

Final Indicators for Evaluating Telestroke
Selection of the Canadian Stroke Quality of Care Study Telestroke Consensus Panel
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Purpose: This study proposed to establish a core set of Telestroke indicators through an expert panel process. The Telestroke panel build upon the work to date for the Canadian Stroke Quality of Care study to now develop and select a core set of indicators that address the issues unique to telemedicine and Telestroke.

Background:

Telemedicine (digital transmission of diagnostic images and data as well as video conferencing and telecommunications) makes it possible to link specialists in large urban centres to practitioners in small community hospitals and remote communities for purposes of making decisions regarding patient management. Telemedicine for stroke (or *Telestroke*) gives local practitioners in remote hospitals timely access to specialists in acute stroke care (neurologists, and radiologists). This link has made it possible for specialists in urban centers to evaluate patients with signs and symptoms of acute ischaemic stroke at remote hospitals for thrombolytic therapy. It has increased access to an intervention that could have a positive impact on patient outcomes, and decreased barriers caused by geographic location.

With Telestroke consults on the rise, and with several other centres in Canada currently implementing Telestroke capabilities, it is essential to develop and implement an evaluation system to determine the impact of Telestroke, both with respect to the processes of care and the outcomes of care following a Telestroke consult. To make this determination, a core set of valid, relevant, and scientifically sound indicators must be identified at the outset to guide evaluation and research efforts.

Methodology:

This study followed the process for indicator selection developed for the first CSQCS on acute stroke care (Lindsay et al, CMAJ 2005; Online at www.cmaj.ca). This included a comprehensive review of existing guidelines for telemedicine and telestroke, and primary research related to stroke care and telestroke. A consensus panel was convened to review the research and existing guidelines and to recommend a set of best practices and related performance measures for telestroke in Canada. Once the indicators were selected a feasibility study was conducted to determine the availability and quality of data to populate the indicators, and develop a consistent analysis model. Indicators with currently available data were then measured to establish a baseline of telestroke performance, using data from the Registry of the Canadian Stroke Network (Ontario data).

Core Performance Measures for Telestroke Selected by the CSQCS_Telestroke Panel:

Component 1: Organization of Telestroke Care Delivery	
1	<p>For remote, designated Telestroke hospitals without neurologists or stroke specialists on site, if CT/MRI technology is available, processes and technology should be implemented to support remote neurological assessment of patients with acute ischemic stroke using Telestroke. Processes should include:</p> <ul style="list-style-type: none"> a. a coordinated mechanism for rapid access to remote stroke expertise 24 hours per day and seven days per week b. a means of transmitting CT/MRI images c. a means of establishing 2-way videoconferencing d. a means for ongoing access to stroke specialist for ongoing advice regarding patient treatment and management as required
2	<p>Referring and consulting hospitals require harmonized clinical protocols to support assessment and management of acute stroke patients. Harmonized protocols should include the following:</p> <ul style="list-style-type: none"> a. Inclusion and exclusion criteria for administration of t-PA (in accordance with published NINDS protocols)¹⁷ b. Blood pressure control prior to and following t-PA administration c. Neurological monitoring following t-PA administration d. Management of patients with intracerebral hemorrhage post t-PA
3	Percentage of patients who arrive at a designated referring hospital with stroke symptoms who receive access to stroke expertise through Telestroke (as a proportion of total stroke cases treated per site).
4	Proportion of Telestroke cases where an urgent follow-up is required with the Stroke specialist due to complication or unexpected event.
5	For Telestroke cases requiring additional consults with the stroke specialist, the time from the first consult to subsequent consults.
Component 2: Emergent evaluation of acute ischemic stroke	
6	<p>Number of Telestroke referrals where stroke specialists were inaccessible due to:</p> <ul style="list-style-type: none"> a. multiple conflicting calls (Telestroke and other) b. technical difficulties preventing video-transmission
7	A Telestroke consult should be initiated within 30 minutes of ED arrival for all potentially t-PA eligible patients who present to designated Telestroke hospitals with suspected acute ischemic stroke within three hours of symptom onset.
8	The stroke specialist should be able to view the CT/MRI within 15 minutes of

	requesting it (track per cent of time this occurs).
9	The stroke specialist should be able to make a videoconferencing connection with the designated Telestroke ED within 15 minutes of initial contact by the central referral system (track per cent of time this occurs).
10	Time from patient arrival in ED to CT completion.
11	Time to initiation of Telestroke consult a. from arrival in ED. b. from CT scan completion.
12	Time from arrival in ED (or Telestroke consult) to t-PA administration.
Component 3: Management of Patients Receiving Thrombolytic Therapy	
13	Percentage of Telestroke consults that are treated with t-PA.
14	Percentage of Telestroke consults that have an absolute contraindication for t-PA.
15	For all Telestroke patients who receive t-PA: a. repeat CT/MRI imaging should be done at 24-72 hours and this should be made available to the stroke specialist. b. there should be mechanism for follow-up between the consulting site and the stroke specialist.
16	Patients should be transferred to the regional/enhanced district stroke centre if there is deterioration post t-PA requiring neurological or neurosurgical care not available at designated Telestroke hospital.
17	Total length of stay for patients who received thrombolysis through a Telestroke consult from time of triage in the emergency department until discharge from inpatient care.
18	Number of patients in a hospital/region receiving t-PA before and after Telestroke program initiated.
Component 4: Outcomes following a Telestroke Consultation	
19	The Rankin and NIHSS should be recorded at discharge for all patients who received a Telestroke consult (whether or not t-PA was given).
20	Proportion of stroke patients with and without a Telestroke consult who died in the ED or during their inpatient stay following admission for stroke.
21	Proportion of patients discharged to their place of residence prior to stroke, those transferred to rehab, and those transferred to a long-term care facility.
22	Proportion of stroke patients who received a Telestroke consult who experienced at least one of the following complications during their ED or inpatient stay (both t-PA and non-tPA patients):

	<ul style="list-style-type: none">a. Intracerebral hemorrhage or other hemorrhage.b. Recurrent stroke.c. Systemic complications including UTI, DVT, pneumonia.
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