

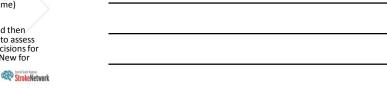
### **Session Objectives**

- > To discuss the Canadian Stroke Best Practices related to Stroke Screening Tools and Stroke Severity Scales.
- > To provide an overview of the difference between Prehospital Stroke Screening Tools and Prehospital Stroke Severity Scales.
- > To provide an overview of Prehospital Stroke Severity Scales that have been developed including components of the tool and the psychometric properties of each tool.
- To discuss the current state of implementation of Prehospital Stroke Severity Scales Provincially, Nationally and Internationally.
- To discuss the planning that is underway regarding implementation of a Prehospital Stroke Severity Scale within Ontario.
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#### Canadian Stroke Best Practice Recommendations (2018)

#### 3.2 Paramedic On-scene Management<sup>1</sup>

- EMS personnel should use validated acute stroke out-of-hospital diagnostic screening tools as part of on-scene assessment [Evidence Level B]. [New for 2018]
  - ➤ Patients should be screened for signs of stroke using a validated stroke assessment tool that includes the components of FAST (Face, Arm, Speech, and Time) [Evidence Level B].
  - ➤ Patients who demonstrate any FAST signs should then undergo a second screen using a tool validated to assess stroke severity, which may be considered in decisions for transportation destination [Evidence Level B]. [New for 2018].



Prehospital Stroke Screening	
Prehospital	
• To screen for signs of stroke.  Tools	
Prehospital • To assess for stroke severity to	
Prehospital  Stroke Severity  • To assess for stroke severity to identify patients who may be eligible for Endovascular Therapy	
Scales (EVT).	
Ome about homes.  StrokeNetwork	
Prehospital Stroke Screening Tools	
Ontario Prehospital Stroke Screening Scale (OPSS)	
Cincinnati Pre-Hospital Stroke Scale (CPSS)	
Face, Arm, Speech Test (FAST)	
Los Angeles Prehospital Stroke Screen (LAPSS)	
Melbourne Ambulance Stroke Screen (MASS)	
StrokeNetwork	
Prehospital Stroke Severity Scales	
Field Assessment Stroke Triage for Emergency Destination (FAST-ED)	
Vision, Aphasia and Neglect – (VAN)	
Face, Arm, Speech Test – Vision, Aphasia and Neglect (FAST-VAN)	
Los Angeles Motor Scale (LAMS)	
Prehospital Acute Stroke Severity Scale (PASS)	
Cincinnati Prehospital Stroke Severity Scale (CPSSS)	
Rapid Arterial oCclusion Evaluation (RACE)	
200 STONEHELMOLK	



#### National Institute of Health Stroke Scale (NIHSS)

ta. Level of Consciousness (LOC)	0 - 000	Alart Drowsy Shipperous Consulton	5. Limb Atonia	0 1 2	Absent (or in corns) Present in 1 limb Present in 2 or more limits
to.LCC Questions	0 = 2	Answers both questions correctly Answers one question correctly Answers neither question correctly	10. Sensory	1 2	Normal Portal loss Dense loss for in coma:
Sc. LOC Commands	0 = 2	Performs both tasks correctly Performs one task correctly Performs neither task correctly	11. Best Language	1 2 3	No dysphasia 565) Severe dysphasia 564e
2. Best Gaze	0-2	Normal Partial gaze policy Forced deviation	12. Dysarthria	1 2	Normal articulation MMI – moderale dysarthris Unintelligible or worse
3. Visual Fields	0 -110	No visual loss (or in coms) Partiel hernanopia Complete hernanopia Bilateral Hernanopia	13. Neglect	D 1 2	No neglect (or in some) Portial neglect Complete neglect
4. Facial Paley	0-20	Norrel Mnor Fattal Corplete	MPISS Total Soore	_	
L. Sest Motor RIGHT ARM	D-NA	No drift Drift Some effort against gravity No effort against gravity No movement	NHSS Soning for Aphasic and Comatose Patient 10) LOC Questions: Aphasic and Staporous patients unable to state age or month = 2 2. Best Gaze: Conjugate gaze deviation oversome by voluntary.		
L. Smat Motor LEFT ARM	0-204	No drift Cutt Some effort against gravity No effort against gravity No movement	refers recovered: * 1 biolization per option * 1 cent of objectivity to biolization per option * 1 cent of objectivity from the per option of objectivity from the per option of objectivity from the per option of objectivity from the period of objectivity from the period of objectivity from the period objective objectivity from the period objective objectiv		
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### **Psychometric Properties of Scales**

- Sensitivity:
   The ability of the test to correctly identify those with a disease
  - Proportion of patients who will have LVO Occlusion based on a positive test
  - Sensitivity = # of True Positive + # of False

    Negatives # of True Positives + # of False
  - Score above 70 80% is considered high sensitivity
- Specificity:
   The ability of the test to correctly identify those without the disease
   Proportion of patients who do not have Large Vessel Occlusion
   Specificity = # of True Negatives
  # of True Negatives + # of False Positives
- In general scales with higher sensitivity have lower specificity
   Increased likelihood of identifying Large Vessel Occlusion but will also identify patients who do not have Large Vessel Occlusion

- Positive Predictive Value:

  Probability that the patient with the disease will have a positive test result

  Probability that the patient with a Large
  Vessel Occlusion that has a positive test result

  PPV= # an OTrue Positive
  # of True Positives # of False Positives

- Negative Predictive Value:

  Probability that the patient who get negative test who truly do not have the disease

  Probability that the patient with a
- > NPV= # of True Negatives # of True Negatives + # of False Negatives
- The ability of a scale to differentiate between those who have the disease and those who do not

- do not

  The probability that the patient will have a

  I/O and the number of those who do not

  Of 100 pt's tested, 25 have I/O and 50 do not

  Accuracy 0.75

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# Field Assessment Stroke Triage for Emergency Destination (FAST-ED)<sup>2,3</sup>



- ➤ 6 Item Scale
- ➤ 5 based on NIHSS Items
- ➤ Total possible score = 9
- ➤ Score ≥ 4 showed likelihood to predict LVO greater than 60%
- > Psychometric Properties:
  - ➤ Sensitivity: 0.61
  - > Specificity: 0.83
  - ➤ PPV: 0.72
  - ➤ NPV: 0.82 ➤ Accuracy: 0.79
    - StrokeNetwork

https://em.umaryland.edu/educational\_pearls/3047/

### Vision, Aphasia and Neglect (VAN) 4



- > 3 Item Scale
- ➤ Based on 3 NIHSS Items
- Scoring = None
- If arm weakness present PLUS any one of the below = VAN positive - 74%
- Psychometric Properties:
  - ➤ Sensitivity: 1.00
  - ➤ Specificity: 0.90
  - ➤ PPV: 0.74
  - ➤ NPV: 1.00
  - > Accuracy: 0.92
- www.strokevan.com training

StrokeNetwork

www.strokevan.com

### Face, Arm, Speech Test – Vision, Aphasia and Neglect (FAST – VAN)<sup>5,6</sup>



- ➤ Combination of FAST Screening Tool and VAN
- Psychometric Properties:
  - Sensitivity: 0.94
  - ➤ PPV: 0.58
- Saskatchewan Stroke
   Program is utilizing FAST
   VAN for LVO Screening

www.sasksurgery.ca/doc/StrokeCare2018\_005.pdf



### Los Angeles Motor Scale (LAMS)7



- > 3 Item Scale
- ➤ Based on 2 NIHSS items
- ➤ Total Possible Score = 5
- ➤ A cut off of ≥ 4 had the best predictive value for detecting LVO
- ➤ Psychometric Properties:
  - ➤ Sensitivity: 0.81
  - > Specificity: 0.89
  - Accuracy: 0.85



# Ambulance Clinical Triage for Acute Stroke Treatment (ACT-FAST)<sup>8</sup>



- ➤ 3 Step Scale
- If any step is negative, do not proceed with further testing
- ➤ Psychometric Properties:
  - ➤ Sensitivity: 0.86
  - ➤ Specificity: 0.94
  - ➤ PPV: 0.80
  - ➤ NPV: N/A
  - Accuracy: 0.92



### Rapid Arterial oCclusion Evaluation (RACE)<sup>9</sup>



- ➤ 5 Item Scale
- All items based on NIHSS Scale
- ➤ Total Score = 9
- A cut point of ≥ 5 had the best predictive value for detecting LVO
- Psychometric Properties:
  - ➤ Sensitivity: 0.85
  - > Specificity: 0.68
  - ➤ PPV: 0.42
  - NPV: 94
  - > Accuracy: 0.87

https://www.physio-pedia.com/Stroke:\_Assessment



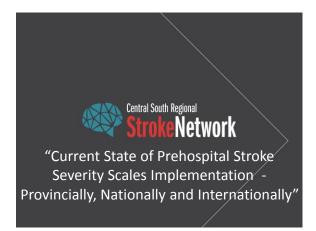
### **Comparing The Scales**

Scale	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value	Accuracy
FAST- ED	0.61	0.83	0.72	0.82	0.79
FAST - VAN	0.94		0.58		
VAN	1.00	0.90	0.74	1.00	0.92
LAMS	0.81	0.89			0.85
ACT-FAST	0.86	0.93	0.80		0.92
RACE	0.85	0.68	0.42	0.92	0.87



Which of these Prehospital Stroke Severity Scales seem more appealing for use in Central South?





### Southwestern Ontario Stroke Network

- > Piloting two Prehospital Stroke Severity Scales to determine feasibility of implementation:

  - Huron County Paramedic
     Service using LAMS
     Perth County Paramedic
     Service using STROKEVAN and LAMS
  - Not bypassing centres
  - Not oypassing centres
    Use Prompt Card to screen for stroke, the LVO tool completed, hospitals pre-notified, paramedics discuss/compare findings with designated stroke centre teams



### Champlain Stroke Network

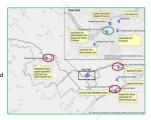
- > Pilot Project to test diverting patients picked up between tPA Centres and EVT Centre:
  - Patient must present within 6 hours of symptom onset
  - ➤ Three Step Process:

    - Three Step Process:

      \*\*Prompt Card Identified Stroke\*\*

      \*\*Transport Time is determined (Re-direct to EVT Centre if patient is within 90 minutes and LAMS > 4)

      \*\*Paramedics remain at EVT centre for 30 minutes, if not eligible for EVT patient taken back to stroke centre where they normally would have presented to received acute stroke care





### Alberta Experience

- Alberta has 2 Comprehensive Stroke Endovascular Centres and a number of Primary Stroke Centres
- ➤ Using LAMS to divert patients picked up between the Primary Stroke Centre and the EVT Centre:
  - Patient must present within 6 hours of symptom onset and/or be a wake up stroke
  - Patient must have a LAMS >4
- > Utilize Telestroke with stroke neurologists consulting with the paramedics to support decision making





# Nationally/Internationally Saskatchewan and British Columbia – FAST VAN Montreal – LAMS Catalonia - RACE StrokeNetwork Central South Regional StrokeNetwork "Planning for Prehospital Stroke Severity Tool in Ontario""/ Potential Criteria to Select a Prehospital Stroke Severity Scale

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### CorHealth EVT Transport Task Group

- Currently reviewing PreHospital Stroke Severity Screening Tools for Paramedics to provide a recommendation for a tool for Ontario
- Apply criteria to LAMS, FAST-ED, ACT Fast and VANS
- EHS MAC strongly prefers a single recommended tool for the province versus different tools being used in different regions
- Waiting for feedback from the ongoing pilots









### Questions



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