diverting her to St. Mary's Hospital in Camrose. On arrival, she was rapidly assessed by a stroke neurologist at the University of Alberta Hospital in Edmonton using a Telehealth link. The conclusion of this assessment indicated she could receive without delay a specific time-sensitive clot-busting drug to treat her condition. She improved immediately and the lasting effects of her stroke were minimized, allowing her to maintain her independence, speech, mobility and overall quality of life. She now receives stroke follow-up in her local area rather than driving to Edmonton, using both Telehealth and local services.

Background

Stroke is the number one cause of disability in Canada and costs the Canadian economy over \$2 billion per year (Heart and Stroke Foundation of Canada 2009). Each year, over 1,800 people in the Edmonton area alone have strokes, with over 5,500 strokes occurring yearly in Alberta. These numbers are expected to rise by 1% to 2% per annum for the next decade. To further complicate matters, timely access to appropriate assessment and treatment is critical to effective stroke management (The Canadian Stroke Strategy Steering Committee 2000). In response to the increased demand for timely stroke care, in 2005 the former Capital Health (CH) region developed a five-year regional stroke service plan of comprehensive services across the continuum of care in the Edmonton area. The overall vision of this plan was to embrace integration concepts to strengthen connections between health services, people and providers. As such, the plan articulated six guiding principles to achieving a regional integrated model of care for stroke patients:

1. Stroke care will be integrated across the region and care continuum, allowing all sectors, services and sites participating in the care of stroke patients to build upon existing strengths.
2. Patients requiring care for stroke in the region will receive equitable access to such care, enabling patients to receive appropriate care in the right setting, at the right time and

from the right provider within an interdisciplinary model of care.

3. Stroke care will be evidence-based and supported by best practice, with the integration of research and education into clinical practice.
4. Technology resources will be appropriately utilized, including Telehealth, diagnostic imaging and other technologies, to advance practice and support equitable access to care for patients from both within and outside of the Edmonton area.
5. Stroke care will evolve and change based upon clinical requirements for care and advances in practice and technology, supported by research and expert knowledge.
6. CH will partner and collaborate with other regional health authorities, Alberta Health and Wellness, and external agencies to develop, implement and evaluate practice, research and education initiatives to advance standardized stroke prevention and care throughout the province (Regional Stroke Steering Committee 2005).

CH worked to create the comprehensive and integrated stroke services included in their vision. Four cross-continuum strategies have been implemented, considering the Quality Dimensions framework originally developed by the Health Quality Council of Alberta. The strategies endeavor to provide:

1. Accessible and effective stroke prevention services by enhancing and expanding stroke prevention clinics to all three major hospitals.
2. Accessible and effective emergency care for stroke patients by developing stroke transport protocols.
3. Accessible, acceptable, appropriate, effective and safe in-patient care for stroke patients.
4. Accessible, acceptable, appropriate, effective and safe rehabilitation services.

Application of these strategies will be further described in the intervention sections below.

Along with its regional initiatives, CH was a partner in the Alberta Provincial Stroke Strategy (APSS), and CH service plans aligned with this provincial framework. APSS is an approximately \$42 million project funded by the Alberta provincial government and the Heart and Stroke Foundation of Alberta, NWT and Nunavut to improve stroke care and prevention throughout the province. It is a collaborative partnership between Alberta Health and Wellness, all nine former health regions and the Heart and Stroke Foundation. APSS provides a structure so that its partners can share information about their stroke services, coordinate service delivery across boundaries and develop common strategies to facilitate access to evidence-based care for optimal practice (Alberta Provincial Stroke Strategy 2006).

CH work now continues as the Stroke Program, Edmonton Area, within the new provincial health structure, Alberta Health Services.

Interventions

The initial phase of development of integrated stroke care in Alberta required the creation of two comprehensive stroke centres, one at the University of Alberta Hospital (UAH) in Edmonton and another at the Foothills Medical Centre in Calgary. Their purpose is to serve as hubs for clinical expertise and support in order to increase rural capacity to manage stroke care throughout the province. Thus, along with its own service integration, Stroke Program, Edmonton Area is mandated to support both the treatment of patients and the development of integrated stroke services in central and northern regions. Through extensive education and mentorship of physicians, health professionals and program leaders, Numerous central and northern Alberta communities were supported to create Primary Stroke Centres (PSCs). A proposed PSC must meet the provincial guidelines to receive the PSC designation. To ensure it meets these guidelines, each PSC is provided standardized tools, including written algorithms, protocols/order sets and healthcare-provider education. The stroke toolkit provided to hopeful PSCs ensures replication of the desired model for stroke care best practice. In our case example, Helen was assessed at the PSC in Camrose, which had been established in March 2007. More PSCs are proposed, and similar work is being completed in the southern half of Alberta. The Foothills Medical Centre provides leading-edge support to build capacity so that rural areas can also offer effective stroke care.

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Stroke Prevention

Prevention of recurrent stroke events and management of high-risk individuals to prevent first events are imperative if we are to manage increasing stroke numbers and encourage a healthier population (Rothwell et al. 2007). In the past, individuals in the Edmonton area have experienced considerable wait times that have extended beyond national best practice recommendations for secondary stroke prevention. In addition, individuals in rural and remote areas who needed secondary stroke prevention services were required to travel to the UAH in Edmonton to

receive those services. Three initiatives are targeted to improve the access to standardized stroke prevention services in the Edmonton area and the province.

To begin, stroke prevention clinics have been expanded to offer comprehensive care at all three major hospitals and now include services at the Royal Alexandra Hospital (RAH) and Grey Nuns Community Hospital (GNCH). Despite an increase in total visits at the hospitals from 1,849 in 2005/06 to 3,200 in 2007/08, urgent patients are still being seen within seven days, in keeping with best practice guidelines. These clinics are also working together to develop a central intake system to provide a single point-of-access, thereby further improving the triage of very high-risk individuals.

A second initiative aims to increase community access to stroke expertise by targeting individuals experiencing transient ischemic attacks (TIAs), a key warning sign of an impending stroke (Giles and Rothwell 2009). The province is currently implementing an extensive provincial network to triage TIA patients anywhere in Alberta for appropriate care. Best practice guidelines in stroke care now identify TIAs as a medical emergency. To meet these standards, we have collaborated at all levels across the province to establish a TIA hotline. The hotline provides referring physicians a single point-of-entry to effectively triage patients who experience a TIA throughout Alberta. The hotline now ensures that any emergency department (ED) or community-based family physician has a direct and effective link to stroke expertise. This initiative required cooperation from administration and clinicians province-wide, including stroke neurologists, stroke prevention clinics, the regional patient transport office (urgent care line), emergency medical services (EMS), PSCs and comprehensive stroke centres. In order to be viable, the project required an existing and extensive inter-collaborative foundation between provincial stakeholders and staff. This groundwork was previously laid by the APSS collaborative to set up the primary and comprehensive stroke centres and the Telestroke (Telehealth for stroke assessment and prevention services) network throughout the province. This hotline initiative is spearheaded by the Alberta Stroke Prevention in TIAs and Mild Strokes (ASPIRE) research project and is an example of leading-edge innovation to improve stroke care on a provincial scale using integrative concepts.

Complementing the added clinics, Telestroke stroke prevention services have been developed to improve access to the suburban and rural patients who are unable to travel for either initial or follow-up visits. This patient-focused service uses Telehealth to complete the same assessment that the patient would receive if visiting one of the Edmonton clinics in person. In 2005/06, Telestroke provided secondary stroke prevention care to 53 patients in central and northern Alberta. This number has grown substantially, with 191 patients in 52 sites in 2007/08, and 189 patients as of December for 2008/09 (the

year ends March 31, 2009), with Telestroke prevention now also available at GNCH and RAH. In our case study example, Helen Jones was able to receive her follow-up after an initial assessment by stroke neurologists from the UAH via Telehealth. Thus, she avoided having her husband take the day off work to travel into Edmonton, and she is now able to receive her subsequent follow-up visits in her local area at the Camrose PCS.

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Emergency Management

Timely access to services is critical in the management of stroke in order to minimize its potential effects (Hacke et al. 2008). Suspected strokes must be evaluated by appropriate diagnostic imaging and stroke experts to determine the type of stroke and appropriate course of care. This rapid evaluation can result in significantly more positive patient outcomes. Rapid and effective pre-hospital care is essential to minimize scene time, provide optimal pre-hospital assessment and treatment and quick transportation to an appropriate ED. To achieve this, our first application has drastically improved management of stroke patients prior to arrival at the hospital. Through coordination with Health Link Alberta, the Regional Patient Transport Office (Critical/Urgent Care Line) and EMS, the Edmonton Stroke Program developed stroke bypass protocols and guidelines. These ensure stroke patients are appropriately identified and transported to a hospital with the ability to administer tPA, a vital clot-busting medication. tPA administration has increased from 100 patients 2006/07 to over 140 patients in 2007/08. These bypass protocols have been adopted province-wide, and were used in Helen Jones' case. EMS was aware that the local hospital was not equipped with the imaging technology, trained staff and Telehealth support for proper stroke assessment; thus Helen was appropriately diverted to the nearest PSC, in Camrose.

The second application is the capability to use Telestroke to provide comprehensive assessment to the hyper-acute stroke patient in a rural or remote area. It uses video conferencing and CT image-sharing technology to allow stroke specialists from comprehensive stroke centres in Edmonton and Calgary to examine patients at PSCs, thereby effectively diagnosing the patient's condition and recommending a plan of care. PSCs can deliver this time-sensitive acute-stroke care for patients without physically transferring them to comprehensive centres for an

exam. As of December 2008, hyper-acute Telestroke at UAH completed consults with 51 patients, eight of whom received tPA which, in the past, could have been delivered only if the patient had attended the UAH. These numbers are expected to continue to rise, as GNCH is now also able to manage hyper-acute strokes via Telehealth. Helen directly benefited from the use of Telestroke for this hyper-acute management by receiving a consult from stroke neurologists at UAH who determined she was eligible to receive tPA. This medication minimized the non-reversible effects of her stroke and maximized her quality of life.

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In-patient Care

It is internationally recognized that organized “stroke units” are critical to the successful treatment of stroke patients (Lindsay et al. 2005). A stroke unit is defined as “multi-disciplinary specialized care for patients who have had an acute stroke” (Hill 2002: 649). To satisfy this best practice recommendation, acute in-patient stroke services were enhanced at UAH, and new stroke units were created at the RAH and GNCH. With a total of three stroke units, the number of acute-stroke in-patient beds has increased from approximately 30 to 56. Processes have also been developed to improve the flow of stroke patients into these beds from other hospital units. Through the Alberta Provincial Stroke Strategy, organized stroke units have been created within each PSC as part of the requirement to meet PSC designation. Our case, Helen would have benefitted from the local stroke expertise at the Camrose hospital for her in-patient stay if she had required it.

Rehabilitation and Community Re-integration Services

Research now clearly indicates that early and comprehensive post-stroke rehabilitation is essential to improving patient outcomes (Teasell et al. 2008). In order to achieve this recommendation, stroke unit staffing has been enhanced at all three Edmonton acute care sites to ensure access to timely physical and occupational therapy and speech–language pathology services. It also now includes weekend access to therapy, and a new level of care was created to serve the “slow-to-progress” stroke patient. These long-duration rehabilitation beds at the Glenrose Rehabilitation Hospital offer therapy to patients who may previously have been denied this level of rehabilitation due to their slow progress. Further to the in-patient improve-

ments, outpatient rehabilitation services have been enhanced to decrease wait times for certain types of therapy from up to eight weeks to less than one week. Finally, the role of the caregiver in the care of a stroke survivor is more fully recognized, starting in acute care and rehabilitation. Programs designed specifically for caregivers of stroke survivors have been created by the health system, and alliances have been built with non-profit organizations such as the Stroke Recovery Association of Alberta, which can provide support to both stroke survivors and caregivers.

Regional Stroke Navigators

To support the region and central and northern Alberta, the Stroke Program, Edmonton Area has put coordinators in place to provide assistance to healthcare professionals, stroke survivors and their caregivers. These “navigators” help to ensure patients are receiving the right service at the right time, delivered by the right provider. They coordinate education for healthcare providers, including learning resources and staff orientation materials. In addition, they make recommendations or provide education for stroke survivors and caregivers. There are equivalent positions in each former health region to act as a point-of-contact. These positions make up a provincial alliance in frequent consultation to review and improve practice through APSS activities.

Discussion

Providing effective and equitable access to appropriate stroke care for all Albertans is an overwhelming task. Regardless of the patient’s location, the expediency for rapid assessment is critical. Management of the stroke patient upon arrival at an emergency department requires precise and accurate protocols and trained staff. Rehabilitation of the post-stroke patient and preparation for community re-integration, including identification of caregiver needs, is of growing concern as the occurrence of stroke in younger populations grows. As a result, integration of the parts of the healthcare continuum on a local and provincial level is also crucial. By definition, integration is the building of stronger connections between health services, people and providers to better support people in their care journey and realize all the benefits of a health system. In Alberta, program leaders, physicians and clinicians throughout the province have been able to effectively collaborate with support and guidance from APSS. The result of this collaboration is an extensive network with a focus on improving stroke care for all Albertans and meeting best practice recommendations for stroke care, regardless of location within the province. Our case study highlights how the integrative work completed by the Stroke Program, Edmonton Area has been vital to the development of effective stroke care in the central and northern part of Alberta. However, it is only one example of the exceptional efforts that have and will continue to take place throughout the province.

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The Edmonton Area's mentorship is mirrored in the south by the Calgary area and is evidenced by the growing number of PSCs also arising in the southern half of the province. Equally, rural regions have demonstrated extreme dedication to improvement of stroke care with every current and proposed PSC, as seen in Helen's case with St. Mary's Hospital in Camrose.

An extensive evaluation plan has been put in place both at a local and provincial level to measure the effects of these integrative efforts. Preliminary data are just coming in, and results to date are encouraging. As mentioned, markedly increased patient visits to prevention clinics both in person and via Telehealth and the number of people treated with tPA are expected to continue to rise. Another important area of interest includes a significant downward trend of stroke recurrence after prevention clinic visits of people who visit emergency with signs of stroke. It is expected that the ASPIRE project results will strengthen these data even further.

Conclusion

The concept of integration provides an effective framework for the health system to reorganize, streamline and improve access and equitability for all Albertans. This has been the experience to date in the example of the development of an integrated stroke system both in the Edmonton area and in the province. And, of utmost most importance, Albertans can anticipate the benefits of this improved system as demonstrated in our case example of Helen Jones. **HQ**

References

- Alberta Provincial Stroke Strategy. 2006. *Alberta Provincial Stroke Strategy Stroke Blueprint*. Retrieved February 11, 2009. <http://www.strokestrategy.ab.ca/PDFs/APSS_Blueprint.pdf>.
- Giles, M.F. and P.M. Rothwell. 2009. "Transient Ischaemic Attack: Clinical Relevance, Risk Prediction and Urgency of Secondary Prevention." *Current Opinions in Neurology* 22(1): 46–53.
- Hacke, W., M. Kaste, E. Bluhmki, M. Brosman, A. Davalos, D. Guidetti et al. 2008. "Thrombolysis with Alteplase 3 to 4.5 Hours after Acute Ischemic Stroke." *New England Journal of Medicine* 359(13): 1317–29.
- Heart and Stroke Foundation of Canada. 2009. *Statistics – Stroke*. Retrieved February 11, 2009. <<http://www.heartandstroke.com/site/c.ikiQLcMWJtE/b.3483991/k.34A8/Statistics.htm>>.
- Hill, M.D. 2002. "Stroke Units in Canada." *Canadian Medical Association Journal* 167(6): 649–50.
- Lindsay, M.P., M.K. Kapral, D. Gladstone, R. Holloway, J.V. Tu, A.

Laupacis and J.M. Grimshaw. 2005. "The Canadian Stroke Quality of Care Study: Establishing Indicators for Optimal Acute Stroke Care." *Canadian Medical Association Journal* 172: 363–5.

Regional Stroke Steering Committee. 2005. *Capital Health Stroke Care – 5-Year Service Plan*. Edmonton, AB: Author.

Rothwell, P.M., M.F. Giles, A. Chandratheva, L. Marquardt, O. Geraghty, J.N. Redgrave et al. 2007. "Effect of Urgent Treatment of Transient Ischaemic Attack and Minor Stroke on Early Recurrent Stroke (EXPRESS Study): A Prospective Population-Based Sequential Comparison." *Lancet* 370(9596): 1432–42.

Teasell, R., N. Bayona and J. Bitensky. 2008. *EBRSR: Evidence-Based Review of Stroke Rehabilitation Background Concepts in Stroke Rehabilitation*. Retrieved February 6, 2009. <<http://www.ebrsr.com/index.php>>.

The Canadian Stroke Strategy Steering Committee. 2000. *Towards an Integrated Stroke Strategy for Ontario – Report of the Joint Stroke Strategy Working Group*. Toronto, ON: Author.

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