This Regional Stroke Triage Plan has been reviewed and approved by the Rappahannock EMS Council Board of Directors.

Approved: ________________________________  Date: ________________

Approved: ________________________________  Date: ________________

President

Executive Director
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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, 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.

**SUMMARY OF THE 2018 CHANGES**

  - Added rapid dispatch considerations as noted in Virginia Office of EMS Stroke Plan algorithm and AHA /ASA Guidelines
  - Added 6-24 hour from last known well time considerations for assessment and triage decisions
  - Last known well time (LKWT) should be documented as specific date and time
  - Establish two IVs while enroute and do not delay transport for IVs
  - On scene time should be less than 15 minutes

- Spotsylvania Regional Medical Center added to list of certified stroke centers in REMS Council region.

- Public Safety Answering Point (PSAP) Recommendations included, as noted under 2018 AHA Acute Stroke Guidelines.

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

Cincinnati Pre-hospital Stroke Scale (CPSS / FAST)

All patients suspected of having an acute stroke should undergo a formal screening algorithm such as the CPSS / 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.

<table>
<thead>
<tr>
<th>F (Face)</th>
<th>FACIAL DROOP: Have patient smile or show teeth. (Look for facial asymmetry)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal: Both sides of the face move equally or not at all.</td>
<td></td>
</tr>
<tr>
<td>Abnormal: One side of the patient’s face droops or does not move.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>A (Arm)</th>
<th>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)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal: Remain extended equally, drifts equally, or does not move at all.</td>
<td></td>
</tr>
<tr>
<td>Abnormal: One arm drifts down when compared with the other.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S (Speech)</th>
<th>SPEECH DIFFICULTY: Have the patient repeat, “You can’t teach an old dog new tricks” (repeat phrase)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal: Phrase is repeated clearly and correctly.</td>
<td></td>
</tr>
<tr>
<td>Abnormal: Words are slurred (dysarthria) or abnormal (dysphasia) or none (aphasia).</td>
<td></td>
</tr>
</tbody>
</table>

| 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 CPSS / 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 CPSS / 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 Neurointerventional clot retrieval. Using VAN can assist EMS in transport decisions that will get this population of stroke patients to a Comprehensive Stroke Center that performs these additional procedures.

*Patient 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 **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**
**REMS REGIONAL FIELD STROKE TRIAGE DECISION SCHEME**

**Rappahannock EMS Council**
Regional Field Stroke Triage Decision Scheme

- **Early EMS pre-alert from scene to PSC/CSC is critical from first medical contact for Code Neuro Activation and Stroke Center readiness**

**VAN Assessment for IVO**
Patient must have new onset weakness on one side plus one of the V, A, or N to be VAN positive

- Visual Disturbance:
  - Double Vision (Patient to look right then left, evaluate for uneven eyes)
  - New Onset Blindness
  - None
- Aphasia:
  - Expressive (Inability to speak or paraphasic errors, do not include slurring of words): (repeat and name 2 objects)
  - Receptive (Inability to understand simple commands): (close eyes, make fist)
  - None
- Neglect:
  - Forced hand or inability to track to one side: abnormal ocular movement, inability to move eyes.
  - Unable to feel both sides at the same time, or unable to identify own arm
  - Ignoring one side
  - None

**Primary Stroke Centers (PSC):**
- Within REMS Region
  - Mary Washington Hospital
  - Spotsylvania Regional Medical Center
  - Fauquier Hospital

**Comprehensive Stroke Centers (CSC):**
- Outside of REMS region
  - Inova Fairfax
  - University of Virginia - UVA VCU

*Transport >30 minutes consider use of Air Medical Otherwise transfer to nearest stroke center*
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 locally-approved Guidecards. Recommend including questions in the program to determine when the patient was last seen normal, recognizing symptoms of stroke as provided by caller and relaying to responding EMS units.
DESIGNATED STROKE CENTERS

The Commonwealth of Virginia defines a “Certified Stroke Center” as a hospital that has achieved Stroke Center Certification by 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 which provides a specific level of medical, technical, and procedural expertise for acute stroke patients. Certification ensures that the hospital is prepared to provide definitive acute stroke care at all times and has an organized approach to providing clinical care, performance improvement, education, etc. As of December 2018, the current regional Certified Stroke Centers accessible with minimum delay in and near the Rappahannock EMS Council region are:

Certified Stroke Centers Within REMS Designated Region:

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Location</th>
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<tbody>
<tr>
<td>Mary Washington Hospital</td>
<td>Fredericksburg – Primary Stroke Center</td>
</tr>
<tr>
<td>Spotsylvania Regional Medical Center</td>
<td>Spotsylvania – Primary Stroke Center</td>
</tr>
<tr>
<td>Fauquier Hospital</td>
<td>Warrenton – Primary Stroke Center</td>
</tr>
</tbody>
</table>

Outside Area Stroke Centers/Hospitals Used By REMS Region Agencies:

<table>
<thead>
<tr>
<th>City</th>
<th>Hospital Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexandria</td>
<td>Inova Alexandria Hospital</td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>Inova Mount Vernon Hospital</td>
<td>Primary</td>
</tr>
<tr>
<td>Charlottesville</td>
<td>Martha Jefferson Hospital</td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>University of Virginia Hospital</td>
<td>Comprehensive</td>
</tr>
<tr>
<td>Falls Church</td>
<td>Inova Fairfax Hospital</td>
<td>Comprehensive</td>
</tr>
<tr>
<td>Mechanicsville</td>
<td>Bon Secours Regional Medical Center</td>
<td>Primary</td>
</tr>
<tr>
<td>Richmond</td>
<td>Augusta Medical Center</td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>Bon Secours Richmond Community</td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>Bon Secours-St. Mary’ Hospital</td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>CJW Hospital</td>
<td>Comprehensive</td>
</tr>
<tr>
<td></td>
<td>Henrico Doctor’s Hospital</td>
<td>Comprehensive</td>
</tr>
<tr>
<td></td>
<td>Johnston Willis Hospital</td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>Parham Doctor’s Hospital</td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>Retreat Doctor’s Hospital</td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>VCU Health Systems</td>
<td>Comprehensive</td>
</tr>
<tr>
<td>Winchester</td>
<td>Winchester Medical Center</td>
<td>Comprehensive</td>
</tr>
<tr>
<td>Woodbridge</td>
<td>Sentara Northern VA Medical Center</td>
<td>Primary</td>
</tr>
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A current list of all The Joint Commission Primary Stroke Centers that meet the definition of Virginia Designated Stroke Centers is available at http://www.vdh.virginia.gov/stroke/virginia-stroke-systems-task-force/
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:

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

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
Post IV tPA EMS Transfer Checklist

APPENDIX A

Post-IV Tissue Plasminogen Activator (t-PA) Inter-Facility Transfer

Note: Patient will be transported with minimum of paramedic-level care. All questions regarding patient care must be referred to the receiving physician.

Receiving Hospital: ____________________________
Physician: ____________________________
Phone Number: ____________________________
Contact Number for family: ____________________________

Prior to Departure – to be completed together by ED staff and transferring paramedic:

- 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 “t-PA Dosing and Administration Communication Form” on back of this sheet
- If IV pump tubing is not compatible with transport pump:
  - Add extension tubing with a cartridge adaptable to transport pump, if available OR
  - Hold patient in ED until t-PA infusion is completed

During Transport:

- Replace t-PA bottle with 20 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 monitoring
  - Call receiving physician if hemodynamically unstable or symptomatic from tachycardia or bradycardia
- Continuous pulse oximetry monitoring
  - Apply oxygen to maintain O2 sat > 94%
- Maintain NPO including medications
- Perform and record neuro checks every 15 mins
  - Cincinnati Pre-Hospital 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
- Maintain head of bed 30 degrees

Blood Pressure Management:

- Avoid venipuncture or other invasive procedures unless absolutely necessary after t-PA start due to risk of bleeding

- Keep SBP < 180 and DBP < 105
  - IV Labetalol (10 mg) (provided by hospital)
    - Increase by 2mg/min every 10 mins (to a max of 8mg/min) until SBP < 180 and/or DBP < 105
  - IV Nitroprusside (0.1 mg/mL) infusion (provided by hospital)
    - Increase dose by 2.5 mg/hr every 5 mins (to a max of 15 mg/hr) until SBP < 180 and DBP < 105
  - If max dose of medication reached and BP remains above goal, turn off pump and call receiving physician for further instructions

Complication Management:

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

Additional Instructions

NOTE: Leave copy of MIVT or ePCR, EKG strips, and serial vital signs/neuro checks with RN at receiving hospital

Transferring Physician Signature: ____________________________ Date/Time: ____________________________

Patient Sticker – sending hospital

Patient Sticker – receiving hospital