Best Practices for EMS Time-Critical Diagnoses:

STROKE

Patient Care Policies and Procedures Toolkit
Deaths from heart attacks, stroke and trauma make up the largest collection of preventable deaths in the country. Each EMS agency can impact the care of these patients a great deal. To be successful in providing the highest standard of care to our patients and communities, we need to commit ourselves to a higher standard. We need to commit ourselves to becoming engaged partners in our respective systems of care. If we do this, we will provide greater value to our communities and the patients we serve.
INTRODUCTION

In 2016, the Office of Rural Health developed and delivered an assessment of EMS agencies related to patient care policies and practices titled, EMS Patient Care Assessment. The assessment focused on the care of patients with time critical diagnoses: stroke, STEMI, trauma and cardiac arrest. This was developed with experts in those areas. The assessment followed the model of a previous assessment of ambulance service management and leadership. For each patient care attribute in the STEMI Protocol Review, for example, there were five response options. Rather than the traditional “rate your agency on a 1 – 5 scale,” the response options were in narrative form. The options represented a “ladder” of policies/practices, from lower capacity to high capacity, representing the gold standard in patient care for that attribute.

One goal of this format is to provide examples for agencies of what a high capacity EMS service’s policy might look like regarding patient care. These can serve as a roadmap for improvement in order to become a high capacity agency. While the assessment itself can serve as this roadmap, it will also be useful to have a more detailed guide. The Patient Care Policies and Procedures Toolkit will explain why an agency may want to change their policies/practices and how they can implement them.

This document is divided into four systems of care. Each of these systems is then further divided into two primary subsections, the first being a workbook which serves as a “checklist” of completion for each of the corresponding policies and procedures manuals and the corresponding levels of achievement. Following each workbook is a development support section, again categorized by the systems’ attributes. This section provides support information, links to helpful data and more detailed explanations into the development of these attributes’ features.
Identifying strokes early and activating the chain of survival is highly correlated to the degree of survivability of a patient as well as the patient’s functionality if they survive it. Achieving the following attributes will ensure best practices for addressing stroke care.

**Gold Standard Attributes**

1. **Attribute 1: Stroke Protocol Development**
   The agency will have adopted and vetted protocols for the care of stroke patients based on recognized American Stroke Association (ASA) care guidelines.

2. **Attribute 2: Protocol Review**
   The agency will have an adopted Protocol Review Policy and system to review all care provided by the agency to the stroke patient, which includes a representative from the agency’s operations team, administration and medical director on a regular basis.

3. **Attribute 3: Stroke Care Training**
   The agency conducts regular training (more than once a year) on stroke care in cooperation with other system of care stakeholders, e.g. hospitals, other responder based providers and staff.

4. **Attribute 4: Stroke Quality Assurance Policy**
   Agency has a QA/QI policy for stroke cases, they review all cases and collect data points as it pertains to those cases. These data points are then reviewed on a regular basis with the agencies medical director.

5. **Attribute 5: Quality Assurance Review with System of Care**
   Agency’s medical director or representative meets with the receiving stroke centers on a regular basis to review the stroke case data.
Attribute 1: Protocol Development

It is important to have an up to date protocol that is specific for the treatment of stroke patients.

Gold Standard

The agency will have adopted and vetted protocols for the care of stroke patients based on recognized ASA care guidelines.

Create Current Stroke Protocol

1. **Set up** a meeting with the medical director to discuss the creation of stroke protocol.

2. **Review** ASA or other stroke accredited system guidelines

3. **Draft** stroke protocol to address the following attributes:

   - **A. Fastest possible recognition of a stroke** using accepted stroke assessments, such as the Cincinnati Stroke Scale, LAPSS or even the acronym F.A.S.T.

   - **B. Appropriate documentation** including but not limited to:
     1. Time of onset or Last Known Well
     2. FMC (First Medical Contact)

   - **C. Appropriate treatment**
     1. Including Stroke System Activation

   - **D. Correct identification** of closest and most appropriate destination facility.

4. **Vet** protocol.

5. **Adopt** protocol. Sign off by medical director.

6. **Update** protocol every 2 years by reviewing with medical director, leadership and staff.
Attribute 2: Stroke Protocol Review

Agencies need to develop a stroke protocol review policy for any time the agency receives a complaint, identifies substandard performances, or realizes adverse patient outcomes.

Gold Standard

Agency has updated standard stroke protocols and the operations officer, medical director or administration conducts regular reviews of those protocols with leadership and staff at minimum every 2 years.

Establish a Regular Review Process

1. Identify leadership and individuals (education manager, clinical coordinator, administration or specific person) responsible for protocols inside the agency.

2. Draft review policy containing the following attributes:
   - A. Define “issues” within operations and care.
   - B. Define the entry point for any incident into the review process.
     - o Receives a complaint
     - o Identifies substandard performance
     - o Experiences adverse patient outcomes
   - C. Identify the time for which a review should take place following the incident.

3. Confirm that a review of the protocol which relates to the reported issue gets reviewed during the process.

4. Identify the people who should review process and be sure to include this in policy.

5. Ensure review process includes common aspects that repeatedly need to be reviewed. These include but are not limited to:
   - A. Closest appropriate destination facility
   - B. Treatment in line with current and active ASA guidelines

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Add a communication tree and education standard for assuring compliance of any changed aspects of the protocol during a review process.

Include staff in regular reviews with operations officer, medical director or administration. Add this into education standards or their job descriptions. Ensure staff are aware of when meetings are scheduled. Consider setting multiple meetings to ensure compliance with attendance. Scheduling the event on the same day or on a regular interval will help.

Keep staff informed of any changes to policy or protocol as it pertains to stroke care.

Develop an assessment for staff that will test them on any changes to protocols or policy.

Review protocol at least once every two years.
**Attribute 3: Stroke Care Training**

Since early recognition is so important to the survivability of a patient suffering from a stroke, an agency’s training should be largely centered around this skill. It is also important to educate practitioners on foundational knowledge of how the brain works, what a stroke is, what types of strokes exist and what kind of symptoms could be expected. An agency should also review the capabilities of local hospitals and the closest stroke centers.

**Gold Standard**

Agency conducts regular training (more than once a year) on stroke care in cooperation with other system of care stakeholders, e.g. hospitals, other responder based providers and staff.

**Establish Stroke Care Training Protocol**

1. **Identify** and communicate agency training standards and skills competencies for staff.
2. **Conduct** scheduled trainings for stroke care and operations more than once a year and not in conjunction with an identified issue.
3. **Require** attendance at trainings in job descriptions or company handbook.
4. **Develop** an education calendar or procedure that clearly communicates to staff when and where trainings take place.
5. **Review** cases that involve stroke calls.
6. **Determine** educational outline and skill competencies training with medical director.
7. **Include** agency’s local stroke system of care hospitals.
   - A. Identify the closest stroke referring or receiving hospital.
   - B. Identify a point person at each of the hospitals who will engage with the agency on training events and case review.
   - C. Develop any agreements, contracts or procedures which will facilitate the transferring of stroke case information and protect sensitive material.
Attribute 4: Stroke Quality Assurance Policy

Quality assurance policies are vital to any improvement process. It implements a non-bias guide to follow and offers expectations and limits uncertainties for those involved in the process.

**Gold Standard**

Agency has a QA/QI policy as it pertains to stroke cases. Agency reviews all cases and collects data points as it pertains to those cases. These data points are then reviewed on a regular basis with the agency’s medical director.

**Adopt a Quality Assurance Policy**

1. **Identify** agency quality assurance (QA) policy and ensure updated.

2. **Establish** review process that includes stroke referring or receiving hospital.

3. **Include** the following components for a successful QA policy:
   - A. A Non-reprisal section
   - B. A defined review team
   - C. A policy creation date
   - D. Timeliness of reviews
   - E. A review sample size
   - F. A designed feedback process

4. **Adopt** a procedure to consistently pull stroke cases for review.
   - A. Identify a point person or team that is responsible for pulling the cases for review.
   - B. Identify case selection criteria, such as specific percentage of trips, random selection or care providers.
   - C. If the agency uses an electronic patient care reporting (ePCR) system, work with vendor to flag trips or pull reports electronically.

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5. **Select** data components for agency to collect, such as the following:
   - A. First Medical Contact (FMC) to Electrocardiogram (EKG)
   - B. Percentage of patients who receive a 12-LEAD EKG
   - C. On Scene Time (FMC to in route to destination)
   - D. Arrival Time at receiving facility.
   - E. Percentage of patients who receive PCI treatment within 90 minutes of FMC
   - F. Percentage of Patients who receive Fibrinolytic Therapy within 30 minutes of FMC.

6. **Define** goals for agency performance using established metrics.
   - A. If the agency uses an electronic ePCR system, work with the vendor to see if there is a way to flag trips or pull reports electronically. One tip for this is to use interventions inside of the ePCR system to pull data, since most ePCR systems can pull data based on interventions, use “alerts” as an intervention and track reports.
   - B. Use the STEMI CARD located on page 22 and adapt it into a “Stroke Card”. Have staff attach these to each stroke report after they finish their PCR.

7. **Develop** a feedback system for reviews. Create a process for getting information from the review process back to the practitioners. Some reviews may need to be done in person with the care team.

8. **Engage** medical director in review process in the following ways:
   - A. Discuss medical director responsibilities as outlined in contract.
   - B. Develop a secure, HIPAA compliant way for the medical director to access case reviews and data.
   - C. Work with medical director to develop a calendar of review dates well in advance.

8. **Be prepared** for reviews and don’t waste time.
Attribute 5: Working with Hospitals on Stroke Quality Assurance

An agency will need to identify a point person within the local system of care and set a day of the week or month (depending on volume) to have a phone conference with staff to review stroke cases. This allows for feedback from the hospital and improved outcomes for the agency.

**Gold Standard**

Agency’s medical director or representative meets with the receiving cardiac hospitals on a regular basis to review all STEMI case data.

**Establish QA Review with System of Care**

1. Identify the hospital’s point person for stroke review.
2. The agency should consider any agreements protecting the handling of PHI.
3. Identify the multi-agency clinical review team.
4. Within the review team, lay the ground rules for case review, stress education and the creation of a learning environment. Develop a non-reprisal policy to encourage open and honest feedback while preventing an environment for attacking practitioners.
5. Identify the acceptable means of communication and the expectations for meetings with the receiving hospitals.
6. Check with the hospital to see if there is an existing internal process for reviewing stroke cases.
7. Develop a feedback form for the hospital, which outlines the type of feedback the agency wants to receive, including opportunities for improvement and outcome data on stroke patients.
8. Schedule regular face-to-face meetings. Discuss cases and use root cause analysis to identify strengths and opportunities for improvements.
According to the Centers for Disease Control and Prevention (CDC), strokes kill 130,000 Americans each year, which is 1 out of every 20 deaths. This amounts to someone having a stroke every 40 seconds and one dying from a stroke every four minutes. Most recently the American Stroke Association (ASA) suggested that as many as 65% of patients with signs and symptoms of acute stroke and should access their initial medical care via EMS. As vital members of our healthcare communities, we should address these numbers with the objective reducing preventable deaths and improving outcomes for patients.

The risk of stroke varies with race, additional risk factors and even age to some degree. In addition to these risks, two very important statistics must be taken into account in order to have a successful stroke policy.

1. Patients who arrived at the emergency room within 3 hours of their first onset of symptoms have less disability 3 months after the stroke than those whom received care later.

2. Of those surveyed, only 38% were aware of all the major symptoms associated with a stroke and knew to call 911 when those were identified.

The most important thing an EMS practitioner can do for a stroke patient is to correctly identify that the patient is suffering from one as quickly as possible and getting that patient to the right hospital quickly.

It is important for EMS agencies to educate the community on the signs and symptoms of stroke and encourage the use of the 9-1-1 system as an appropriate response when recognizing those symptoms. FAST is an easy way to remember and identify the most common symptoms of a stroke.

**F.A.S.T.**

- Facial Droop
- Arm Drift
- Slurred Speech
- Time of Onset
According to the American Stroke Association, stroke protocols should concentrate on the following components.

1. Early and successful identification of the stroke

It has been found that dispatchers are capable of correctly identifying a patient suffering from a stroke 52% of the time. Consider involving dispatch center staff in stroke policy and procedures. Achieving early chain of survival activation at the time of the call could save lives. Using identification scales internally and in protocols may be a useful way to create consistency. While a few different scales exist in helping a practitioner identify strokes with an elevated level of sensitivity, the two most common are the CPSS (Cincinnati Prehospital Stroke Scale) and the LAPSS (Los Angeles Prehospital Stroke Scale). While studies debate theses scales’ abilities to identify all manner of stroke with varying acuity levels, they both show sensitivity ratios in the 80-90% range when practitioners are educated on the signs of stroke and additional associated risk factors.

RESOURCES TOOLBOX: Stroke Scale

The two most common scales used are the lapss and cpss. The links below will direct you to those scales.


2. Identification of most appropriate transport destination and logistics pathway

A link to a map of all Certified Stroke Centers in the state of Wisconsin is provided below and includes estimated drive times to each of the hospitals. These times should be taken into consideration when developing protocol. Transport the patient to the most appropriate hospital as quickly as possible. For some agencies,

RESOURCES TOOLBOX: Stroke Centers

[www.dhs.wisconsin.gov/library/p-00538.htm](http://www.dhs.wisconsin.gov/library/p-00538.htm)
this may mean incorporating other transport methods, like air transport, into the protocol. This procedure and decision-making process for appropriate destination designation should be outlined clearly. This is yet another area where integrating dispatch into the protocol can be of significant use, as they can help identify the appropriate facility nearest the location of the call.

3. System Activation

Once the appropriate location has been identified, alerting the facility of impending arrival as quickly as possible will be important in the success of patient care. Having a STROKE alert, the same as a STEMI alert or TRAUMA alert is an important part of the entire system. Be sure to identify the appropriate form of communication as it relates to the agency’s own region and system. If it is a phone call, be sure to include the number in the protocol.

4. Identification and documentation of important assessment findings

A patient’s vital signs, GCS scores, your CPSS/LAPAA scores are all obviously worth tracking. It is also very important that you identify the most accurate onset time possible, often referred to as “last time known well”. Document this with the FMC (First Medical Contact) time. This information will need to be relayed to the receiving physician.

Other Key Components of History:

- Recent Events
  - Stroke
  - MI
  - Trauma
  - Surgery
  - Bleeding
- Comorbid disease
  - Hypertension
  - Diabetes Mellitus
- Use of Medications
  - Anticoagulants
  - Insulin
  - Antihypertensive medication
5. Primary Care Objectives

The most important thing for these patients is to quickly and correctly identify that they are having a stroke and get them to the appropriate hospital as quickly as possible. While in transit, objectives will be to manage and support your patient’s ABCs. According to the ASA, care should include the following, if applicable to the agency’s scope of care and medical director’s approval.

- Manage ABCs
- Cardiac Monitor
- Intravenous Access
- Oxygen (as required O2 saturation <92%)
- Assess for Hypoglycemia

They DO NOT recommend:

- Dextrose-containing fluids in non-hypoglycemic patients
- Induced Hypotension/excessive Blood Pressure reduction
- Excessive Intravenous Fluids

An agency should review this protocol with its medical director and administration regularly. As suggested previously, doing this on every even or odd year is an effective way to start this habit, though an agency may do it more often.

Wisconsin Coverdell Stroke Program

The Coverdell Stroke Program is a robust resource developed out of the public health office. We strongly encourage EMS providers to engage in the program. It offers resources on best practices of stroke care and engagement with a community of who will review processes and care procedures. They also provide access to free education for EMS practitioners. The links below will provide direction to becoming further involved with this program if an agency so desires. Some 26 EMS agencies are already participating members.

RESOURCES TOOLSBOX: Wisconsin Coverdell Stroke Program

EMS partner agreement: www.dhs.wisconsin.gov/forms/f01647.pdf

Best practices to improve coordinated stroke care for emergency medical service professionals: www.dhs.wisconsin.gov/publications/p01158.pdf

Free stroke education for EMS: www.strokeawareness.com
Stroke Training

Since early recognition is so important to the survivability of a patient suffering from a stroke, an agency’s training should be largely centered around this skill. While this should be the core of agencies’ interventional training, do not underestimate the importance of educating practitioners on foundational knowledge of how the brain works, what a stroke is, what types of strokes exist and what kind of symptoms could be expected.

In addition to educating practitioners on the anatomy, pathophysiology and treatment of strokes, an agency should also review the capabilities of local hospitals and the closest stroke centers.

Regular training on these matters will be needed to bring an agency to the desired level of success the community deserves. For this, we recommend training on these subjects more than once a year. This provides multiple benefits; things change and regularly reviewing this information allows an agency to be current with the most up-to-date information. Most EMS agencies experience employee turnover or attrition, so to ensure that the entire system continues to operate cohesively, make sure that new staff are aware of any system policies and can show competency on important skills, protocols and procedures.

Getting local hospital and other healthcare agencies involved in training will help improve the entire stroke system of care and will ultimately improve patient outcomes.

Below is a series of foundational education information and a base outline that any agency may want to consider when developing a training regime. A key to having a successful training program is creating excitement to encourage engagement and effective communication. Create an educational calendar for staff well in advance of any events and be sure that staff are aware of where to find this calendar of events. Some agencies have found success in setting a specific day of the week, with a specific time that does not alter or change. While that method will undoubtedly cause schedule conflicts for staff, it has the benefit of creating consistency. Taking advantage of social media is also a great mechanism to share educational events as well as showing the community that an agency is dedicated to the task at hand.
**Stroke Training Outline**

### Brain Anatomy
- Brain Function Illustration
  - Parietal Lobe (Right Side: Abstract Concepts, Left Side: Speech, Motor, Sensory Functions)
  - Occipital Lobe (Vision)
  - Frontal Lobe (Smell, Thought, Behavior, Memory, Movement, Sensation, Hearing, Reasoning)
  - Temporal Lobe (Behavior, Memory, Hearing and Vision Pathways, Emotion, Language)
- Brain Stem
- Cerebellum (Balance, Coordination)
- Left vs Right Hemispheres

### Strokes
- Definition: A Brain Attack caused when tissue of the brain does not receive the blood it needs due to the pathway being “cut off”. This results in a lack of needed oxygen to the cells and eventual cell death.
- Stroke Types:
  - Ischemic
  - Hemorrhagic
  - TIA (Transient Ischemic Attack)

### Risk Factors
- Age
- Heredity and Race
- Gender
- Prior Stroke, TIA or Heart Attack
- Hypertension
- Smoking
- Diabetes
- High Cholesterol
- Obesity

### Triage and Diagnosis
- CPSS/LAPSS stroke scales
- F.A.S.T
  - Face: Does one side of the face droop?
  - Arm: Does one arm drift downward?
  - Speech: Does the speech sound slurred?
  - Time: Time to call 911 or activate your system for stroke

### Treatment
- What is tPA and are its contraindications?
- Where is my closest Stroke Center?
- Study your own Protocols

### Signs and Symptoms
- Sudden numbness or weakness in the face, arms or legs
- Trouble seeing or vision disturbance
- Sudden trouble walking, dizziness or loss of balance
- Sudden confusion, trouble talking or understanding speech
- Sudden severe headache with no known cause
**Data Measures to Collect**

These minimum data measures should be collected for each stroke case. Ideally, additional patient outcome data measures from the receiving hospitals will be available to pair with the agency’s data.

**Data Measures for Stroke:**

- Last Known Well Time
- First Medical Contact
- Was a stroke scale used to identify the stroke?
  - If so, which one?
- Was a Stroke Alert called to the receiving hospital?
- Was the destination appropriate?
- EMS TAKT times:
  - Last Known Well to arrival at appropriate destination.
  - FMC to arrival at appropriate destination.

The advantage of performing these reviews with local receiving hospitals is the ability to connect patient outcome data. In these instances, it will be beneficial to discover if specific patients received tPA or not, and if these patients survived.

One suggestion to improve engagement that has been proven to be beneficial across multiple EMS agencies has been an award system. This can be used for each of the systems of care. Essentially an agency should set goals for each of these systems of care. For stroke, this may be transport times, successful identification percentages or the ratio of successful stroke alerts called to receiving facilities. If practitioners achieve these goals, give them public recognition for doing so. This tactic becomes even more successful if receiving hospitals get engaged with the process as well.
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