Thomas Jefferson EMS Council

Stroke Triage Plan
2022 Edition

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Executive Summary

Under the Code of Virginia §32.1-111.3, the Office of Emergency Medical Services, acting on behalf of the Virginia Department of Health has been charged with the responsibility of maintaining a Statewide Stroke Triage Plan. The Thomas Jefferson Emergency Medical Services Council, Inc. (TJEMS) is responsible for establishing a strategy through a formal region-wide Stroke Triage System incorporating the region's geographic variations and acute stroke care capabilities and resources. The Commonwealth of Virginia recognizes four levels of stroke certification (a Certified Stroke Center) consistent with recommendations of the Brain Attack Coalition. These are Comprehensive Stroke Centers, Primary Stroke Centers, Primary +, and Acute Stroke Ready Hospitals. There are multiple certifying bodies, including the Joint Commission, DNV, the American Heart Association, and potentially others.

The purpose of the TJEMS Council Regional Stroke Plan is to establish a consistent baseline of criteria for prehospital and inter-facility triage and transport of acute stroke patients. The plan will identify formalized regional stroke plans to augment the State Stroke Triage Plan to recognize and address variations with the regional EMS and hospital resources. This Regional Stroke Plan addresses patients experiencing an "acute stroke," defined as any patient suspected of having an acute cerebral ischemic or hemorrhagic event with witnessed onset or last known well at baseline within 24 hours. The primary focus of this plan is to provide guidelines to facilitate the early recognition of the acute stroke patient and to expedite transport to a center able to provide definitive care within an appropriate time window.

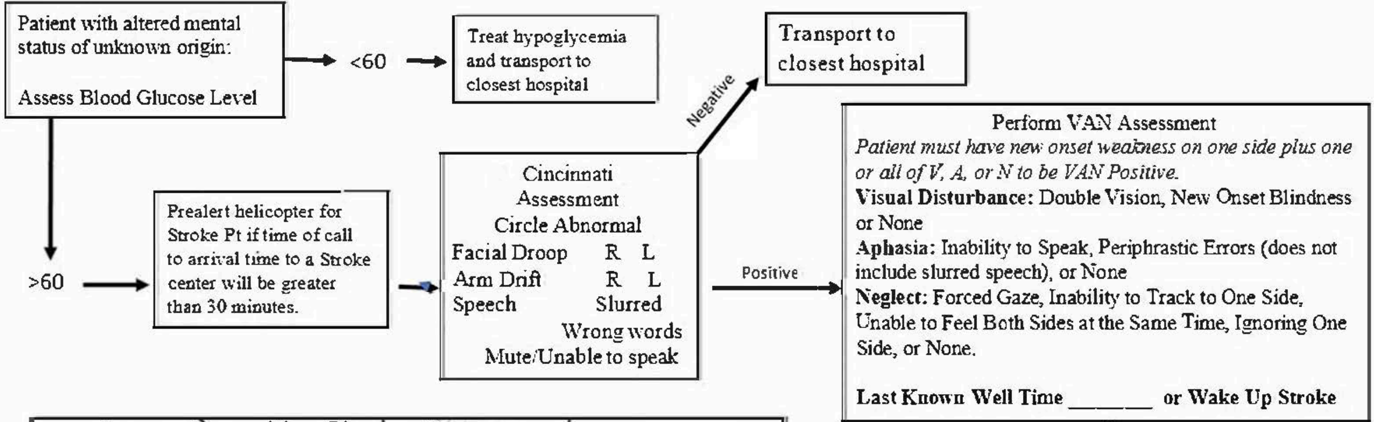
It is very important to note that because of the continuing evolution of scientific evidence indicating successful management of acute stroke regardless of time of onset, EMS *providers are encouraged to initiate real-time contact with regional or local medical direction to discuss individual cases that may fall outside of their established agency protocol.* The closest hospital may not necessarily be the most appropriate hospital for that patient. In selected cases it may be determined that expeditious transfer or transport directly to a Certified Stroke Center may be of benefit for a specific patient. Some selected acute stroke types may benefit from intervention *for an extended period* following symptom onset. Regardless of time of onset the sooner an acute stroke is treated, the better the potential outcome ("Time is Brain"). Based on an individual patient's time of symptom onset and following discussion with Medical Control, EMS should carefully consider what mode of transport would be most appropriate to transport the patient expeditiously to a Certified Stroke Center.

The primary goal of the TJEMS Regional Stroke Plan is: **To develop a stroke emergency care system that, when implemented, will result in decreased stroke mortality and morbidity in the TJEMS Region.** In order to accomplish this, a number of specific processes are essential. These are:

1. The rapid and accurate identification of patients experiencing an acute stroke.
2. The triage of patients to an appropriate transport destination to provide timely and definitive treatment of the acute stroke patient.
3. The provision of quality patient care to those utilizing the EMS System.
4. The continuous evaluation and improvement of the prehospital stroke care system based on established EMS performance measures for stroke.

Thomas Jefferson Prehospital Stroke Assessment and Patient Checklist

Patient Name:________________________ Date: ________ Time:_______ EMS Agency/Unit: ____________________
DOB: ____________________ Age:____________ Witness/Family Contact Name:_______________ Phone Number: ______________



Answer for positive Cincinnati	Circle One		
Current use of anticoagulants (e.g., warfarin, pradaxa)	Yes	No	Unk
Has blood pressure consistently over 180/110 mm/Hg	Yes	No	Unk
Witnessed seizure at symptom onset	Yes	No	Unk
History of GI or GU bleeding, ulcer, varices	Yes	No	Unk
Is within 3 months of prior stroke	Yes	No	Unk
Is within 3 months of serious head trauma	Yes	No	Unk
Is within 21 days of acute myocardial infarction	Yes	No	Unk
Is within 21 days of lumbar puncture (spinal tap)	Yes	No	Unk
Is within 14 days of major surgery or serious trauma	Yes	No	Unk
Is pregnant? Due Date: N/A	Yes	No	Unk
Blood Glucose Level			
Completed By:			

LNWT<4 hours	LNWT >4 hours
Transport to a PSC/CSC; Establish 2 IVs enroute if possible	Transport to a CSC; Establish 2 IVs enroute if possible

CSC	
Sentara Martha Jefferson Hospital (until Oct 4, 2023)	UVA Health University Hospital

Guidance Materials

Cincinnati Prehospital Stroke Scale (CPSS)
All patients suspected of having an acute stroke should undergo a formal screening algorithm such as the CPSS. Use of stroke algorithms has been shown to improve identification of acute strokes by EMS providers up to as much as 30%. Results of the CPSS should be noted on the prehospital medical record. ANY abnormal (positive) finding which is suspected or known to be acute in onset is considered an indicator of potential acute stroke.

Stroke Assessment

The Cincinnati Prehospital Stroke Scale

Facial Droop (have patient show teeth or smile):

- Normal—both sides of face move equally
- Abnormal—one side of face does not move as well as the other side

Left: Normal. Right: Stroke patient with facial droop (right side of face).

Arm Drift (patient closes eyes and extends both arms straight out, with palms up, for 10 seconds):

- Normal—both arms move the same *or* both arms do not move at all (other findings, such as pronator drift, may be helpful)
- Abnormal—one arm does not move *or* one arm drifts down compared with the other

Left: Normal. Right: One-sided motor weakness (right arm).

Abnormal Speech (have the patient say "you can't teach an old dog new tricks"):

- Normal—patient uses correct words with no slurring
- Abnormal—patient slurs words, uses the wrong words, or is unable to speak

Interpretation: If any 1 of these 3 signs is abnormal, the probability of a stroke is 72%.

VAN Assessment

All patients with positive CPSS result should undergo VAN Assessment to identify if there is a potential large vessel occlusion (LVO). Patient must have new onset weakness on one side plus one of all of V, A, or N to be VAN positive.

Visual Disturbance	Double vision, or New onset blindness, or None.
Aphasia	Inability to speak, or Periphrastic errors (does not include slurred speech), or None.
Neglect	Forced gaze, or Inability to track to one side, or Unable to feel both sides at the same time, or Ignoring one side, or None.

TJEMS Regional Guideline:

Medical: Stroke/TIA

History	Physical	Differential Diagnoses
Previous CVA or TIA	Altered mental status	TIA
Previous cardiac or vascular surgery	Weakness/paralysis	Seizure
Diabetes	Blindness, vision changes or other sensory loss	Hypoglycemia
Hypertension	Aphasia	Thrombotic or embolic stroke
Coronary artery disease	Syncope	Hemorrhagic stroke
Atrial fibrillation	Vertigo/dizziness	Tumor
Medication (blood thinners)	Vomiting	Trauma
History of trauma	Headache	Migraine
	Seizures	

PEARL/S

PEARLS:

- If unable to determine if symptoms are related to a stroke or traumatic injuries – consider transport to facility that can manage both conditions.
- Stroke assessment should be performed on hypoglycemic patients once symptoms of hypoglycemia have resolved.
- Obtain and document onset of symptoms (time), medications and contact information for medical decision maker.
- Determine and report if the patient is taking:
  - warfarin (Coumadin®)
  - heparin
  - clopidagrel (Plavix®)
  - Lovenox
  - xarelto (Rivaroxban®)
  - pradaxa (Dabigatran®)
  - apixaban (Eliquis®).

Stroke/TIA

EMT	Universal Protocol
	Identify witness to last time patient was seen normal. Transport with patient if possible or obtain contact information for immediate contact by ED staff upon arrival.
	Check blood glucose level Focused neurological exam. Cincinnati Prehospital Stroke Scale. IF Cincinnati positive, VAN assessment Repeat every 15 minutes.
	Instant glucose, 15 grams, for hypoglycemia and able to maintain airway.
EN/A	IV/IO/Vascular Access
	Dextrose 50% 25 grams IV for hypoglycemia.
	Glucagon 1 mg IM (in thigh) if no IV access.
Med Control	For onset of symptoms **under 24 hours**, contact medical command immediately for possible stroke alert and expedite transport.

Acute Stroke Patient Transport Considerations

MODE OF TRANSPORTATION: TJEMS is unique in that it has the availability of two Certified Stroke Centers, both of which are thrombectomy-capable, within the region. Consideration should be given to both hospitals available to the region and the resources they have available for acute stroke patients.

Stroke patients who meet any of the criteria of the Cincinnati Prehospital Stroke Scale, indicative of an acute stroke, shall be transported to the **closest appropriate Certified Stroke Center for rapid assessment and treatment.**

Stroke patients not within 30 minutes ground transport time to a Certified Stroke Center should be transported to the closest hospital, unless they can be delivered to a Certified Stroke Center more rapidly by a Helicopter EMS (HEMS) agency.

Transport of acute stroke patients, as defined in this plan, by HEMS should:

1. Significantly lessen the time from scene to a Certified Stroke Center compared to ground transport.
2. Be utilized to expeditiously transport acute stroke patients to the closest appropriate Certified Stroke Center.

NOTE: Any patient with a compromised airway or impending circulatory collapse must be transported to the closest hospital Emergency Department.

RAPID TRANSPORTATION: Because stroke is a time-critical event ("Time is Brain"), EMS providers should initiate ***rapid transport*** once acute stroke is suspected. Consideration should also be given to prehospital resources, including use of HEMS, available at the time of the incident, and other conditions such as transport time, road and weather conditions. Use of HEMS can facilitate acute stroke patients reaching Certified Stroke Centers in a timeframe that allows for acute treatment interventions.

The likelihood of benefit of acute stroke therapy decreases with time, **but there are several therapy options which offer definite benefit for an extended period following symptom onset.** Interventions may include any or all of the following: specialty physician or ICU capability, medical therapy (such as tPA or new experimental therapies), radiologic evaluation and procedures (MRI, intra-arterial thrombolytics, mechanical thrombectomy), or life-saving emergent surgery (hemicraniectomy, large artery thrombus extraction, clot evacuation for ICH, clipping coiling for aneurysmal subarachnoid hemorrhage.).

Public Safety Answering Point (PSAP) Recommendations

Public Safety Answering Points are typically the first point of contact for a patient entering the Emergency Medical Services system. Emergency medical telecommunicators serve as a vital connection between the patient, responding EMS providers and the stroke system of care. It is imperative that the stroke system of care provide education and training to 911 personnel to provide early recognition and to minimize delays in prehospital dispatch. Emergency medical telecommunicators must identify and provide high-priority dispatch to patients with stroke symptoms. Current literature suggests that the use of scripted stroke-specific screens during a 911 call may be helpful.

Public Safety Answering Points should develop the following procedures or programs to better serve the stroke system of care.

- Emergency Medical Dispatch (EMD) - A systematic program of handling medical calls for assistance. Trained telecommunicators, using locally-approved EMD Guidecards, quickly and properly determine the nature and priority of the call, dispatch the appropriate response and then give the caller instructions to help treat the patient until the responding EMS unit arrives.
- Hospital notification at the time of dispatch of EMS units when a stroke is suspected.
- Included questioning in the EMD program to determine the time last known well (when the patient last seen normal), which would be relayed to responding EMS units.
- See Appendix C for suggested guidelines for questioning by 911 dispatch centers without established protocols or EMD.

Certified Stroke Centers

The Commonwealth of Virginia recognizes four levels of stroke certification (a Certified Stroke Center) consistent with recommendations of the Brain Attack Coalition. These are Comprehensive Stroke Centers, Thrombectomy-Capable Primary Stroke Center, Primary Stroke Centers, and Acute Stroke Ready Hospitals. There are multiple certifying bodies, including the Joint Commission, DNV, and potentially others. The process of Stroke Certification is entirely voluntary on the part of the hospitals and identifies hospitals that have established and maintain an acute stroke program that provides a specific level of medical, technical, and procedural expertise for acute stroke patients. Certification ensures that the hospital is capable to provide definitive acute stroke care at all times and has an organized approach to providing clinical care, performance improvement, education etc. Additionally, the level of certification that a hospital achieves reflects its ability to care for stroke patients of increasing complexity, with Comprehensive Stroke Centers providing the most complete longitudinal and rehabilitation care available for stroke patients. The list of hospitals becoming certified as stroke centers is increasing. A current list of The Joint Commission Primary Stroke Centers that meet the definition of Virginia Certified Stroke Centers is available by entering the state of interest at http://www.qualitycheck.org/consumer/searchQCR.aspx. The list of hospitals accredited by DNV Healthcare can be found at http://dnvglhealthcare.com/hospitals.

Inter-hospital Triage Criteria

Various hospitals meet many of the components of a Certified Stroke Center based on national survey results and would be the next logical choice. The closest hospital may not be the most appropriate hospital. Resource information via **self-reported data** on the level of acute stroke care provided by hospitals which are not Certified Stroke Centers is available at https://www.vdh.virginia.gov/emergency-medical-services/trauma-critical-care/virginia-stroke-system/.

Non-stroke center hospitals within and adjacent to the TJEMS region should develop transfer guidelines and have agreements in place for the expeditious and appropriate management of acute strokes when the care required exceeds their capabilities. This is especially critical for transfer of patients following thrombolysis since specific guidelines must be followed to diminish the risk of cerebral or systemic hemorrhagic complications. The TJEMS Council does not presume to direct hospitals regarding inter-facility transfer of patients.

Stroke Triage Quality Monitoring

The TJEMS Council, will report aggregate acute stroke triage findings on an intermittent basis, but no less than annually, to assist EMS systems and the Virginia Stroke Systems Task Force in improving the local, regional, and Statewide Stroke Triage Plans. A de-identified version of the report will be available to the regional agencies and will include, minimally, as defined in the statewide plan, the frequency of:

(i) Over- and under- triage to Certified Stroke Centers in comparison to the total number of acute stroke patients delivered to hospitals

(ii) Helicopter EMS utilization

(iii) EMS Benchmarks: under development

TJEMS Stroke Triage Committee will produce a report which will be used as a guide and resource. This report will have three primary evaluation areas: timeliness of care, treatment provided, and outcomes of care. The following areas are the 2020 Stroke PI Metrics:

a) Time difference between arrival at scene and transport of patients with stroke symptoms
b) Time difference between arrival at patient and first set of vitals for stroke patients
c) Percentage of patients suspected of stroke that are transported by HEMS.
d) Percentage of patients with stroke like symptoms who had a documented GCS.

The ultimate goal of collecting this data is to provide actionable information, to the TJEMS OMD committee and the TJEMS training staff, relative to the care processes and outcomes associated with their treatment of Acute Stroke patients as it relates to EMS.

Appendix A

Stroke Related Resources

Virginia Code § 32.1-111.3.
https://law.lis.virginia.gov/vacode/title32.1/chapter4/section32.1-111.3/

Link to Joint Commission Certified Stroke Centers

- Certification Data Download - Data Download | QualityCheck.org

Link to DNV Certified Stroke Centers

- https://www.dnvglhealthcare.com/hospitals

Link to a map of Virginia Stroke Certified Hospitals

- http://www.vdh.virginia.gov/content/uploads/sites/133/2018/01/Stroke-Centers-Update.pdf

Virginia Stroke System Web page

- http://www.vdh.virginia.gov/stroke/virginia-stroke-systems-task-force/

Virginia Office of EMS Stroke Web page

- http://www.vdh.virginia.gov/emergency-medical-services/trauma-critical-care/virginia-stroke-system/

The Joint Commission

- What is Accreditation? | Joint Commission

American Heart Association

- https://www.heart.org/en/professional/quality-improvement/target-stroke/clinical-tools-and-resources

American Stroke Association

- https://www.stroke.org/

Centers for Disease Control and Prevention:

- Stroke Information | cdc.gov

Appendix B

Dispatch Guidance/Resources

The following information is offered as a guide in questioning by dispatch centers within the Thomas Jefferson EMS Council region that do not have established procedures.

911 Call Received

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Standard questioning:

1. What is the address of the emergency?
2. What is the phone number you are calling from?
3. What is the problem, tell me exactly what happened?
    a. Are you with the patient now?
    b. How many people are hurt? (if not obvious)
4. Patient's age
5. Patient's gender
6. State of consciousness of patient
7. Patient's respiratory status

↓

Stroke Dispatch Protocol:

1. Is the patient awake (alert)?
2. Is the patient breathing normally?
3. Is the patient able to talk normally?
4. Why do you believe the patient is having a stroke?
    a. Is the patient having any problems with movement?
    b. Is the patient having problems talking?
    c. Is the patient having any numbness or tingling?
        i. If so where?
    d. Is the patient having any problems seeing?
    e. Is the patient experiencing a sudden onset of a severe headache?
5. When was the last time the patient was seen without this or these problems? (Last time seen normal)
6. Has the patient ever had a stroke before?

↓

- **Any post-dispatch questions or agency required questions?**
- **If EMD – Pre-arrival instructions should be given.**