



Central South Regional  
**StrokeNetwork**

# **Future Directions in PreHospital Hyperacute Stroke Care**

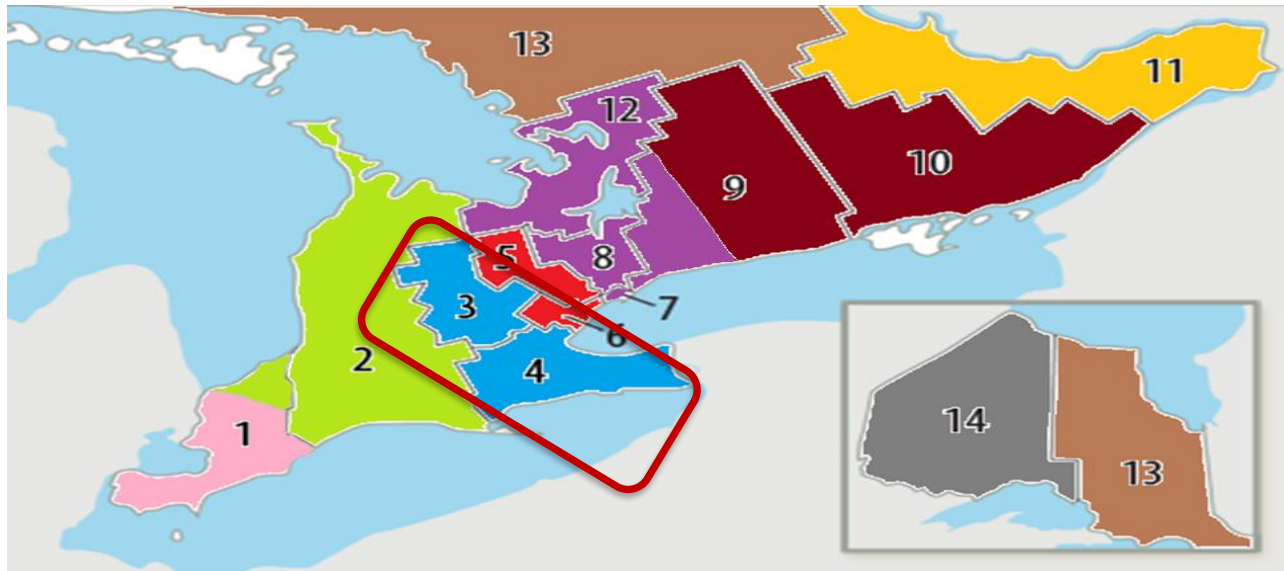
**Rhonda Whiteman**

**Central South Regional Stroke Network Paramedic  
Workshop: “Sirens of the LAMS”**

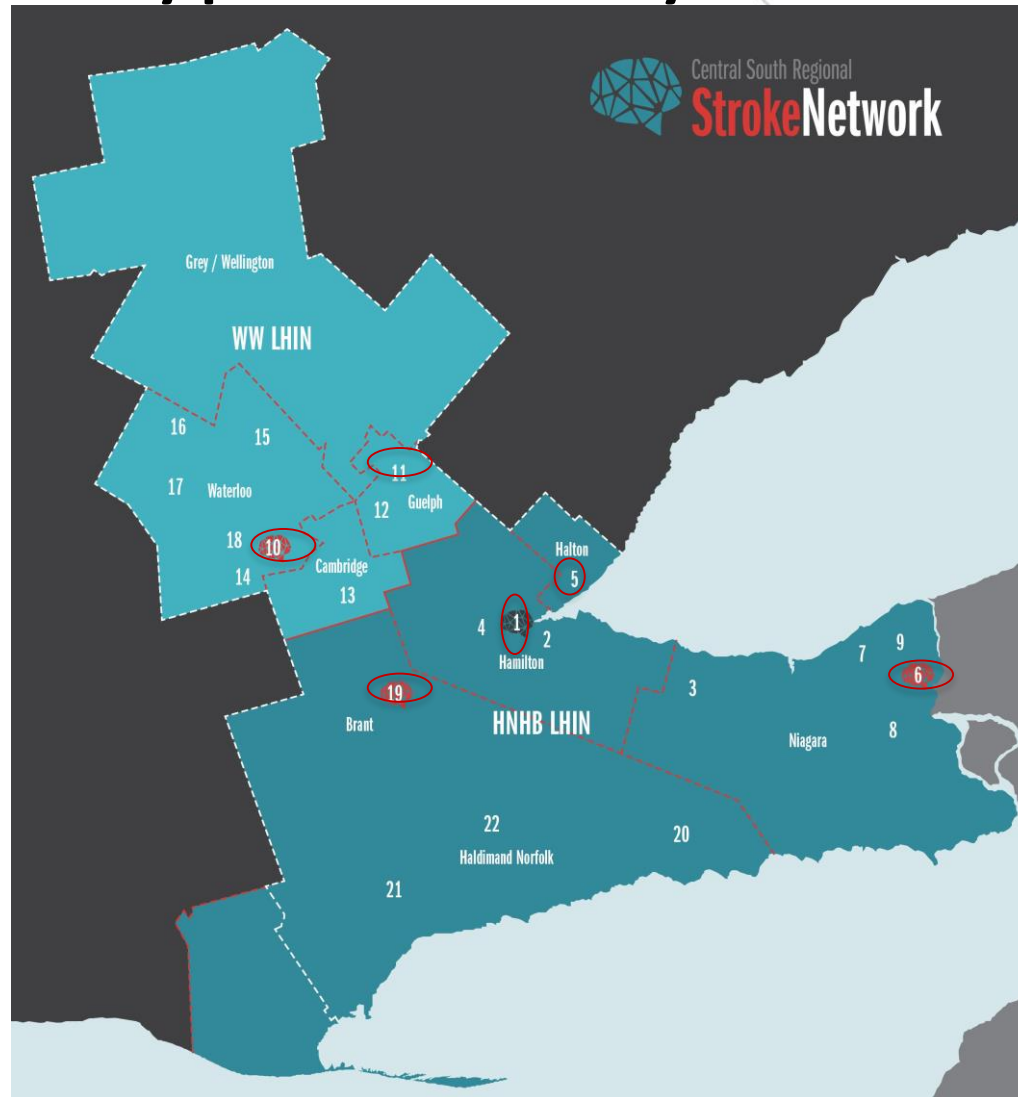
**June 10, 2021**

# Objectives

- At the end of the session, the learners will be able to:
  - Discuss further directions in PreHospital Stroke Care within Central South Ontario Stroke Network.
  - Describe the clinical outcomes of patients undergoing stroke endovascular therapy within the region.



# Central South Regional Stroke Hyperacute System



# **CENTRAL SOUTH REGIONAL NETWORK FUTURE DIRECTIONS**

# Acute Stroke Bypass Protocol Changes

## Addition of Large Vessel Screening

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:

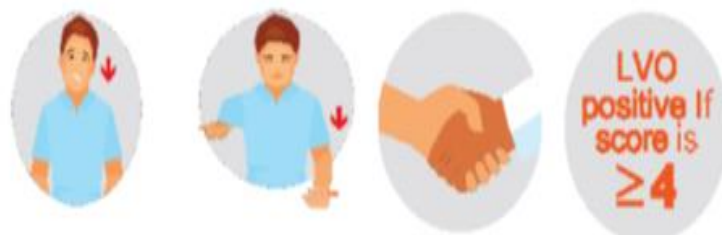
1. CTAS Level 1 and/or uncorrected airway, breathing or circulatory problem.
2. Symptoms of the stroke resolved prior to paramedic arrival or assessment\*\*.
3. Blood sugar <3 mmol/L\*\*\*.
4. Seizure at onset of symptoms or observed by paramedics.
5. Glasgow Coma Scale <10.
6. Terminally ill or palliative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

### Los Angeles Motor Scale (LAMS)



#### STEP 1 Facial Droop

Ask the person to smile. Is there any weakness or facial droop?

- 0 Absent  
1 Facial droop present

#### STEP 2 Arm Drift

Bring the person's arm(s) up to a 90° angle and ask them to hold that position for 10 seconds. Is there any drift or drop of an arm?

- 0 Absent  
1 Drifts Down  
2 Falls Rapidly

#### STEP 3 Grip Strength

Ask the person to grip your hands. Does one hand have less power than the other?

- 0 Normal  
1 Weak Grip  
2 No Grip

#### STEP 4 Add the Score

Total possible score of 5



- The Los Angeles Motor Scale (LAMS) is a brief 3-item stroke severity assessment measure designed for prehospital use. It identifies possible large vessel occlusion (LVO) stroke and potential eligibility for endovascular thrombectomy (EVT).
- A score of 4 or greater is considered positive for LVO stroke and patients may be eligible for endovascular therapy.

Canadian Stroke Best Practice Recommendations: Acute Stroke Management, July 2018.

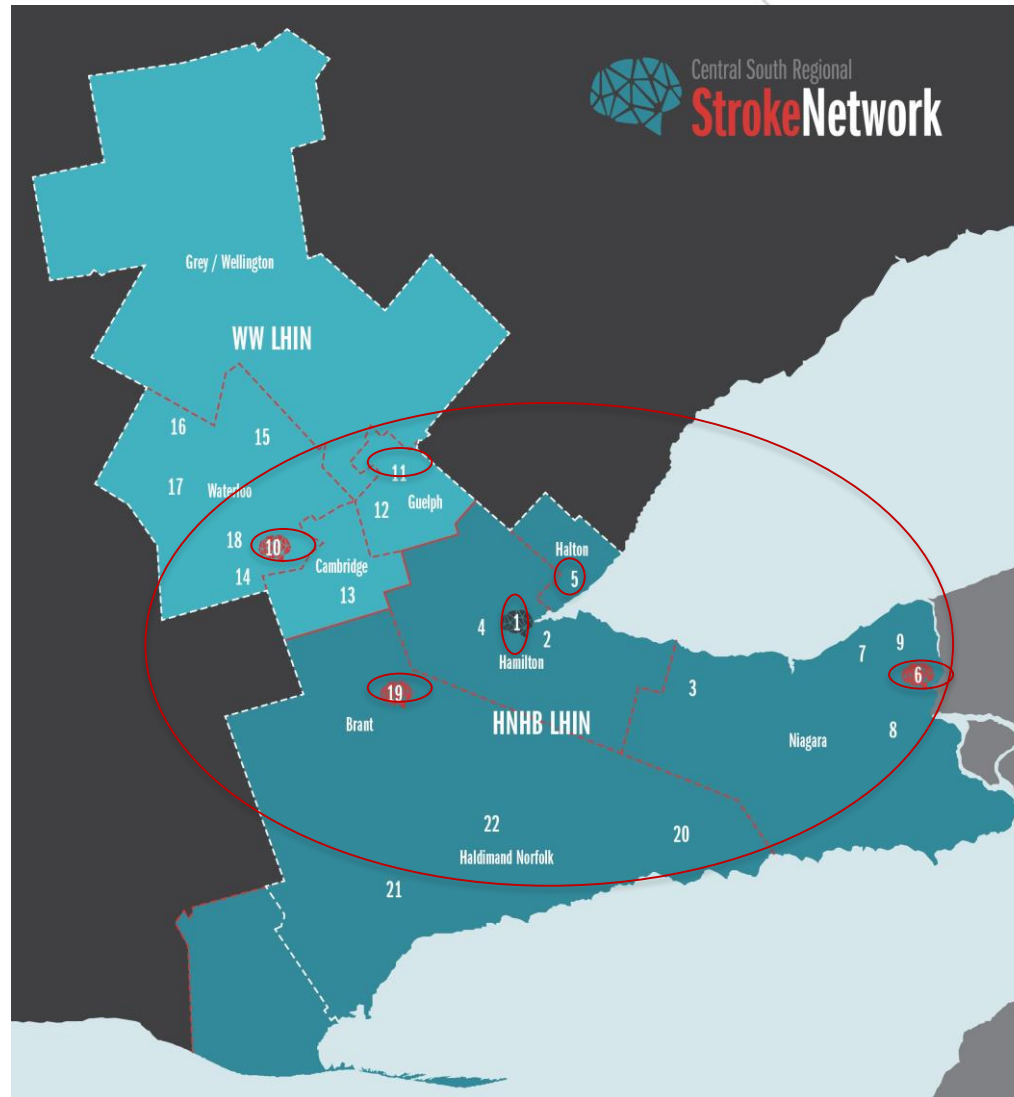




# Central South Regional Stroke Network

## Direct Access to EVT Centre

Majority of Central South Region is within 60 minutes of the HGH - Regional Stroke/EVT Centre



If implemented Mothership Model see increase of 228% increase of cases going to HGH versus TPA Sites:

- 1257 may have LVO
- 742 False Positive
- Unknown how many EVT eligible

# Regional Working Group

## Impact of LAMS Positive Cases

- Regional Paramedic Services are working with vendors to build into LAMS into EPCR's so that Services can easily run reports:
  - Volumes of Stroke Protocol Cases that are LAMS positive
  - Disposition/Outcomes of LAMS positive cases
- Regional Stroke Program will be pulling together a regional working group to start understanding the impact of LAMS positive cases within region to inform planning:
  - Determine Volumes of LAMS across the region?
  - How many LAMS positive cases had LVO on CTA at tPA Centre?
  - How many LAMS positive cases transferred for EVT?
  - How many LAMS positive cases were treated with EVT?

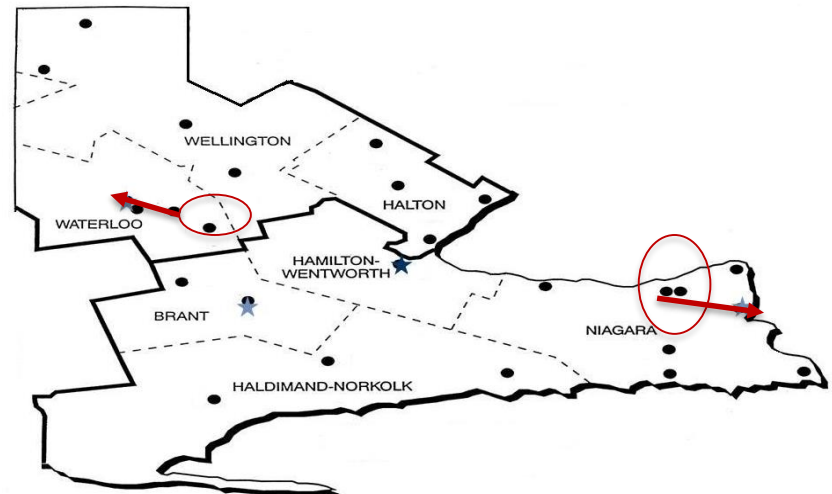
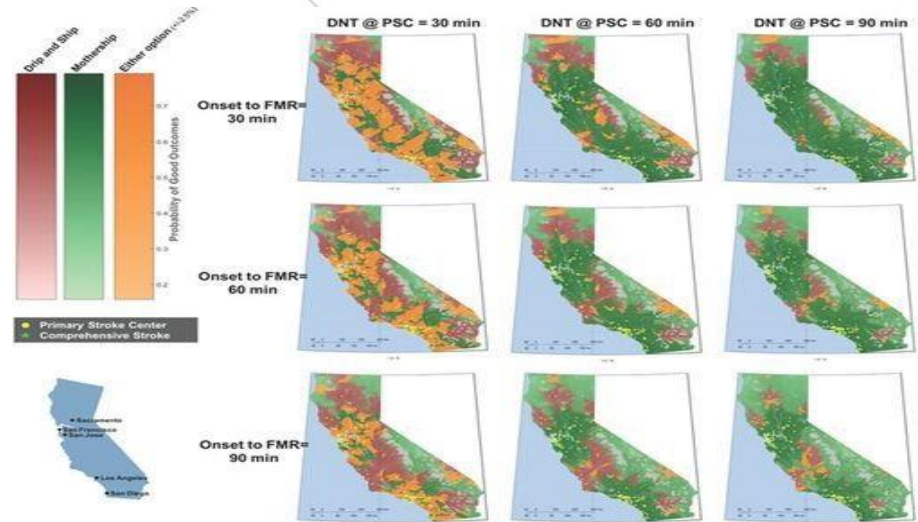


# Geospatial Mapping Project

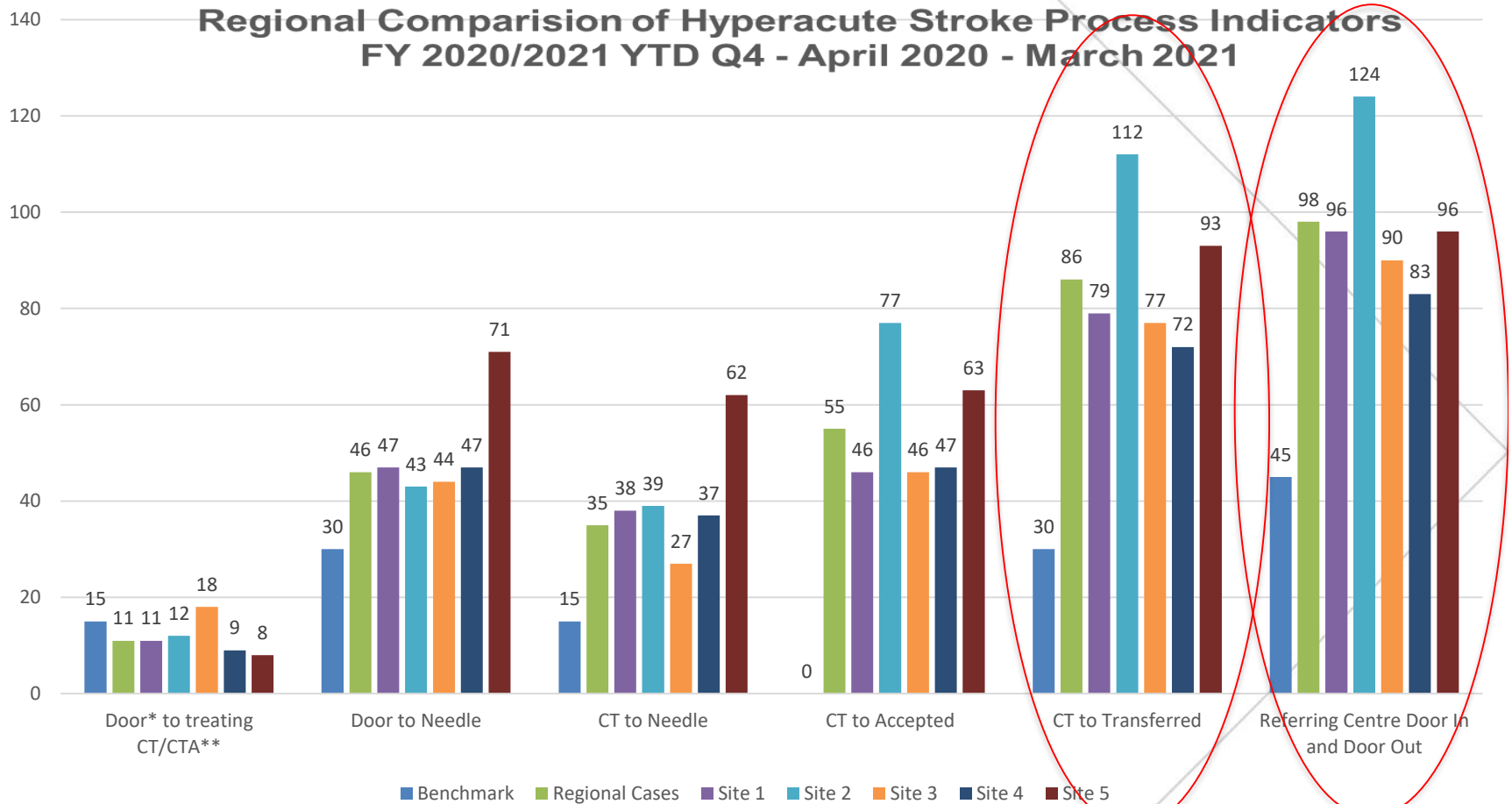
- Regional Stroke Team is working with a team to develop a geospatial mapping system that will allow us to identify whether Direct Access to EVT Centre or Drip and Ship Model would be better approach for various part of our region considering:

- Resources available
- Performance of DTN/DIDO of TPA Centre
- Travel Time
- LAMS Score

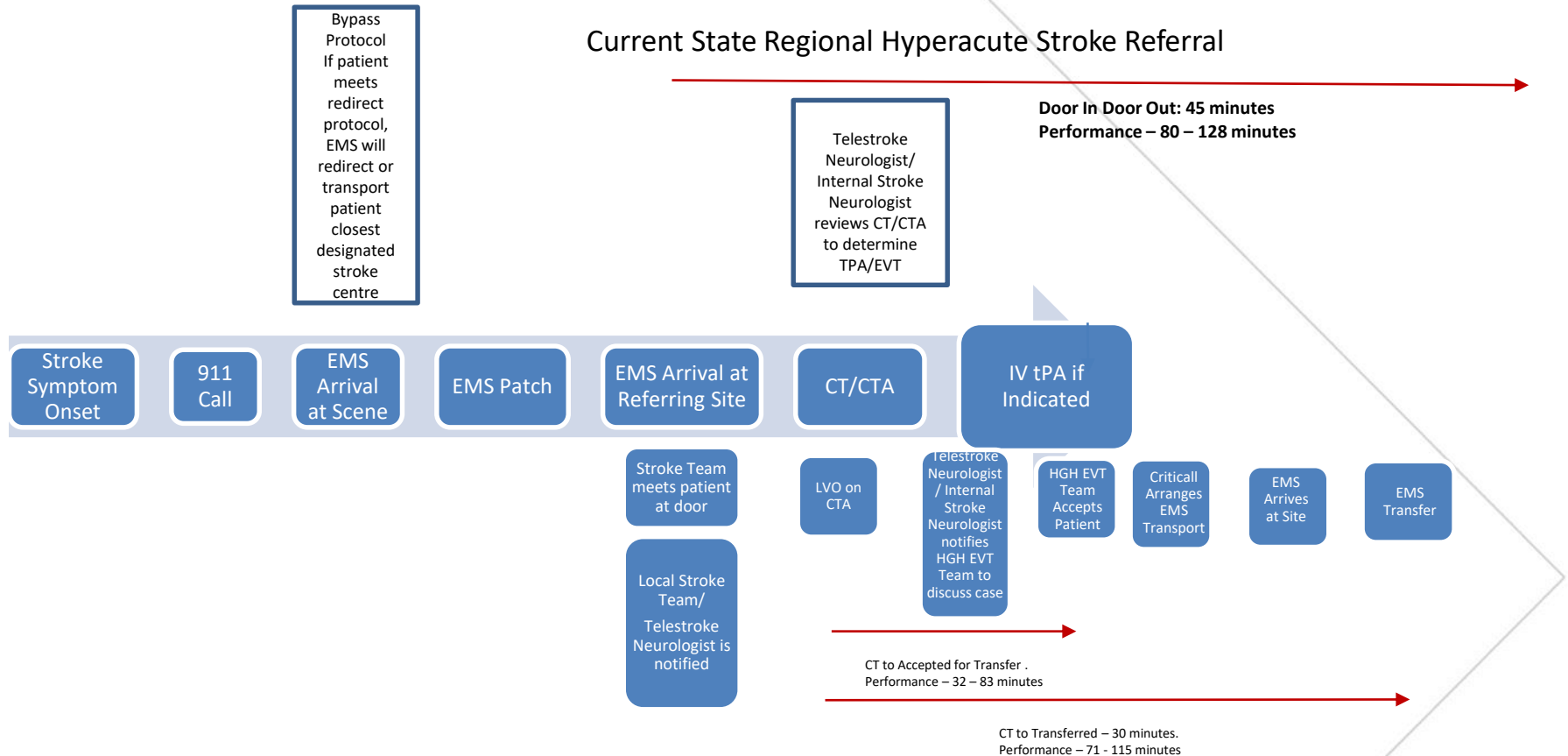
- Goal is to inform development of Direct Access to EVT Model:
  - Especially for the “Wrong Way Sites” that go away from EVT Centre to Thrombolysis Centre
  - Create a Geospatial Fence that LAMS positive cases within X minutes of EVT Centre could go to EVT versus TPA Centre



# Improving Door in Door Out Times for EVT Transfers



## Current State Regional Hyperacute Stroke Referral



# Improving Door in Door Out Times for EVT Transfers

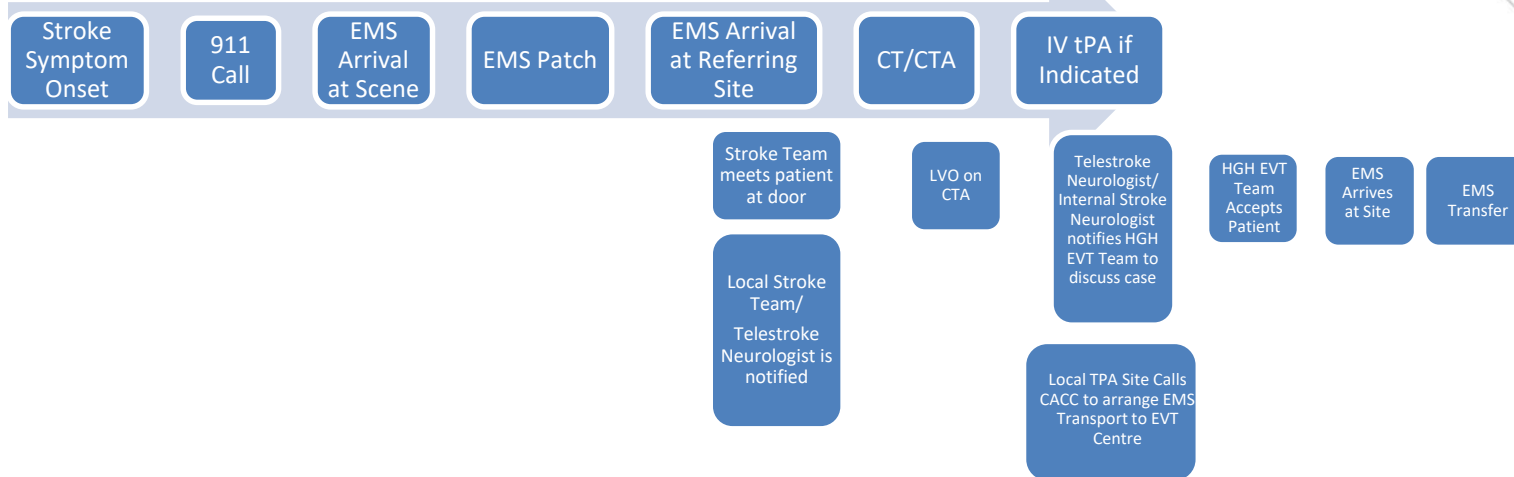
- Regional Stroke Network is working with Central Ambulance Dispatch Communication Centre (CACC)/Dispatch Centre, Paramedic Services and Stroke Thrombolysis Centres to develop a mechanism to arrange the Ambulance Transport when the Telestroke Neurologist is reaching out to HGH EVT Team to improve Door In Door Out Time
- Grand River launched this process in March and other sites are planning implementation over the summer/fall

## Future State Regional Hyperacute Stroke Referral

Bypass Protocol  
If patient meets redirect protocol, EMS will redirect or transport patient closest designated stroke centre

Telestroke Neurologist/  
Internal Stroke Neurologist reviews CT/CTA to determine TPA/EVT

Door In Door Out: 45 minutes  
Performance – 80 – 128 minutes  
Goal is to see 20 minute decrease



CT to Accepted for Transfer .  
Performance – 32 – 83 minutes

CT to Transferred – 30 minutes.  
Performance: 72 – 112 minutes  
Goal is to see a reduction by 20 minutes

# Technology to Enable PreHospital Communication for Hyperacute Stroke Care

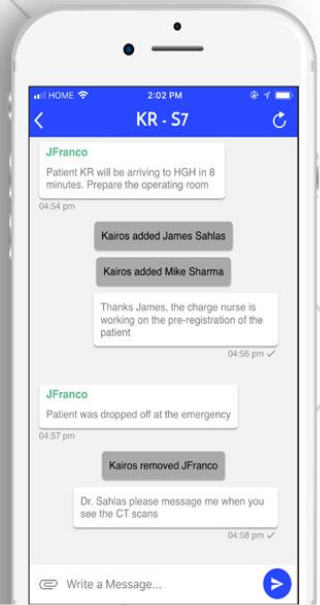
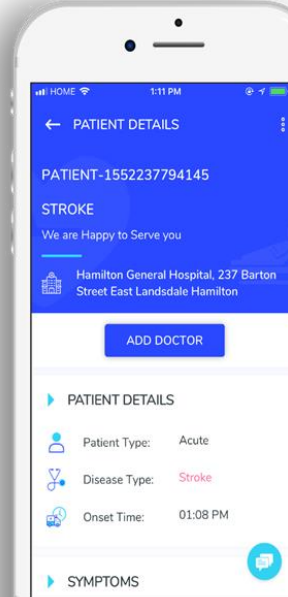
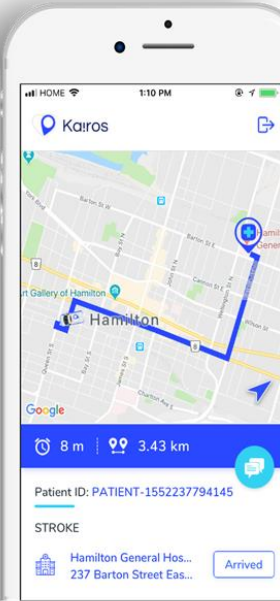
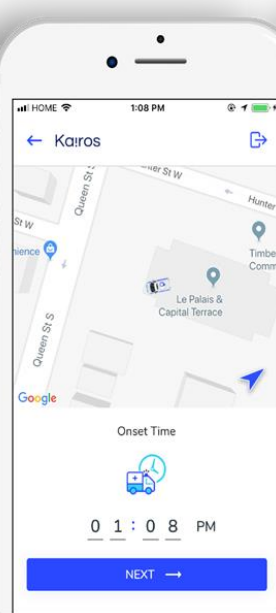
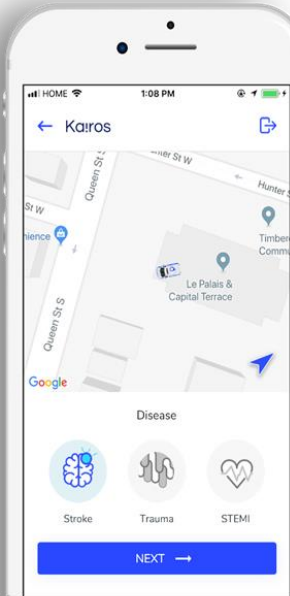
## Accurate Patient Information

Enable Pre-Registration  
process in hospitals

Accurate estimate time of patient arrival

Supporting Doctors & Accurate diagnosis

Group chatting – Secure PHI compliant communication





## An End-to-end Acute Care Solution



# KAIROS

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RAPID<sup>AI</sup>



### JoinTriage (FAST-ED, etc.)

- Assessment and triage tool for EMS providers to identify stroke severity and other emergency events
- Routes EMS to closest, most suitable medical facility for best patient care and outcomes
- Shares crucial patient information to ED before arrival through integration with Join
- Bidirectional communication; pre-notification



### Join

- Physicians collaborate seamlessly through text messages, timestamped clinical data, share/edit DICOM images, and more
- Integration with hospital EHR system reduces administrative burden and saves valuable time
- Patient care improves as silo break down and clinicians collaborate effectively
- Cost savings through increased efficiency, prevention of readmissions, and fewer repeated procedures; helps make ACO's and Value-Based Healthcare a reality!

### Security

Cloud-based, HIPAA compliant FDA approved platform designed for confidential data sharing. Data is encrypted and anonymized as it moves through the platform.



# **CENTRAL SOUTH REGIONAL NETWORK STROKE ENDOVASCULAR OUTCOMES**

# Stroke EVT Dashboard

Equity: Do patients have equitable access to EVT throughout the province?

Fiscal Year 2020/2021 Q1/2

## Proportion of ischemic stroke patients who receive an EVT procedure



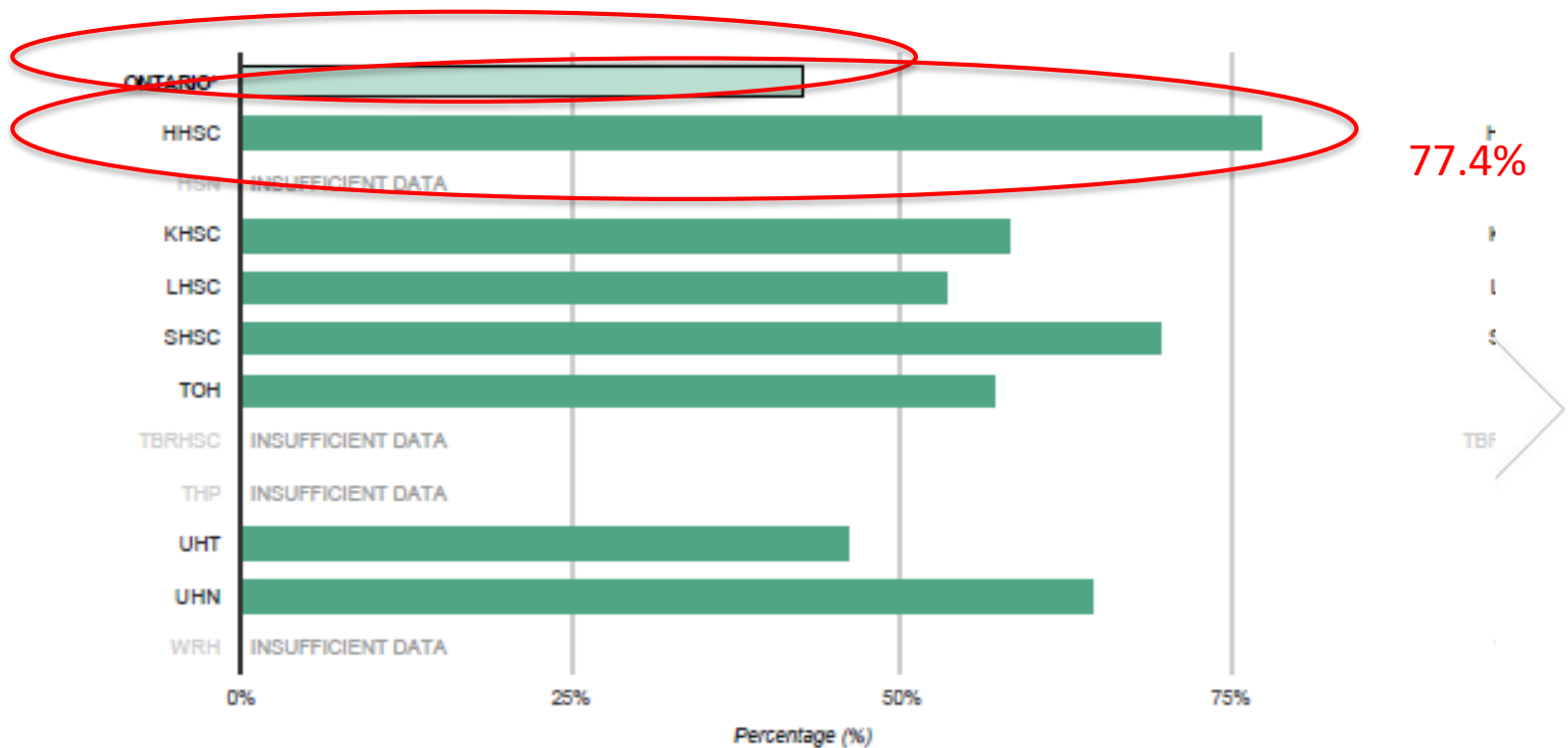
# Stroke EVT Dashboard

Effectiveness: Are the appropriate patients being identified, referred, and accepted for EVT?

Fiscal Year 2020/2021 Q1/2

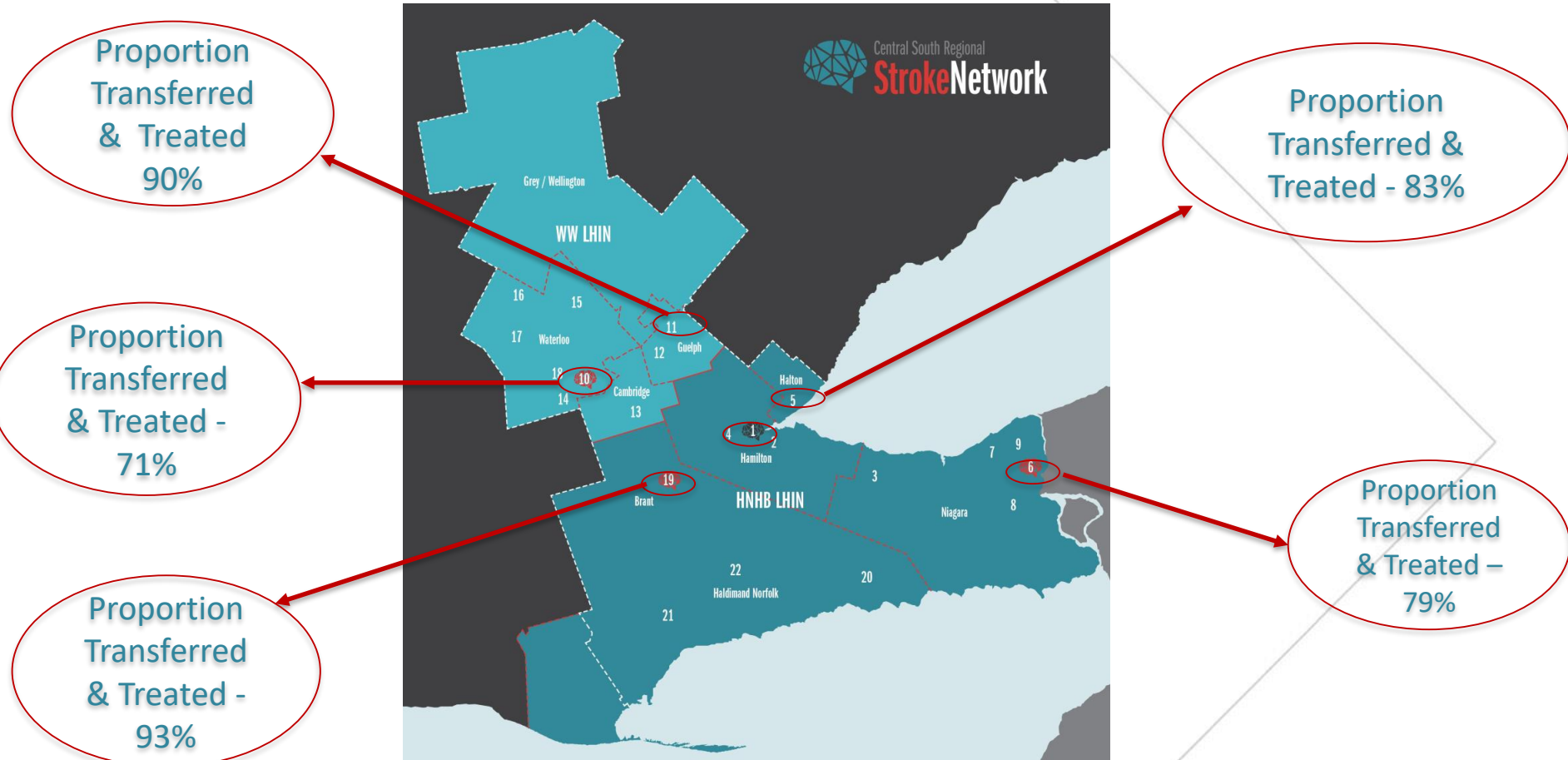
Proportion of patients transferred to an EVT centre for EVT who received an EVT procedure

42.6%



# Central South Regional Stroke Network

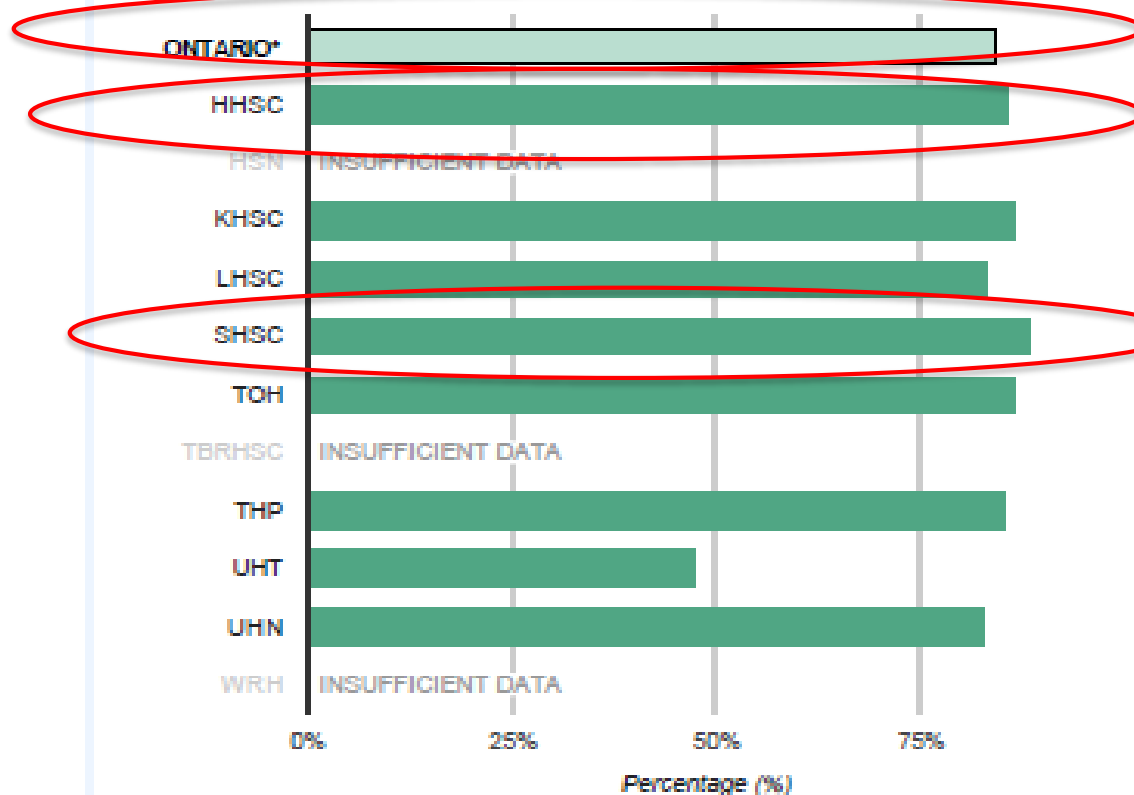
## Proportion of Patients Transferred and Treated FY 2020/2021 – 81% (95/117)



Fiscal Year 2020/2021 Q1/2

## Proportion of EVT patients successfully reperfused

84.4%



85.9%

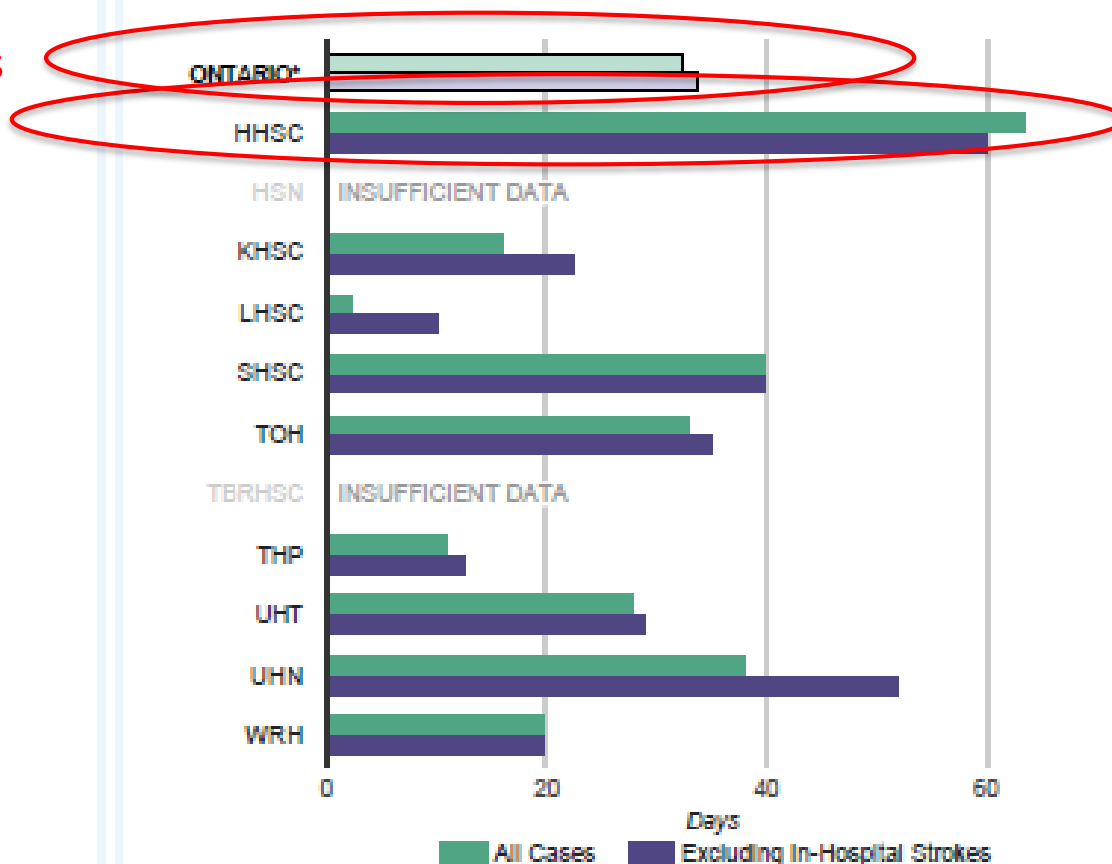
88.4%



**Fiscal Year 2019/20 Q1/2**

**Median number of days EVT patients spent at home in the first 90 days post procedure**

32.5 days



63.5 days

# Questions



[mcnicolr@hhsc.ca](mailto:mcnicolr@hhsc.ca)