REGIONAL STROKE TRIAGE PLAN

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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 Rappahannock EMS Council, Inc. (REMS) is responsible for establishing a strategy through a formal region-wide Stroke Triage System incorporating the regions' geographic variations and acute stroke care capabilities and resources. The Commonwealth of Virginia recognizes three levels of stroke certification (a Certified Stroke Center) consistent with recommendations of the Brain Attack Coalition. These are Comprehensive Stroke Centers, Thrombectomy-Capable Stroke Centers, Primary Stroke Centers and Acute Stroke Ready Hospitals. There are multiple certifying bodies including the Joint Commission, DNV, and potentially others.

The purpose of the Regional Stroke Triage Plan is to establish a uniform set of criteria for the pre-hospital and inter-hospital triage and transport of acute stroke patients. This Regional Stroke Triage Plan addresses patients experiencing an "acute stroke." For the purposes of this document, "acute stroke" is defined as any patient suspected of having an acute cerebral ischemic or hemorrhagic event. The primary focus of the plan is to provide guidelines to facilitate the early recognition of patients suffering from acute stroke and to expedite their transport to a center able to provide definitive care within an appropriate time window.

In order to accomplish this, a number of specific processes are essential. These are:

1. The ability to rapidly and accurately identify patients suffering from Stroke-like presentation.

2. Patients who have sustained an Acute Stroke event must receive care in a hospital that is a certified Stroke Center that is capable of providing immediate and comprehensive assessment, resuscitation, intervention, and definitive care.

3. The Rappahannock EMS Council must provide continuous and effective region-wide coordination of pre-hospital and hospital care resources, so stroke patients will be most expeditiously transported to the closest available interventional center capable of performing stroke interventions in a manner both appropriate and timely, while establishing and maintaining continuity. To accomplish this process there must be a method of tracking the care capability for Stroke patients and reviewing the quality of the process itself.

4. The regional plan must provide all hospitals in the region the opportunity to participate in the system (an inclusive system), and to receive Stroke patients if they are willing to meet the system and operational criteria, as established by this plan.

5. Provide quality EMS and patient care to EMS System citizens.

6. Continuously evaluate the EMS System based on established EMS performance measures for Stroke.

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.

PRE-HOSPITAL AND INTER-HOSPITAL TRIAGE CRITERIA

The default destination for acute stroke patients should be a Certified Stroke Center. When acute stroke patients cannot be transported directly to a Certified Stroke Center in a timely manner, consideration may be given to transport to a closer hospital. 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 on Certified Stroke Centers can be found on The Joint Commission website (https://www.jointcommission.org/), the DNV website (DNV GL - Healthcare | DNV GL – Healthcare) and The Healthcare Facilities Accreditation Program (HFAP - Primary Stroke Center Certification Program).

Non-stroke center hospitals within the REMS region must develop transfer guidelines and 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 protocols must be followed to diminish the risk of cerebral or systemic hemorrhagic complications. If the patient has received, or is receiving thrombolytic therapy, it is the responsibility of the sending facility to ensure that the transporting agency is staffed with providers that have received appropriate training in the monitoring of this patient population. (See Appendix A for a sample post IV tPA EMS transfer checklist as used by REMS region certified Stroke Centers)

PRE-HOSPITAL STROKE AND LARGE VESSEL OCCLUSION (LVO) SCREENING TOOLS

All patients suspected of having an acute stroke should undergo a formal screening algorithm such as the BE FAST Use of stroke algorithms has been shown to improve identification of acute strokes by EMS providers up to as much as 30%. ANY abnormal (positive) finding which is suspected or known to be acute in onset is considered an indicator of potential acute stroke.

B **(Balance)**	SUDDEN DIZZINESS: loss of balance or coordination. Ask the person if they are having trouble walking or losing coordination.	
E **(Eyes)**	SUDDEN TROUBLE SEEING: out of one or both eyes. Ask if they are having double vision or sudden persistent trouble with vision.	
F **(Face)**	FACIAL DROOP: Have patient smile or show teeth. (Look for facial asymmetry) **Normal:** Both sides of the face move equally or not at all. **Abnormal:** One side of the patient's face droops or does not move.	
A **(Arm)**	MOTOR WEAKNESS: Arm drift (Have patient close eyes, extend arms, palms up for 10 seconds; if only leg is involved, have patient hold leg off floor for 5 seconds) **Normal:** Remain extended equally, drifts equally, or does not move at all. **Abnormal:** One arm drifts down when compared with the other.	
S **(Speech)**	SPEECH DIFFICULTY: Have the patient repeat, "You can't teach an old dog new tricks" (repeat phrase) **Normal:** Phrase is repeated clearly and correctly. **Abnormal:** Words are slurred (dysarthria) or abnormal (dysphasia) or none (aphasia).	
T **(Time)**	TIME: SYMPTOM ONSET or LAST KNOWN WELL If patient awakened with symptoms, when were they last known to be normal?	

- Results of the BE FAST should be documented on the patient's pre-hospital medical record and shared in transport notification to hospital.

VAN Stroke Scale - Emergent Large Vessel Occlusion Screening Tool

Following a positive BE FAST screening, EMS providers should perform the VAN Stroke Scale which is a secondary screening tool used to determine if a patient is having a large vessel occlusion stroke. Large artery stroke types tend to have worse outcomes and disable people. They are best treated with the additional use of Neuro-interventional clot retrieval. Using VAN can assist EMS in transport decisions that will get this population of stroke patients to a Comprehensive Stroke Center or Thrombectomy-Capable Stroke Center that performs these additional procedures.

***Patients must have new onset weakness on one side plus one or all of the V, A, or N to be VAN Positive.**

Weakness - Raise both arms palms up to determine how weak
___ Patient shows no weakness. Patient is VAN negative (exceptions are confused or comatose patients with dizziness, focal findings, or no reason for their altered mental status then basilar artery thrombus must be considered; CTA is warranted)
___ Mild (minor drift)
___ Moderate (severe drift – touches or nearly touches ground)
___ Severe (flaccid or no antigravity)

Visual Disturbance (+ if any are met)
___ Double vision (ask patient to look to right then left; evaluate for uneven eyes)
___ Blind new onset
___ None

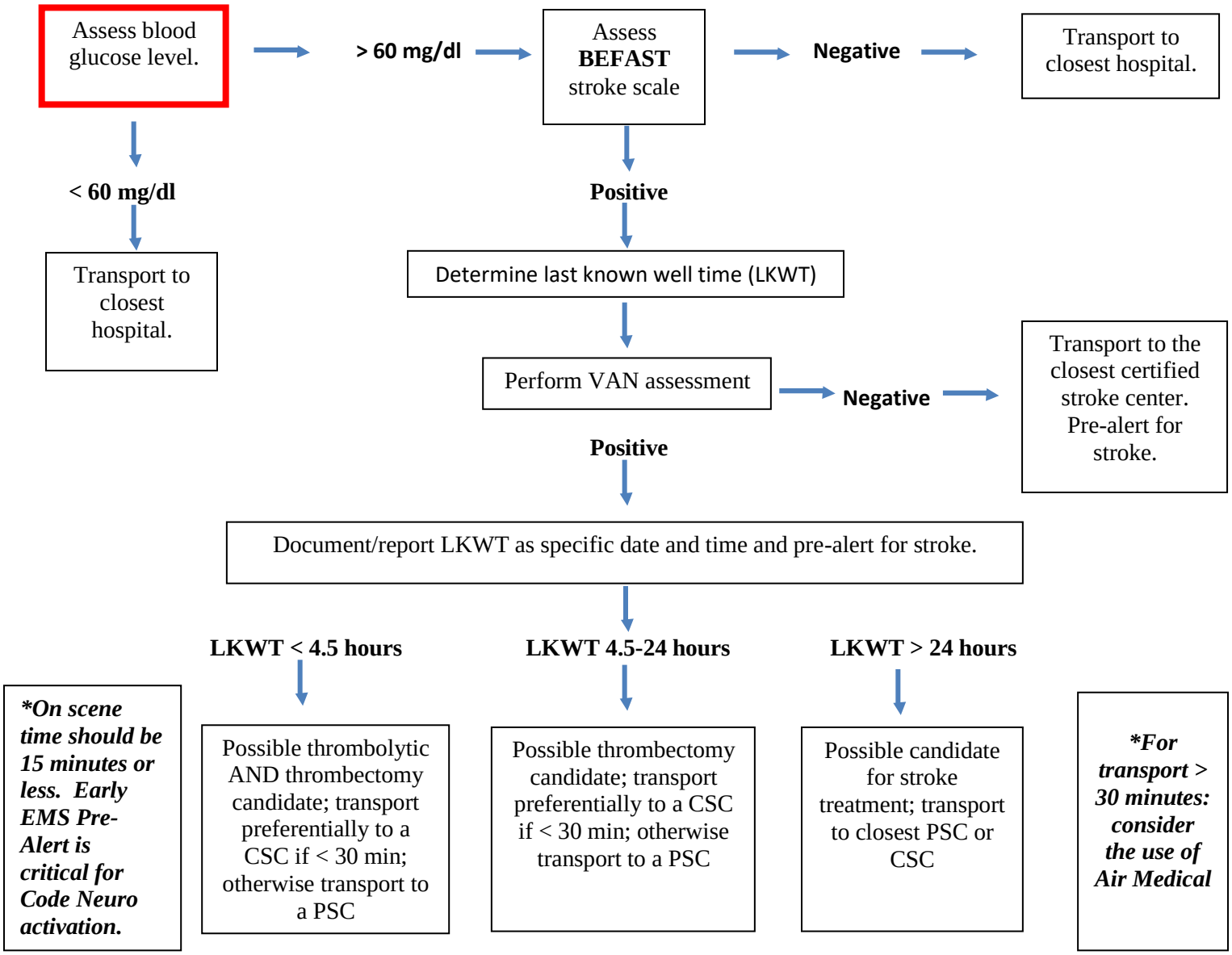
Aphasia (+ if any are met)
___ Expressive (inability to speak or paraphasic errors); do not count slurring of words (repeat and name 2 objects)
___ Receptive (not understanding or following commands) (close eyes, make fist)
___ None

Neglect (+ if any are met)
___ Forced gaze or inability to track to one side
___ Unable to feel both sides at the same time, or unable to identify own arm
___ Ignoring one side
___ None

- The above is a modified VAN screening for the REMS region.
- Results of the VAN screening should be documented on the patient's pre-hospital medical record and shared in transport notification to hospital.

GOAL = RIGHT PATIENT + RIGHT HOSPITAL + RIGHT TIME

RAPPAHANNOCK EMS COUNCIL
Regional Field Stroke Triage Decision Scheme



VAN Assessment for LVO

Patient must have new onset weakness on one side PLUS one or all of the V, A, or N to be VAN positive.

Visual Disturbance: Double vision, new onset blindness or none
Aphasia: Inability to speak, periphrastic errors (does not include slurred speech), or none
Neglect: Forced gaze, inability to track to one side, unable to feel both sides at the same time, ignoring one side, or none.

Acute Stroke Ready Hospitals (ASRH)

Stafford Hospital

Primary Stroke Centers (PSC)

Fauquier Hospital
Mary Washington Hospital
Sentara Northern Virginia Medical Center
Spotsylvania Regional Medical Center UVA
Health Prince William Medical Center
Winchester Medical Center

Comprehensive Stroke Centers (CSC)

INOVA Fairfax
University of Virginia- UVA Health Virginia Commonwealth University

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ACUTE STROKE PATIENT TRANSPORT CONSIDERATIONS

RAPID TRANSPORTATION: Because stroke is a time-critical illness, time is of the essence, and EMS should rapidly initiate transport once acute stroke is suspected. Consideration should also be given to pre-hospital resources including use of helicopter EMS (HEMS) available at the time of the incident, and other conditions such as transport time 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 of the following: specialty physician or Neurologic ICU capability, advanced radiologic evaluation, or life-saving emergent procedures.

Field transports of acute stroke patients by helicopter as defined in this plan:

1. Should significantly lessen the time from scene to a Certified Stroke Center compared to ground transport.

2. Should be utilized to expeditiously transport acute stroke patients to the closest appropriate certified stroke center.

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 procedures or programs to better serve the stroke system of care, to include Emergency Medical Dispatch (EMD) or other local-approved guide cards. Recommend including questions in the program to determine when the patient was last seen normal, recognizing symptoms of stroke as provided by the caller and relaying to responding EMS units.

DESIGNATED STROKE CENTERS

The following hospitals have been designated as an Acute Stroke Ready Hospital (ASRH) or higher as provided by the Virginia Stroke System Task Force:

Geographic Area	Hospital	Type of Stroke Center
Designated Stroke Centers within the REMS Region		
Fredericksburg	Mary Washington Hospital	Primary
Spotsylvania	Spotsylvania Regional Medical Center	Primary
Stafford	Stafford Hospital	Acute Stroke Ready Hospital
Warrenton	Fauquier Hospital	Primary
Designated Stroke Centers Outside the REMS Region used by REMS Agencies		
Alexandria	INOVA Alexandria Hospital	Thrombectomy Capable
	INOVA Mount Vernon	Primary
Charlottesville	Martha Jefferson Hospital	Primary
	UVA Health	Comprehensive
Falls Church	INOVA Fairfax Hospital	Comprehensive
Manassas	UVA Health Prince William Medical Center	Primary
Mechanicsville	Bon Secours Regional Medical Center	Primary
Richmond	Augusta Medical Center	Primary
	Bon Secours Richmond Community	Primary
	Bon Secours St Mary's Hospital	Comprehensive
	HCA Chippenham Hospital	Comprehensive
	Henrico Doctor's Hospital	Thrombectomy Capable
	HCA Johnston-Willis Hospital	Primary
	Parham Doctor's Hospital	Primary
	Retreat Doctor's Hospital	Primary
	VCU Health System	Comprehensive
Winchester	Winchester Medical Center	Comprehensive
Woodbridge	Sentara Northern Virginia Medical Center	Primary

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STROKE TRIAGE QUALITY MONITORING

The Rappahannock EMS Council, EMS agencies and Hospitals are encouraged to utilize their performance improvement programs to perform quality monitoring and improve the delivery of acute stroke care.

The Rappahannock EMS Council Performance Improvement Committee will produce a report no less than annually which will be used as a guide and resource for stroke care in the region. This report will have three primary evaluation areas: timeliness of care, treatment provided, and outcomes of care. The fields identified are critical to analyses for the following reason: they allow linking of EMS data and hospital Stroke data, they allow for "real time" collection of data focused upon process improvement, and they allow for retrospective systemic analyses. The ultimate goal of collecting this data is to provide actionable information to the REMS Regional Stroke Committee, REMS Medical Direction Committee and EMS licensed agencies relative to the care processes and outcomes associated with their treatment of Acute Stroke patients as it relates to EMS.

STROKE RELATED RESOURCES

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/OEMS/Trauma/Stroke.htm

Joint Commission:
http://www.jointcommission.org/CertificationPrograms/PrimaryStrokeCenters/

Vision, Aphasia, Neglect Assessment
Teleb MS, Ver Hage A, Carter J, Jayaraman MV, McTaggart RA. Stroke vision, aphasia, neglect (VAN) assessment – a novel emergency large vessel occlusion screening tool: pilot study and comparison with current clinical severity indices. J Neuro-Interventional Surg 2016; 0:1-5.

VAN Website:
https://www.strokevan.com/

Mission Lifeline Stroke Website:
http://www.heart.org/HEARTORG/Professional/MissionLifelineHomePage/Mission-Lifeline-Stroke_UCM_491623_SubHomePage.jsp

2018 American Heart Association Guidelines for Management of Acute Ischemic Stroke
http://stroke.ahajournals.org/

Rappahannock EMS Council Regional Stroke Plan
Sample Post IV tPA EMS Transfer Checklist

APPENDIX A

Prior to Departure – EMS Transport Team obtain **t-PA Dosing and Administration Communication Form** from transferring RN and complete / sign together

During Transport

- Replace t-PA bottle with 50 mL 0.9% NS when bottle is empty and before pump alarms "air in line" or "no flow above"
- Continue infusion at current settings until preset volume is completed
- Continuous cardiac and pulse oximetry monitoring with oxygen per protocol
- Perform and record neuro checks every 15 mins using Cincinnati Stroke Scale, GCS and pupil exam
- **Include assessment for changes in initial or current symptoms or onset of new stroke-like symptoms**
- Monitor and document vital signs every 15 mins **on opposite arm from t-PA infusion site**
- **Call receiving physician if any changes or patient becomes unstable**

Blood Pressure Management

- Keep SBP < 180 and DBP < 105
- Manage BP with IV *Labetalol* (10mg)
- If the HR is < 60 while pushing Labetalol, notify the receiving facility for guidance
- If *Labetalol* not available, manage BP with *Enalaprilat (VASOTEC),* notify receiving facility 0.625 mg IV every 10 min PRN if SBP greater than 180 mmHg or DBP is 105 mmHg or greater - max cumulative dose 5 mg. Call receiving facility for instructions if SBP >180 on 2 readings.
- Maintain Nicardipine gtt during transport (if started at the initial center to manage BP)
- If BP >180/105 on Nicardipine gtt during transport, administer Labetalol pushes **or** Enalaprilat (VASOTEC) if Labetalol is not available (see above)

Complication Management

- Monitor for acute worsening of neurological condition or severe headache, acute hypertension, nausea, vomiting, allergic reaction, difficulty breathing, bleeding or hematomas at infusion site or in emesis
- Stop t-PA infusion if still being administered
- Call receiving physician for further instructions and to update receiving hospital
- Treat allergic reaction according to agency protocol
- Apply direct pressure to any sites for bleeding
- Continue to monitor vital signs and perform neurological exam every 15 mins

Prior to leaving the hospital:

- ☐ Verify SBP < 180; DBP < 105. Sending hospital must stabilize if above limit
- ☐ Perform and document neurological exam to establish baseline neurological status
- ☐ If t-PA to continue during transport, complete Communication Form below. AirCare will transfer the remaining t-PA dose to their mini med pump until infusion completed during transport.
- ☐ Do not delay transport at MWH until t-PA infused.
- ☐ Obtain contact method for family or caregiver. Phone (cell preferred):_____

Receiving Hospital _____

Physician _____

Phone Number _____

All questions regarding patient care must be referred to the receiving physician

t-PA Dosing and Administration Communication Form: To be completed by sending RN/AirCare Crew (EMS Transport Team)

Verify/confirm the following dosing and pump settings prior to departure:	RN Initials	EMS Transport Initials
Total t-PA dose to be given: _____mg		
Excess t-PA discarded before hanging on pump: _____ Yes: _____mg ____ No, excess still in bottle/bag		
Bolus dose: _____mg Time given:_____		
Continuous Infusion: • Dose: _____mg Time started:_____ • Rate: _____mg/hr **Estimated** time of completion: _____		
Actual stopped/completed time:_____		
Stopped early due to: _____		
Total amount t-PA received: _____mg (Ensure that all t-PA in IV tubing is administered)		

Signature/Title	Initials	Signature/Title	Initials

DD1800

Mary Washington Healthcare

Stroke Transfer Checklist For Interventional Care

FR-2713-MWHC 9/2015 Top Copy: Receiving Facility Bottom Copy: Medical Record

Patient Identification