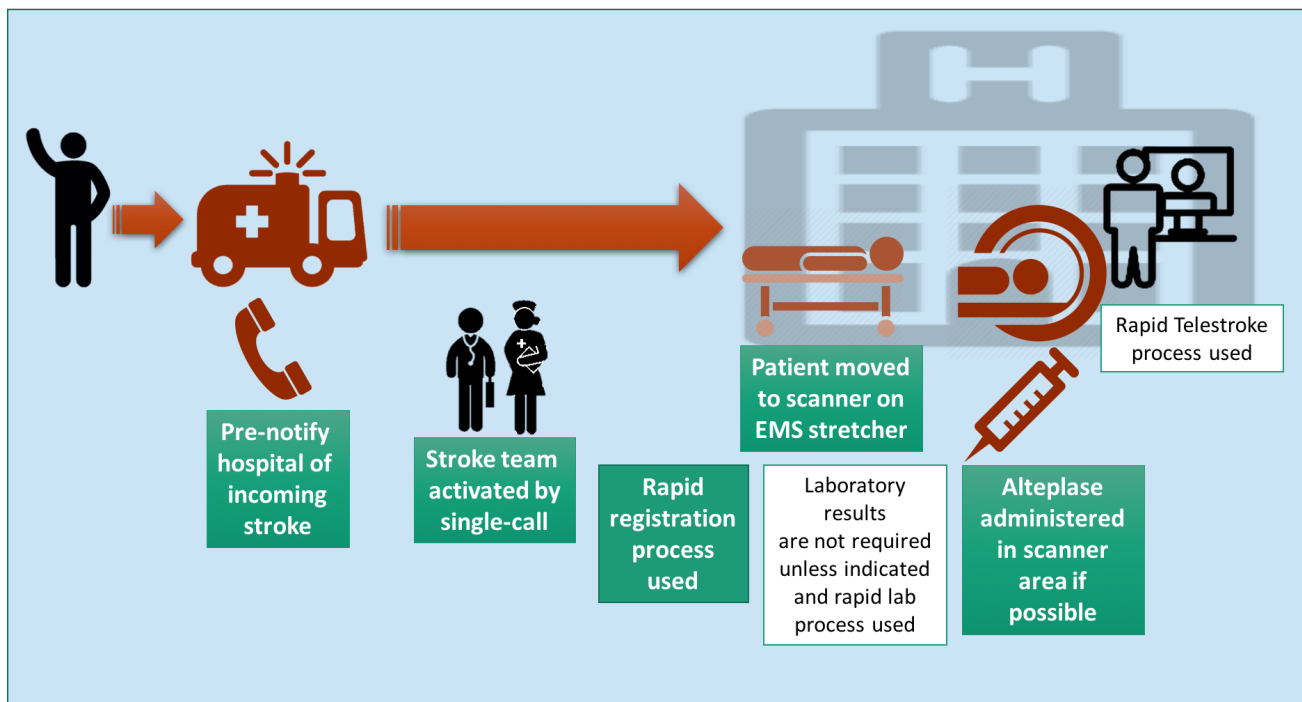


Door-to-Needle Improvement Package

QuICR (Quality Improvement and Clinical Research) Alberta Stroke Program is providing this package to all of Alberta’s Stroke Centres. It is summary documentation for the full Door-to-Needle (DTN) initiative. The DTN target is Alberta is a **median of 30 minutes** and to have **90% of patients treated within 60 minutes**. Full details of the DTN initiative and the materials provided can be found at: <http://ucalgary.ca/quicr/quality-improvement/door-needle-initiative>

This package presents the key changes that are recommended for implementation at your hospital. In addition to including this package, your site should have specific protocols and documents for each of these changes.

The following figure shows a schematic of all the key strategies to improve DTN:





Pre-Notification and Stroke Team Activation



If EMS has recognized a **STAT Stroke** (see page 8 for definition of terminology), they should:

- Pre-notify the hospital that they are coming in **STAT Stroke**
- Provide estimated time of arrival
- Provide LAMS score (see page 10)
- Ensure that two IV lines are in-place (one an 18 gauge right antecubital where possible)



The hospital should use this pre-notification to activate the care team for the stroke patient:

- Develop a single-call activation process if possible such as pager notification to the **entire** care team
- Early activation should include: **Neurologist** (if available at site), **ED physician, ED nurse, stroke nurse** (if available at site), and **CT (CTA) technician**
- Care team needs to be ready for the incoming stroke patient

Rapid Registration Process



A rapid registration process should be used to ensure that there are no delays in entering the CT(CTA) imaging and other orders. How this is achieved is dependent on the local context and policies of your hospital. Examples include:

- This can be **Registration as *Unknown***, which uses generic numerals or name for the patient
 - This is a similar process as used for trauma patients
 - The actual patient information will need to be linked afterwards
- This can be **Pre-registration process**, where the clerk registers a patient using information provided by paramedics prior to patient arrival
- This can be a **quick registration process**, where only the first and last names are entered upon arrival



Patient Moved to Scanner on EMS Stretcher



This is the direct-to-CT or stretcher-to-CT process, where the patient is moved directly to the CT scanner:

- Once the patient arrives, the full care team should **swarm** patient in the triage area
 - **Assess ABCs** to ensure patient is stable enough to go to scanner
 - Obtain history from paramedics
 - Ensure IVs in place if thrombolysis possible in scanner or if CTA planned
- Patient should **not** be moved to an ED bed prior to CT unless the patient is medically unstable and requires urgent critical care or resuscitation
- A **tPA kit** should be ready and taken with the patient to the scanner
 - The kit should contain medication to manage hypertension, seizures and nausea in addition to alteplase (tPA) medication, dosing charts, and tubing
- A quick NIHSS or neuro exam should be completed on the way to the CT



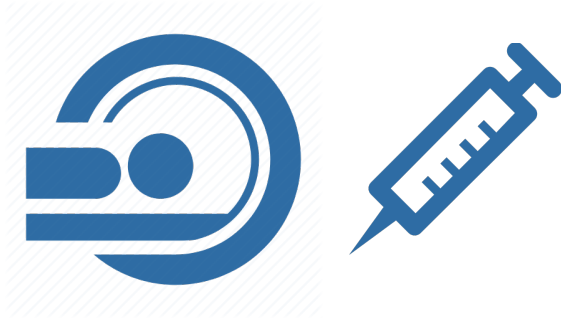
Do Not Wait for Lab Work

Unless the patient is known to be on warfarin or a novel anti-coagulation medication, or there is a known history of a bleeding disorder, liver cirrhosis, or other medical condition that increases susceptibility to bleeding, **do not wait for blood work results**. There can be rapid laboratory protocols in place to ensure fast turnaround of results if the patient is on an anti-coagulation medication:

- Point-of-Care INR testing machine can be put in place
- Rapid or STAT lab process for acute stroke patients can be put in place



Alteplase (tPA) Administered in Scanner Area or Telehealth Area



Once the decision to treat the patient with alteplase (tPA) has been made, no time should be wasted, and you should avoid moving the patient to an ED bed or in-patient unit.

- The alteplase (tPA) should be **mixed immediately** upon decision to treat patient
- The **tPA kit** should be with the patient to avoid delays in obtaining drug

For Hospitals that have Neurology in-House (or in cases where the ED Physician makes decision to treat patient with alteplase (tPA))

- The initial bolus should be administered while the patient is still in the scanner or in the imaging area

For Hospitals that require telestroke for tPA decision

- The initial bolus should be administered while the patient is still in the telehealth bay

Rapid Telestroke Process



For PSCs that require a telestroke consult for the treatment decision, rapid telestroke process should be used:

- A **“heads-up” call** should be made to RAAPID *after* the patient arrives in the hospital
 - The patient’s PHN should be provided
 - The patient should be in the scanner or on the way to the scanner
- Once the scan is complete, the PSC and the consulting stroke neurologist should both **actively try to connect** for the telestroke consult
 - The telestroke consult can be done via telephone (with CT images) or with video using the telehealth equipment
- PSC’s diagnostic imaging technicians should be familiar with common pitfalls of image transfer to the consulting site
 - Frequent testing should be done to ensure that the system is working and all personnel are trained
- If LAMS is 4 or 5, the Red Referral process should be started as soon as possible (upon patient arrival)
- The complete telestroke process for STAT stroke consults is shown on page 11



APPENDICES: Supporting Documents

TERMINOLOGY for ACUTE STROKE TRIAGE and TRANSPORT

“STATstroke”

STATstroke means three things:

- Acute stroke diagnosis
- Within 6h of stroke onset OR stroke-on-awakening presenting within 6 hours of waking
- 1 or more “red” findings on the provincial stroke screen (see page 9)

“Red Findings”				
Grip	Arm	Leg	LOC	Speech
R – no grip	R – arm falls rapidly	R – Leg falls rapidly	Responds to pain only	Incomprehensible or mute
L – no grip	L – arm falls rapidly	L – Leg falls rapidly	Unresponsive	

A STATstroke is a possible case for acute stroke intervention with intravenous alteplase (tPA).

“LAMS 4-5”

The LAMS score (see page 10) assesses stroke severity on a scale from 0-5. A score of 4 or greater implies a possible candidate for endovascular intervention.

LAMS4-5 implies an acute stroke case for possible additional endovascular intervention.


“Red Referral”

Red Referral means:

- Urgent transport, or urgent case that requires emergency telemedicine or emergency transport.

Answer “yes” to the question about emergency transport for LAMS ≥ 4 ; answer “no” to the question about emergency transport for LAMS 1-3.

Alberta EMS Stroke Screen (STAT! Stroke and Red Findings)

 <p>Alberta Health Services</p>		<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> Affix patient label within this box </div>													
<p>EMS Stroke Screen EMS must obtain critical patient information and complete this form on scene</p>															
Patient last seen neurologically normal Date (yyyy-Mon-dd) Time (hh:mm)		Patient name Event number													
History provided by <input type="checkbox"/> Patient <input type="checkbox"/> Family member <input type="checkbox"/> Other (specify) _____		Patient last seen by (witness name) Witness phone													
		History provider name History provider phone													
<p>Complete Physical Examination Findings and LAMS scoring, then continue with screening process</p>															
<p>Physical Examination Findings</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"> Level of Consciousness <input type="checkbox"/> Alert <input type="checkbox"/> Responds to Verbal <input type="checkbox"/> Responds to Pain only <input type="checkbox"/> Unresponsive </td> <td style="width: 50%;"> Speech <input type="checkbox"/> Normal <input type="checkbox"/> Slurred <input type="checkbox"/> Incomprehensible or mute </td> </tr> <tr> <td colspan="2"> Leg Strength <input type="checkbox"/> Normal <input type="checkbox"/> Right-Drifts down <input type="checkbox"/> Left-Drifts down <input type="checkbox"/> Right-Falls rapidly <input type="checkbox"/> Left-Falls rapidly </td> </tr> <tr> <td colspan="2"> Facial Smile Smile, show teeth, raise eyebrows and squeeze eyes shut <input type="checkbox"/> Normal (0) <input type="checkbox"/> Right-Droop (1) <input type="checkbox"/> Left-Droop (1) </td> </tr> <tr> <td colspan="2"> Arm Strength Elevate with palm down and hold for 10 second count (45 degrees if laying down, 90 degrees if sitting) <input type="checkbox"/> Normal (0) <input type="checkbox"/> Right-Drifts down (1) <input type="checkbox"/> Left-Drifts down (1) <input type="checkbox"/> Right-Falls rapidly (2) <input type="checkbox"/> Left-Falls rapidly (2) </td> </tr> <tr> <td colspan="2"> Grip Strength Have patient try to grasp examiners fingers <input type="checkbox"/> Normal (0) <input type="checkbox"/> Right-Weak grip (1) <input type="checkbox"/> Left-Weak grip (1) <input type="checkbox"/> Right-No grip (2) <input type="checkbox"/> Left-No grip (2) </td> </tr> <tr> <td colspan="2" style="text-align: center;"> Total LAMS Score </td> </tr> </table>		Level of Consciousness <input type="checkbox"/> Alert <input type="checkbox"/> Responds to Verbal <input type="checkbox"/> Responds to Pain only <input type="checkbox"/> Unresponsive	Speech <input type="checkbox"/> Normal <input type="checkbox"/> Slurred <input type="checkbox"/> Incomprehensible or mute	Leg Strength <input type="checkbox"/> Normal <input type="checkbox"/> Right-Drifts down <input type="checkbox"/> Left-Drifts down <input type="checkbox"/> Right-Falls rapidly <input type="checkbox"/> Left-Falls rapidly		Facial Smile Smile, show teeth, raise eyebrows and squeeze eyes shut <input type="checkbox"/> Normal (0) <input type="checkbox"/> Right-Droop (1) <input type="checkbox"/> Left-Droop (1)		Arm Strength Elevate with palm down and hold for 10 second count (45 degrees if laying down, 90 degrees if sitting) <input type="checkbox"/> Normal (0) <input type="checkbox"/> Right-Drifts down (1) <input type="checkbox"/> Left-Drifts down (1) <input type="checkbox"/> Right-Falls rapidly (2) <input type="checkbox"/> Left-Falls rapidly (2)		Grip Strength Have patient try to grasp examiners fingers <input type="checkbox"/> Normal (0) <input type="checkbox"/> Right-Weak grip (1) <input type="checkbox"/> Left-Weak grip (1) <input type="checkbox"/> Right-No grip (2) <input type="checkbox"/> Left-No grip (2)		Total LAMS Score		<p>Is blood glucose level greater than 3.0 mmol/L? <input type="checkbox"/> No → Treat as per Adult Stroke MCP, then continue screening process <input type="checkbox"/> Yes → Continue screening process</p> <p>Is one or more red Physical Examination Findings checked? <input type="checkbox"/> No → Transport to closest medical facility <input type="checkbox"/> Yes → Continue with screening process</p> <p>Patient last seen normal less than 6 hours ago or awoke with stroke symptoms? <input type="checkbox"/> No → STOP screening process; Treat and transport as per local stroke strategy guidelines. <input type="checkbox"/> Yes → EMS Stroke Screen is positive; Continue with screening process</p> <p>Is the LAMS Score 4 or greater? <input type="checkbox"/> No → STOP Provide early pre-notification and rapid transport to the most appropriate Primary or Comprehensive Stroke Centre. <input type="checkbox"/> Yes → STOP Call OLMC number and state: "I have a STAT Stroke patient with a LAMS Score of 4 or 5"</p> <p>Los Angeles Motor Scale (LAMS) Scoring 1. Score the affected side using the values provided 2. Score Facial Smile, Arm Strength and Grip Strength 3. Calculate Score (0-5)</p> <p>A score of 4 or greater is predictive of large artery occlusion</p>	
Level of Consciousness <input type="checkbox"/> Alert <input type="checkbox"/> Responds to Verbal <input type="checkbox"/> Responds to Pain only <input type="checkbox"/> Unresponsive	Speech <input type="checkbox"/> Normal <input type="checkbox"/> Slurred <input type="checkbox"/> Incomprehensible or mute														
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Total LAMS Score															
Practitioner Name (print)		Practitioner Signature													
		Date (yyyy-Mon-dd)													
09336 (Rev2017-02)		White - Chart Canary - EMS EMS Stroke Screen													

Screening Process



LAMS (Los Angeles Motor Scale)

	Normal	Right	Left	Total
Facial smile/grimace	┆ (0)	┆ Droop (1)	┆ Droop (1)	
Grip	┆ (0)	┆ Weak grip (1) ┆ No grip (2)	┆ Weak grip (1) ┆ No grip (2)	
Arm strength	┆ (0)	┆ Drifts down (1) ┆ Falls rapidly (2)	┆ Drifts down (1) ┆ Falls rapidly (2)	
				TOTAL Score

Full Telestroke Process for STAT Stroke Patients

ACUTE STROKE NEUROLOGY CONSULT

QuICR January 2016

