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Knowledge that will change your world

ALABAMA Emergency Medical Services

Severity-Based Stroke Triage: Key Concepts

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Course Description

This course is based on the premise that earlier identification of strokes will lead to earlier treatment and better outcomes.

Materials covered include:

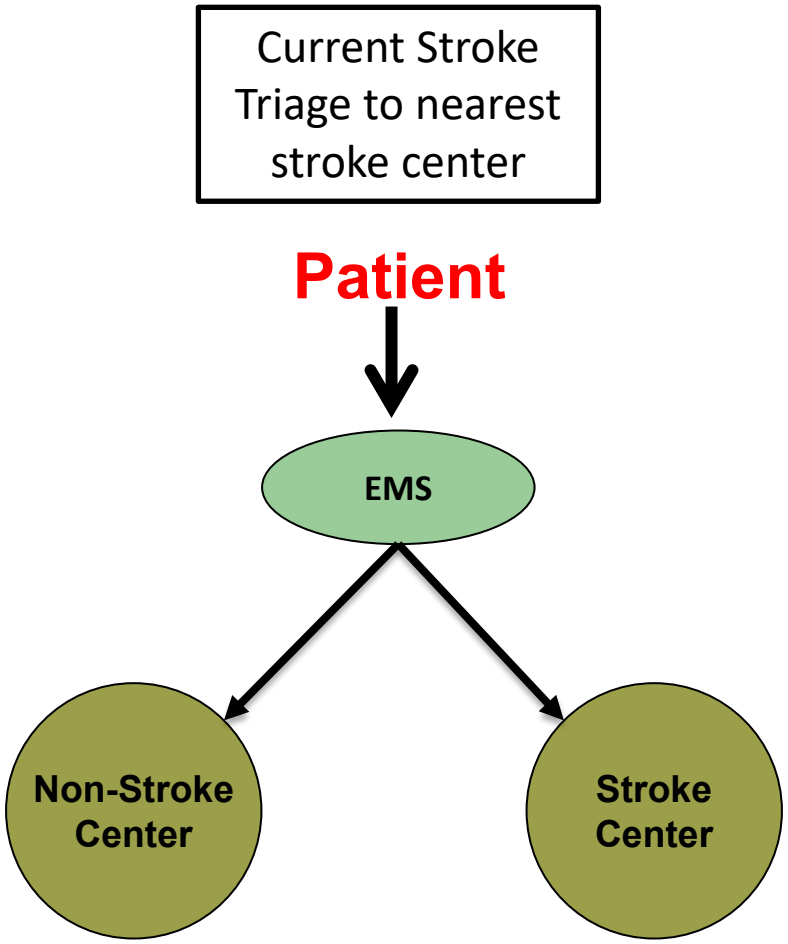
- Severity-Based Stroke Triage and why the Alabama Stroke System is incorporating it
- Why it matters: Treatment options and time windows for acute ischemic stroke
- Key Concepts:
  - Stroke versus Stroke mimics
  - Large vessel occlusion (LVO)
  - The Emergency Medical Stroke Assessment (EMSA)
  - Concept of time Last Known Well (LKW)

Learning Objectives

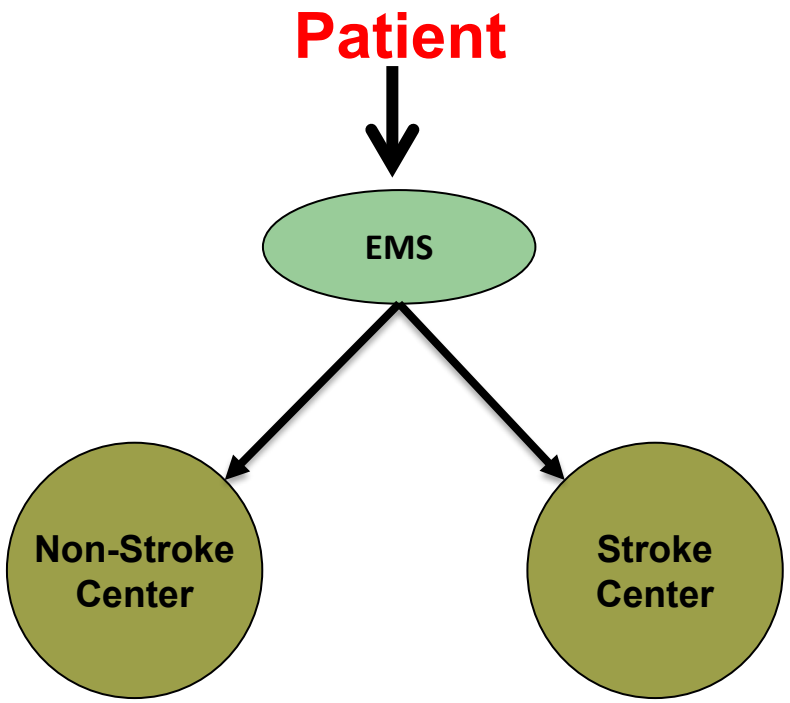
At the conclusion of this course, participants will be able to:

- Understand why the Alabama Stroke System is incorporating severity-based stroke triage
- Recall treatment options for ischemic strokes and the time frame for certain treatment options
- Recognize stroke symptoms and signs and common stroke mimics
- Examine a patient using the EMSA, and interpret the results
- Determine a patient's LKW time
- Support patients in getting routed to the most suitable location avoiding delays

Current EMS Stroke Triage



Stage 1: EMS Identification of Patients with Severe Stroke (Suspected LVO)



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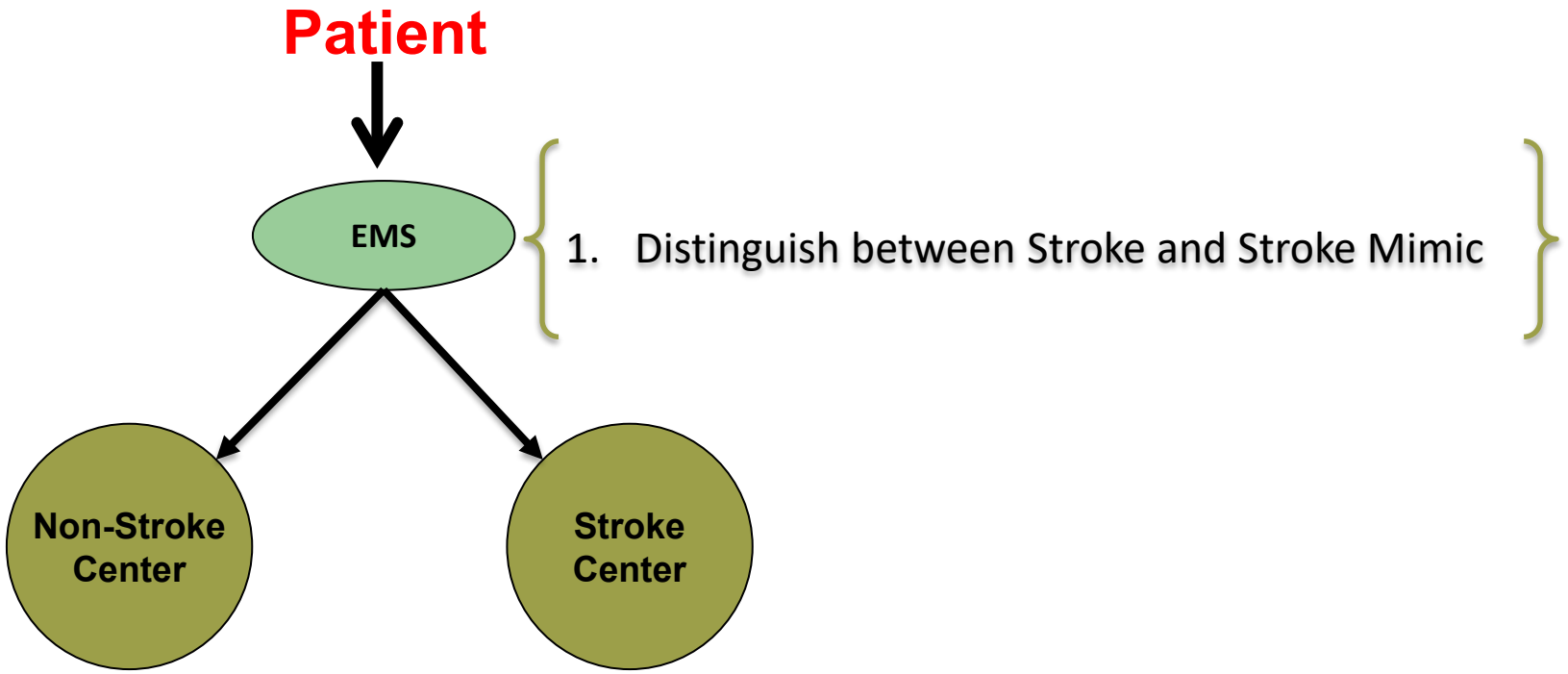

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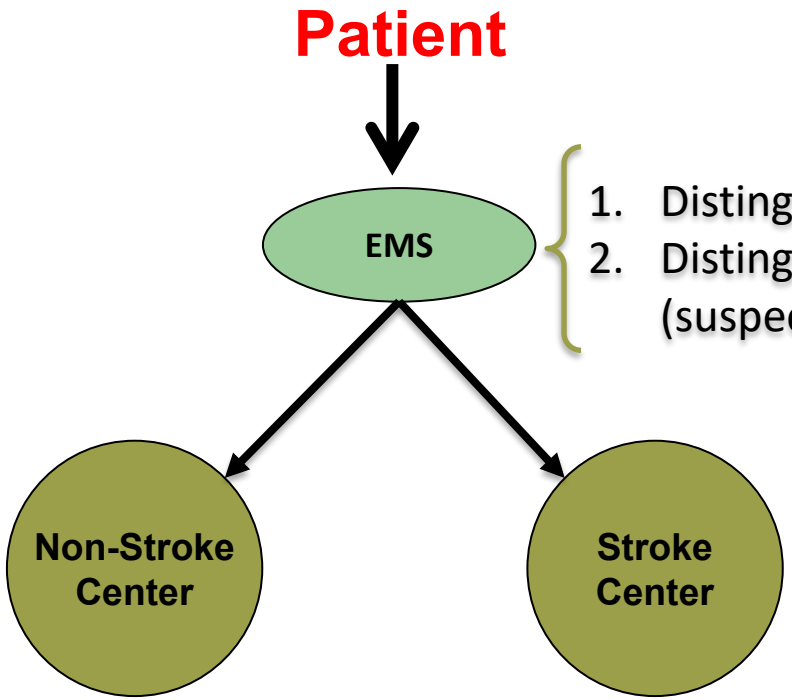

1. Distinguish between Stroke and Stroke Mimic
2. Distinguish between mild and severe stroke (suspected LVO)

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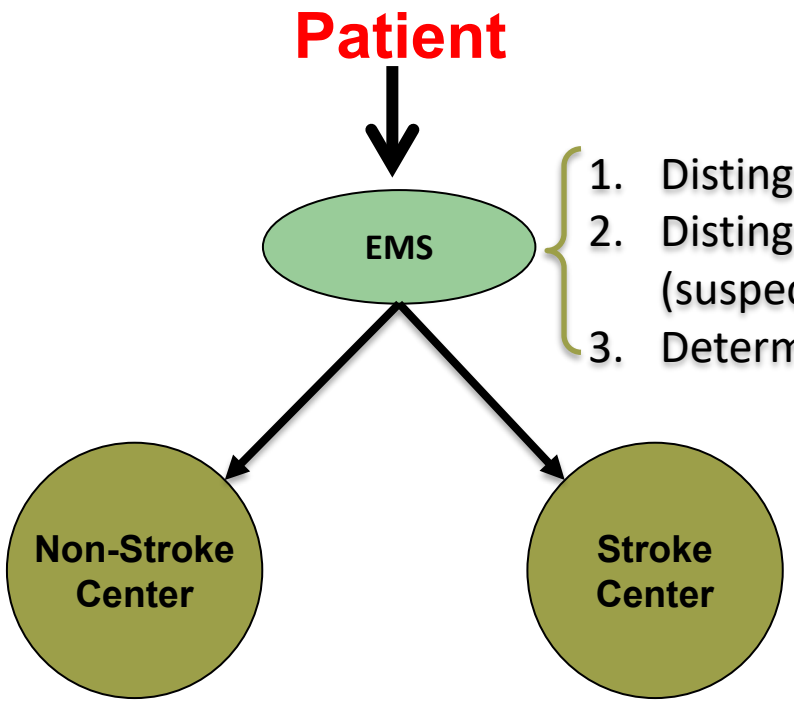
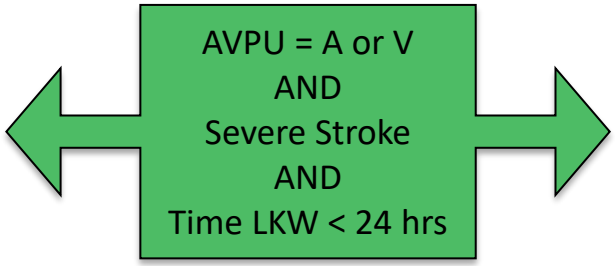


1. Distinguish between Stroke and Stroke Mimic
2. Distinguish between mild and severe stroke (suspected LVO)
3. Determine time LKW

Stage 2: Severity-Based Stroke Triage

EMS Evaluation and Triage



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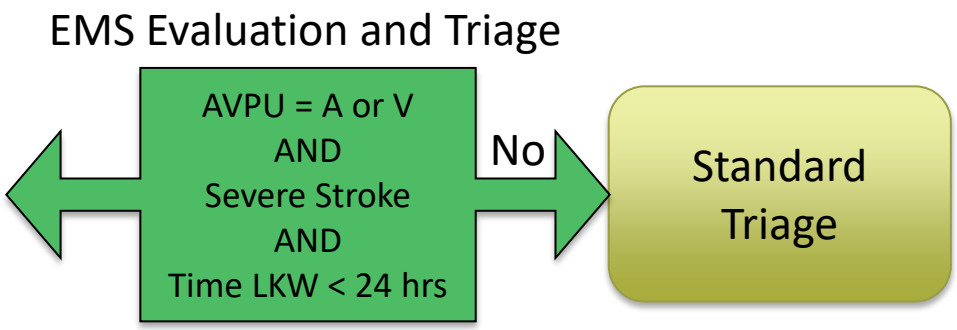

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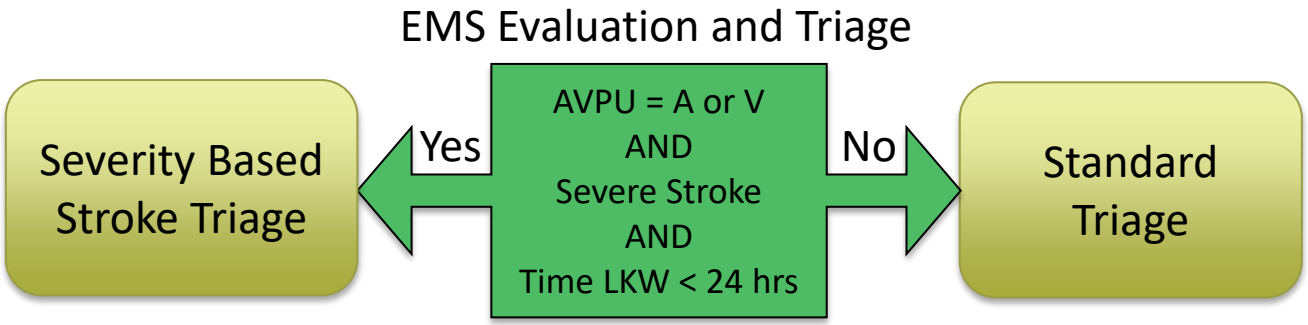

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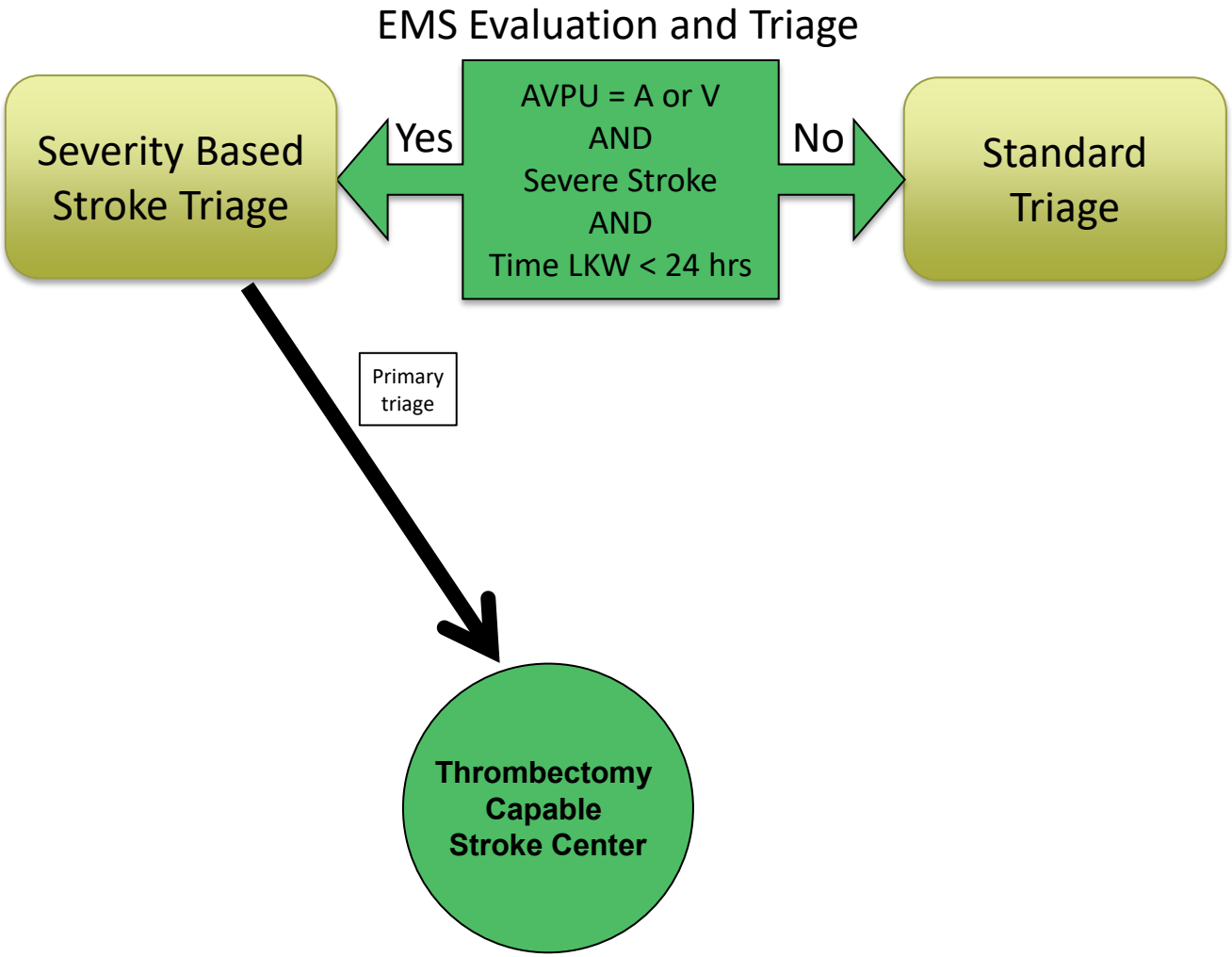

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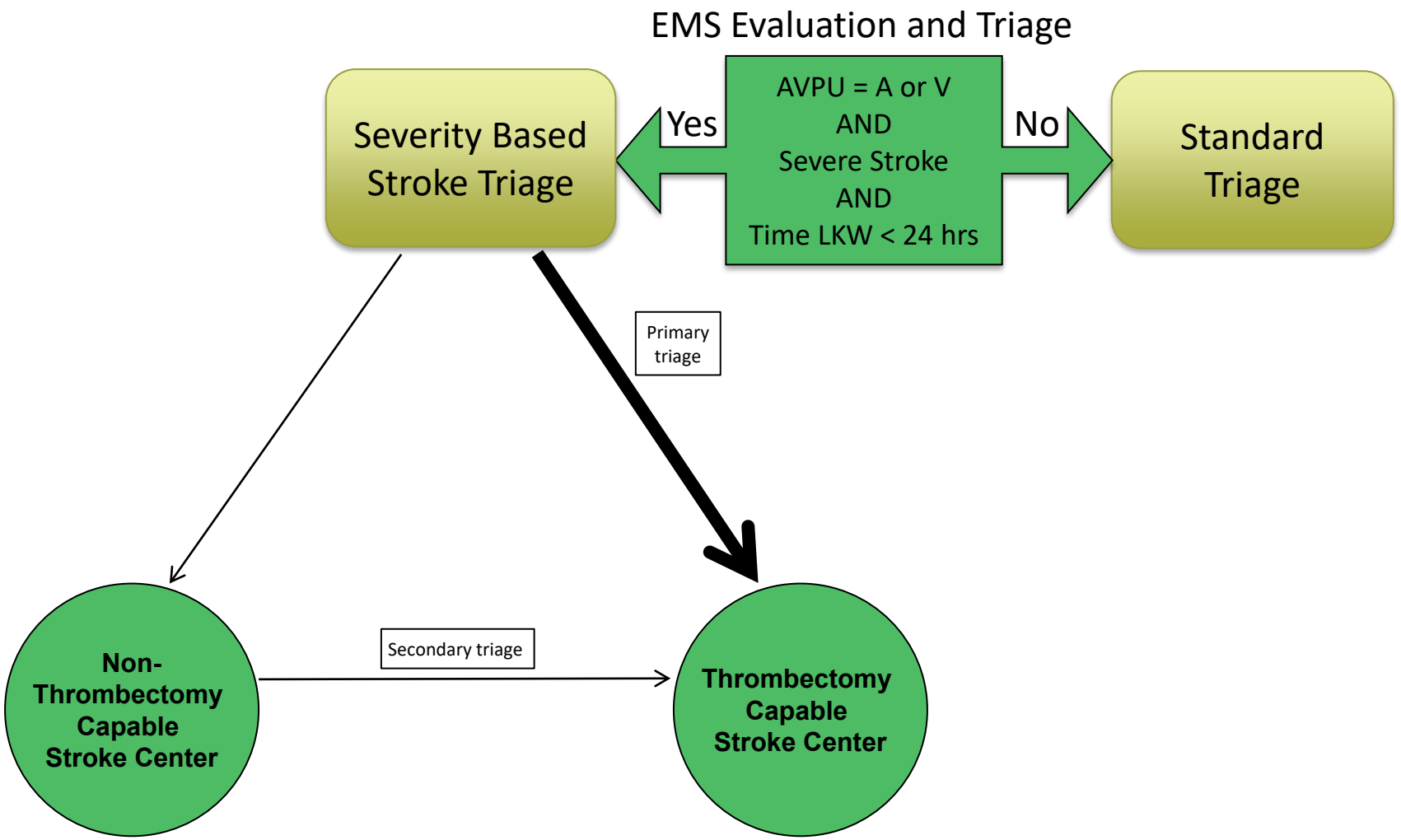

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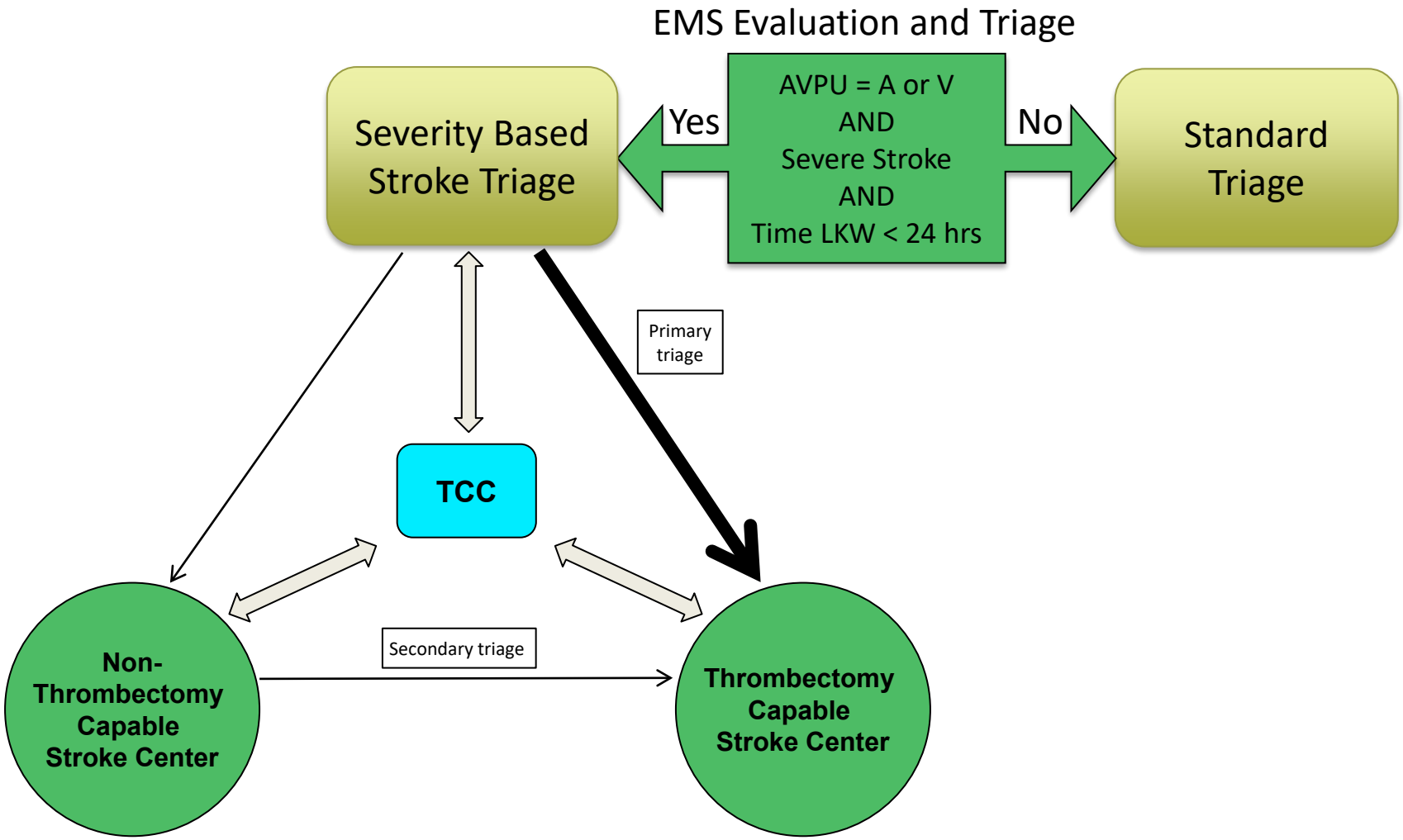


5 Year Project Timeline

Region 3	Statewide EMS training in EMSA				Standard Triage				Train	TCC Coordinated SBST									
Region 5					Standard Triage					Train	TCC Coordinated SBST								
Region 1					Standard Triage						Train	TCC Coordinated SBST							
Region 6					Standard Triage							Train	TCC Coordinated SBST						
Region 2					Standard Triage								Train	TCC Coordinated SBST					
Region 4					Standard Triage									Train	TCC Coordinated SBST				
Year	One				Two				Three				Four				Five		
Quarter	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

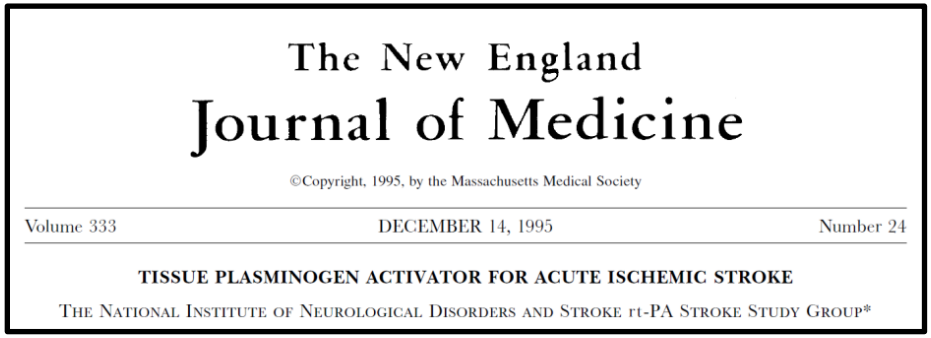
- Standard triage: TCC Guided EMSA but with continued triage to nearest stroke center of any level
- During standard triage period, we will develop region and hospital specific severity-based triage plans
- Train: Implementation of region and hospital specific triage plans
- TCC Coordinated SBST: TCC Guided EMSA and TCC Coordinated SBST

Why it Matters

- Some of the damage may be reversible
  - Ischemic Core = Infarction = Irreversible tissue injury
  - Ischemic Penumbra = reduced blood supply = tissue at risk = potentially reversible

T-PA

- Tissue Plasminogen Activator (t-PA) was approved by the FDA based on the 1995 NINDS rt-PA study



The New England
Journal of Medicine

Volume 333 DECEMBER 14, 1995 Number 24

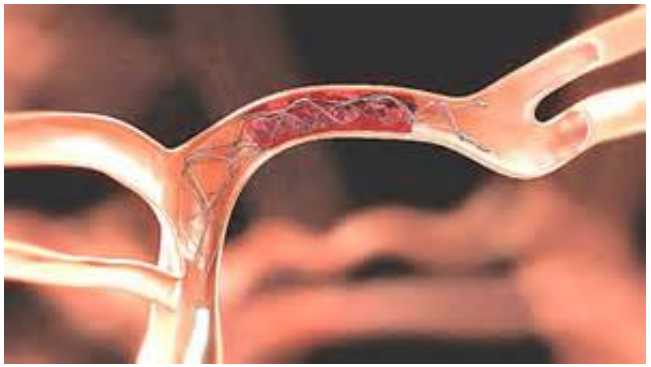
TISSUE PLASMINOGEN ACTIVATOR FOR ACUTE ISCHEMIC STROKE

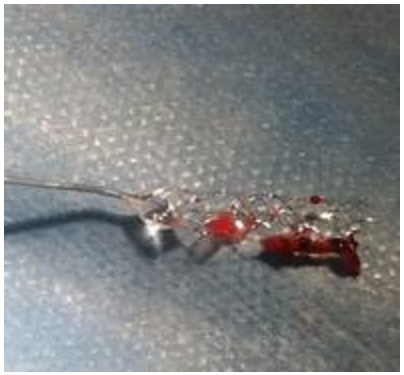
THE NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE rt-PA STROKE STUDY GROUP*

- Clinical trial of IV t-PA vs. placebo given within 3 hours of onset
- Patients treated with t-PA were 30% more likely to have minimal or no disability at three months
- Additional studies have supported the use of t-PA up to 4.5 hours in selected patients
- Advantages of t-PA; important contraindications

Intra-arterial Therapy for Stroke

- Select stroke patients may be eligible for intra-arterial (IA) reperfusion therapies





- Several clinical trials emerged since late 2014 showing benefit of mechanical thrombectomy in addition to t-PA for selected stroke patients with large vessel occlusions up to 24 hours after onset

The typical patient will lose 2 Million neurons each minute a stroke is not treated

Common Clinical Features of Stroke

- Sudden onset + focal symptoms
- Sudden unilateral facial droop
- Sudden unilateral weakness or numbness
- Sudden loss of vision
- Sudden difficulty speaking and/or understanding
- Sudden eye deviation and/or neglect of one-side

Stroke Mimics

- Loss of consciousness without unilateral symptoms
  - Seizure
  - Syncope
- Altered mental status without unilateral symptoms
  - Hypotension
  - Hypoglycemia
  - Overdose
- Pain
  - Migraine
  - Arm or leg pain

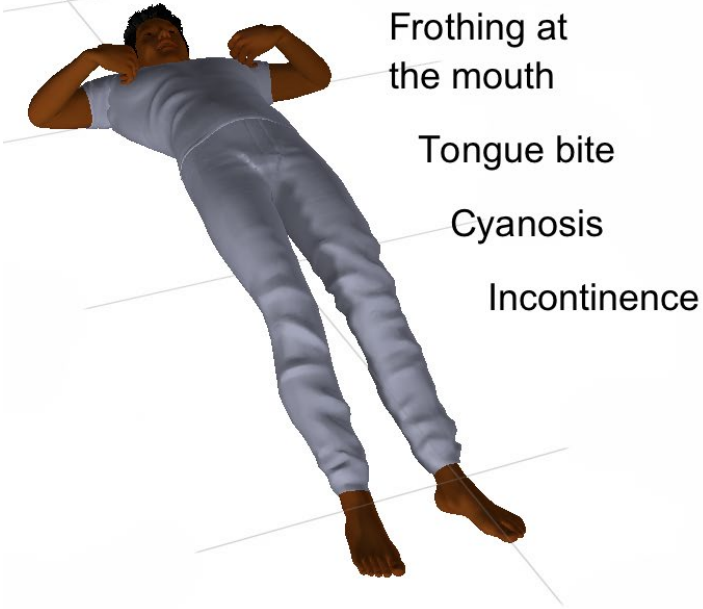
Generalized Seizure

Tonic-Clonic Phase

Loss of consciousness

Epileptic cry

Eyes blinking



Frothing at the mouth

Tongue bite

Cyanosis

Incontinence

Stiffening of body and limbs with back arched, then jerks of limbs, body, and head

Post-Ictal Phase

Lethargy and confusion

Headache

Weakness and muscle pain of limbs and body

Pre-Syncope and Syncope

Dizziness or light-headedness

Tinnitus

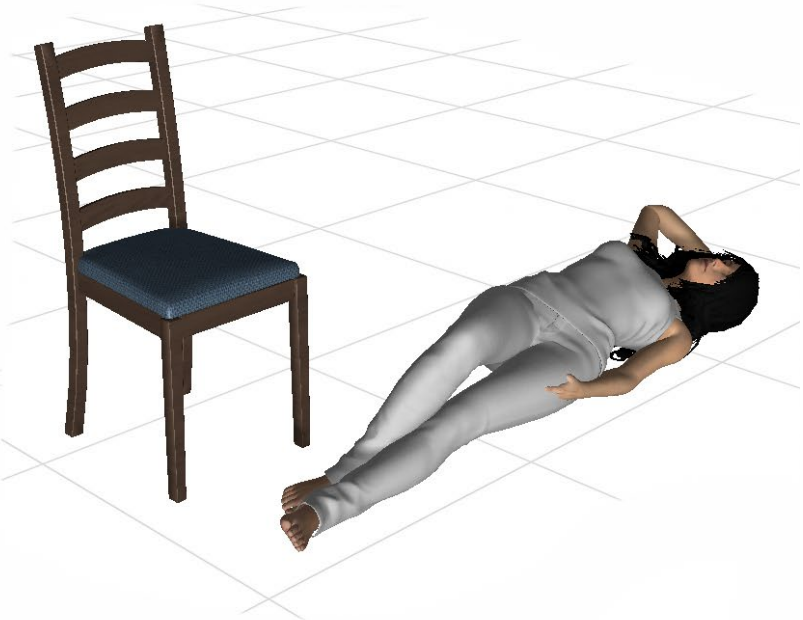
Blurred or tunnel vision

Pallor

Sweating

Nausea

Brief loss of consciousness
with rapid recovery



Features of MCA and ICA Large Vessel Occlusion (LVO)

- Left MCA/ICA stroke
  - Aphasia = acquired loss of language function
    - Impaired speech production and/or comprehension
    - Impaired naming and repetition are common
  - Eye deviation to the left side with impaired gaze to the right (weak) side
  - Loss of vision and/or neglect of the right side
  - Right-sided weakness
- Right MCA/ICA stroke
  - Eye deviation to the right side with impaired gaze to the left (weak) side
  - Loss of vision to the left side
  - Prominent neglect including failure to recognize the left side of the body or that they are having stroke symptoms
  - Left-sided weakness

Right MCA Stroke

Eye deviation to right

Loss of vision and neglect on the left

Left facial droop

Weakness of left arm

Weakness of left leg

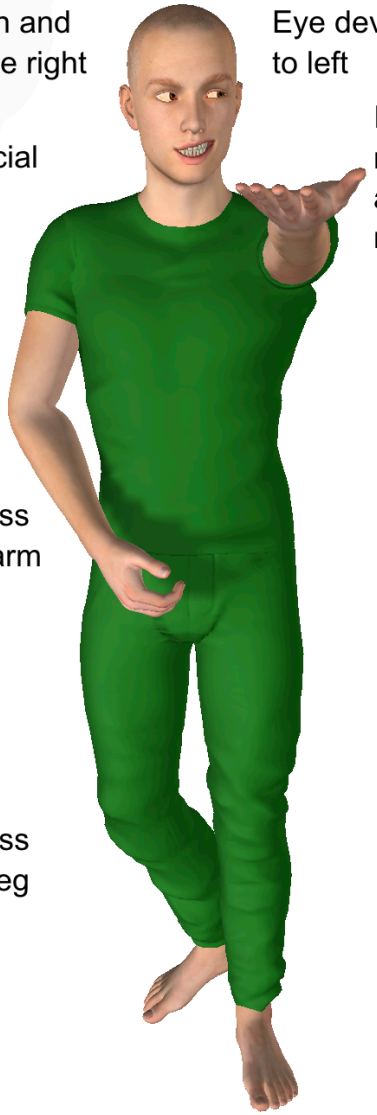
Left MCA Stroke

Loss of vision and neglect on the right

Eye deviation to left

Impaired naming and repetition

Right facial droop



Weakness of right arm

Weakness of right leg

Emergency Medical Stroke Assessment (EMSA)

	Abnormal?
E: Eye Movement	
Horizontal Gaze Ask patient to keep their head still and follow your finger left to right with their eyes In aphasic patients, call the patient's name on one side and then the other Abnormal: Patient is unable to follow as well in one direction compared to the other	☐
M: Motor – Asymmetric Face, Arm, or Leg Weakness	
Facial Weakness Ask patient to show their teeth or smile In aphasic patients, look for asymmetric grimace to pain Abnormal: One side of the face does not move as well as the other	☐
Arm Weakness Ask patient to hold out both arms, palms up, for 10 seconds with eyes closed In aphasic patients, hold the patients arms up and let go Abnormal: One arm does not move or drifts down compared to the other	☐
Leg Weakness Ask patient to lift up one leg and then the other for 5 seconds In aphasic patients, hold up one leg and let go, then repeat on the other side Abnormal: One leg does not move or drifts down compared to the other	☐
SA: Slurred Speech or Aphasia	
Naming Ask patient to name your watch and pen Abnormal: Patient slurs words, says the wrong words, or is unable to speak	☐
Repetition Ask patient to repeat "They heard him speak on the radio last night" after you Abnormal: Patient slurs words, says the wrong words, or is unable to speak	☐

Concept of Last Known Well

- Time Last known well (LKW) is part of how we determine if a patient is eligible for t-PA (< 4.5 hours) or thrombectomy (< 24 hours)
- Time LKW will be a critical part of your triage decision after implementation of SBST
- A reliably-witnessed onset time = time LKW
- If onset not reliably witnessed, time LKW = when the patient was last seen at their baseline level of neurologic function

Concept of Last Known Well

- LKW = onset time when symptoms are first observed when a patient can reliably self-report or if onset is witnessed by someone else
  - Wife sees husband suddenly stop speaking during breakfast at 7 AM
    - Witnessed onset = time LKW = 7 AM
  - Patient without aphasia or neglect reports sudden onset of right-sided weakness at 2 PM while at work
    - Reliably self-reported onset = time LKW = 2 PM

Concept of Last Known Well

- If not reliably witnessed, time LKW = when the patient was last seen at their baseline level of neurologic function
  - After returning home from work at 6 PM, wife finds husband on kitchen floor with confusion and left-sided weakness. He was last seen to be OK at 8 AM after breakfast before she went to work
    - Time LKW = 8 AM
  - Patient reports that she had left-sided weakness on awakening at 6 AM. She was in her usual state of health when she went to bed at 11 PM
    - Time LKW = 11 PM

Thank You!

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