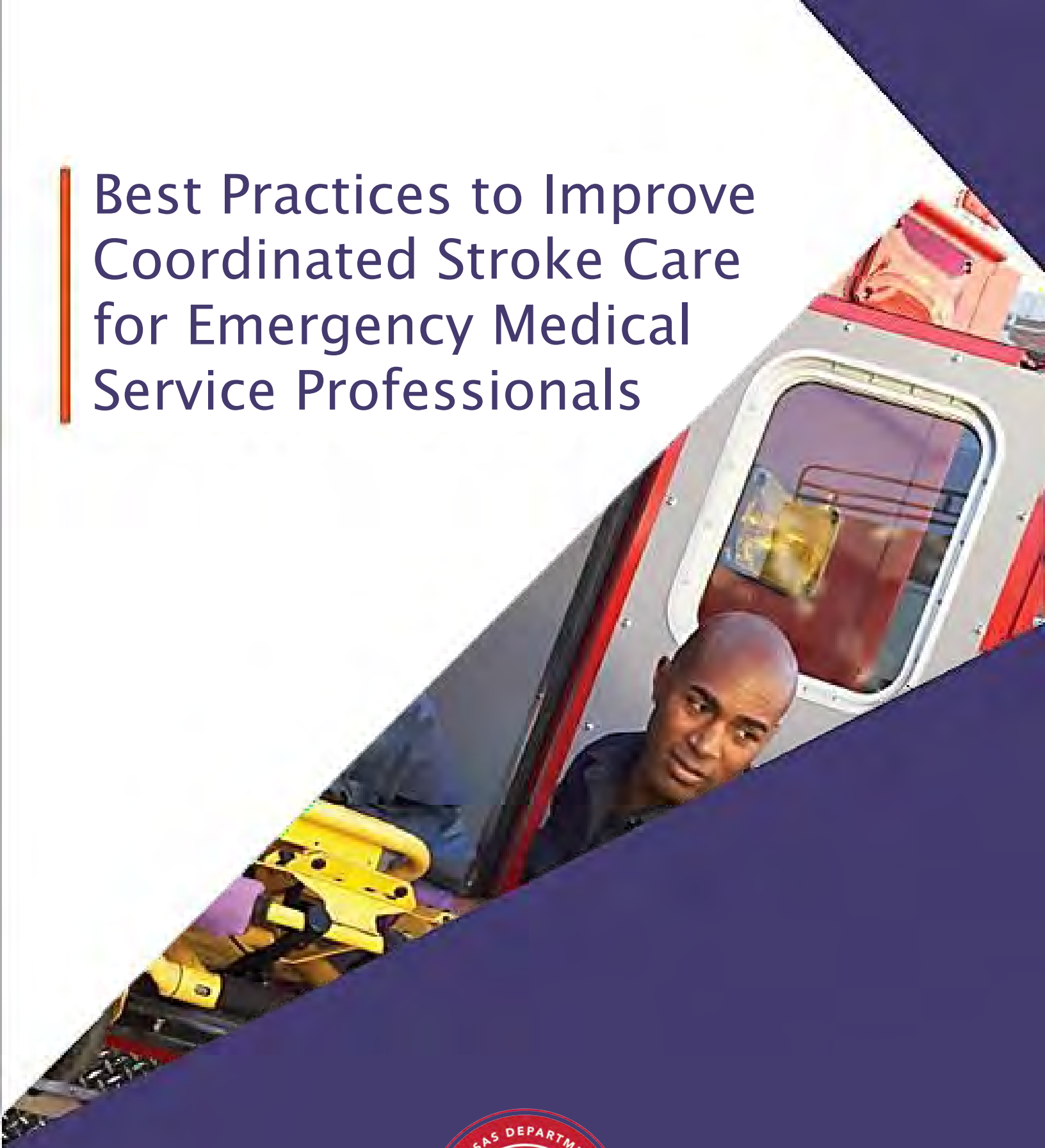
Best Practices to Improve Coordinated Stroke Care for Emergency Medical Service Professionals



ARKANSAS DEPARTMENT OF HEALTH

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For more information about the statewide stroke program:
Arkansas Stroke Program: http://www.healthy.arkansas.gov/programs-services/topics/stroke

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PRE-HOSPITAL STROKE CARE PRE-TEST

1. What acronym is commonly used for assessing a suspected stroke patient?
   a. AVPU
   b. AEIOU-TIPS
   c. BE FAST
   d. ALOC

2. Which statement about ischemic stroke is correct?
   a. It accounts for about 87% of all strokes.
   b. It accounts for about 50% of all strokes.
   c. It accounts for about 25% of all strokes.
   d. It accounts for about 10% of all strokes.

3. You are caring for a patient who you believe is suffering from a stroke. You know that you should remain on scene no longer than_____?
   a. 10 minutes
   b. 25 minutes
   c. 30 minutes
   d. There is no recommended maximum on-scene time with a stroke patient.

4. TIAs (Transient Ischemic Attacks) are currently defined as the acute onset of any focal neurological deficit that spontaneously resolves in_____.
   a. 1 hour
   b. 2 hours
   c. 6 hours
   d. 24 hours

5. Listing the steps needed to test a change is which part of the Plan-Do-Study-Act (PDSA) cycle?
   a. Plan
   b. Do
   c. Study
   d. Act

See inside back cover for answers to Pre-test.

Introduction

An acute stroke (or "brain attack") is an EMERGENCY demanding immediate and prompt action. Emergency Medical Services (EMS) are often the first healthcare providers in contact with a suspected stroke patient, making them a critical link in a patient's survival and long-term functioning. Medical advances in the past 20 years have significantly changed stroke treatment and outcomes. In the past when a stroke patient showed up in the emergency room, they were given blood thinners and often nothing more. Staff comforted patients and waited to monitor the severity of the stroke's damage before recommending rehabilitation. Now, it is widely known that there is actually a "golden hour" of treatment for most stroke patients. According to a study reported in the American Stroke Association's Stroke Journal, every delay in delivering a clot-busting drug after an ischemic stroke reduces a survivor's chance of a disability-free life. Clearly, EMS professionals play a significant role in the care and long-term outcomes of suspected stroke patients.

The purpose of this toolkit is to assist EMS agencies in consistently providing optimal stroke care and to improve care coordination among EMS agencies and hospital emergency departments (ED). This resource was created by EMS and quality improvement professionals to provide a variety of tools that support continuing education, performance improvement efforts and community education. Some of these tools include:

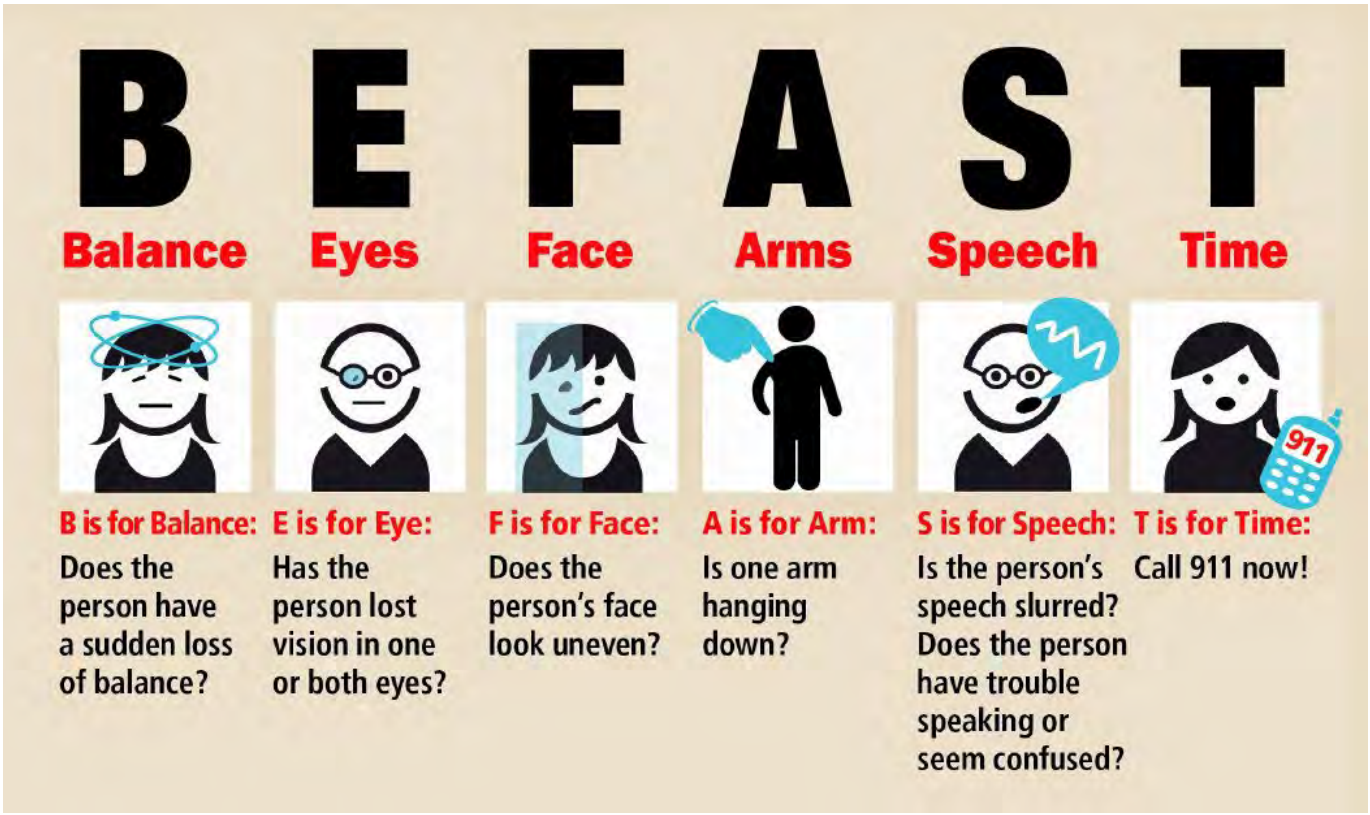
- Educational handouts about stroke
- Opportunities for stroke education
- Stroke treatment guidelines
- Sample EMS protocols/guidelines
- Ideas for stroke treatment quality improvement metrics and projects
- Information on where to learn about hospitals' level of stroke care
- Community education information and resources

Put these resources to good use! Consider the critical role EMS plays in stroke outcomes and look at how your agency can enhance training and processes to improve timely, evidence-based stroke care. To start:

1. Examine your agency's stroke protocol to make sure it meets current guidelines for EMS stroke care.
2. Ensure that all EMS crew members understand and apply best practices in caring for suspected stroke patients.
3. Collect data to track your agency's performance on stroke care metrics.
4. Work with your hospitals to coordinate communication protocols and hand-off procedures.

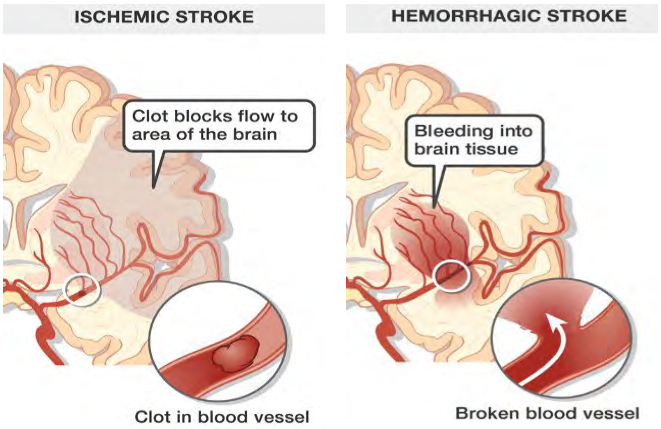
Through these efforts, you and your colleagues can help make stroke treatable and beatable for the individuals and communities you serve.

The BE FAST stroke scale is recommended over the FAST scale as it captures two additional symptoms ('B' for a sudden loss in in balance and 'E' for a loss of vision in one or both eyes):



https://www.joeniekrofoundation.com/stroke-2/b-e-f-a-s-t-save-a-life-from-stroke/

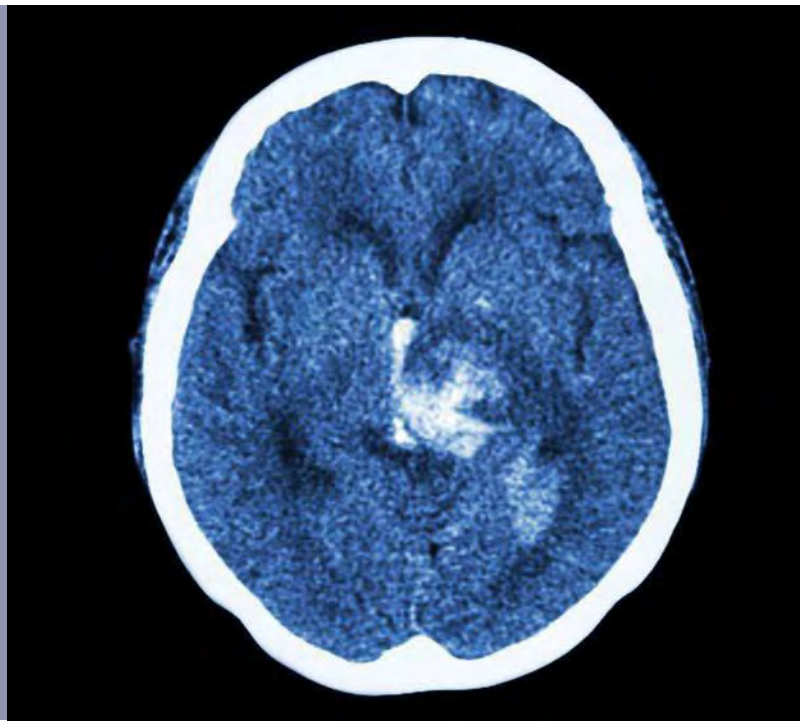
Stroke Facts and Figures



Each year, nearly 800,000 Americans experience a stroke — that is equivalent to about one stroke every 40 seconds. An ischemic stroke, sometimes called a "brain attack," is similar to a heart attack except that it happens in the brain. Clots can form in the blood vessels that lead to or are in the brain. Sometimes clots can form in other areas of the body and travel to the brain. Ischemic strokes can also be caused by too much plaque (fatty deposits and cholesterol) that can clog vessels. When a blockage occurs, it robs brain cells of the oxygen and glucose they need to survive. About 87% of all strokes are ischemic.[1] Another type of stroke, known as hemorrhagic (heh-more-raj-ik) stroke, is caused when a blood vessel in the brain ruptures or tears. When this happens, blood from the vessel seeps into the brain tissues and damages the brain cells. The most common causes of this type of stroke are high blood pressure and brain aneurysms (an-yur-isms) which can cause weakened blood vessels to burst. Patients experiencing hemorrhagic stroke are likely to complain of the worst headache of their life or they may become unconscious.

Time is Brain

This phrase refers to the rapid damage of brain cells when a stroke occurs and emphasizes the importance of recognizing and responding to stroke quickly. Researchers estimate that the average brain has between 86 and 100 billion neurons, cells that transmit information throughout the nervous system.[2] When a stroke occurs, the lack of oxygen to these cells can kill millions of neurons — about 32,000 neurons per second. For ischemic stroke, the brain ages 8.7 hours per second without treatment. Because of delays in getting treatment, about 15%–30% of stroke survivors experience some form of long-term disability.[3]



[1] http://strokeinfo.org/signsandsymptoms/stroke-facts
[2] Adapted from www.webmd.com/heart-disease/stroke#3 [3] http://www.disabled-world.com/artman/publish/brain-facts.shtml

Stroke Systems of Care

A stroke system of care refers to the several links or partners in the stroke chain of survival. These include: 1) community awareness; 2) dispatch and EMS; 3) acute stroke care provided by a small hospital or certified/designated stroke center; and 4) post-stroke care including rehabilitation services and primary care. A well- functioning stroke system requires seamless coordination among EMS, hospitals and certified/designated stroke centers. Coordinating smooth transitions of care from dispatch to EMS to hospital is essential to interrupt a stroke and prevent additional brain damage. The use of clot- busting medications known as tissue plasminogen activator (tPA)/alteplase and Tenecteplase (TNK) for ischemic strokes, but the drug needs to be delivered within 4.5 hours of when a patient first experienced symptoms. Ischemic stroke patients who experienced symptom onset greater than 4.5 hours but less than 24 hours from first medical contact may require clot removing interventions due to a potential large vessel occlusion (LVO). Hemorrhagic stroke patients are not eligible to receive tPA/ alteplase or TNK and may require other intervention therapy. EMS is often the first link in this time-critical chain of survival. How quickly EMS recognizes stroke symptoms and determines the last time the patient was known to be well will have a significant impact on patient survival and disability.

EMS should emergently transport suspected stroke patients to the nearest stroke-certified/ designated facility if symptoms are within 24 hours of onset. Certified/designated stroke centers are hospitals that meet rigorous criteria to demonstrate that they apply national guidelines in providing advanced stroke treatment. Similar to the different levels of trauma care that hospitals provide, there are multiple levels of stroke care certificaton or designation that hospitals can achieve. These include Arkansas Stroke Ready Hospitals (ArSRHs), Primary Stroke Centers (PSCs) and Comprehensive Stroke Centers (CSCs).

STROKE CERTIFIED AND STROKE DESIGNATED HOSPITALS

While most hospitals can provide a basic level of stroke care, stroke certified and stroke designated hospitals are organizations that provide stroke care according to national recommendations. Three main national organizations certify hospitals as stroke centers. However, in several states, like Arkansas, the state health department designates the level of stroke care hospitals provide based on specific criteria. More and more hospitals are becoming certified and/or designated stroke centers each year. Talk with hospitals in your region to confirm their capabilities in treating stroke.

For a current list of hospitals with national stroke certification, visit these websites:

The Joint Commission - http//:www.qualitycheck.org/consumer/searchQCR.aspx
DNV-GL - http://dnvglhealthcare.com/hospitals
Healthcare Facilities Accreditation Program (HFAP) - http://www.hfap.org/about/overview.aspx

For a current list of state designated stroke centers in Arkansas, see Arkansas Stroke System https://www.healthy.arkansas.gov/programs-services/topics/arkansas-stroke-ready-hospitals

NOTE: All UAMS IDHI Stroke Program and Mercy Telestroke participating sites in Arkansas that have not yet received official ADH designation, but are capable of providing initial acute stroke care, have been provisionally designated as Arkansas Stroke Ready Hospitals (ArSRHs). The Arkansas Department of Health is in the process of completing the official designations for these hospitals.

Stroke Centers At a Glance

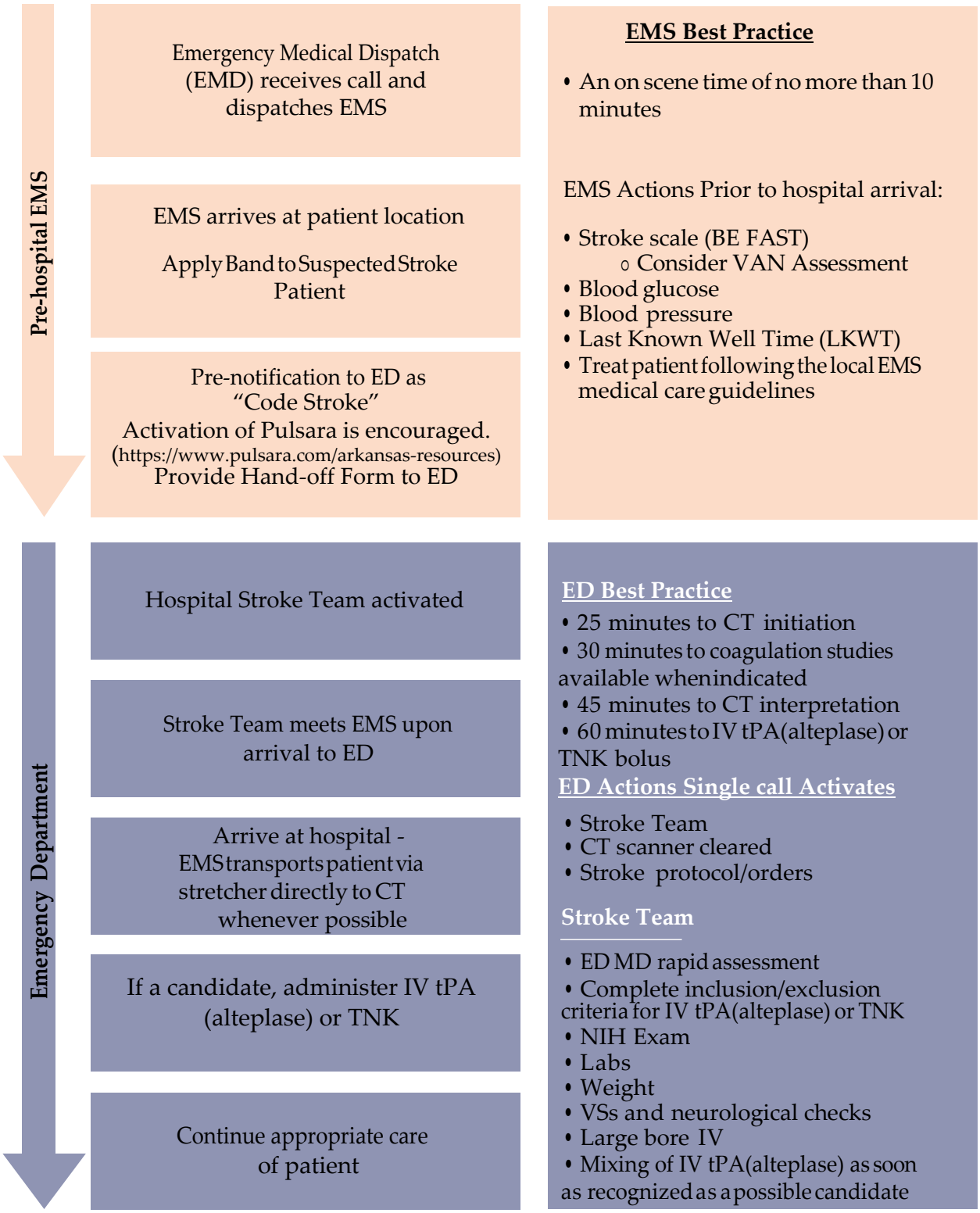
Arkansas Stroke Ready Hospital (ArSRH)
An Arkansas Stroke Ready Hospital (ArSRH) has the infrastructure and capability to care for acute stroke, including administration of intravenous tPA/alteplase and TNK. The ArSRH has fewer capabilities than a PSC but is able to diagnose, stabilize, treat, and transfer most patients with stroke. Most acute stroke patients are transferred to a CSC or PSC post-treatment.

Primary Stroke Center (PSC)
A Primary Stroke Center (PSC) has the necessary staffing, infrastructure, and programs to stabilize and treat most acute stroke patients. A PSC provides acute treatment to most patients with stroke and can admit the patient to a stroke unit (Alberts MJ, 2011).

Comprehensive Stroke Center (CSC)
A Comprehensive Stroke Center (CSC) has the personnel, infrastructure, and expertise to diagnose and treat stroke patients who require intensive medical and surgical care, specialized tests, or interventional therapies. The types of patients who might use and benefit from a CSC include, but are not limited to, patients with large ischemic strokes or hemorrhagic strokes, those with strokes from unusual causes or requiring specialized testing or therapies (e.g., endovascular, surgery), and/or those requiring multispecialty management. A CSC acts as a resource center for other facilities in their region (Alberts MJ, 2005).

TABLE 1: IDEAL PRACTICES FROM 9-1-1 TO STROKE TREATMENT

This visual highlights national recommendations for steps and timing in delivering optimal pre-hospital and acute care.



Emergency Dispatch Stroke Tool

Question About Vital Points

- What does the patient look like?
- Can the patient respond to you and follow simple commands?
- Can the patient answer your questions? Is the patient acting different from usual? Is the patient short of breath?
- Is the patient able to speak in full sentences?
- Is the patient complaining of any pain? Where is the pain located?
- Is the patient a diabetic?
- Has the patient had a seizure recently?
- Has the patient had a severe headache recently?
- Does the patient have any other medical or surgical history? What?
- Has the patient had a stroke before?
- Has the patient had any recent trauma/injury?

First Responder and Advanced Life Support (ALS) Priority Response

- Decreased or altered level of consciousness
- Difficult/noisy breathing
- Chest pain/diaphoresis
- Seizure
- Severe headache with any visual changes or loss of vision and no history of migraines
- Diabetic
- Difficulty speaking
- Confused
- Unilateral (one-sided) paralysis
- Weakness, numbness that is not focal to any one part of the body
- No breathing difficulty

Pre-arrival Instructions

- If unconscious, go to Airway Control (Nontrauma).
- Keep the patient calm.
- Do not allow the patient to move around.
- If having difficulty breathing, keep neck straight and remove pillows.
- Do not give the patient anything by mouth (to eat or drink). Gather patient's medications.
- If anything changes or the patient's condition worsens, call back immediately.

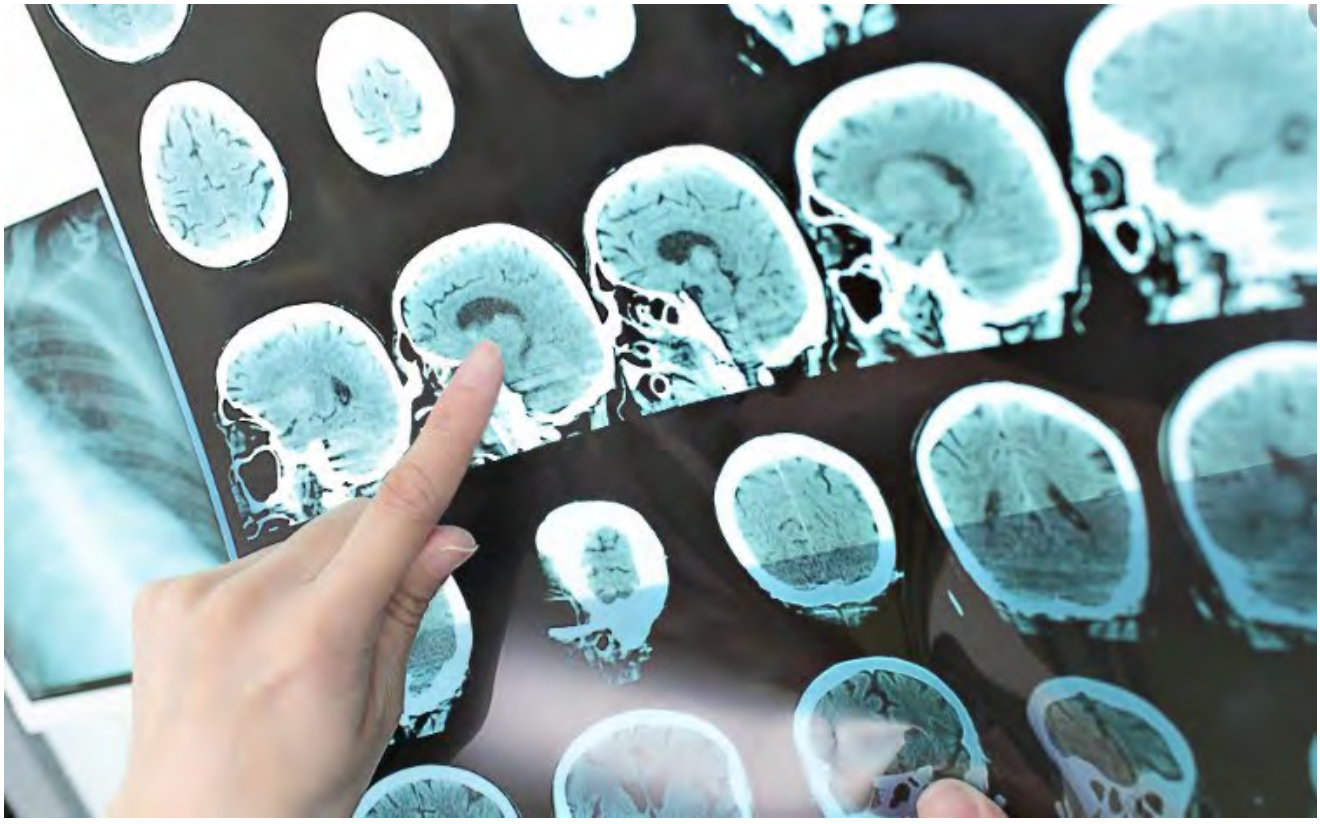
Short Hand-off Report should contain the following information

- Patient's Age
- Patient's Gender
- Chief complaint
- BEFAST Findings
- Dispatch criteria used to determine response
- Pertinent related symptoms
- Medical/surgical history
- Other agencies responding

EMS Guidelines

Best Practices for EMS Response to Stroke

How EMS responds to stroke patients in the first few minutes can have a profound impact on treatment options and long-term outcomes for those patients. Rapid assessment is the key in identifying suspected stroke. The following pages present evidence-based stroke care guidelines for EMS and sample protocols to use in your agency. Please compare these guidelines with the ones currently being utilized by your EMS Agency. Discuss any differences identified throughout this process with the service director and your EMS medical director.



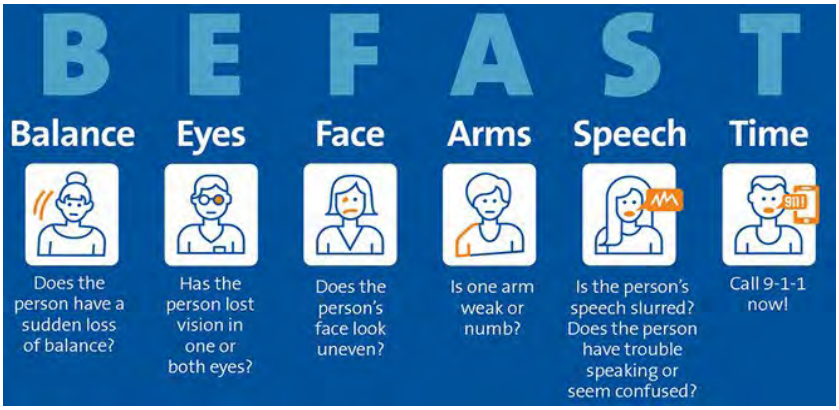
[6]American Heart Association (2011). Advanced Cardiovascular Life Support Provider Manual.

ADH Stroke EMS Assessment and Management Guidelines

Prompt stroke recognition and treatment by EMS is a critical component of acute stroke care. As an integral part of the Arkansas Stroke System of Care, EMS will use a standarized prehospital treatment guideline for suspected stroke patients.

Initial Medical Care:

- Manage ABC's (Airway, Breathing and Circulation) Titrate oxygen to bring oxygen saturation to 94% or greater.
- Perform a pre-hospital stroke assessment using the Balance, Eyes, Face, Arms, Speech and Time (BE FAST) and report those findings to the receiving emergency department as soon as possible. NOTE: if BE FAST exam is positive, do not treat hypertension in the field. Consider additional stroke assessment tool such as VAN (Visual, Aphasia, Neglect) to include assessment for LVO depending upon LKWT/symptom onset.
- When completing the ePCR, use the stroke scale that your EMS service prefers: the Los Angeles Pre-Hospital Stroke Scale, Cincinnati Pre-Hospital Stroke Scale, Miami Emergency Neurologic Deficit (MEND), or other nationally recognized Stroke Scale such as BEFAST.
- Elevate head of bed 15-30 degrees if BP is greater than 90 mmHg.
- Protect paralyzed limbs from injury.
- Keep head, neck and spine in neutral alignment. Do not flex neck.
- Provide IV access.
- Obtain and record blood glucose levels (if less than 60, treat per appropriate guideline).
- Length of time symptomatic and Last Known Well Time (LKWT). If less than 4.5 hours the patient is a candidate for thrombolytic intervention and may be a thrombectomy candidate if symptom onset is less than 24 hrs
- Obtain a Glasgow coma scale and BE FAST stroke scale. Note any changes from the known baseline.
- Complete Neuro/Stroke Alert while enroute to the hospital using "Code Stroke".
- If seizures occur, treat per seizure protocol.



The Glasgow coma scale		
Best motor response	**Best verbal response**	**Eye opening**
6 Obeying commands	**5** Oriented (time, place, person)	**4** Spontaneous
5 Localizing to pain	**4** Confused conversation	**3** In response to speech
4 Withdrawing to pain	**3** Inappropriate speech	**2** In response to pain
3 Flexor response to pain	**2** Incomprehensible sounds	**1** None
2 Extensor response to pain	**1** None	
1 No response to pain		

Suspected Stroke/Transient Ischemic Attack

Aliases

Cerebrovascular accident (CVA)
Transient ischemic attack (TIA)

Patient Care Goals

1. Detect neurological deficits
2. Determine eligibility for transport to a stroke center
3. Identify patients who have potentially sustained a stroke involving a large vessel occlusion (LVO)

Patient Presentation

1. Neurologic deficit such as facial droop, localized weakness, gait disturbance, slurred speech, altered mentation, sudden onset of dizziness/vertigo
2. Hemiparesis or hemiplegia
3. Dysconjugate gaze, forced or crossed gaze (if patient is unable to voluntarily respond to exam, makes no discernible effort to respond, or is unresponsive)
4. Severe headache, neck pain/stiffness, difficulty seeing

Inclusion Criteria

Patient has signs and symptoms consistent with stroke or transient ischemic attack (TIA)

Exclusion Criteria

1. If glucose less than 60 mg/dL (deciliter), treat per the Hypoglycemia Guideline
2. If trauma and Glasgow Coma Score (GCS) less than or equal to 13, treat per the Head Injury Guideline and General Trauma Management Guideline

Patient Management

Assessment

1. Use a validated prehospital stroke scale that may include, but is not limited to:
   a. Facial smile/grimace – ask patient to smile
   b. Arm drift – close eyes and hold out arms for count of 10 seconds
   c. Speech – ask patient to say "You can't teach an old dog new tricks"
2. Use a validated prehospital stroke severity scale that may include, but is not limited to:
   a. Vision changes
   b. Sensory neglect
   c. Aphasia
3. Pertinent historical data includes:
   a. History – "last known well" and source of that information
   b. Neurologic status assessment [See Appendix VII. Neurologic Status Assessment]
   c. Patient is taking warfarin or any anticoagulant medication
   d. History of recent trauma
   e. History of recent seizure
   f. History of recent surgery
   g. History of recent hemorrhage (e.g., GI bleed)

4. Evaluate for the presence of stroke mimics including:
   a. Hypoglycemia
   b. Seizure
   c. Sepsis
   d. Migraine
   e. Intoxication

Treatment and Interventions

1. Determine "last known well" time
2. Administer oxygen as appropriate with a target of achieving 94–98% saturation
3. If seizure activity present, treat per Seizures Guideline
4. Check blood glucose level (BGL)
   a. Treat only if glucose less than 60 mg/dL
5. Acquire 12-lead EKG, if possible
6. Early hospital notification per local stroke plan that should include any suspected large vessel occlusion (LVO) stroke

Patient Safety Considerations

1. Prevent aspiration – elevate head of stretcher 15–30 degrees if systolic BP greater than 100 mmHg
   a. Maintain head and neck in neutral alignment, without flexing the neck
2. Protect paralyzed limbs from injury
3. Avoid multiple IV attempts

Notes/Educational Pearls

Key Considerations

1. Transport and destination decisions should be based on local resources and stroke system of care
   a. Destination hospitals may include:
      i. Stroke Ready
      ii. Primary Stroke Center
      iii. Thrombectomy-capable Stroke Center
      iv. Comprehensive Stroke Center
2. Time of onset of stroke or last known well is critical data for patient treatment
   a. Positive stroke scale with time of onset or last known well less than 4½ hours may be eligible for thrombolytic agents
   b. Positive stroke severity scale with time of onset or last known well less than 24 hours may be eligible for mechanical thrombectomy
      i. Consider transport to hospital capable of mechanical thrombectomy per local stroke plan
3. Do not treat hypertension
4. Place on cardiac monitor
5. **Pediatrics**:
   a. Treatment principles remain the same
   b. Although rare, pediatric patients can have strokes

c. Stroke scales are not validated for pediatric patients
d. The EMS crew should call ahead to make sure that the hospital can manage the patient

Quality Improvement

Associated NEMSIS Protocol(s) (eProtocol.01) *(for additional information, go to www.nemsis.org)*

- 9914145 – Medical - Stroke/TIA

Key Documentation Elements

- "Last known well" must be specific
  - If the patient was last known well prior to bedtime the night before, this is the time to be documented (not time the patient woke up with symptoms present)
- Blood glucose results
- Specific validated stroke scale used and findings
- Time of notification to receiving hospital

Performance Measures

- Documentation of time "last known well"
- Use of validated stroke scale
- Blood glucose level obtained
- Minimize EMS scene time
- Hospital stroke team pre-arrival alert or activation occurred as early as possible after positive stroke assessment finding
- ***National EMS Quality Alliance (NEMSQA) Performance Measures*** *(for additional information, see www.nemsqa.org)*
  - *Stroke—01: Suspected Stroke Receiving Prehospital Stroke Assessment*
    NOTE: This measure can only be evaluated if EMS documentation can be combined with information provided by the receiving hospital

References

1. Kleindorfer, D, Towfighi, A, et al. 2021 Guideline for the Prevention of Stroke in Patients With Stroke and Transient Ischemic Attack: A Guideline From the American Heart Association/American Stroke Association, *Stroke* 2021;52:e364–e467.

Revision Date

March 11, 2022



ARKANSAS STROKE BANDS

Q&A

What are stroke bands?

Stroke bands are bright blue colored wristbands with a unique alpha-numeric sequence. Each band starts with an "S" followed by six digits. The band identifier is used to link together a stroke patient's pre-hospital and hospital data.

Who receives a stroke band?

Patients who present with stroke-like symptoms and test positive on a validated stroke scale.*

What is the EMS provider's role?

EMS providers shall place a stroke band on all suspected stroke patients* and document the stroke band identifier in the patient's record.

What is the hospital's role?

Hospitals shall place a stroke band on all suspected or confirmed stroke patients* and document the stroke band identifier in the patient's EHR and the Arkansas Stroke Registry.

What happens if EMS brings a stroke patient to the ER without a stroke band?

ER staff shall band the patient, inform EMS to write the identifier on their run sheet, and document it in the patient's record.

When should I remove the stroke band?

Following neurologic assessment by the hospital stroke team and a TIA/stroke is ruled out.

*A Stroke Band should be placed on a patient in the event they do not test positive on a validated stroke scale but the provider has a high index of suspicion for stroke.

Need more?

Email **stroke.bands@arkansas.gov** to order more bands.

healthy.arkansas.gov

IDHI Stroke Program
Acute stroke IV alteplase Critical Care Orders during Transport

Patient Name:_____ Date Initiated:_____ Time Initiated:_____
Allergies:_____
_____

1. Transfer patient to: _____
2. NPO including medications. **NO** heparin, warfarin, aspirin, Plavix, Aggrenox, Lovenox, Fragmin, Pradaxa, Xarelto, or Eliquis for 24 hours from start of alteplase infusion
3. Oxygen at 2 liters/minute per nasal cannula if needed to keep O2 Sat greater than 94%
4. Continuous ECG monitoring
5. Continue IV alteplase infusion at ml/h for a total of 60 minutes. **Efforts should be made to not interrupt the infusion. Upon completion of alteplase infusion, without flushing, start normal saline at the alteplase infusion rate for 30 minutes to ensure patient receives the remaining alteplase dose in the IV tubing.**
6. Vital signs and neuro checks:
   - every 5 minutes if patient received blood pressure (BP) medications until BP is controlled to less than 180/105
   - every 15 minutes for 2 hours after the start of alteplase infusion, then
   - every 30 minutes for 6 hours, then every one hour
7. Bleeding Precautions: Check puncture sites for bleeding or hematoma. Apply digital pressure or pressure dressing to active compressible bleeding sites. Evaluate urine, stool, emesis or other secretions/drainage for blood.
8. Once alteplase is administered, maintain systolic BP less than 180 and diastolic BP less than 105. (AVOID HYPOTENSION).

   Labetalol 10 mg slow IV push over 1 to 2 minutes. May repeat or double dose every 10 minutes to maximum dose 100 mg per day. Hold if HR is less than 50.

   OR

   Labetalol 10 mg slow IV push over 1 to 2 minutes, then continue or maintain Labetalol drip at 2- 8 mg/minute.

   OR

   Nicardipine 5 mg /hour infusion as initial dose and titrate to desired effect by increasing dose by 2.5 mg / hour every 5-15 minutes to maximum of 15 mg / hour.

   For systolic BP 180-220 and/or diastolic BP 105-120 (on 2 readings 5 minutes apart):

   Labetalol 10 mg slow IV push over 1 to 2 minutes. May repeat or double dose every 10 to 20 minutes up to maximum dose 100 mg. Hold if heart rate is less than 50.

   OR

   Labetalol 10 mg slow IV push over 1 to 2 minutes, then continue or maintain Labetalol drip at 2 to 8 mg/minute.

   OR

   Clevidipine 1–2 mg/h IV, titrate by doubling the dose every 2–5 min until desired BP reached; maximum 21 mg/h
9. Call attending Dr._____at the IDHI Stroke Program Call Center 877-262-4491 immediately for evidence of bleeding, neurological deterioration, or vital signs outside of the following parameters:
   - Systolic blood pressure greater than 180 or less than 110
   - Diastolic blood pressure greater than 105 or less than 50
   - Pulse less than 50
   - Respirations greater than 24 or less than 12
   - Decline in neurological status or worsening stroke symptoms
10. Intake and output during transport.
11. Activity: Bedrest.
12. Aspiration Precautions: Elevate Head of Bed to 30º
13. IV fluids: ☐ 0.9 % Normal Saline at 1ml/kg/hour (Do not mix with alteplase – Infuse in separate IV Line) or as ordered by MD

NOTE: All IDHI Stroke Hospitals have EMS transport orders for post tpa/tnk patient transfers that are to be given to the EMS crew transporting the patient to a higher level of care facility post thrombolytic treatment.

Signature:_____ Date/Time:_____

IDHI Stroke Program
Acute Stroke Post Tenecteplase TNK Critical Care Orders during Transport

Patient Name:_____ Date Initiated:_____ Time Initiated:_____
Allergies:_____

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1. Transfer patient to: _____
2. NPO including medications. **NO** heparin, warfarin, aspirin, Plavix, Aggrenox, Lovenox, Fragmin, Pradaxa, Xarelto, or Eliquis for 24 hours from start of alteplase infusion
3. Oxygen at 2 liters/minute per nasal cannula if needed to keep O2 Sat greater than 94%
4. Continuous ECG monitoring
5. Vital signs and neuro checks:
   - every 5 minutes if patient received blood pressure (BP) medications until BP is controlled to less than 180/105
   - every 15 minutes for 2 hours after the administration of Tenecteplase, then
   - every 30 minutes for 6 hours, then every one hour for 16 hours
6. Bleeding Precautions: Check puncture sites for bleeding or hematoma. Apply digital pressure or pressure dressing to active compressible bleeding sites. Evaluate urine, stool, emesis, or other secretions/drainage for blood. NO heparin, warfarin, aspirin, Plavix, Aggrenox, Lovenox, Fragmin, Pradaxa, Xarelto, or Eliquis for 24 hours from start of alteplase infusion.
7. Maintain systolic BP less than 180 and diastolic BP less than 105. (AVOID HYPOTENSION).

Potential thrombolytic patients and post thrombolytic care
treat blood pressure if
Systolic >180mmHg and/or Diastolic >105mmHg

Labetalol 10 mg IV	Followed by continuous IV infusion 2-8mg/min	
OR		
Nicardipine 5mg/h IV	Titrate up by 2.5mg/h every 5-15 min	Maximum 15mg/h
OR		
Clevidipine 1-2 mg/h IV	Titrate by doubling the dose every 2-5 min until desired BP reached	Maximum 21 mg/h
OR		
Hydralazine 5 or 10 mg	Repeat every 2-5 minutes	

Notify neurologist if diastolic blood pressure is less than 50

8. Call attending Dr._____at the IDHI Stroke Program Call Center 877-262-4491 immediately for evidence of bleeding, neurological deterioration, or vital signs outside of the following parameters:
   - Systolic blood pressure greater than 180 or less than 110
   - Diastolic blood pressure greater than 105 or less than 50
   - Pulse less than 50
   - Respirations greater than 24 or less than 12
   - Decline in neurological status or worsening strokesymptoms
9. Intake and output duringtransport.
10. Activity: Bedrest.
11. Aspiration Precautions: Elevate Head of Bed to 30º
12. IV fluids: ☐ 0.9 % Normal Saline at 1ml/kg/hour or as ordered by MD

Signature:_____ Date/Time:_____

Quality Improvement Tools

EMS can face a variety of barriers in delivering ideal care. Consider whether some of these typical barriers affect your agency. Then, consider implementing one or more of the Quality Improvement (QI) activities to address those barriers.

Barriers to Ideal Practices	Sample QI Activity
Working with dispatch to identify suspected stroke	Work with dispatchers on screening questions that can be used in the event of a suspected stroke
Stroke symptoms that mimic other conditions	Review the use of the BE FAST Pre-hospital Stroke Scale and do mock patient assessments
Too much time spent on the scene	Practice "Code Stroke" Mocks
Lack of destination protocols	Identify hospitals' level of stroke care
Identifying the patient's Last Known Well Time (LKWT)	Work with EMS providers on sample questions to determine the LKWT
Pre-notifying hospital with "Code Stroke"	Coordinate with the receiving hospital on a pre-notification process
Lack training on stroke guidelines	Online courses, refresher courses, and stroke education with local hospitals, EMS QI toolkit
Communicating critical patient data and coordination of handoff	Develop a communication tool to support the patient hand-off between EMS and hospitals
Documenting run data accurately	Perform a quarterly audit of stroke reports to verify adherence to stroke protocol and documentation of stroke performance metrics on the run sheet
Lack of feedback from hospitals	Coordinate with the stroke coordinator, EMS coordinator or ED team to get feedback on defect free care; ask to attend QI meetings to discuss cases
Implementing and monitoring stroke performance improvement	Use Quality Improvement (QI) tools to support your work around improving stroke care in your community and in the pre-hospital setting

BARRIER: WORKING WITH DISPATCH TO IDENTIFY A SUSPECTED STROKE

Sample QI Activity: Work with dispatchers on sample screening questions that can be asked in the event of a suspected stroke (See Best Practices for Emergency Medical Dispatch).

Put it to Action: 9-1-1 received a phone call from a patient's wife who says he is very confused. The wife reports that they were eating breakfast and he spilled coffee all over his shirt, then he started talking funny. Some screening questions for dispatch to determine if this is a possible stroke include:

1. Was the change in your husband's behavior sudden? Did this just happen at the breakfast table, or did you notice anything odd earlier in the morning?
2. Spilling his coffee may be a sign of arm weakness. Ask the wife to check if he can raise his arms. Are both arms the same?
3. Does your husband take any medications for blood sugar, blood pressure or cholesterol?

BARRIER: STROKE SYMPTOMS THAT MIMIC OTHER CONDITIONS

Sample QI Activity: Review the cerebrovascular accident (CVA)/stroke protocol for your agency and make sure that a neuro assessment is included. Perform mock patient assessments to better understand stroke symptoms and common mimics.

Put it to Action: The BE FAST scale predicts the likelihood that a patient's symptoms are related to stroke. Here are some common signs and symptoms of stroke:

- Facial drooping
- Sudden loss of balance
- One-sided weakness or numbness, in the arms or legs or face
- Trouble walking, dizziness, loss of balance
- Speech that is slurred or garbled, or not making sense
- Visual disturbances, such as blurry vision or double vision in one or both eyes
- Severe headache

Your agency can do mock patient assessments to practice identifying stroke and stroke mimics. Common stroke mimics include:

- Low blood sugar (hypoglycemia)
- Vertigo
- Migraine headache
- Bell's Palsy
- Residual symptoms left over from a previous stroke

But what if you're still not sure? You can only gather so much information in the pre-hospital setting. If you are unsure, it is appropriate to notify the hospital with a "code stroke" alert.

BARRIER: TOO MUCH TIME SPENT ON SCENE

Sample QI Activity: Include an "on-scene time limit" on your CVA/stroke protocol and perform a mock stroke code.

Put it to Action: Add an on-scene time goal to your stroke protocol, such as "limit scene time to 10 minutes." Research shows that EMS stroke protocols that include specific guidelines for on-scene time are more likely to reduce on-scene times than those with no or general timing instructions. Here are some ideas to minimize scene time:

- Know what questions to ask the patient/family to determine Last Known Well Time (LKWT).
- Ask the family member to ride along in the back of the rig to answer questions on the way to the hospital. If no family member is available, get a cell phone number.
- Obtain the patient's medications and bring them along to the hospital.
- Complete patient assessment and treatment in the moving ambulance. This includes assessment to include BE FAST, blood glucose, 12-lead and IV.
- If the patient is capable and willing, consider having the patient walk to the ambulance. This gives the EMT additional opportunity to assess the patient's gait, arm movements, etc.
- Know your hospital destination so that family members or others can be advised without delay.

Put it to Action: Get a team of people together to perform a mock stroke code. A simple mock code can be done in a short period of time with everyone in the same room:

1. Assign one person to be in charge of running the mock code.
2. Give people name tags so their role in the code is clear: dispatch, first responder 1, first responder 2 (driver), patient, patient's daughter.
3. Have the leader read a description of the dispatch call.

   Example: The patient's daughter drove over to her father's house after receiving a strange phone call from him. She called 9-1-1 after finding him slumped over on his chair. He appears to be very confused and doesn't know what is going on.
4. Ask the "dispatcher" to practice assessment questions in order to get more information about the patient's condition and the possible reason for the 9-1-1 call.
5. Instruct "first responder 1" and "first responder 2" to walk through the steps of arriving at the patient's home, doing a quick assessment and loading the patient. Talk through steps that you will take to minimize on-scene times.

BARRIER: LACK OF DESTINATION PROTOCOLS

Sample QI Activity: Identify hospitals' level of stroke care.

Put it to Action: Review and display a list and/or map of stroke certified or stroke designated hospitals in your area. EMS should deliver patients to the most appropriate hospital. This state-level recognition identifies hospitals that provide a specific level of stroke care according to criteria specified by the state. NOTE: All UAMS IDHI and Mercy Telestroke participating sites in Arkansas that have not yet received official designation however are capable of providing initial acute stroke care. These sites have been provisionally designated as Arkansas Stroke Ready Hospitals (ArSRHs). The Arkansas Department of Health is the process of completing the official designations for these hospitals.

BARRIER: IDENTIFYING THE PATIENTS' LAST KNOWN WELL TIME (LKWT)

Sample QI Activity: Work with EMS providers on sample scenarios and questions to determine the LKWT.

Put it to Action: Identifying the time the patient was LKWT (or at baseline), is essential to determine if emergent treatment can safely be used. Here are some tips to help you accurately document a patient's LKWT:

- If the patient or family reports that the patient was last normal "_____minutes ago," convert that to a clock time and verify that with the patient/family, for example, "so that would be about 2:15 this afternoon?" and then record as 14:15.
- Stroke patients are not always the best historians or may not be able to communicate clearly so getting any information you can from the family or bystanders is important.
- Having a specific time documented using the 24-hour clock avoids any miscommunication as the patient is seen by various providers in the ED.
- If symptoms resolved and returned, determine the LKWT before the first episode as well as the most recent episode. Make sure to determine if all symptoms completely resolved between episodes or if any symptoms remained.

Put it to Action: If asked when symptoms started, people often identify the time symptoms were first noticed. It is important to clarify:

- Is that when you first noticed the symptoms or when you last remember being normal?
- What were you doing when you noticed the symptoms? What were you doing before that? Was everything normal?
- What is your normal routine? Did you have problems with that today?
- If symptoms were present upon wakening, what time did you go to bed last night? Did you get up during the night? Did you have any problems then?

If you are unsure of the patient's Last Known Well Time, try to help the patient identify a timefram

- What was on TV when you last remember being normal?
- What time did you get home? What did you do after that?
- What time did you talk to your daughter? Can we get her phone number to call her and see if she remembers what time it was?
- What time did you get up? Talk me through your morning routine and when you first noticed something was different.

Put it to Action: Case study to determine the patient's Last Known Well Time (LKWT):

- 9-1-1 was called at 10:05AM — "I think my dad is having a stroke."
- EMS arrived to the scene at 10:18AM.
- The son, John, said, "I arrived about 20 minutes ago and noticed that the right side of my dad's face wasn't moving normally and he was having a hard time using his right arm, especially the hand. I think his speech sounds slurred too."
- The patient, Paul, was asked when the symptoms started. "I was fine until about five minutes before John arrived. I couldn't keep hold of the starter handle on the mower. Every time I tried to pull the starter, my hand slipped off."

Do you have enough information to determine Paul's LKWT? What else do you need to know? We know what time John and Paul noticed the symptoms, but that doesn't tell us when Paul was last normal.

- Paul was asked to talk through his morning routine to determine if he was truly normal at any time after waking.
- Paul got up at 7:30AM, used the bathroom and made coffee. He ate breakfast and took a shower without any difficulty.
- John called about 45 minutes before he arrived to say he was running some errands and would stop by. Neither John nor Paul noted any slurred speech during the conversation.
- About 5–10 minutes after John called, Paul went to get more coffee. He remembers it seemed very heavy and he ended up spilling coffee all over his shirt. He cleaned up the coffee on the floor, but had to use his left arm because he kept dropping the sponge with his right arm.

Given this sequence, the last time Paul was known to be normal was when he spoke to John on the phone. What time was it?

- John arrived about 20 minutes before EMS arrived at the scene, approximately 9:58AM. He spoke to his father on the phone about 45 minutes before then, approximately 9:13AM.
- When asked if 9:13AM sounded right, John said, "I would say 9:15. Dad asked what time I would be there and I had to look at my watch to estimate when I would arrive."
- LKWT is 09:15 (make sure you're using a 24-hour clock).

BARRIER: LACK OF TRAINING ON STROKE GUIDELINES

Sample QI Activity: Have EMS staff take courses like the UAMS IDHI Stroke Program live and online courses for stroke and an annual refresher course. A list of Stroke Education Resources can be found below. When possible, have EMS personnel participate in stroke protocol and educational opportunities that are offered in your region, especially by your local hospitals.

Put it to Action: New employees should review the CVA/Stroke protocol upon hire and receive an orientation on the protocols for patient handoff and the process for filling out and leaving a run report. Coordinate with area hospitals to involve/invite EMS to stroke education opportunities. Make sure that EMS is involved with any mock code strokes that are put on by the hospitals. Contact your EMS Medical Director and discuss the need for stroke education. Specific resources to support stroke refresher training are listed in the back of this toolkit.

BARRIER: COMMUNICATING CRITICAL PATIENT DATA / COORDINATION OF HANDOFF

Sample QI Activity: Work with your local hospitals to define what information, in what order and to whom it should be communicated during the patient handoff. Develop a tool to support the communication process of critical patient information.

Put it to Action: Use an SBAR Communication tool to support the handoff between EMS and hospitals. Situation Background Assessment and Recommendation (SBAR) is an evidence-based communication tool used to make sure that the right information gets to the right people in the shortest timeframe:

- **Situation:** Urgent Concerns, age, sex, chief complaint
- **Background:** History of present illness, high–risk medications
- **Assessment:** General impressions, pertinent findings, vital signs, pain level
- **Recommendations/Recap:** Treatment provided, response to interventions

Let's give it a try for a stroke patient:

- **Situation:** Our patient is a 68-year-old male with an altered state of consciousness and right-sided weakness. His wife reports that he started acting funny around dinner time (about 45 minutes ago, around 6PM). I called the hospital with a "code stroke" alert.
- **Background:** Mr. Johnson does have a history of atrial fibrillation, but he does not take medicine because he had an ablation for it 5 years ago. He takes aspirin twice per day and took his dose this morning.
- **Assessment:** The patient has a blood pressure of 165/106, pulse of 102, oxygen at 98 and appears to be in no pain. He has a facial droop, weakness in his right arm and can follow some commands; he does appear to be a bit confused.
- **Recommendations/Recap:** Mr. Johnson is exhibiting stroke-like symptoms. His Last Known Well time is around 6PM this evening. His wife is on her way to the hospital and will be there in approximately 10 minutes.

Put it to Action: Use an EMS communication board in the patient's room to document critical information during the verbal report. This ensures that the same information is provided to the various providers involved in the patient's care.

Put it to Action: Meet with the hospital EMS coordinator, stroke coordinator and/or ED staff to develop a written protocol for the patient handoff process. The protocol should address the following elements at a minimum:

- Where should the stroke patient should be taken?
- What information should be given to the ED staff (written or verbal)?
- In what form should the information be delivered (run sheet, paper form, piece of paper, verbal report)?
- Which ED staff should receive the information?
- Where and when should the EMS run sheet be left or transmitted?

Once a protocol is established, work with your EMS staff to make sure they are aware of this process. It is also advisable to pull area EMS agencies and hospitals together to ensure as much consistency as possible.

BARRIER: COMPLETE DOCUMENTATION OF RUN DATA

Sample QI Activity: Perform a quarterly audit of stroke run sheets to verify adherence to stroke protocol and documentation of stroke performance metrics on the run sheet.

Put it to Action: Every quarter pick five (or up to 10%) stroke run sheets to audit. This can be done using paper run sheets or electronic records. Check each run sheet for this information:

- Patients correctly identified as stroke (may require feedback from hospital)
- Patients for whom the BE FAST (or other neurological assessment) was performed
- Patients for whom the BE FAST (or other neurological assessment) was positive either in triage on arrival or by EMS and the patient was transported immediately to CT on arrival.
- Patients for whom the Last Known Well Time (LKWT) is documented and recorded as a clock time
- Patients for whom glucose level was checked
- Patients for whom the hospital was notified en route of a suspected stroke
- Patients for whom scene time was kept to less than 10 minutes

After the audit is complete, compile and share the results with EMS staff on a report card. Set goals to increase adherence to the stroke protocol and run sheet documentation. Take this opportunity to educate and remind staff of the importance of data collection and how the care that is provided pre-hospital is instrumental to patient outcomes. Here is an example of a report card:

EMS Performance Metrics	Q1 2022	Q2 2022	Q3 2022	Q4 2022	Q1 2023	Q2 2023
1. Percentage of primary provider impression of CVA confirmed as stroke						
2. Percentage of stroke cases for whom the BE FAST scale was performed and documented						
3. Percentage of patient cases for whom the Last Known Well Time was recorded as a clock time						
4. Percentage of stroke cases for whom the glucose level was checked						
5. Percentage of stroke cases for whom the hospital was notified en route of a "code stroke"						
6. Percentage of potential stroke patients whose scene time was kept to less than 10 minutes						

Put it to Action: Develop a Stroke Quality Improvement Initiative Project Plan. This project plan is used to plan and coordinate the work of a specific quality improvement project. It defines the scope, resources, objectives and execution of a project. You may choose to take a key activity from your Stroke Quality Improvement Plan and develop it further by putting it into a project plan to guide the project.

STROKE QUALITY IMPROVEMENT INITIATIVE PROJECT PLAN

EMS Name: Lakewood Community EMS

Project Leader: Berry (EMS Educator)

Project Title: Adherence to Stroke Protocol and documentation on run sheet data

Team Members/Roles:

- Berry (EMS Educator): oversees project plan and helps group stay on task
- Kristina (Admin Assistant): audits run sheets and collects data
- John (EMS Medical Director): oversees project implementation and communicates results to EMS staff.
- Jake F. (Paramedic): liaison to EMS staff and support this project

Opportunity Statement: Describe why you are intiating this effort:

Our goal is to provide defect-free care to all suspected stroke patients.

Objectives: Describe what the project aims to accomplish. SMART (Simple, Measurable, Attainable, Results–Oriented and Time–Bound):

The objective of this project is to identify if pre-hospital providers are adhering to the Stroke protocol and properly documenting information on the run sheet for suspected stroke patients. After baseline data, we will set compliance goals.

Key Stakeholders:

- Suspected Stroke patients and their families
- Local Stroke Ready Hospital
- Emergency Services
- Department of Health

Metrics: What information/data will you collect to measure the success of the project?

We will audit five charts per quarter of suspected stroke patients to assess (1) Patients correctly identified as stroke, (2) BE FAST Stroke Scale used, (3) Last Known Well Time documented, (4) Glucose checked, (5) Stroke alert language used inpre-notification.

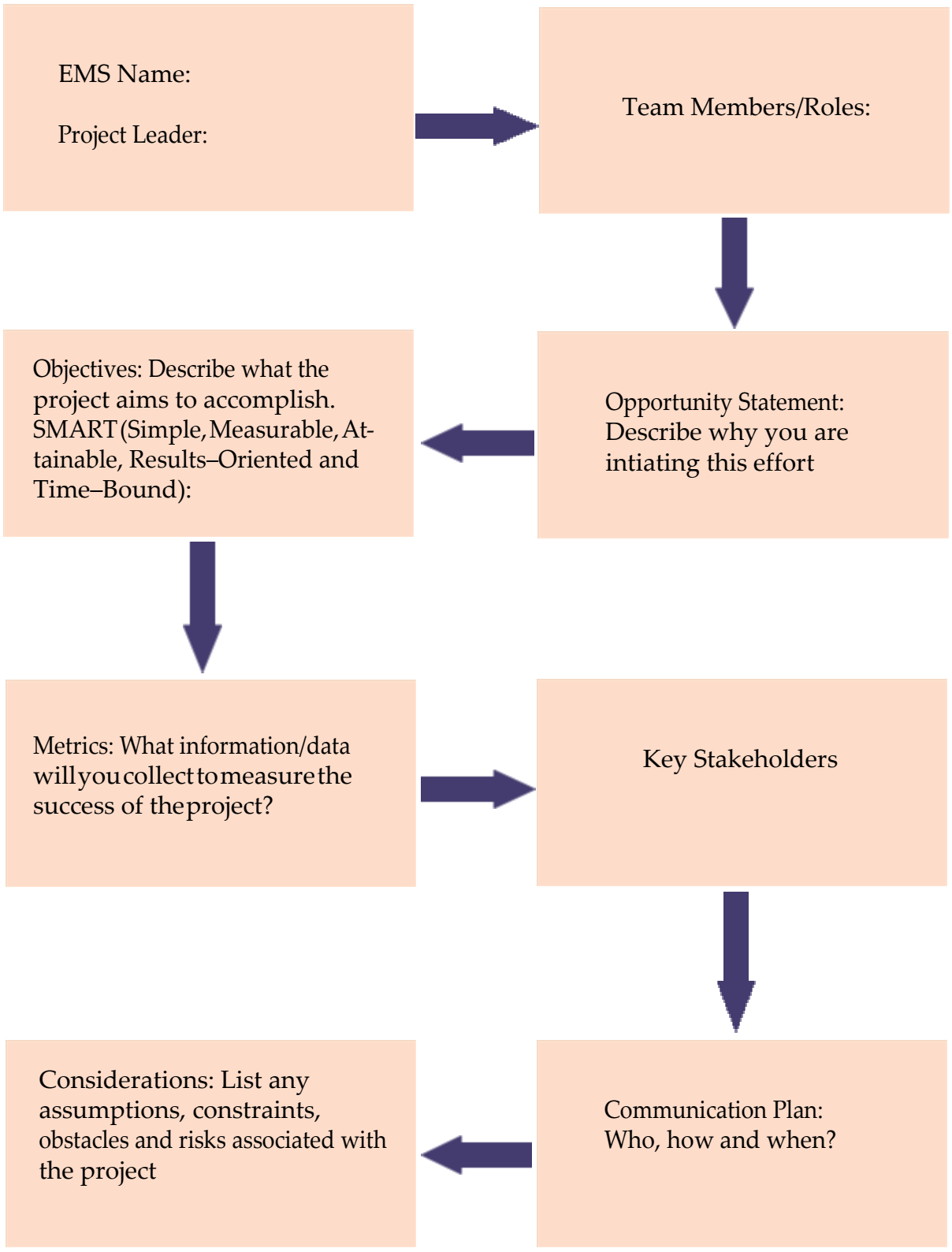
Communication Plan: Who, how and when?

Stroke education was given by Berry in January 2019 to all staff. Staff were informed that auditing on these five metrics will be starting in Feb 2019. Each staff member signed their name that education was received. On the last Friday of each month, Kristina will give a status report on how we are doing using the report card.

Considerations: List any assumptions, constraints, obstacles and risks associated with the project:

We're not sure that we will have at least five suspected stroke patients per quarter. Kristina will be going on maternity leave in a few months.

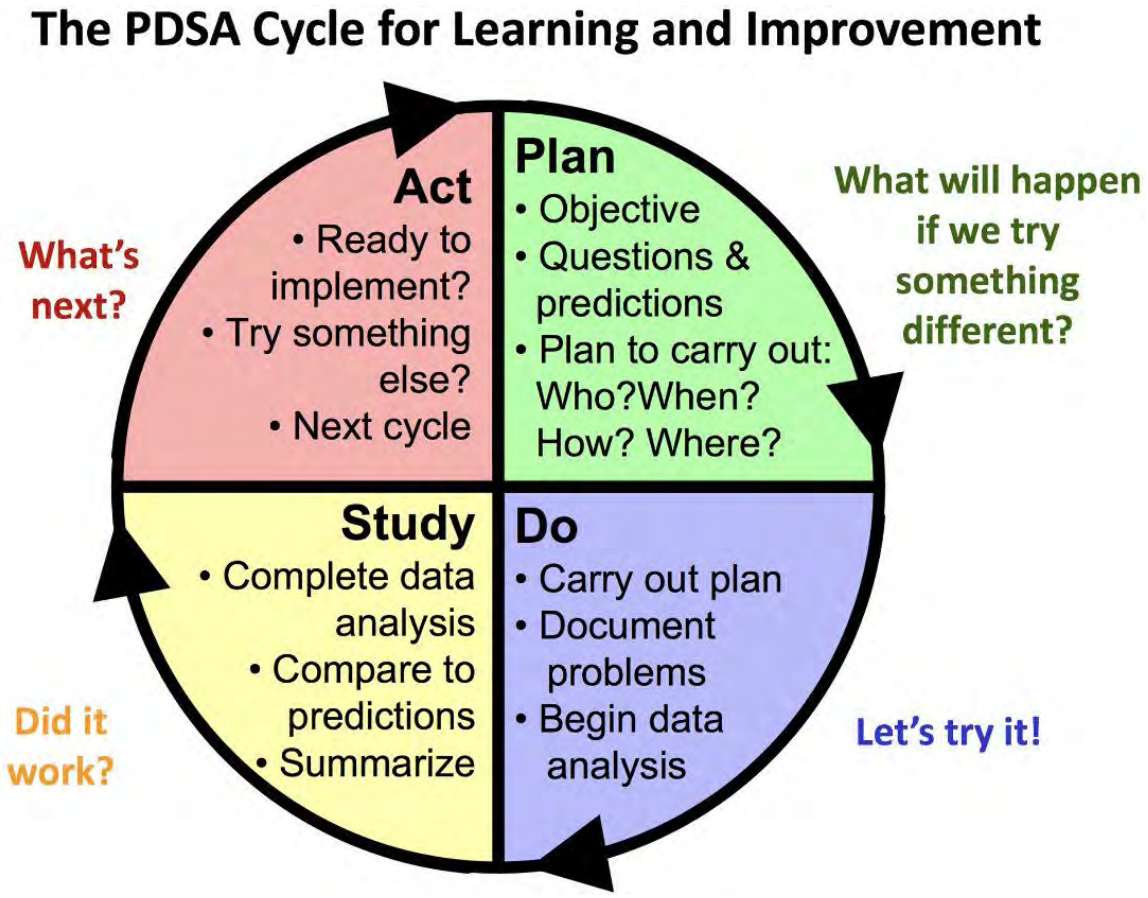
STROKE QUALITY IMPROVEMENT INITIATIVE PROJECT PLAN



Put it to Action: Use the Plan-Do-Study-Act (PDSA) worksheet to test a change in your process.

The PDSA cycle is an interactive, four-stage problem-solving model used for improving a process or carrying out a change. The four stages of the worksheet include:

- **Plan:** Recruit a team, draft an aim statement, describe current context and process, describe the problem, identify causes and alternatives
- **Do:** Implement action plan
- **Study:** Determine if plan resulted in an improvement
- **Act:** Standardize a positive change, or do another PDSA if negative change



PDSA WORKSHEET FOR TESTING CHANGE

EMS Agency: _____ Prepared By: _____ Date: _____

AIM

Overall goal you wish to achieve; make sure it is time-specific, measureable, and defines the specific population of patients that will be affected.

By December 31, 2019, Ten consecutive suspected stroke patients will have documentation of the BEFAST scale, 24-hour clock time of Last Known Well Time (LKWT), and pre-notification to the receiving hospital on the run sheet. Run sheet will have been left with hospital to scan into patient chart.

Describe your first (or next) test of change	Person responsible	When to be done	Where to be done
Train EMS staff on the updated Stroke/CVA protocol.	EMS Educator	By June 30, 2024	EMS Base

PLAN

List the tasks needed to set up this test of change	Person responsible	When to be done	Where to be done
1. EMS Educator to develop materials to teach pre-hospital providers appropriate care guidelines for suspected stroke patients. Develop materials for 45-minute training (e.g., pre-test, post-test, and PowerPoint) 2 EMS Educator and EMS Manager to train staff about protocol for suspected stroke patients. 3. EMS will demonstrate learning by using "teach back" method and self-graded post-test.	EMS Educator EMS Manager	Three training dates by June 1st (consider an UAMS IDHI class or other training)	Main Conference room; order pizza

Predict what will happen when the test is carried out	Measures to determine if prediction succeeds
Ten consecutive suspected stroke patients will have a documented BE FAST Stroke Scale, LKWT and pre-notification to receiving hospital on run sheet.	Abstract run sheet data by hospital to determine if BE FAST Stroke Scale, LKWT and pre-notification are documented; reports available.

DO

Describe what actually happened when you ran the test.

Trained EMS staff in June. Collected further data through August. July and August data indicates that Last Known Well (LKWT) was being documented as "unknown" in at least 50% of the suspected stroke patients. Of suspected stroke patients, 100% had a documented neuro assessment of BE FAST Pre- hospital Stroke Scale and 90% had documentation of pre-notification to the hospital.

STUDY

Describe the measured results and how they compared to the predictions.

Case review plus informal interviews with staff found that if the patient/family could not identify when the patient was last normal (at their baseline), that the LKWT was being documented as unknown. EMS staff was able to increase documentation of LKWT, but it was unexpected for this documentation to be listed as "unknown" instead of a clock time. Adherence to the protocol for a neuro assessment of the BE FAST Pre-hospital Stroke Scale and pre-notification to the hospital is as expected. One of the two cases where pre-notification was not documented noted that the patient refused to be brought to the hospital. An informal interview revealed that the second case that did not receive pre-notification was because they were only a few minutes away from the hospital.

ACT

Describe what modifications to the plan will be made for the next cycle from what you learned.

EMS Educator will send out a memo and post reminders for EMS staff to document a clock time of LKWT. EMS Educator will develop a short 20-minute follow-up training (to be tacked on to cardio training day) to provide education on how to determine LKWT (specifically, what questions to ask the patient/family to drill down to an actual LKWT, including how to document and ask questions on possible wake-up stroke). This will also cover when it is appropriate to document "unknown" as the LKWT. We will continue to review and track run sheet documentation to continuously evaluate and make appropriate changes to the PDSA cycle.

PDSA WORKSHEET FOR TESTING CHANGE

EMS Agency:_____ Prepared By:_____ Date: _____

AIM

Overall goal you wish to achieve; make sure it is time-specific, measureable, and defines the specific population of patients that will be affected

Describe your first (or next) test of change	Person Responsible	When to be done	Where to be done

PLAN

List the tasks needed to set up this test of change

Predict what will happen when the test is carried out	Measures to determine if prediction succeeds

DO

Describe what actually happened when you ran the test

STUDY

Describe the measured results and how they compared to the predictions

ACT

Describe what modifications to the plan will be made for the next cycle from what you learned

Community Outreach

Recognizing the signs and symptoms of stroke and calling 9-1-1 is one of the biggest gaps in treating stroke patients. We hear it over and over again: "if they would only get to the hospital sooner." Many organizations are stepping up to the plate to make public awareness of stroke a priority. This includes hospitals, public health departments, the American Stroke Association, the Arkansas Department of Health and many others. EMS too plays an important role in educating the public on the signs and symptoms of a stroke and the need to activate emergency services. This section of the toolkit provides resources for reaching out to your community.

In Arkansas, data from the Arkansas Stroke Registry in 2016 showed that less than 40% of people admitted to the hospital for stroke treatment arrived by EMS. Studies clearly demonstrate that a stroke patient who arrives in an ED by EMS is treated faster than a walk-in stroke patient. Clearly, there is a need to increase recognition of and response to stroke in our communities. This is our call to action!

There are many things that your EMS agency can do to provide important information about stroke to your community. You may consider several activities to reach people. And remember, you don't have to do it alone. Consider partnering with your community hospitals, government or local businesses to get the word out. Here are some suggestions:

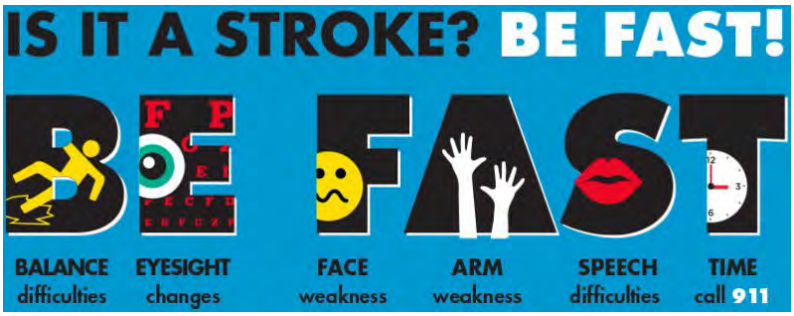
- Order free stroke materials from the UAMS IDHI Stroke program (see order form included in Resource section within this document)
- Host an event for Stroke Month in May
- Hold town hall meetings
- Deliver presentations at schools
- Message using your website and social media
- Print materials such as posters, flyers, bookmarks
- Show stroke PSA videos at events
- Host blood pressure screenings at your fire department
- Distribute stroke education materials at your fund raising events

STROKE TALKING POINTS

When you have a conversation with someone in your community, you'll want a few talking points to get things started. Here are the key messages you'll want to talk about:

Know the signs and symptoms of a stroke

"How would I know if I'm having a stroke and what's happening inside my body?"



The acronym BE FAST is an easy way to remember the signs and symptoms of stroke.

- Balance Loss
- Vision Loss
- Facial Drooping
- Arm Weakness
- Slurred Speech
- Time to call 9-1-1

A stroke happens when there is a blood clot in the brain (ischemic stroke) or a blood vessel in the brain that bursts (hemorrhagic stroke), causing blood flow to the brain to stop. This is sometimes called a brain attack. A person who has a stroke may lose function of their body parts and often spends time in rehabilitation to regain their strength. Some people may die from a stroke.

Stroke is an emergency and the first step is to call 9-1-1

"I only live 10 minutes from the hospital; I'll just get a ride."

Someone may feel silly calling an ambulance when they live a short distance from the hospital, but calling 9-1-1 is more than a ride in an ambulance. A paramedic will ask the patient or their family important questions that the doctor will need to know, like what medications they are taking, or when their symptoms started. Emergency workers will also call the hospital ahead of time so they can have a team of people waiting for the patient at the door, with all the right equipment turned on and ready. EMS knows the current capabilities of the local hospitals that the general public does not know. This can save valuable time

A stroke doesn't hurt (most of the time)

"I have slurred speech and a weak arm, but it's not painful, so what's the emergency?"

Doctors have a short time window (4.5 hours) to give people a lifesaving drug for an ischemic stroke (the clot kind). Even if it does not hurt, stroke patients lose millions of brain cells every minute. If someone having a stroke does not get to the hospital in time to be treated, they may not regain certain functions and could even die.

Resources

COMMUNITY EDUCATION

Free Outreach Materials – BE FAST

- Participate in UAMS IDHI BE FAST Education – The UAMS IDHI (Stroke Assistance through Virtual Emergency Support) program is making available free BE FAST stroke education materials (while supplies last). There are many different items available. To order materials, please follow the steps on the next page.

STROKE TRAINING AND EDUCATION

UAMS IDHI Stroke Program Training

- Onsite and online Stroke Education Classes coordinated by the UAMS IDHI team that are free to attend. Information on UAMS IDHI Stroke Program information may be found on this web page:
  idhi.uams.edu/stroke-program/

Advanced Stroke Life Support Training

- ASLS Classes coordinated by Advanced Stroke Life Support Training Centers and registration fees for a limited number of registrants are paid by the state. To sign up for a class reach out to your local ASLS contact. More information here:
  https://www.healthy.arkansas.gov/images/uploads/pdf/Advanced_Stroke_Life_Support_Flyer.pdf

Arkansas Stroke Bands

- To order bands please send your request to stroke.bands@arkansas.gov

Pulsara

- The Arkansas Department of Health provides free access to Pulsara for all healthcare facilities and EMS agencies. More information can be found here:
  https://www.pulsara.com/arkansas-resources

Stroke Regions

- Attend regional stroke meetings (align with trauma regions) to collaborate with local EMS and hospital teams. Reach out to your local stroke contacts on this page:
  https://www.healthy.arkansas.gov/images/uploads/pdf/STROKE_CONTACTS_.pdf
- Link to regional stroke care data found toward bottom of this page:
  https://www.healthy.arkansas.gov/programs-services/topics/stroke-resources

FREE STROKE AWARENESS MATERIAL

(1) View this ordering website showing the items that are available: idhi.uams.edu/stroke-program/

(2) Email Ms. Olivia Wilson with UAMS IDHI the following information on your point of contact person to place orders: the person's full name, email address, phone number and shipping address. Ms. Wilson's email address is: OWilson2@uams.edu.

(3) You will receive a confirmation email from Ms. Wilson that you are setup to order materials online. You will then be able to login to the ordering website.

(4) Login to the ordering website and place your order. Ms. Wilson will reply asking what the event will be, the location and expected attendees. Any questions on this process you may either email Ms. Wilson or call her at (501) 615-4697

See below sample items that are available for order:

BE FAST bag
#U-BAG
On Hand: 2437

Bandage Dispenser
#U-BANDAGE
On Hand: 7465

Bookmarks
#U-BOOKMARK
On Hand: 4430

Calendar
#U-CALENDAR
On Hand: 3520

Coloring Bag
#U-COLBAG
On Hand: 715

Hot/Cold Pack
#U-COLDPACK
On Hand: 325

Emery Board
#U-EMERY
On Hand: 3690

English Health Cards
#U-ENGCARD
On Hand: 9650

Magnets, English
Assorted Colors
#U-ENGMAGN
On Hand: 5704

Brain Erasers
Assorted Colors
#U-ERASERS
On Hand: 13350

Highlighter
#U-HIGH
On Hand: 25

Medical Record
#U-MEDREC
On Hand: 5775

Message Pens
#U-MESSAGE
On Hand: 31815

Notepad Magnet
#U-NOTEMAG
On Hand: 1692

Neon Pencils
#U-PENCILS
On Hand: 2525

Emergency Medical Services Section

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User friendly interface allowing you to browse agencies, see contact information, and locate the nearest hospital.

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Glossary

BE FAST Stroke Scale: The BE FAST Stroke Scale is a stroke assessment tool that identifies acute stroke symptoms. It highlights two additional stroke symptoms from the former FAST/Cincinnati Pre-Hospital Scale, making it possible to identify additional acute strokes including those that occur in the back of the brain.

Cincinnati Pre-hospital Stroke Scale: The Cincinnati Pre-hospital Stroke Scale is an assessment tool used to diagnose a potential stroke in a pre-hospital setting. It tests three signs for abnormal findings which may indicate that the patient is having a stroke — facial droop, arm drift or speech problems.

Computed tomography (CT): CT technology combines computer-processed x-ray images from different angles to produce a cross-sectional image of specific areas scanned.

Drip and Ship: "Drip and ship" refers to the practice of starting acute stroke therapy with intravenous (IV) tissue plasminogen activator (t-PA) and then transferring a patient to a regional hospital with advanced stroke care capabilities where additional therapies can be offered.

Glasgow Coma Scale: This neurological scale is an objective way to record the conscious state of a person for initial assessment. The scale is scored from 3 (deep unconsciousness) to 15. This is often used by EMS for acute medical and trauma patients.

Hemorrhagic stroke: A hemorrhagic stroke is a kind of stroke caused when a blood vessel in the brain ruptures or tears and blood from the vessel seeps into the brain tissues and damages the brain cells. This type of stroke, most often caused by high blood pressure and brain aneurysms, accounts for approximately 13% of all strokes.

Ischemic stroke: An ischemic stroke, sometimes called a "brain attack," is similar to a heart attack except that it happens in the brain. Clots can form in the blood vessels that lead to or are in the brain. Sometimes clots can form in other areas of the body and travel to the brain.

Last Known Well Time: Last Known Well Time (LKWT) is the exact time when the patient was observed or known to be normal and without stroke symptoms.

Los Angeles Pre-hospital Stroke Screen (LAPSS): The LAPSS is a tool used by EMS to screen for the probability of stroke. It includes the Cincinnati Stroke Scale as well as additional information.

National Institutes of Health Stroke Scale (NIHSS): This tool is used in the acute care setting to assess the severity of stroke. The scale includes 11 items that each have a score between 0 and 4, where zero typically indicates normal function. The scores range from a minimum of 0 to a maximum of 42.

Neuro/Stroke Alert or Code Stroke: These terms are used to cue EMS, ED staff or a stroke team of a suspected stroke patient in need of immediate triage and treatment.

Stroke Certification: This is national recognition that an institution has achieved performance standards to demonstrate routine delivery of advanced stroke care according to national recommendations.

Stroke Designation: This state-level recognition identifies hospitals that provide a specific level of stroke care according to criteria specified by the state. NOTE: All UAMS IDHI and Mercy Telestroke participating sites in Arkansas that have not yet received official designation however are capable of providing initial acute stroke care. These sites have been provisionally designated as Arkansas Stroke Ready Hospitals (ArSRHs). The Arkansas Department of Health is in the process of completing the official designations for these hospitals.

Tissue plasminogen activator (tPA): tPA/alteplase is a protein used to break up blood clots. One of its uses is to treat ischemic stroke. It is contraindicated for hemorrhagic stroke. tPA/Tenecteplase is also commonly used to treat ischemic stroke.

[7]Hurwitz AS, Brice JH, Overby BA, Evenson KR (2005). "Directed use of the Cincinnati Prehospital Stroke Scale by laypersons". Prehosp Emerg Care 9 (3): 292—6. doi:10.1080/10903120590962283. PMID 16147478.

PRE-HOSPITAL STROKE CAREPRE-TESTANSWERS

1. **C —BE FAST.**
   B–Balance loss. Ask patient if there has been a sudden loss of balance or coordination.
   E – Eyes. Ask patient if there has been a sudden change in vision.
   F — Facial droop or grimace. Have the patient smile and determine if the smile appears equal or unequal.
   A — Arm drift. Have the patient extend both arms straight out from the body and check for an inability to hold the arms in that position.
   S — Speech. Have the patient repeat a simple sentence. Does the patient slur their words, use wrong or unintelligible words or not able to speak?
   T — Time. If any of the above tests show an abnormal result (from what is normal for that patient), it is time to call 9-1-1.

2. **A — Ischemic strokes account for about 87% of all strokes.**

3. **A — 10 minutes.** Evidence-based best practices encourage EMS on-scene times of no more than 10 minutes for suspected stroke patients. Time is brain!

4. **A — 1 hour.** Acute onset of focal neurological deficits is a warning sign of potential serious underlying issues that may result in an actual stroke. EMS should always encourage patients to seek medical attention even if their symptoms have resolved within 1 hour.

5. **A — Plan.** This is the first step in the PDSA cycle which includes listing the steps needed to test a change.