

The Canadian Stroke Quality of Care Study: establishing indicators for optimal acute stroke care

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Every 10 minutes someone in Canada suffers a “brain attack,” making stroke the most common serious neurological condition requiring hospital admission. Each year, about 50 000 Canadians are admitted to hospital because of stroke, with an estimated cost to the health care system of \$2.7 billion.¹ As the management of acute ischemic stroke advances, widespread implementation of optimal stroke care continues to pose enormous challenges for health care systems. There are tremendous variations in the practice of care across regions, and national practice guidelines for stroke management are lacking. To achieve “best practice” stroke care across the country, continuous surveillance of the quality of stroke care (e.g., practice audits with feedback) will become increasingly important. But how should quality of stroke care be defined and measured? What are the performance indicators by which hospitals and regions should be judged? It is imperative that we adopt a national approach to measuring stroke care using performance indicators that are clinically relevant, scientifically sound and empirically feasible.²⁻⁴

To address this issue, the Canadian Stroke Quality of Care Study was launched to identify a core set of indicators that represent optimal care and will facilitate uniform measurement and benchmarking of the quality of acute stroke care at the local, provincial and national levels. A description of the study is available online at www.cmaj.ca/cgi/content/full/172/3/363/DC1). This study builds on the acute stroke care indicators developed by Holloway and colleagues in the United States and reflects changes in stroke management practices since 1999 and differences between the US and Canadian health care systems.⁵

The expert advisory panel convened for the study consisted of 14 multidisciplinary members from across Canada who were nominated by their peers for their knowledge and expertise in acute stroke care and performance measurement. Panel members evaluated 51 stroke quality-of-care indicators using 6 criteria: validity, feasibility, relevance, opportunity for improvement, expected impact of improvement and overall utility.⁵ Using a modified Delphi process, 23 of these indicators were selected on the basis of high ratings by the majority of panel members to form a final core set of performance measures for acute stroke care (Table 1). The highest rated indicators focused on maximizing tissue plasminogen activator (tPA) administration for eligible patients, admission of patients to a specialized stroke unit and in-hospital initiation of secondary stroke

prevention therapies. A similar consensus process is underway for developing key quality-of-care indicators for secondary stroke prevention and telemedicine consultations for acute stroke (e.g., TeleStroke).

We propose that these 23 core indicators be used by clinicians, researchers and policy-makers to improve the quality of care for patients with acute stroke and to ensure accountability, facilitate regional comparisons and enable continuous quality improvement. They will also serve to inform efforts to develop consensus guidelines in Canada for acute stroke management. In addition, measurement of these indicators will lead to the establishment of benchmarks for quality stroke management and comparative reporting within Canada and other jurisdictions. Increasingly, hospitals are being judged on their ability to demonstrate that they are providing “best practice” stroke care. We hope that these indicators will be adopted by hospitals and embedded in routine clinical care as a means of ensuring a minimum standard of practice and to make transparent to front-line clinicians the criteria by which their performance is being judged. Systematic documentation of these indicators on every stroke patient’s hospital chart, using standard forms or checklists, should be encouraged.

Numerous initiatives are currently underway across Canada where these quality-of-care indicators will be able to have direct application. The Registry of the Canadian Stroke Network is collecting data on stroke care at selected regional stroke centres in Ontario and Nova Scotia; feedback is given to the participating hospitals on a quarterly basis, which can be helpful by identifying care gaps and encouraging improvement in practice and by establishing “standards” of what types of care are feasible to achieve.⁷ Ontario’s Stroke Strategy has established designated regional and district stroke centres and regional stroke prevention clinics throughout the province; a government-sponsored audit is currently underway to evaluate the success of this strategy.⁸ Similar provincial strategies are being established in Alberta and the Atlantic provinces. Most recently, the Canadian Stroke Network and the Heart and Stroke Foundation of Canada are collaborating to develop a Canadian Stroke Strategy, to address the gaps between available best evidence and current stroke management practices across the continuum of care and to improve consistency of care across all provinces and territories.⁹ Given the resources invested in these initiatives to improve acute stroke care, it is important that their impact on patient

management and outcomes is evaluated. The indicators identified in Table 1 should be incorporated into provincial and national evaluation frameworks as each coordinated strategy is launched.

Three main challenges remain as we strive to implement a common set of stroke quality-of-care indicators across Canada. First, although intravenously administered tPA has become the standard of care for eligible patients within 3 hours of acute ischemic stroke in hospitals that are equipped to provide this treatment, it is acknowledged that many community and rural hospitals are unable to provide this treatment because of their location or a lack of resources (e.g., 24-hour CT scan availability, stroke specialist expertise). These hospitals should focus on the subset of the 23 indicators that are appropriate to their circumstances. For hospitals that administer tPA, the panel was in full agreement that urgent assessment of eligible patients should remain a high priority in emergency departments and that processes should be in place to facilitate rapid administration of tPA to those patients.

The second challenge is the feasibility of measuring these indicators. Their widespread dissemination should help

provinces, regions and hospitals to understand the key elements of stroke care that will be under scrutiny, and thereby encourage hospitals to implement data management systems that facilitate measurement of their acute stroke care processes and patient outcomes. We recognize that each province may adopt a separate stroke care evaluation framework, and we encourage policy-makers to go beyond the indicators chosen in our study and to recognize that their peers have selected these indicators as a common starting point. Initial feasibility testing by the research team has highlighted the fact that existing provincial and national administrative datasets do not contain all the necessary data elements to measure several of these indicators. More sophisticated routine data collection mechanisms, explicit chart audits or participation in coordinated data collection mechanisms at the local or regional level or as part of the Registry of the Canadian Stroke Network will be required to accurately capture the information necessary to measure stroke care performance and establish benchmarks. These data collection efforts require additional resources to implement and sustain, and a funding mechanism to support ongoing measurement by hospitals and others is needed.

Table 1: Core indicators for optimal acute stroke care selected by the expert advisory panel

Quality indicators	Quality of evidence ^a	Final ratings of overall utility; no. of panel members*		
		Reject	Uncertain	Adopt
Patients with acute stroke should be managed on a designated stroke unit	A1	0	0	11
All patients with acute stroke should be evaluated for tPA eligibility	B2	0	0	11
NINDS inclusion/exclusion criteria should be applied for patient selection for thrombolysis	C1/C2	0	0	11
tPA best-practice treatment protocol should be followed for tPA administration	B1	0	1	9
All eligible patients should receive tPA	B2	0	1	10
Potentially eligible patients should have CT brain scan completed within 25 min of arrival at ED	C1/C2	0	1	9
CT/MRI should be completed within 24 h for patients ineligible for tPA	C1/C2	0	1	9
CT/MRI should be completed before hospital discharge for patients ineligible for tPA	C1/C2	1	1	9
Blood glucose level should be checked on arrival at ED and regularly for first 24 h	B1	0	0	11
Elevated blood glucose level should be treated	B1	1	2	8
Patients should have an electrocardiogram	C2	0	1	9
Fever should be treated with antipyretics	B2	0	3	8
Patients should be mobilized within 24 h	A1/C1	0	0	11
Acute ASA therapy should be initiated as soon as possible	B2	0	0	10
Dysphagia screen should be completed	C1	0	1	9
Indwelling urethral catheter should be avoided	C1	0	0	11
Carotid imaging should be completed during hospital stay or as outpatient post discharge	A1/C1	0	0	11
Patients should be discharged with antithrombotic therapy	A1	0	0	11
Patients with atrial fibrillation should be discharged with warfarin therapy	A1	0	0	11
Patients should be discharged with statin therapy if appropriate	A1	0	1	10
Patients should be discharged with antihypertensive agents if appropriate	A1	0	0	9
Education should be provided for patients and caregivers	B1	0	0	11
Smoking history should be assessed and documented	A1	0	1	10

Note: tPA = tissue plasminogen activator, NINDS = National Institute of Neurological Diseases and Stroke, ED = emergency department.

*Eleven of the 14 panel members were able to attend the panel meeting for the full day. Ratings were based on a 9-point Likert scale. "Reject" (ratings of 1–3) indicates support to reject the indicator, "uncertain" (ratings of 4–6) indicates uncertainty about the indicator and "adopt" (ratings of 7–9) indicates strong support to adopt the indicator. Indicators were selected for the final core set if more than 66% of the panel members rated the indicator in the "strong support to adopt" category (ratings 7–9).

Finally, in order to use these indicators to assess quality of care, valid and realistic benchmarks are required. To date, these benchmarks have not been clearly established in Canada. It is important that a national panel of experts, in a process similar to the one used to identify these indicators, establish benchmarks for quality care that can be used to drive improvement efforts at the local and regional levels.

In summary, we have systematically developed a core set of 23 sound and relevant indicators of the quality of acute stroke care. Indicators, like medical interventions, must evolve over time, and research and stakeholders, including the public, health care program managers and health care providers, should inform that evolution. These indicators are intended to guide practice and evaluation of care provided to stroke patients in hospital, yet it is recognized that individual clinicians may make different decisions for individual patients that may be outside the range of these indicators. This study is an important step toward routinely measuring the quality of acute stroke care and must be followed by the development of benchmarks and their incorporation into a process of continuous quality improvement.

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Competing interests: None declared.

Contributors: Patrice Lindsay was responsible for the initial writing of the manuscript and for the development of the concepts and ideas contained in it, in conjunction with Moira Kapral and senior author Jeremy Grimshaw. David Gladstone made a significant contribution to the editing. Robert Holloway, Andreas Laupacis and Jack Tu provided valuable feedback of early drafts in preparation for submission.

Acknowledgements: The Canadian Stroke Quality of Care Study is funded through a research grant from the Canadian Stroke Network. Patrice Lindsay holds a Canadian Institutes of Health Research Post-Doctoral Training Fellowship and receives post-doctoral support from the Registry of the Canadian Stroke Network. Moira Kapral is supported by the Canadian Stroke Network and the Women's Health Program at the University Health Network. Andreas Laupacis is a Senior Investigator of the Canadian Institutes of Health Research. Jack Tu holds a Canada Research Chair in Health Services Research. Jeremy Grimshaw holds a Canada Research Chair in Health Knowledge Transfer and Uptake.

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