

Kingston Health Sciences Centre

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Transforming care, together™

Achieving Best Practice Target Times for HyperAcute Treatments- What we Learned



strokenetwork
SOUTHEASTERN ONTARIO

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Pre-hospital



- **Early recognition**; establish time last seen normal; prompt card
- **Pre-notification** of receiving ED ASAP – “arriving under *Acute Stroke Protocol X minutes out*” (60% of our patients outside of Kingston)
- KHSC-KGH ED charge nurse/staff **activates ASP through Switchboard**
 - Team gets ready based on ETA:
 - Stroke team prepares to meet patient/EMS on ED arrival
 - CT prepares for next on scan
 - ED Nurse readies portable monitor, IV/blood draw equipment, ASP package
- **Start 2 IVs en route, if possible**
- **Second patch** 15 minutes out to give update to receiving facility (for those traveling a distance)
 - Include notification that IV(s) are in place or not in place

Paramedics Interpret Prompt Card with 98% Accuracy

Impact of Expanding the Prehospital Stroke Bypass Time Window in a Large Geographic Region

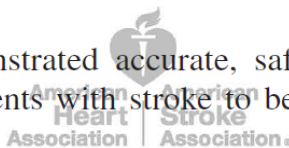
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Background and Purpose—The Ontario Acute Stroke Medical Redirect Paramedic Protocol (ASMRPP) was revised to allow paramedics to bypass to designated stroke centers if total transport time would be <2 hours and total time from symptom onset <3.5 hours. We sought to evaluate the impact and safety of implementing the Revised ASMRPP.

Methods—We conducted a 12-month implementation study involving prehospital patients presenting with possible stroke symptoms. A total of 1317 basic and advanced life support paramedics, of 9 land services in 10 rural counties and 5 cities, used the Revised ASMRPP to take appropriate patients directly to 6 designated stroke centers.

Results—We enrolled 1277 patients with 98.8% paramedic compliance in form completion. Of these, 755 (61.2%) met the redirect criteria and had these characteristics: mean age 72.1 (range 16–101), male 51.1%, mean time scene to hospital 16.7 minutes (range 0–92). Paramedics demonstrated excellent interobserver agreement (κ , 0.94; 95% confidence interval, 0.91–0.96) and 97.9% accuracy in interpretation of the Revised ASMRPP. Prehospital adverse events occurred in 14.7% of patients, but few were life-threatening. Overall, 71.4% of 755 cases had a stroke code activated at the hospital and 23.2% received thrombolysis. For the 189 potential stroke patients picked up in 1 city, the ASMRPP classified thrombolysis administration with sensitivity 100% and specificity 37.3% and a final diagnosis of stroke, with sensitivity 86.1% and specificity 41.9%.

Conclusions—In a large urban–rural area with 9 paramedic services, we demonstrated accurate, safe, and effective implementation of the Revised ASMRPP. These revisions will allow more patients with stroke to benefit from early treatment. (*Stroke*. 2017;48:00-00. DOI: 10.1161/STROKEAHA.116.014868.)



Pre-Hospital Key Elements for Achieving Performance Targets

- ✓ Early recognition of stroke signs
- ✓ Pre-notification of Acute Stroke Protocol
- ✓ Early communication to stroke team of Acute Stroke Protocol by ED & Switchboard



Emergency Department

- Immediate registration completion
- CT notified of arrival
 - Next on scan policy in CT when ASP notification received in CT suite
- Ambulance triage & rapid handover to Stroke team who meet patient at offload; **patient stays on EMS stretcher/monitor**
- Neuro performs NIHSS
- Nurse starts IVs if not already started & draws blood work with tubes from pre-filled packages
- Neurologist initiates consent process for potential thrombolysis +/- EVT



If patient walks into ED, the triage nurse can activate the ASP using FAST and ACT-FAST tools

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Move straight to CT

Door to 1st CT slice < 10 min

- Move patient to CT on paramedic stretcher
- Nurse/team follow with:
 - ED stretcher
 - ED monitor
 - IV pump
 - Transport kit
 - tPA/TNK from Omnicell
 - ASP package



Marco Smits - Communications Officer, County of Frontenac

ED Key Elements for Achieving Performance Targets

- ✓ Patient remains on paramedic stretcher
- ✓ Early call to CT
- ✓ Early activation of Acute Stroke Protocol by ED & Switchboard
- ✓ Each team member works synchronously to assess & prepare patient just inside ED doors
- ✓ Forgo waiting blood work results unless clinically relevant
- ✓ Equipment & tPA follows to CT
- ✓ Early emergency consent process started
- ✓ In addition to paramedic report, neurologist obtains info early from family



Upon arrival in CT Suite

- Neurologist continues process for consent
- Entire team assists with transfer to CT table using transfer board; paramedic monitor switched to ED transport monitor
- Patient prepared for CT
- Paramedic report given to RN; Paramedics leave
- Family is directed to nearby waiting room & is attended to by team



Within CT Suite

Door to Needle < 30 min

- CT tech hooks up injector for contrast before starting CT scan, once neurologist confirms proceeding with IV contrast for CTA & CTP using *RAPID*
- Physician signs Emergency Consent for CT with contrast
- Stroke team informs ED RN if IV tPA candidate
- RN & neuro mixes tPA + prepares bolus
- Neuro monitors patient while ED RN prepares tPA infusion
- RN begins infusion in CT suite
- RN documents time of bolus/infusion
- If not tPA candidate, tPA returned to Omnicell by ED RN



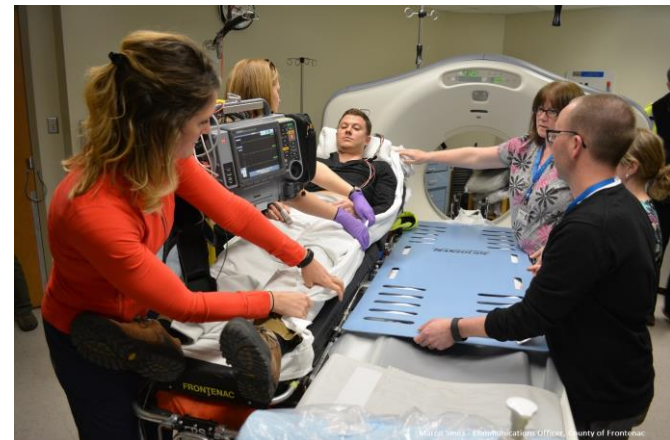
Work in Parallel

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CT Suite Key Elements for Achieving Performance Targets

- ✓ Neurologist stays with patient at all times & actively participates to expedite care, e.g. keeping track of communication & patient flow, helping transfer patient on to CT table, & assisting in any way they can while maintaining oversight of entire process
- ✓ Patient remains on paramedic stretcher through to CT suite
- ✓ Next on CT scan policy for Acute Stroke Protocol
- ✓ IV tPA administered in CT suite
- ✓ Use of *RAPID* CT perfusion protocol to rapidly ID patients for EVT
- ✓ Streamlined consent process for CT including administration of contrast



Is a 10 minute Door-to- Needle time possible? – YES!!

- Fastest time at KHSC = **8 mins**
- 15 - 20 mins may be more realistic as a **median** time
- Suggest non-telestroke sites aim for median < 20 mins
- Telestroke sites - aim for median DTN<30 mins;
 - Will facilitate EVT door-in-door-out, DIDO <45 mins

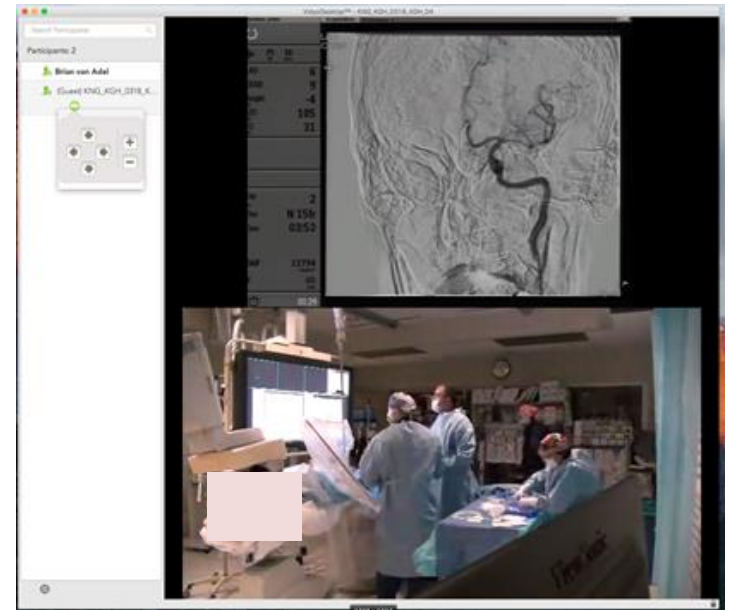


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If an EVT Candidate

- Days: Patient changed into gown & Foley Catheter inserted in CT prep area; moved directly from CT to Angio suite when IVR ready
- Nights/after hours: Return to ED to prepare patient and await IVR team to be ready



Within IVR Suite

Door to Groin Puncture < 60 min

Door to Reperfusion < 90 min

- IVR team prepares IVR suite soon after receive call
- IR obtains consent for procedure
- Stroke + IVR teams work together to transfer patient to procedural table. Neurologist +/- resident continues to provide assistance
- Conscious procedural sedation for most. If patient is intubated, ICU team manages ventilation & sedation
- Continuous cardiac, BP & SpO2 monitoring throughout including ED & CT
- In most cases, femoral artery sheath is removed in IVR with Angio-Seal placed for closure

IVR Suite Key Elements for Achieving Performance Targets

- ✓ MRTs and team assist with setting up room
- ✓ Neurologist +/- resident works as part of IVR team & remain in angio suite to assist directly with care (e.g. procedural sedation, discussion of case with IR as EVT proceeds, coaching patient through procedure)
- ✓ Use of procedural conscious sedation vs GA whenever possible
- ✓ Use of combined stent retriever/aspiration technique (e.g., Solumbra & BADASS)



Other Elements for Success

- **Leadership** & key person is “conductor” – neurologist oversees; all know roles; person playing key part has voice
- **Strong relationships** including with Paramedic Services
- Well coordinated **Team**-use race car pit stop model
- *Time is Brain* Culture
- **Stroke expertise**- learning from each other
- Clear evidence-based **protocols** e.g., CT Imaging protocol for *RAPID*
- **Inclusive multi-disciplinary** EVT Workgroup & RASP committee
- **Ongoing evaluation** including monitoring & reporting **with QI**
- Interprofessional **Debriefs** are carried out as needed
- **Continuous Recognition of** EVT and stroke **teams**
- Inclusive **early planning**; give every player a voice
- Practice **MOCK** simulations – time/video to identify delays
- Reduce unnecessary steps/delays e.g., consent, lab and DI



Keys: Choreographed, know roles, practice, can adapt routine to precise circs

Link to Quinte Health Care video re Race Car Pit Stop Model:
<https://www.youtube.com/watch?v=CrAY467g2E8>

Questions and Discussion

www.strokenetworkseo.ca

For further information: See our website or contact

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Telestroke sites



Some considerations

- Response times are <5 mins
- Medical assessment – sure person has a stroke?
- Contact Telestroke prior to imaging - heads up
- Speed up decision-making - remove unnecessary steps – e.g. some blood work, consent for CTA
- Reduce travel from one area to another
 - Location of Tele-consult
 - Location of tPA delivery
- Build capacity to administer tPA – e.g. doctors and nurses who can mix tPA or give bolus – be flexible
- Common training as a basis to adapt and improve
- Door-in-door-out protocols for EVT
- Kaizen QI process well-received at QHC

Quinte Health Care: Code Stroke Video



<https://www.youtube.com/watch?v=Un0HienMwnU>

In-Hospital Stroke Protocols

Some considerations

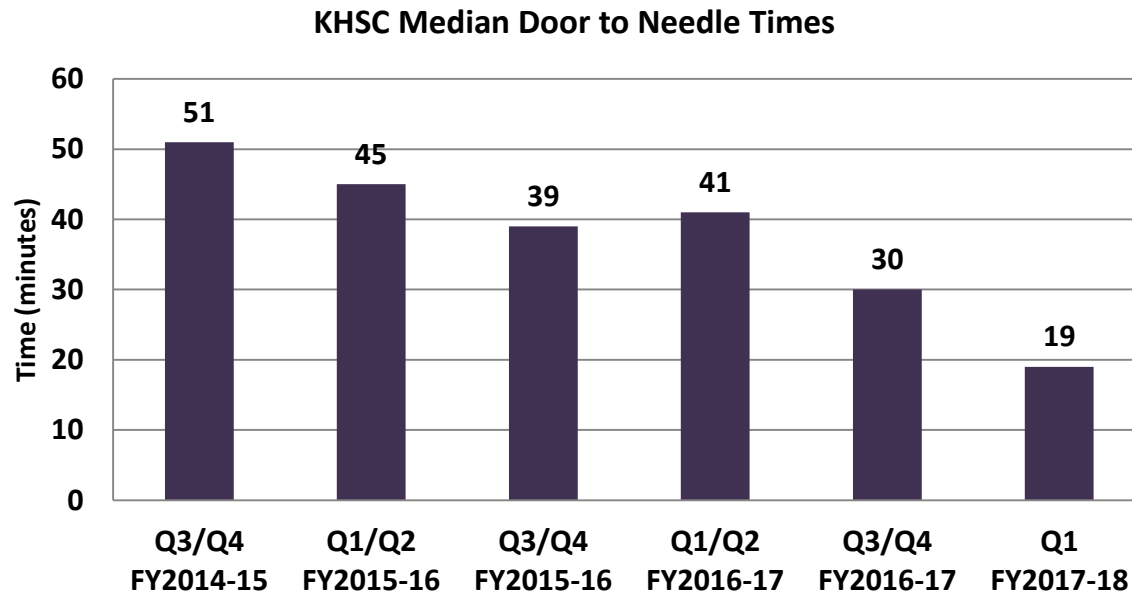
- Have a set protocol
- **Know** who activates the stroke team
- Patient can be transported to CT on own bed
- Designate floor nurse to stay with patient
- Reduce the elevator waits
- Involve RACE team
- Know where your inpatient tPA supply is
- Give tPA in CT suite



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KHSC-KGH site – Median DTN Times



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Stay on
EMS
Stretcher



tPA in
CT
Suite

Paramedic Prompt Card 2021

Emergency Health Regulatory and Accountability Branch

Paramedic Prompt Card for Acute Stroke Bypass Protocol

This prompt card provides a quick reference of the *Acute Stroke Protocol* contained in the *Basic Life Support Patient Care Standards* (BLS PCS). Please refer to the BLS PCS for the full protocol.

Indications under the Acute Stroke Protocol

Redirect or transport to the closest or most appropriate Designated Stroke Centre* will be considered for patients who meet **ALL** of the following:

1. Present with a new onset of at least one of the following symptoms suggestive of the onset of an acute stroke:
 - a. Unilateral arm/leg weakness or drift.
 - b. Slurred speech or inappropriate words or mute.
 - c. Unilateral facial droop.
2. Can be transported to arrive at a Designated Stroke Centre within 6 hours of a clearly determined time of symptom onset or the time the patient was last seen in a usual state of health.
3. Perform a secondary screen for a Large Vessel Occlusion (LVO) stroke using the Los Angeles Motor Scale (LAMS) and inform the CACC/ACS to aid in the determination of the most appropriate destination.

*A Designated Stroke Center is a Regional Stroke Centre, District Stroke Centre or a Telestroke Centre regardless of EVT capability.

Contraindications under the Acute Stroke Protocol

ANY of the following exclude a patient from being transported under the Acute Stroke Protocol:

1. CTAS Level 1 and/or uncorrected airway, breathing or circulatory problem.
2. Symptoms of the stroke resolved prior to paramedic arrival or assessment**.
3. Blood sugar <3 mmol/L***.
4. Seizure at onset of symptoms or observed by paramedics.
5. Glasgow Coma Scale <10.
6. Terminally ill or palliative care patient.
7. Duration of out of hospital transport will exceed two hours.

**Patients whose symptoms improve significantly or resolve during transport will continue to be transported to a Designated Stroke Centre.

*** If symptoms persist after correction of blood glucose level, the patient is not contraindicated.

CACC/ACS will authorize the transport once notified of the patient's need for redirect or transport under the Acute Stroke Protocol.