LERN Acute Stroke Ready Hospital Toolkit

LOUISIANA
EMERGENCY
RESPONSE
NETWORK

Right Place. Right Time. Right Care.

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LOUISIANA EMERGENCY RESPONSE NETWORK

Acute Stroke Ready Hospitals

Definitions

Acute Stroke Ready Hospitals (ASRH) have been defined by the American Heart Association/American Stroke Association as "hospitals that are not Primary Stroke Centers, yet can provide timely, evidence-based care to most patients with an acute stroke[1]. The Joint Commission provides Acute Stroke Ready Certification, but the Louisiana Emergency Response does not require ASRH in our system to obtain this certification. LERN does require data submission by all ASRHs in order to validate they meet identified metric.

Please note that the LERN ASRH criteria are based on the Joint Commission's (TJC) ASRH requirements but do not include all of TJC criteria. The Joint Commission has several additional requirements for certification as an ASRH which can be found at Acute Stroke Ready Hospital | The Joint Commission

This toolkit is designed to provide hospitals with the necessary information and requirements to become a LERN ASRH.

Background

In 2021, 2,755 Louisianans died from stroke (5.5% of total deaths in Louisiana)*. Nationally, there are 795,000 new stroke cases every year. That equates to one stroke every 40 seconds. Furthermore, stroke is the fifth leading cause of death in the state and is the #1 cause for new nursing home admissions. The Louisiana Emergency Response Network recognizes that all hospitals do not have the capabilities to become Primary Stroke Centers (PSC). However, by becoming an ASRH in Louisiana, a hospital signals to its community that it is committed to the best nationally accepted standards of acute stroke treatment.

Why Become an Acute Stroke Ready Hospital?

The goal of the Louisiana Emergency Response Network Stroke Initiative is to develop a statewide system of stroke care to provide access to care proven to improve outcomes for Louisiana citizens regardless of where they live in the state. To accomplish this, we must identify and support the network of hospital providers that are committed to providing timely, evidence-based care to most patients with an acute stroke. Recent studies have shown that more than 96% of the US population is not within 60 minutes of a Stroke Capable Hospital. This improvement has also been identified in Louisiana where there are 22 Primary Stroke Centers, 10 Endovascular Hospitals and 3 Comprehensive Stroke Centers clustered in metropolitan areas. In order to close this gap the system consists of a "hub and spoke" model, where the "hub" hospitals are Health Care Accreditation Program (HFAP) Certified Primary Stroke Centers, Joint Commission Thrombectomy Capable, Primary, and Comprehensive Stroke Centers and the "spoke" hospitals are Acute Stroke Ready Hospitals. Hub hospitals act as the expert resource centers for the "spoke" hospitals, when needed. To function as a spoke within the system of care requires organization and adoption of protocols, policies, data collection, and performance improvement initiatives.

The ASRH is vital to improving stroke outcomes for the citizens of Louisiana, since the ratio of ASRH hospitals to CSC, TSC, or PSC hospitals is 2:1. Per the American Stroke Association, the vision and intent of the ASRH is to provide initial diagnostic services, stabilization, emergent care, and therapies to patients with an acute stroke who are seen in their Emergency Department (ED).

*https://www.cdc.gov/nchs/pressroom/sosmap/stroke_mortality/stroke.htm

What Does an Acute Stroke Ready Hospital Do?

An Acute Stroke Ready Hospital ("spoke" hospital) will provide immediate and time-critical care to the stroke patient, including initial emergency evaluation and screening, stroke scale assessment, and, if indicated, thrombolytic treatment. Using standardized and evidence-based protocols, these Stroke Receiving Facilities will be able to provide the optimum level of care to the acute stroke patient. To assist in this evaluation and decision-making, "spoke" hospitals will have 24-hour access to the expert neurologic resources internally or via hub hospitals (Primary, Thrombectomy Capable, or Comprehensive Stroke Centers) for consultation. Local EMS agencies will be notified that an Acute Stroke Ready Hospital has been identified by LERN and is "stroke ready" to receive acute stroke patients as identified by EMS personnel in the field. The intent of this approach is to get the patient to a facility that can provide appropriate acute stroke care as quickly as possible, with efficient and safe administration of thrombolytic treatment at the foundation of care.

The Chief Executive Officer of any hospital of any size and location, that meets the LERN ASRH criteria (page 5), may sign an attestation that states they meet the LERN requirements. The LERN Tri-Regional Registered Nurse Coordinator will schedule a meeting with hospital administration to discuss and verify key requirements. After two consecutive quarters of data submissions that meet the goal requirements for ASRH, the hospital will then go before the board for designation. If criteria are met, EMS agencies in the area will then be notified that suspected stroke patients might be transported to this facility.

The use of the standardized pre-hospital LERN Stroke Care Guideline and the Stroke Destination Protocol will reduce the time of treatment for patients with acute ischemic strokes who may benefit from thrombolysis by facilitating early identification, communication and delivery of the stroke patient to the closest Acute Stroke Ready Hospital. It will also reduce delays and improve the overall care of other stroke patients who may not qualify for intravenous thrombolysis such as:

- Stroke symptoms with duration more than the institutional window for thrombolytic treatment
- Hemorrhagic strokes
- Patients with completely resolved symptoms suggestive of TIA

What Does this Toolkit Do?

This toolkit will provide medical professionals and hospital administrators the necessary information to improve their hospital's acute stroke care and become an Acute Stroke Ready Hospital in Louisiana. Each hospital is invited to review the information contained in this toolkit and plan its Acute Stroke Ready Hospital implementation.

LERN Acute Stroke Ready Hospital Requirements

Facilities in this category will provide timely access to stroke care but may not be able to meet all the criteria specified in CSC, TSC, and PSC-E guidelines. These centers will provide acute stroke care in urban and rural areas where transportation and access to time-sensitive treatment are limited and is intended to recognize those models of care delivery that have shown utility including "give and go" for thrombolytics and telemedicine. Because the effectiveness of treatment is time-dependent, ASRH centers should not be bypassed to go to a more distant LERN CSC, TSC, PSC-E or PSC Hospital unless 1) the patient is >4.5hr from last seen normal and and <4.5 hours from the times symptoms were noted, or 2) a screen for large vessel occlusion is positive it would take <15 additional minutes of transportation time to reach a hospital with endovascular therapy.

Program Concept	**Acute Stroke Ready Hospital**
Eligibility	General eligibility requirements; use of a standardized method of delivering care centered on evidence-based guidelines for stroke care.
Emergency Department	Physician staffed 24/7: Perform initial ER physician evaluation within 10 minutes of patient arrival
EMS Collaboration	Access to protocols used by EMS, routing plans; records from transfer and prehospital notification
Acute Stroke Team	Available 24/7 (in person or via telemedicine) – credentials designated by hospital and arrives within 15 min
CT Scan	Ability to perform CT on site within 25 minutes of patient arrival and interpret within 45 minutes of arrival, 24/7. (LERN encourages CT within 20 minutes and interpretation within 35 minutes to facilitate meeting stretch goal of 45 minute Door to Needle delivery)
Labs	Ability to draw and report results of appropriate lab work within 45 minutes of patient arrival 24/7
Proficiency in delivery of Lytic	a. Ensure that Lytic can be delivered within 60 minutes from arrival. Documentatio ongoing efforts to reduce the median time from arrival to Lytic, in recognition of new target door-to-needle time of 45min (AHA Target Stroke). b. Timely transfer of appropriate patients for unavailable services, such as endovas and neurosurgical procedures to an appropriate higher level of care.
Infrastructure	Emergency Room, If the hospital does not have an ICU then patient transfer should be considered after Lytic administration.
Written care protocols and order sets for stroke, including guidelines, algorithms for management of Lytic-related and other hemorrhagic strokes and angioedema, critical care pathways, NIH Stroke Scale training and VAN training.	
Written documentation of a plan for secondary transfer to CSC, TSC, PSC-E, PSC, or other appropriate facility, if resources deemed necessary are not available at the primary destination site.	
Quality of stroke care demonstrated by submission of required data elements to LERN on a quarterly basis.	

Please note the LERN ASRH requirements are based on the Joint Commission ASRH requirements, but do not include all TJC criteria. TJC has several additional requirements for certification as an Acute Stroke Ready Hospital found at Acute Stroke Ready Hospital | The Joint Commission

Note:
Acute Stroke Ready Hospitals are encouraged to keep uncomplicated stroke patients during the duration of treatment if the facility is comfortable with the post-acute stroke care. Post-thrombolytic patients must be transferred to a higher level of care if an Intensive Care Unit is not available. Transfer agreements with Primary, Thrombectomy Capable and Comprehensive Stroke Centers are important and strongly encouraged. ASRHs are required to have written documentation of a plan for secondary transfer to a CSC, TSC, PSC, or another appropriate facility, if resources deemed necessary are not available at the ASRH.

The following are Louisiana Emergency Response Network contacts for the Louisiana Stroke System. Any questions on planning and operations can be directed to:

Sheryl Martin-Schild, MD, PhD, FANA, FAHA
Vascular Neurologist
Assistant Professor of Neurology
Director of the Stroke Program
Clinical Assistant Professor of Medicine
Tulane University Health Science Center
LERN Stroke Medical Director
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(504) 988-0972

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LERN Tri-Regional Coordinator
Stroke Lead
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(337) 342-0420

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Acute Stroke Ready Hospital Application Process

1) Hospitals wishing to become an Acute Stroke Ready Hospital must have their Chief Executive Officer submit a signed letter attesting to meeting the ASRH requirements.

   Attestation letters may be requested from and returned to:

   Paige B. Hargrove, BSN, RN
   Louisiana Emergency Response Network
   7979 Independence Blvd, Suite 207, B17
   Baton Rouge, LA 70806

   The attestation letter can also be accessed at:
   Hospital Stroke Level (la.gov)

   *Hospitals that obtain certification from the Healthcare Facilities Accreditation Program (HFAP) as an Acute Stroke Ready Hospital must submit a copy of the certification. Data submission to LERN **is** required for Level III hospitals who obtain HFAP certification.

2) Upon receipt of the completed attestation letter, the LERN Tri-Regional Registered Nurse Coordinator will schedule a meeting with hospital administration to discuss and verify key requirements.

3) Upon receipt of 2 consecutive quarters worth of ASRH data that meets the goal requirements, the hospital will be awarded Acute Stroke Ready Status.

4) Data elements identified on pages **20–25 of this toolkit** must be submitted with the initial application (2 quarters meeting goals) and then quarterly to the Louisiana Emergency Response Network.

Medical Treatment and Protocol

EMS Assessment and Management

Emergency Department Initial Evaluation and Treatment

The following are recommended "model" protocols for consideration by EMS agencies and Emergency Departments (ED). They are evidence-based recommendations developed by a panel of EMS and stroke experts. These have been approved by the LERN Board.

LERN PRE-HOSPITAL STROKE CARE GUIDELINE

Our crucial role in caring for stroke victims is geared toward early recognition and appropriate triage. The *Cincinnati Prehospital Stroke Scale* shall be used as a quick stroke screening tool (consider assessment of Balance and Eyes to BE-FAST). The VAN should be utilized to identify patients with high probability of having a stroke due to large vessel occlusion (LVO). The LERN Stroke Destination Protocol should be followed to appropriately triage the patient with suspected stroke from the field. If present, transport bystander/family member to the ED with pertinent medical information.

Standard Medical Care

↓

Supplemental oxygen to maintain SpO_2 > 94%

↓

Assess blood glucose. If < 60mg/dL, give Dextrose containing solution according to your agency's protocol

↓

Do NOT treat hypertension (unless directed by Med Control or receiving physician)

↓

Prehospital Stroke Assessment
Cincinnati Stroke Scale

F – A – S – T
- F – Facial Droop
- A – Arm Drift
- S – Speech
- T – Time Last Seen Normal

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

Perform stroke screening exams (CPSS and VAN) and determine LSN

VAN Assessment

Any weakness PLUS any one of the following is considered positive:

Visual disturbance - field cut, double or blind vision
Aphasia – inability to speak or understand
Neglect – gaze to one side or ignoring one side

If the patient is VAN Positive and has a high probability of having LVO.

↓

Transport to closest appropriate Stroke Center based on LERN Stroke Destination Protocol

↓

Position patient supine for transport. If aspiration risk or decreased LOC, elevate head to 30°

↓

Notify receiving Stroke Center as soon as possible for Stroke Activation

- Prior to concluding the Medical Control radio report, identify who will be notifying the receiving ED (EMS or Medical Control).
- Transport to a hospital, based on LERN Stroke Destination Protocol, that has neurological services (on site or remote) and a functional CT scanner, capable of administering thrombolytic. This includes patients who awaken from sleep with neurological deficits and those found with deficits.
- Treat hypotension to improve perfusion as per protocol.
- Treat generalized seizure activity aggressively as per protocol.

Relevant Time Considerations:
- Last Seen Normal (LSN) = the time the patient was last seen or reports being in normal state
- Time Symptoms Noted (TSN) = the time the new symptoms were first noted by patient or witness
- If stroke witnessed or patient awake and able to provide onset, LSN = TSN = Time of Stroke Onset (TSO)
- If stroke unwitnessed and patient is unable to provide onset, LSN is before TSN and TSO is unknown, but sometime between LSN and TSN.

FOR ASSISTANCE WITH TRANSFERS, CALL THE LERN COMMUNICATION CENTER:

1-866-320-8293

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EMS Assessment and Management Guidelines

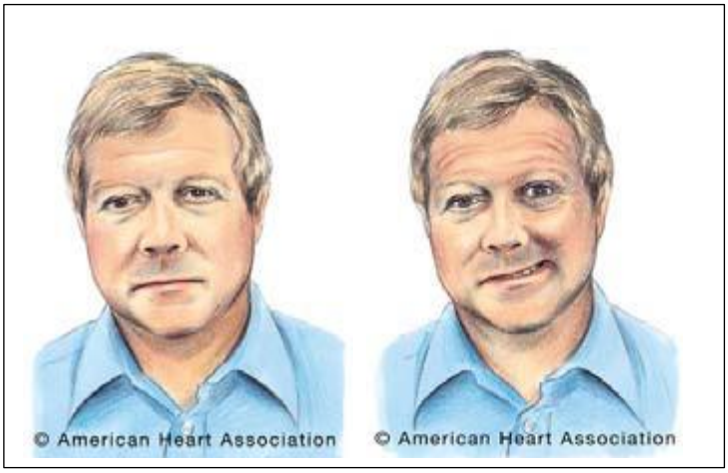
Prompt stroke recognition and treatment by EMS is a critical component of acute stroke care. As an integral part of the Louisiana Stroke System, we strongly encourage EMS to use a standardized pre-hospital treatment protocol for suspected stroke patients. The following model EMS stroke protocol is provided as a guideline.

Step-by-Step Instructions

On the Scene:

1) Manage ABCs (Airway, Breathing, and Circulation). Give oxygen if needed.
2) Perform pre-hospital stroke assessment using the *Cincinnati Stroke Scale*.

- **Facial Droop** (have patient smile)
  - **Normal:** Both sides of face move equally
  - **Abnormal:** One side of face does not move as well



- **Arm Drift** (have patient hold arms out for 10 seconds)
  - **Normal:** Both arms move equally or not at all
  - **Abnormal:** One arm drifts compared to the other, or does not move at all

Patients with 1 of these 3 findings as a new event have a 72% probability of an ischemic stroke. If all 3 findings are present the probability of an acute stroke is more than 85%.

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- **Speech** (have patient speak a simple sentence)
  - **Normal:** Patient uses correct words with no slurring
  - **Abnormal:** Slurred or inappropriate words, or mute

3) Establish and record an **exact time**, in military time, the "Time of Stroke Onset" (TSO), if witnessed. If unknown, establish and record when patient was "Last Seen Normal" (LSN) and the "Time Symptoms Noted" (TSN).

In Transit:

1) Rapidly transport to closest appropriate Stroke Receiving Facility (Comprehensive Stroke Center, Primary Stroke Center or Acute Stroke Ready Hospital), unless the patient is medically unstable.

2) Bring witness or family member if possible, or record the names and phone numbers of witnesses.

3) Alert the receiving emergency department that a suspected stroke patient is en-route, so they can begin to activate their acute stroke team and be ready on arrival.

4) Check and record blood glucose to assess for hypoglycemia.

5) Check and record blood pressure. Do NOT administer any hypertensive medication without physician approval.

6) Establish cardiac monitoring and IV access with large bore catheter, if possible.

7) Keep NPO.

8) Bring medications or medication list.

*Photos from http://www.strokecenter.org/trials/scales/cincinnati.html

Physician Acute Stroke Checklist
To determine thrombolytic Eligibility and Administration

Indications for use of IV Thrombolytic*

- Symptoms suggestive of ischemic stroke that are deemed to be disabling* (regardless of improvement)
- Able to initiate treatment within 4.5 hours of Time Last Seen Normal
- Able to treat within 4.5 hours of symptom detection, when guided by MRI diffusion weighted imaging without completed stroke on FLAIR imaging (unknown LSN time frame)
- Head CT shows no hemorrhage, subdural hematoma or tumor
- Age ≥18 years

AHA/ASA Contraindications for use:

- CT scan demonstrating intracranial hemorrhage or subarachnoid hemorrhage
- CT exhibits extensive regions of clear hypo attenuation
- Unable to maintain BP SBP >185mmHg or DBP > 110mmHg, despite aggressive treatment
- Ischemic stroke within the last 3 months
- Evidence of active internal bleeding (i.e., Aortic Dissection known or suspected)
- Arterial puncture-noncompressible site ≤ 7 days
- Infective endocarditis
- Gastrointestinal bleeding within 21 days
- Intracranial or spinal surgery within last 3 months
- Blood glucose <60 mg/dL (however, should treat if stroke symptoms persist after glucose normalized)
- Active bleeding diathesis (including Plt <100,000, Heparin w/in 48 hrs & elevated aPTT, anticoagulant with PT/INR > 15/1.7, DOAC within last 48hrs)

**** The reason for withholding thrombolytic to all patients with suspected stroke must be concisely documented as this is a CMS Stroke Core Measure.***

Intravenous tPA is a Class I: Level of Evidence A recommendation for patients who have no exclusion and can be treated within three hours of onset. The door-to-needle time should be within 60 minutes.

Intravenous tPA is a Class I: Level of Evidence B recommendation for patients who can be treated within 3-4.5 hours of onset, with additional relative exclusion criteria, depending on institutional protocol. Written informed consent should be obtained, since this window is off-label.

*Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. William J. Powers, Alejandro A. Rabinstein, Teri Ackerson, Opeolu M. Adeoye, Nicholas C. Bambakidis, Kyra Becker, José Biller, Michael Brown, Bart M. Demaerschalk, Brian Hoh, Edward C. Jauch, Chelsea S. Kidwell, Thabele M. Leslie-Mazwi, Bruce Ovbiagele, Phillip A. Scott, Kevin N. Sheth, Andrew M. Southerland, Deborah V. Summers, David L. Tirschwell and …

Care of the Patient receiving a Thrombolytic for Stroke

All treatment decisions should be made in collaboration with your facility's neurological expert.

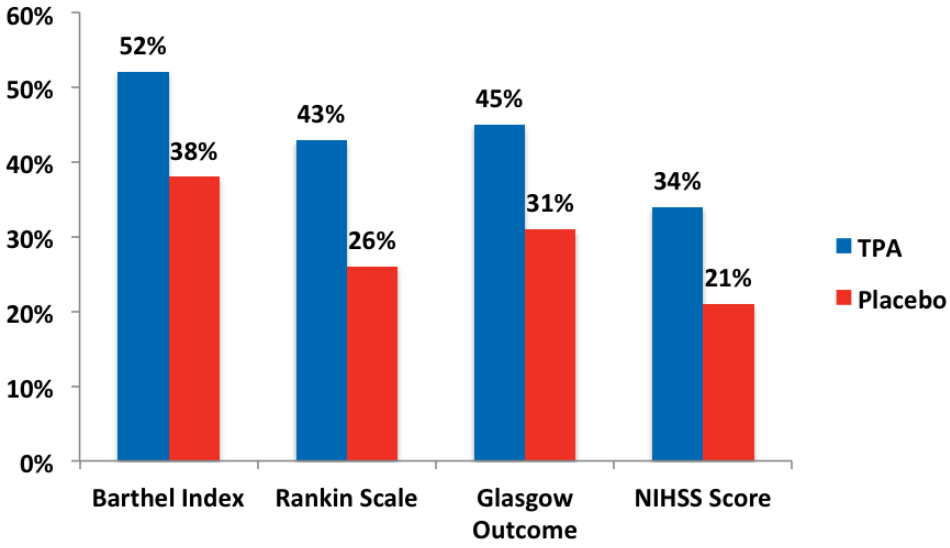
- BP must be < 185/110 for treatment with thrombolytic
- Nicardipine infusion is the preferred medication to achieve and maintain BP <180/105 in the 24 hours following treatment with tPA/TNK. An alternative is labetalol 10-20mg IV over 1-2 min, provided the HR >60

  AND
- Neuro Checks & Mini NIHSS monitored
  - q 15 minutes for 2 hours
  - q 30 minutes for 6 hours
  - then hourly for 16 hours
- Monitor for signs of angioedema (especially if on ACE-Inhibitor)
  - Recommended treatment for angioedema includes – maintain airway, discontinue alteplase & hold ACEIs, administer IV methylprednisolone 125 mg, IV diphenhydramine 50 mg, and ranitidine 50 mg IV or famotidine 20 mg IV. If there is an increase in angioedema despite therapy consider epinephrine (0.1%) 0.3 mL subQ or by neb (0.5 mL)
- HOB flat x 24 hours following alteplase (tPA)/tenecteplase (TNKase) (if tolerated and secretion management not problematic)
- CT head without contrast to be ordered at 24 hours. Once no hemorrhage confirmed, antithrombotic therapy/pharmacological DVT prophylaxis can be started.

*Powers, W. J., et al. (2019). Guidelines for the early management of patients with acute ischemic stroke: 2019 update to the 2018 guidelines for the early management of acute ischemic stroke. A guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke, 50, e344-e418.
Hill MD, Lye T, Moss H, Barber PA, Demchuk AM, Newcommon NJ, GreenTL, Kenney C, Cole-Haskayne A, Buchan AM. Hemi-orolingual angioedema and ACE inhibition after alteplase treatment of stroke. Neurology.2003;60:1525–1527.

Alteplase (tPA) and Tenecteplase (TNKase) Trial Data

NINDS tPA Stroke Trial

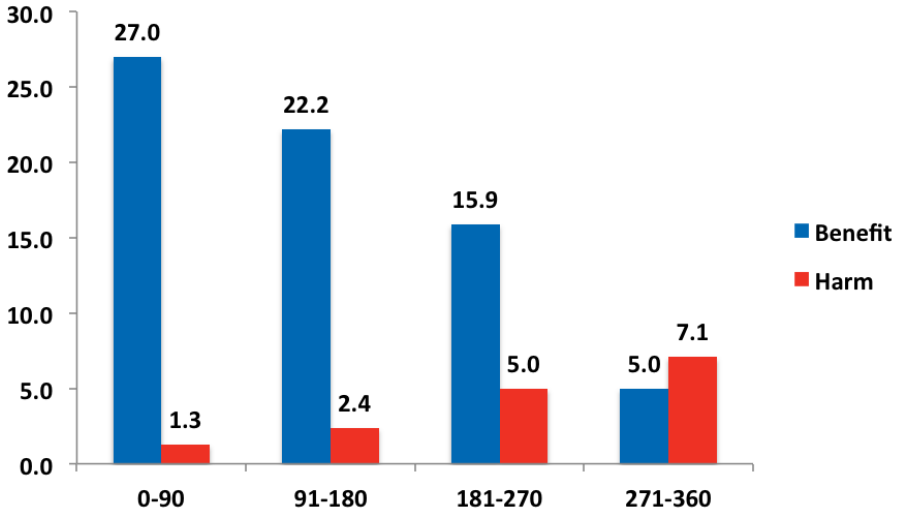


Global outcome statistic: OR = 1.7, 50% v. 38% = 12% benefit

N Engl J Med 1995;333;1581-7

From American Heart Association, Target: Stroke

Number of Patients Who Benefit and Are Harmed per 100 Patients tPA Treated in Each Time Window



Lansberg et al, Stroke 2009

From American Heart Association, Target: Stroke

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NINDS tPA Stroke Trial

Number Needed to Treat to Benefit from IV tPA Across Full Range of Functional Outcomes

Outcome	NNT
Normal/Near Normal	8.3
Improved	3.1

For every 100 patients treated with tPA,
32 benefit, 3 harmed

Better outcome by 1 or more grades on the mRS

Saver JL et al Stroke 2007; 38:2279-2283

From American Heart Association, Target: Stroke

All the Necessary Components

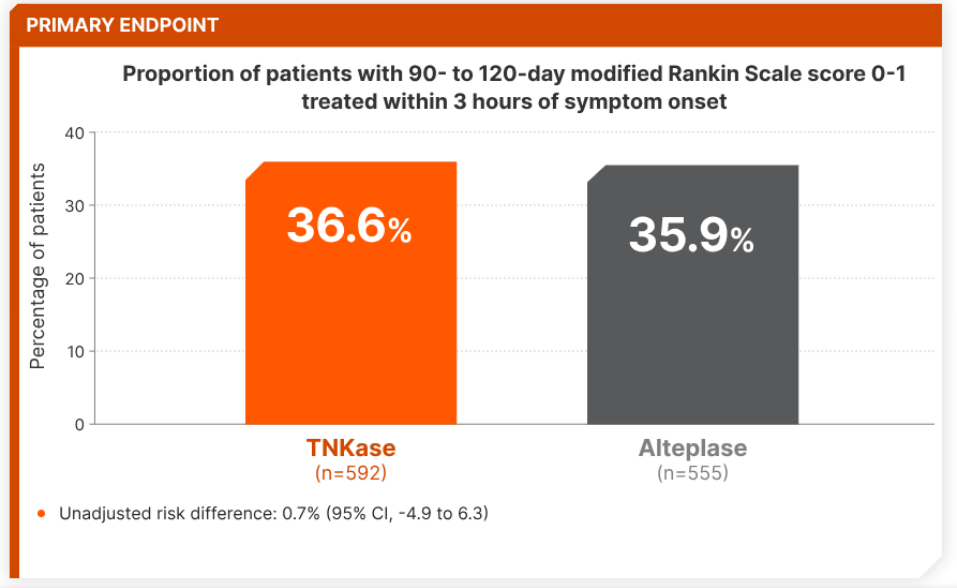
For timely, but safe and effective, acute ischemic stroke care, the following components are necessary:

- Early identification of a candidate for thrombolysis
  - Activation of a stroke team
  - Evidence-based, readily assessable, effective protocols
  - Rapid ordering, acquisition, and interpretation of brain imaging
  - Accurate and rapid physician orders
  - Reliable intravenous tPA/TNK treatment administration
  - Coordinated patient monitoring
  - Ongoing assessment
  - Accurate time logs for tracking and timely data feedback

From American Heart Association, Target: Stroke

Tenecteplase (TNKase) and the AcT Trial

In the AcT Trial, TNKase was compared to Alteplase in reducing stroke disability and the study results demonstrated no significant differences between treatment groups.



Menon BK, Buck BH, Singh N, et al. Intravenous tenecteplase compared with alteplase for acute ischaemic stroke in Canada (AcT): a pragmatic, multicentre, open-label, registry-linked, randomised, controlled, non-inferiority trial. *Lancet*. 2022;400(10347):161-169. doi:10.1016/S0140-6736(22)01054-6
And
TNKase Prescribing Information. South San Francisco, CA. Genentech, Inc.

STAT LABEL GOES HERE

DANGEROUS/UNACCEPTABLE ABBREVIATIONS - DO NOT USE		
QD QOD U IU MS MSO4 MgSO4 Trailing Zero Lack of leading Zero		
ALL PRN MEDICATIONS ORDERED MUST HAVE A REASON *		
Date Ordered	Time Ordered	PHYSICIAN'S ORDER

Patient Weight _____kg ( ) Estimated

Dosing: Use the 100 mg vial (100mg/100ml=1mg/ml)

Reconstitution: Add diluent to powder using the transfer device. Gently roll or swirl the mixture for a few seconds until the contents of the vial are clear. **DO NOT SHAKE**!

Alteplase (tPA) Infusion (1mg/ml) See Alteplase infusion guide

Total Dose= 0.9 mg/kg (never exceeds 90 mg) =_____mg

Loading Dose= 0.09mg/kg (10% of total dose) =_____mg IV over one minute

Infusion Dose= 0.81mg/kg (90% of total dose) =_____mg IV over one hour Discard

Amount= 100 ml minus Total Dose administered = _____ml

Bleeding Precautions: For 24 hours after tPA administration, unless specifically ordered by MD:

(**X**) Do not give any antiplatelet or anticoagulant medication

~~(**X**) Avoid insertion of NGT, Foley catheter and administer nothing per rectum~~

(**X**) Avoid central line placement/ arterial puncture/ IM Injections

(**X**) If bleeding occurs, apply manual pressure to site for at least 10 minutes or until bleeding stops, call MD if bleeding does not stop.

Nursing: Notify Physician for:

(**X**) Change in mental status

(**X**) Urine Output >300ml/hr or <30ml/hr

(**X**) If unable to maintain SBP < 180 or <_____with prescribed interventions

(**X**) If unable to maintain DBP < 105 or <_____with prescribed interventions

(**X**) Respiratory Rate > 24 or < 8

(**X**) New onset or worsening headache

(**X**) Total mini-NIHSS increases by > 2 points

(**X**) Angioedema of lips or tongue

(**X**) Signs and symptoms of bleeding

(**X**) Heart Rate > 120 or < 50

(**X**) Temp > 37.2° C/ 99° F

(**X**) LOC 1a increases after tPA initiated

PHYSICIAN_____PAGER NUMBER _____

The Louisiana Emergency Response Network provides this as an example order set for alteplase (tPA) administration and post- treatment care. It is not a LERN approved order set. Any use or adoption must be approved by your hospital's internal policy and procedure.

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QD QOD U IU MS MSO4 MgSO4 Trailing Zero Lack of leading Zero		
ALL PRN MEDICATIONS ORDERED MUST HAVE A REASON *		
Date Ordered	**Time Ordered**	**PHYSICIAN'S ORDER**

Medications: (**X**) Labetalol 20 mg IV every 20 mins X 2 PRN SBP> 180 or DBP >105. Hold if HR < 65
(**X**) Cardene/nicardipine 0.2mg/ml IV. Initiate at 2.5 mg/hr PRN SBP>180-200 or DBP >105. Initiate at 5mg/hr if SBP>200. Titrate in increments of 2.5 mg/hr as often as every 15 minutes to maintain above parameters. Max 15mg/hr

Nursing**:** (**X**) Vital signs and neuro checks every 15 minutes for 2 hours after start of tPA then every 30 minutes for 6 hours then hourly for total of 24 hours utilizing the following flow-sheet.

Time tPA Initiated:_____ **Time tPA Discontinued or Completed** _____

	Time of Bolus	15 Minutes	30 Minutes	45 Minutes	1 Hour	1 Hour & 15 Minutes	1 Hour & 30 Minutes	1 Hour & 45 Minutes	2 Hours
Date/Time									
Blood Pressure									
Heart Rate									
LOC 1a									
LOC 1b									
LOC 1c									
Motor RUE									
Motor LUE									
Motor RLE									
Motor LLE									
Total mini-NIHSS									
Initials									
Intervention? Y/N*									

*Further explanation of intervention must be documented in chart/EMR.

**Monitoring flowsheet between 2 and 15 Hours not included to reduce the size of this document.

The Louisiana Emergency Response Network provides this as an example order set for alteplase (tPA) administration and post- treatment care. It is not a LERN approved order set. Any use or adoption must be approved by your hospital's internal policy and procedure.

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DANGEROUS/UNACCEPTABLE ABBREVIATIONS - DO NOT USE
QD QOD U IU MS MSO4 MgSO4 Trailing Zero Lack of leading Zero
ALL PRN MEDICATIONS ORDERED MUST HAVE A REASON *

Date Ordered	Time Ordered	PHYSICIAN'S ORDER

	15 Hours	16 Hours	17 Hours	18 Hours	19 Hours	20 Hours	21 Hours	22 Hours	23 Hours	24 Hours
Date/Time										
Blood pressure										
Heart Rate										
LOC 1a										
LOC 1b										
LOC 1c										
Motor RUE										
Motor LUE										
Motor RLE										
Motor LLE										
Total mini-NIHSS										
Initials										
Intervention? Y/N*										

Scoring for Mini-NIHSS 1a. **Level of Consciousness**	0 = Alert; keenly responsive. 1 = Drowsy; arousable by **minor stimulation** 2 = Stuporous; requires **repeated stimulation** to attend, or is obtunded and requires **strong or painful stimulation** to make movements. 3 = Coma; responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, and areflexic.
1b. **LOC Questions:** The patient is asked the month and his/her age. The answer must be correct-there is no partial credit for being close. If intubated, arbitrarily score 1.	0 = Answers **both** questions correctly. 1 = Answers **one** questions correctly. 2 = Answers **neither** questions correctly.
1c. **LOC Commands:** The patient is asked to open and close the eyes and then to grip and release the non-paretic hand. Demonstration is permitted.	0 = Performs **both** tasks correctly. 1 = Performs **one** task correctly. 2 = Performs **neither** task correctly.
Motor Arm: The limb is placed in the appropriate position: extend the arms (palms down) 45 degrees. 10 second count for arm. **Motor Leg:** The limb is placed at 30 degrees. 5 second count for leg. Demonstration is permitted. Each limb is tested in turn, beginning with the non-paretic side.	0 = **No drift**; limbs holds for full count. 1 = **Drift;** drifts before full count; does not hit the bed or other support. 2 = **Some effort against gravity**; limb cannot get to, or maintain position, drifts to bed, but has some effort against gravity. 3 = **No effort against gravity**; limb falls 4 = **No movement.**

*Further explanation of intervention must be documented in chart/EMR.

Nurse Signature/ Initials _____

Nurse Signature/ Initials _____

The Louisiana Emergency Response Network provides this as an example order set for alteplase (tPA) administration and post- treatment care. It is not a LERN approved order set. Any use or adoption must be approved by your hospital's internal policy and procedure.

LOUISIANA EMERGENCY RESPONSE NETWORK

Complications with thrombolytic

All treatment decisions should be made in collaboration with your facility's neurological expert.

Angioedema

- Angioedema occurs in about 5 percent of cases (higher risk if taking ACE-inhibitor) and typically involves the tongue, lips, or oropharynx. Monitoring after thrombolytic is recommended.

- If angioedema occurs, close monitoring of the airway is necessary. Empiric treatment with intravenous Histamine 2 blocker, antihistamine, and a steroid is recommended for signs of angioedema.

* Duymun, S., Reddy, V., Bentley, E., & Bose-Kolanu, A. (2021). Tissue plasminogen activator-induced angioedema involving a posterior cerebral artery infarct: a case presentation. *The American Journal of Case Reports*, *22*, e927137-1.

Reasons to Suspect Thrombolytic Related Hemorrhage

- Neurological decline (suggest using mini NIHSS increase of ≥ two points)
- Sudden changes in blood pressure or heart rate
- Decline in level of consciousness
- Seizure
- Nausea/vomiting
- Severe or worsening headache

Post-thrombolytic symptomatic intracranial hemorrhage

Who should get treated?

- Neurological deterioration with parenchymal hemorrhage (PH) thought to be causing or contributing to the acute worsening, within 24hrs of when thrombolytic was administered with anticipated risk for hemorrhage expansion
- Consider treated patients with identified PH who have not demonstrated neurological deterioration, within 24hrs of when thrombolytic was administered when the risk of hemorrhage expansion is high
- Consider treating hemorrhage occurring beyond 24hrs of when thrombolytic was administered, if fibrinogen is low
- The median time from thrombolytic administration to detection of symptomatic intracranial hemorrhages is 8 hours.
- Most are classified as parenchymal hemorrhage type 2 (PH2), which is defined as >30% of the infarcted volume with mass effect OR hemorrhage outside of the area of infarct.
- PH2 is associated with worse outcome, including close to 50% mortality

- Cryoprecipitate is considered first-line treatment for post-thrombolytic intracranial hemorrhage, despite low-level data supporting efficacy at preventing further hemorrhage and death
- Tranexamic acid and aminocaproic acid inhibit plasmin, which causes breakdown of fibrin into its split products, thereby halting the action of alteplase. The data to support efficacy of either of these treatments, alone or in combination with cryoprecipitate, is severely limited. One small series of patients treated for post-thrombolytic ICH found no advantage of adjunctive tranexamic acid with cryoprecipitate vs cryoprecipitate alone (n=16). A smaller series demonstrated increased rate of hemostasis with aminocaproic acid combined with cryoprecipitate (n=6).
- If no reversal agent is available, transfusion of 8 units of platelets is reasonable as emergent transfer to a higher-level center is arranged.

Table 6. Management of Symptomatic Intracranial Bleeding Occurring Within 24 Hours After Administration of IV Alteplase for Treatment of AIS

COR IIb	LOE C-EO
Stop alteplase infusion	
CBC, PT (INR), aPTT, fibrinogen level, and type and cross-match	
Emergent nonenhanced head CT	
Cryoprecipitate (includes factor VIII): 10 U infused over 10–30 min (onset in 1 h, peaks in 12 h); administer additional dose for fibrinogen level of <150 mg/dL Check fibrinogen level 30 minutes after infusion (	
Tranexamic acid 1000 mg IV infused over 10 min OR ε-aminocaproic acid 4–5 g over 1 h, followed by 1 g IV until bleeding is controlled (peak onset in 3 h) (Potential for benefit in all patients, but particularly when blood products are contraindicated or declined by patient/family or if cryoprecipitate is not available in a timely manner.)	
Hematology and neurosurgery consultations	
Supportive therapy, including BP management, ICP, CPP, MAP, temperature, and glucose control SBP goal should be lowered to	

AIS indicates acute ischemic stroke; aPTT, activated partial thromboplastin time; BP, blood pressure; CBC, complete blood count; COR, class of recommendation; CPP, cerebral perfusion pressure; CT, computed tomography; ICP, intracranial pressure; INR, international normalized ratio; IV, intravenous; LOE, Level of Evidence; MAP, mean arterial pressure; and PT, prothrombin time.

Sources: Sloan et al,[138] Mahaffey et al,[139] Goldstein et al,[140] French et al,[141] Yaghi et al,[142–144] Stone et al,[145] and Frontera et al.[146]

Intracranial Hemorrhage

All treatment decisions should be made in collaboration with your facility's neurological expert.

Initial Assessment of ICH

- Airway/breathing–low threshold for intubation
- Measure GCS; brainstem reflexes
- Send coagulation profile and platelets
- CT of head without contrast
  - Determine location and volume
  - Identify intraventricular blood or hydrocephalus
- Guidelines recommend SBP < 160mmHg; achieved with labetalol boluses (10-20mg) for SBP 160-200 and nicardipine infusion for SBP > 200, if available
- If suspicion for ICP or herniation, consider:
  - SBP goal is < 180 with MAP goal > 100 (2007 AHA/ASA guidelines)
  - Head-of-bed elevated at 30°
  - Patient's neck in a neutral position to maximize venous outflow
  - Minimizing the patient's agitation and pain
  - Hyperventilation
  - Hyperosmolar therapies–mannitol and hypertonic saline
  - Alert neurosurgery for possible clot evacuation and/or ventriculostomy

*AHA/ASA Guideline for the Management of Spontaneous Intracerebral Hemorrhage. Stroke. 2010;41:2108-2129.

Suggested Methods For Reversal of coagulopathy in ICH

All treatment decisions should be made in collaboration with your facility's neurological expert.

If INR is elevated, consider:

- Give 10mg IV vitamin K (slow infusion)
- Type & Cross for:
  - 4 units FFP
    Or
  - Prothrombin complex concentrate (PCC) containing Factors II, VII, IX, and X at 30 units/kg
    Or
  - Consider activated Factor VII (Novo 7) 40mcg/kg
    - Off-label/compassionate use
    - Must be followed by FFP or INR will increase after a few hours
- Would give PCC for hemorrhages on new oral anticoagulant therapy

*AHA/ASA Guideline for the Management of Spontaneous Intracerebral Hemorrhage. Stroke. 2010;41:2108-2129.

Suggested Goals for Stroke Care

All treatment decisions should be made in collaboration with your facility's neurological expert.

- Temperature < 37.2°C
- Blood Glucose < 160mg/dl
- HOB
  - Ischemic flat for 24 hours, unless poor control of secretions
  - ICH 30 degrees elevation
- Blood Pressure
  1) During thrombolytic and Post thrombolytic < 180/105 x 24 hours
  2) For patients NOT treated with thrombolytic - Permissive HTN up to SBP < 220, DBP < 110 (should be individualized)
  3) S/P ICH–SBP < 160 & MAP > 100 unless suspect or known increased ICP, then SBP < 180 and MAP > 100 per 2018 AHA/ASA goals

*AHA/ASA Guideline for the Early Management of Patients with Acute Ischemic Stroke. Stroke. 2103;44:870-947.

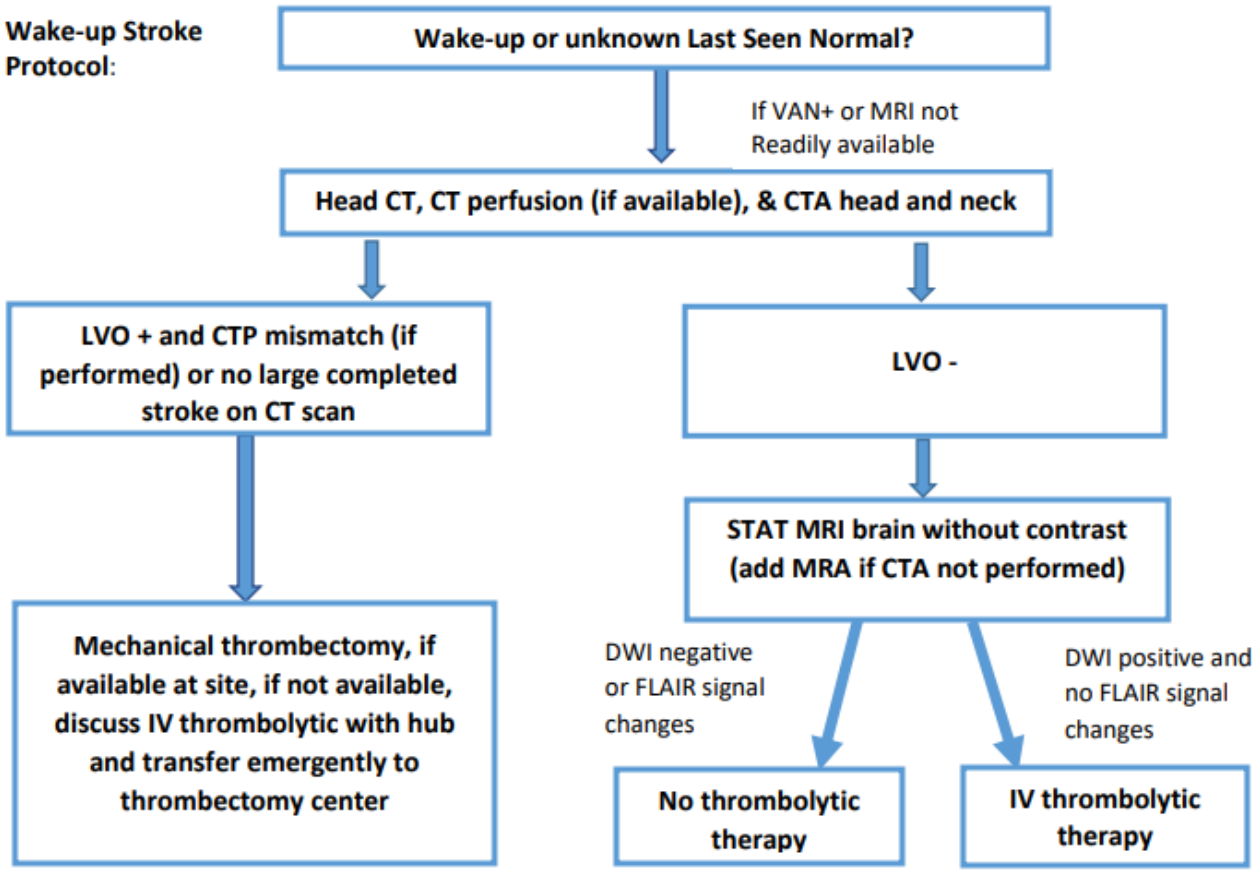
2022 Guideline for the Management of Patients With Spontaneous Intracerebral Hemorrhage: A Guideline From the American Heart Association/American Stroke Association
Steven M. Greenberg, Wendy C. Ziai, Charlotte Cordonnier, Dar Dowlatshahi, Brandon Francis, Joshua N. Goldstein, J. Claude Hemphill III, Ronda Johnson, Kiffon M. Keigher, William J. Mack, J. Mocco, Eileena J. Newton, Ilana M. Ruff, Lauren H. Sansing, Sam Schulman, Magdy H. Selim, Kevin N. Sheth, Nikola Sprigg, Katharina S. Sunnerhagen and … See all authors
Originally published17 May 2022https://doi.org/10.1161/STR.0000000000000407Stroke. 2022;53:e282–e361

Wake Up/ Unknown Symptom Onset Stroke Guideline

All treatment decisions should be made in collaboration with your facility's neurological expert.

Background

- About 20% of strokes are detected upon awakening. Historically, these patients were excluded from treatment with IV lytic due to being "out of the window" from last seen normal.
- Radiographic studies of patients with wake-up strokes support the onset is likely shortly upon awakening.
- A randomized controlled study demonstrated efficacy of IV lytic (alteplase) in improving the odds of an independent outcome when selected by MRI of the brain, performed within 4.5 hours of symptom detection. The number needed to treat was nine. The symptomatic hemorrhage rate was only 2.4%.
- Since 2019, our AHA/ASA Guidelines for the Emergency Management of Acute Ischemic Stroke issued a Class 11a, level of evidence B recommendation for IV alteplase (0.9mg/kg, maximum dose 90mg) within 4.5 hours of symptom detection for patients who have MRI confirmation of DWI lesion less than one-third of the MCA territory and no visible signal change on FLAIR. This applies to patients who are found with stroke symptoms whose last seen normal is more than 4.5 hours prior.



- If your center does not have CT perfusion imaging and the patient has LVO, emergently transfer to a thrombectomy center.
- If your center does not have emergent MRI capability and the patient does not have LVO, emergently transfer to closest hospital with MRI capability, if feasible within 4.5 hours of symptom detection.

Mini NIH Stroke Scale

For patients receiving thrombolytic, the nurse should perform:

- Neuro checks (GCS and mini-NIHSS) every 15 minutes; notify physician for signs of neurological worsening (decline in GCS or increase in mini-NIHSS by 2 or more points).

	Time of lytic bolus	15 Minutes	30 Minutes	45 Minutes	1 Hour	1 Hour, 15 Minutes	1 Hour, 30 Minutes	1 Hour, 45 Minutes	2 Hours
Time									
BP									
HR									
GCS – eyes									
GCS – verbal									
GCS – motor									
GCS total									
LOC 1a									
LOC 1b									
LOC 1c									
Motor RUE									
Motor LUE									
Motor RLE									
Motor LLE									
Total mini-NIHSS									
Initials									
Intervention ? Y/N*									

1a. **LOC Responsiveness**: The examiner assesses patient's level of alertness and evaluates patient according to the stimuli required to arouse him/her.	0 = Alert; keenly responsive. 1 = Drowsy; arousable by **minor stimulation** 2 = Stuporous; requires **repeated stimulation** to attend, or is obtunded and requires **strong or painful stimulation** to make movements. 3 = Coma; responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, and areflexic.
1b. **LOC Questions:** The patient is asked the month and his/her age. The answer must be correct-there is no partial credit for being close. If intubated, arbitrarily score 1.	0 = Answers **both** questions correctly. 1 = Answers **one** question correctly. 2 = Answers **neither** question correctly.
1c. **LOC Commands:** The patient is asked to open and close the eyes and then to grip and release the non-paretic hand. Demonstration is permitted.	0 = Performs **both** tasks correctly. 1 = Performs **one** task correctly. 2 = Performs **neither** task correctly.
Motor Arm: The limb is placed in the appropriate position: extend the arms (palms down) 45 degrees. Ten second count for arm. **Motor Leg:** The limb is placed at 30°. Five second count for leg. Demonstration is permitted. Each limb is tested in turn, beginning with the non-paretic side.	0 = **No drift**; limbs holds for full count. 1 = **Drift**; drifts before full count; does not hit the bed or other support. 2 = **Some effort against gravity**; limb cannot get to, or maintain position, drifts to bed, but has some effort against gravity. 3 = **No effort against gravity**; limb falls. 4 = **No movement.**

Acute Stroke Ready Hospital Data Collection Requirements

Quality Improvement | Educational Resources | Other Resources

Who?

All LERN Acute Stroke Ready Hospitals. Primary, Thrombectomy Capable, and Comprehensive Stroke Centers have reporting requirements to The Joint Commission or other Board-approved credentialing agency as a part of the credentialing and maintenance of certification processes. LERN Stroke Bypass Hospitals have no reporting requirements. LERN Acute Stroke Ready Hospitals must submit quarterly reports to LERN in order to ensure that these centers are functioning at the standards set for a LERN Acute Stroke Ready Hospital.

Why?

The primary aim of LERN's stroke system of care efforts is to develop a comprehensive stroke system of care in Louisiana to provide timely access to proven treatments necessary to reduce death and dependency. Your center has attested to LERN Acute Stroke Ready Hospital capability. While Primary, Thrombectomy Capable, and Comprehensive Stroke Centers are held accountable by The Joint Commission or other Board-approved credentialing agency through quarterly reports and on-site reviews, LERN seeks to develop a mechanism of confirming that LERN Acute Stroke Ready Hospitals are functioning as Stroke Enabled Centers. The data collected by the Acute Stroke Ready Hospitals will provide the LERN Stroke Medical Director with the opportunity to provide direction for improvement, when the need is identified or when assistance is requested. Persons who present with acute stroke deserve the opportunity to receive time-sensitive treatment with intravenous tissue plasminogen activator (IV tPA or TNK), which is the foundation of acute stroke care. LERN Acute Stroke Ready Hospitals must demonstrate the timely administration of IV tPA or TNK to eligible patients. Further, Acute Stroke Ready Hospitals must recognize and respond to stroke caused by large vessel occlusion in order to gain access to thrombectomy, when appropriate, via rapid transfer to stroke centers with endovascular capability and other needed resources. The data collection requirements focus on the time stamps for evaluation and management of the stroke patient who presents within the first few hours after onset

What?

Which Patients get entered into the spreadsheet?

- All patients who present to your ED with suspected stroke
- DIDO data elements are only for patients who present within 24hrs of LSN or could be within 24 hrs LSN

- Hospital Identifier = Column A
  A unique letter code given to each hospital to anonymously distinguish one hospital's data from another's. For example, Baton Rouge General Medical Center's identifier may be "AC" while Our Lady of the Lake Regional Medical Center's identifier may be "ABD". This identifier will be assigned by LERN.

1) **Quarter** = Column B
The quarter of the calendar year in which the data is being reported in the format of Q-YY (e.g., 1-24). Data should be submitted once per quarter.

For patient info:	Submit no later than:	Quarter reported:
January 1 – March 31	April 30	1-YY (e.g., 1-24)
April 1 – June 30	July 31	2-YY (e.g., 2-24)
July 1 – September 30	October 31	3-YY (e.g., 3-24)
October 1 – December 31	January 31	4-YY (e.g., 4-24)

2) **Date** = Column C
The date the patient arrived at the hospital. This should be in the format of Month/Date/Year (e.g., June 10th, 2024 would be 06/10/24).

3) **Patient ID #** = Column D
This shall be a facility-dependent "Dummy ID" so that identifiers can be eliminated from the transferred dataset to LERN. Please use the Hospital Identifier, followed by the quarter, followed by 001. For example, if your hospital identifier is CCC, and it is the 1st quarter of 2024, your first patient's Dummy ID should be: CCC-1-24-001. The next patient would be: CCC-1-24-002, and so on. If you click and hold the left mouse button on the bottom right corner of the cell containing CCC-1-24-001 and drag it down, the patient ID #s will automatically populate. **Do not include patients who experienced an in-hospital stroke. This dataset is designed to reflect your Acute Stroke Ready Hospital's capability of rapidly evaluating patients with suspected stroke who present to your Emergency Department.**

4) **Time Last Seen Normal (LSN)** = Column E
This is the time (military time) that the patient was last known to be at his or her normal neurological condition. This time = the time of onset for:

   a. A person who was awake at onset and can provide his or her own history and

   b. A person with witnessed onset.

   If the LSN time is known, enter that time in military format (e.g, 1:35pm would be 13:35). If the LSN time is between 4.5 hours and 24 hours, simply enter ">4.5 hours." If the LSN time is >24 hours, enter ">24 hours". If the LSN time is unknown, leave the cell blank.

5) **Time of Arrival to the Emergency Department Door** = Column F
This is the date and time (military time) that the patient was first acknowledged as being present at the LERN Acute Stroke Ready Hospital. If the patient arrives by ambulance, this is the time the ambulance arrives at the LERN Acute Stroke Ready Hospital. If the patient arrives by private vehicle or as a walk-in, this is the time stamp on the ED triage form. This timestamp should be documented for all patients who present within the first 24 hours of LSN. This timestamp may be left blank for patients arriving >24 hours from LSN.

*If the interval between LSN and arrival to the ED Door is **MORE THAN 4.5 HOURS**, then data elements in columns **G through O** are **not** required for reporting. Collecting this data will assist in determining the proportion of patients who present to the hospital within the "window of opportunity". Knowing the true numerator for tPA/TNK treatment and denominator for your population informs of your possible "missed opportunities" and will serve as a key metric for community education to improve the proportion of patients who present within the "window of opportunity" for treatment. Data collection for #1-6 applies to all patients admitted with ICD-10 diagnoses codes of I63.xxx (Acute Ischemic Stroke), I60.xx (Subarachnoid Hemorrhage), I61.x (Intracerebral Hemorrhage), or G45.9 (Transient Ischemic Attack). **Columns P through X are mandatory for all patients who arrive within 24 hours of LSN.***

6) **Time of ED MD Evaluation** = Column G
This is the first documented date and time (military time) which indicates the ED physician had a face-to-face encounter with the patient with suspected stroke who presents within the first 3.5 hours after last seen normal. The goal is <10 minutes from the Time of Arrival to the Emergency Department Door. It is ok if another provider documents the ED physician saw the patient.

7) **Time of communication with Neurological Expertise** = Column H
This is the date and time (military time) when a neurological expert is first contacted (in person, by telephone, or by telemedicine) by a physician at the LERN Acute Stroke Ready Hospital to discuss the patient with suspected stroke who presents within the first 3.5 hours after last seen normal. The best practice **goal is <15 minutes** from the Time of Arrival to the Emergency Department Door. A LERN Acute Stroke Ready Hospital may have a neurological expert who prefers to have the CT scan and laboratory findings available prior to the first communication. LERN strongly recommends that LERN Acute Stroke Ready Hospital initiate contact with their neurological expert to inform him or her of the patient with suspected stroke within the first 15 minutes s from the Time of Arrival to the Emergency Department Door and document this time. A follow-up communication with the neurological expert can follow when the CT scan +/- laboratory findings are available. If your ED doc has sufficient experience and expertise AND accepts the role of neurological expert for the purposes of determining thrombolytic and thrombectomy eligibility, then the time of ED doc evaluate would be the same as the time of accessing your neurological expertise.

8) **Credentials of Neurological Expertise** = Column I
Please indicate: Neurologist, Vascular Neurologist, Emergency Medicine Physician, or Other. A drop-down box (pick list) is provided on the electronic data collection tool.

9) **Time of CT Performed** = Column J
This is the date and time (military time) of the time stamp on the baseline CT scan of the head. The **goal is <20 minutes** from Time of Arrival to the Emergency Department Door in at least 50% of patients who present <4.5 hours from LSN.

10) **Time of CT Interpretation** = Column K
This is the date and time (military time) when the interpretation of the baseline CT scan of the head becomes available by whomever is responsible for reading it (on-site or off-site radiologist or neurological expert, provided he or she is credentialed for interpretation of neuroimaging at the center). The **goal is <45 minutes** from the Time of Arrival to the Emergency Department Door for patients with suspected stroke who present within the first 4.5 hours after LSN. Each Acute Stroke Ready Hospital defines who is credentialed to interpret the CT scan via internal hospital by-laws.

11) **Time to Labs Complete** = Column **L**
This is the date and time (military time) when necessary laboratory values are available for patients with suspected stroke who present within the first 3.5 hours after LSN, which may include

platelet count, PT/INR (PTT, when appropriate), and glucose. The **goal is <45 minutes** from the Time of Arrival to the Emergency Department Door. The time documented for labs resulted can be the time of the blood glucose measurement, if this is the only required test for your patient; however, you should insure that you can obtain necessary additional lab tests for the population of patients who require them in order to determine eligibility for IV thrombolytic.

NOTE: The American Heart Association/American Stroke Association has issued this statement in the 2013 Guidelines for the Early Management of Patients With Acute Ischemic Stroke: "Although it is desirable to know the results of these tests before giving intravenous recombinant tissue-type plasminogen activator, fibrinolytic therapy should not be delayed while awaiting the results unless:

a. There is clinical suspicion of a bleeding abnormality or thrombocytopenia,

b. The patient has received heparin or warfarin, or

c. The patient has received other anticoagulants (direct thrombin inhibitors or direct factor Xa inhibitors)."

12) **Time to Thrombolytic Bolus** = Column M

This is the date and time (military time) when the bolus of thrombolytic is pushed IV in the patient with suspected stroke who presents within the first 4.5 hours after last seen normal. The **goal is <60 minutes** from the Time of Arrival to the Emergency Department Door and represents the "Door-to-Needle time". Every minute, up to 2 million brain cells are destroyed during a large artery occlusive stroke. Systematic improvement in the Door-to-Needle time should be a priority for all LERN Stroke Centers. Feedback reports from the LERN Stroke Medical Director will push for efforts to reduce the median door-to-needle time, in recognition of the new **target door-to-needle time of 45min** (AHA Target Stroke).

13) **Reason why patient who presents in less than 4.5 hours of last seen normal (LSN) not treated with thrombolytic** = Column N

The LERN Documentation Tool lists the following pick list to facilitate tracking of this metric:

- Symptoms completely resolved
- Hemorrhage on CT scan
- Unable to treat within 4.5 hours of LSN
- Stroke mimic
- Mild deficits which are not disabling
- Ischemic stroke within 3 months
- Severe head trauma within 3 months
- Recent major trauma, not involving the head within 14 days
- Intracranial or intra-spinal surgery within 3 months
- Recent major surgery within 14 days
- History of ICH
- Suspicion of SAH
- GI malignancy or GI bleed within 21 day
- Platelets <100K
- INR >1.7
- Elevated PTT
- Full anticoagulation (treatment dose of LMWH, thrombin inhibitor, or factor Xa inhibitor; prophylactic doses of LMWH are not a contraindication)

- Active use of GIIb/IIIa inhibitor
- Other known bleeding diathesis
- Infective endocarditis
- Aortic arch dissection
- Intra-axial intracranial neoplasm

If the BP or glucose could not be controlled in time to treat by 4.5 hours, the option of "unable to treat within 4.5 hours of LSN" would cover these scenarios. Delayed diagnosis is also covered under "unable to treat within 4.5 hours of LSN". Stroke mimic would include seizure.

- Reason why thrombolytic administration was delayed = **Column O**

  Recognizing that at times there are justifiable reasons for delay in thrombolytic administration causing facilities to miss the 60-minute window, the following pick list has been added:

  - Ongoing HTN despite 2 or more IVP or IV drip initiated
  - Further dx evaluation to confirm stroke in pt w/ blood glucose <50
  - Further dx evaluation to confirm stroke in patients who present with seizure
  - Further dx evaluation to confirm stroke in patient who have other major metabolic disorder –
    - Include other major metabolic disorder in comment section
  - Management of cardiopulmonary arrest, respiratory failure (requiring intubation), major
  - trauma/bleeding event
  - Management of other emergent/acute condition – Include other emergent/acute condition in comment section
  - Eligibility initially unclear due to timeline evolved after discussion with family/friends
  - Eligibility initially unclear due to unclear recent procedure/surgery
  - Eligibility initially unclear due to incomplete history
  - Initial refusal by patient or family
  - Consent delay due to patient wanting to discuss with family/proxy/spiritual guide first
  - Consent delay due to inability to contact family/proxy
  - Wake-up or Unknown symptom onset requiring additional imaging to determine eligibility
  - Difficulty obtaining IV access
  - Delayed/missed diagnosis
  - Equipment related delay
  - Provider wanted additional imaging to confirm stroke before treating (excluding glucose < 50, seizure, or major metabolic disorder)
  - Social/Religious beliefs

The following variables should be completed for all patients who present <24 hours from LSN

- Mode of arrival = **Column P**

  A drop-down menu allows for selection of private vehicle, ambulance, air ambulance, and unknown.

- NIHSS total score = **Column Q**

The NIHSS exam should be performed by certified examiners on all patients with suspected stroke based on 2018 AHA Guidelines for the Emergency Management of Patients with Acute Ischemic Stroke. The total score, performed prior to thrombolytic, if given, should be recorded.

- Was the patient screened for LVO? **= Column R**
  A drop-down menu allows for selection of yes, no, or not applicable (not applicable applies only to symptoms resolved, stroke mimic, hemorrhage).

- Method of screening patient for LVO. **= Column S**
  A drop-down menu of check boxes allows for multiple choices including VAN (Visual, Aphasia, Neglect), CT Angiography (CTA), other clinical scale or score (RACE, FAST-ED, CPSS, total NIHSS), and other vascular imaging (MRA, TCD, and/or angiography).

- Result of LVO screening = **Column T**
  A drop-down menu of choices LVO Positive and LVO Negative.

- Decision Time = **Column U**
  This is the date and time (military time) that the decision to transfer the patient was made for or against emergent transfer for possible thrombectomy for a patient who screen positive for LVO. We want to know how long it took for your site to decide that the patient needed to be transferred. Ideally, this is within minutes of arrival.

  If the patient screened negative for LVO, leave blank (ASRH), even if the patient was transferred for higher level of care.

  If the decision was made against transfer for possible thrombectomy, do not include the time of acceptance or time of transfer/departure/door out, even if transferred, and include the reason the patient was determined to not be a candidate for thrombectomy in the Details Column

- Transfer Request Time **= Column V**
  Enter the date and time of transfer request in military time or n/a if the patient was not transferred. Leave the field blank if the time cannot be determined. If your site does not have a consistent method for source documentation of the time of transfer request, then this is a target for process improvement.

  Ideally, the transfer request will be within minutes of the decision time, for patients who screened positive for LVO and were presumed to be candidates for thrombectomy. We want to know how long it took from the time you decided the patient needed to be transferred until the time you initiated that process.

- Acceptance Time = **Column W**
  Enter the date and time (military time) that the receiving hospital agreed to take the transfer. If the LERN Communication Center was used to facilitate acceptance, please indicate this in the Details Column.

If it took so long to get accepted, that the patient was no longer transferred with the intent of offering thrombectomy, leave this blank and indicate the patient could not be transferred in time for thrombectomy in the Details Column.

- EMS on Scene Time = **Column X**

  Enter the date and time (military time) that EMS arrived to transfer the patient**. This variable is required only for sites who are active in the remediation process for DIDO.**

  This is the time that the secondary transfer EMS ground or air ambulance arrived to transfer the patient for thrombectomy to a thrombectomy center.

- Transfer time = **Column Y**

  Enter the time of transfer request in military time or n/a if the patient was not transferred.

- Reason/s for transfer delay = **Column Z**

  A drop-down check box allows for multiple choices for:

  - Management of cardiopulmonary arrest, respiratory failure (requiring intubation), major trauma/bleeding event
  - Initial refusal of treatment or transfer by patient or family
  - Endovascular eligibility initially unclear due to timeline
  - Delayed/missed recognition of LVO due to altered LOC, seizure, other metabolic disorders
  - Delayed/missed recognition of LVO due to initial negative VAN screening
  - Delay in determination of IR candidacy by accepting facility
  - Delay in vascular imaging completion or interpretation
  - Delay in your facility initiating transfer
  - Delay in finding accepting center independently
  - Delay in finding accepting center through LCC
  - Bed unavailable at initial requested facility (?add multiple facilities)
  - Delay in EMS arrival due to delayed dispatch
  - Delay in EMS arrival due to weather conditions
  - Delay in EMS arrival due to unit not available
  - Social/religious beliefs

- Optional field for details of reason/s for transfer delay = **Column AA**

  This is a free text cell which allows you to provide any information you think is helpful in understanding what happened. If additional details are thought to be necessary or add value to understanding your barrier/s to efficient door in-to-door out, this field allows for a free-text description.

  If a patient presents within 24 hours of LSN and screens positive for LVO (clinical and/or imaging), but has been ruled out for thrombectomy, please document why the patient is not being transferred for thrombectomy

  - Large core infarct on imaging
  - No large vessel occlusion identified on imaging
  - No ischemic penumbra
  - Chronic occlusion not amenable to IR
  - Distal occlusion not amenable to IR

Data Submission to LERN

LERN expects to receive quarterly data report including Data Elements 1-6 (Columns A-F) for all patients presenting with suspected stroke and Data Elements 7-12 (Columns G-L) for patients with suspected stroke who presents within the first 4.5 hours after last seen normal. If thrombolytic is given, the time of thrombolytic bolus must be documented in Column M. If thrombolytic is not given for a patient with suspected stroke who presents within the first 4.5 hours after last seen normal, a reason must be documented in Column N. For all patients who present within the first 24 hours of last seen normal, the expanded data elements in Columns P-X must be documented. The maximum interval between close of a quarter and receipt of the data is 30 days.

Email the completed data form quarterly to Justin.Schleis3@LA.GOV

Date of end of quarter	Date data report is last acceptable
March 31st	April 30th
June 30th	July 30th
September 30th	October 31st
December 31st	January 31st

How much time is involved in the data collection process?

The data collection (if retrospective) would take a maximum of 20 minutes per case, for patients who present within the first 4.5 hours from last seen normal. For cases only requiring Dummy ID, (those presenting >24hrs LSN), time of last seen normal, and time of Arrival to the Emergency Department Door, each case would take a maximum of 5 minutes.

To get a better estimate of your time commitment:

1. Ask one of your hospital coders to pull a list of all patients with stroke diagnosis codes over the last 3 month period. The ICD-10 diagnoses codes of I63.xxx (Acute Ischemic Stroke), I60.xx (Subarachnoid Hemorrhage), I61.x (Intracerebral Hemorrhage), or G45.9 (Transient Ischemic Attack).
2. Get with the Guidelines (GWTG) estimates of % patients presenting within 3 hrs is <25%. Calculate what 25% of all patients with stroke diagnosis codes would represent. This would be an estimate of total quarterly sample size.
3. Divide that # by 3 (3 cases can be collected per hour) => estimated # hours per quarter devoted to the process of data collection.

Who should be responsible for collecting this data?

This will vary and is to be determined by each hospital. Some facilities assign data collection to the following existing employees:

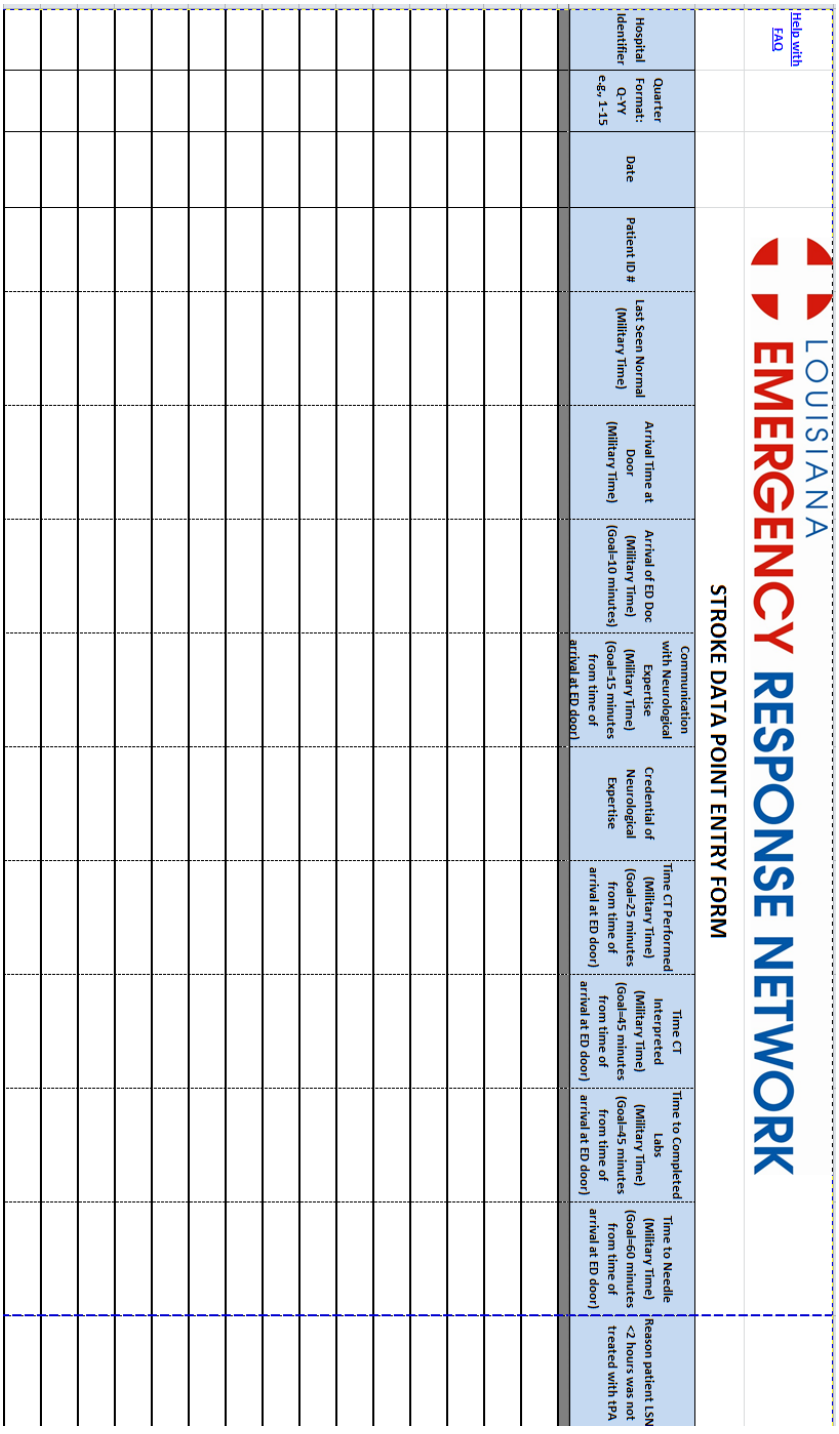
- Stroke director
- Stroke coordinator
- Quality department
- Emergency department nursing director
- Emergency department clinical supervisor
- Emergency department charge nurse

How can you improve the acquisition of these data elements?

One tip from your LERN Stroke Medical Director is to create a template in the ED medical chart (whether paper or electronic) that includes these timestamp data points and encourage your ED staff (MD and RNs) to document the data points that consume time when collected retrospectively (time last seen normal, time of Arrival of Emergency Department MD, time of communication with Neurological Expertise).

*****LERN Stroke Data will be accumulated and organized in summary form. LERN will not release any identified data related to a participating hospital. If disseminated, LERN data will be in aggregate form.*****

Data Collection Form



Help with FAQ

LOUISIANA EMERGENCY RESPONSE NETWORK

STROKE DATA POINT ENTRY FORM

Hospital Identifier	Quarter Format: Q-YY e.g. 1-15	Date	Patient ID #	Last Seen Normal (Military Time)	Arrival Time at Door (Military Time)	Arrival of ED Doc (Military Time) (Goal=10 minutes)	Communication with Neurological Expertise (Military Time) (Goal=15 minutes from time of arrival at ED door)	Credential of Neurological Expertise	Time CT Performed (Military Time) (Goal=25 minutes from time of arrival at ED door)	Time CT Interpreted (Military Time) (Goal=45 minutes from time of arrival at ED door)	Time to Completed Labs (Military Time) (Goal=45 minutes from time of arrival at ED door)	Time to Needle (Military Time) (Goal=60 minutes from time of arrival at ED door)	Reason patient LSN <2 hours was not treated with tPA

Each hospital will be issued a unique hospital identifier, which will only be shared with the associated hospital. ALL data will be accumulated and organized in summary form. LERN will not release any identified data related to a participating hospital. To obtain the unique hospital identifier, please contact Justin Schleis at (225) 756-3440.

The data collection tool is located on the LERN website at *http://lern.la.gov/lern-stroke-system/stroke-data-collection/*

LOUISIANA EMERGENCY RESPONSE NETWORK

Tele-Medicine Contacts (HUB Hospitals)

The following hospitals are providing neurological consultations via tele-medicine or a phone consultation.

1) **Oschner**

BJ Lanier: 202-316-4896 / benard.lanier@ochsner.org
Todd Mule: tmule@ochsner.org

- LCMC
- Amy Lassiter-Holsapple, RN: 504-503-6380 /
- amy.lassiter-holsapple@LCMChealth.org

2) **Our Lady of the Lake**

Amy Booth: 225-765-6649 / amy.booth@fmolhs.org

3) **Our Lady of Lourdes**

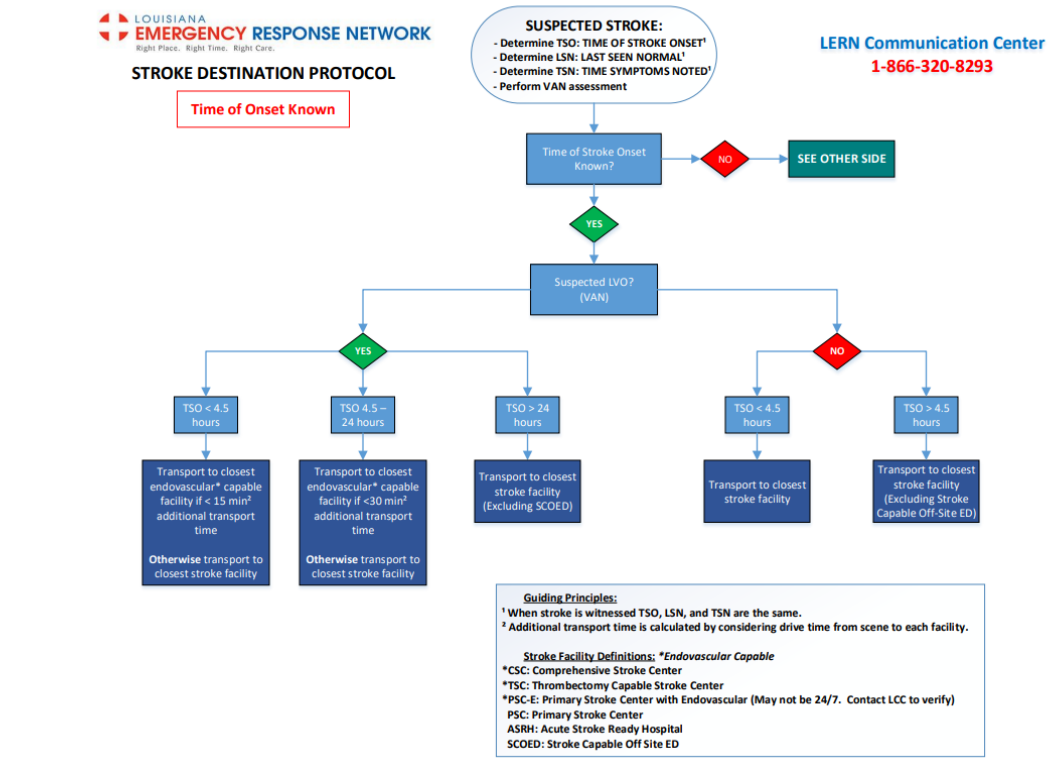
Allen Aubert: 337-470-2905 / allen.aubert@fmolhs.org

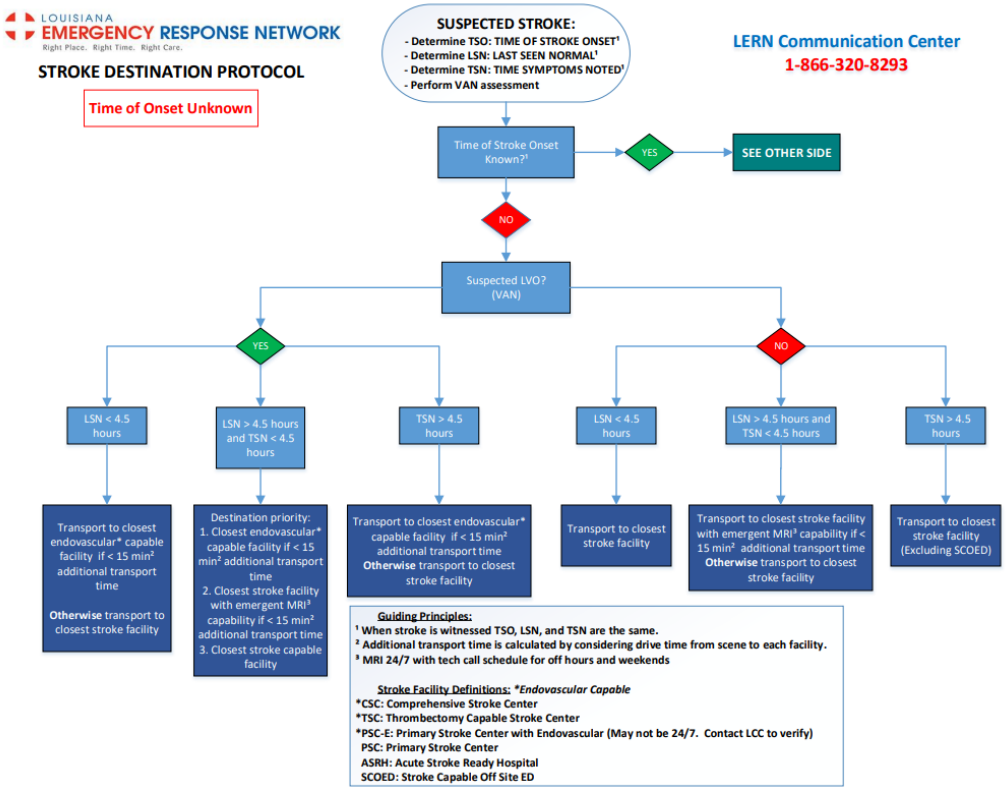
The 10 P's of stroke

Causes, Pathophysiology, Evaluation, and Management Tool

1. Pump	•Abnormal Structure, function, or rhythm can cause or complicate stroke •Work-up will include telemetry and echocardiography
2. Pressure	•High Blood Pressure (BP) is the #1 risk factor for stroke •Pressure or blood reaching the brain = systemic presure = pressure inside of the head
3. Perfusate	•This is blood, which must have sufficient volume, oxygen, and glucose and must not be too viscous or prone to clotting •Lab tests will be ordered
4. Pipes	•Arteries that carry blood to the brain •Can be blocked by clots and plaques, leading to ischemic stroke •Can break, leading to hemorrhagic stroke •Will be assessed by diagnostic tests
5. Plumbing	•Communication of arteries to the brain •If there is good plumbing, the damage from loss of an artery is minimized
6. Perfusion	•The movement of blood through the brain •Diagnostic tests can determine if flow is adequate
7. Parenchyma	•CT and/or MRI scans provide information on ischemic and hemorragic brain injury
8. Penumbra	•Penumbra is the part of the brain that has inadequate flow, but has not yet died •Up to two million brain cells die each minute during stroke
9. Physical rehablilitation and Recovery	•Physical therapy for gait training and strengthening •Occupational therapy for activities of daily living training, fine motor movements, visual issues, and neglect •Speech therapy for production of speech, language, swallowing, and cognition. •Intensive rehab increases the likelihood of going home rather than being institutionalized
10. Prevention	•Behavioral changes and medications to keep: •BP < 120/80 •Fasting glucose < 110mg/dl •Antiplatelet or anticoagulant to prevent clotting •No smoking, illicit drugs, or excessive alcohol use

LERN Destination Protocol (Pre-Hospital)

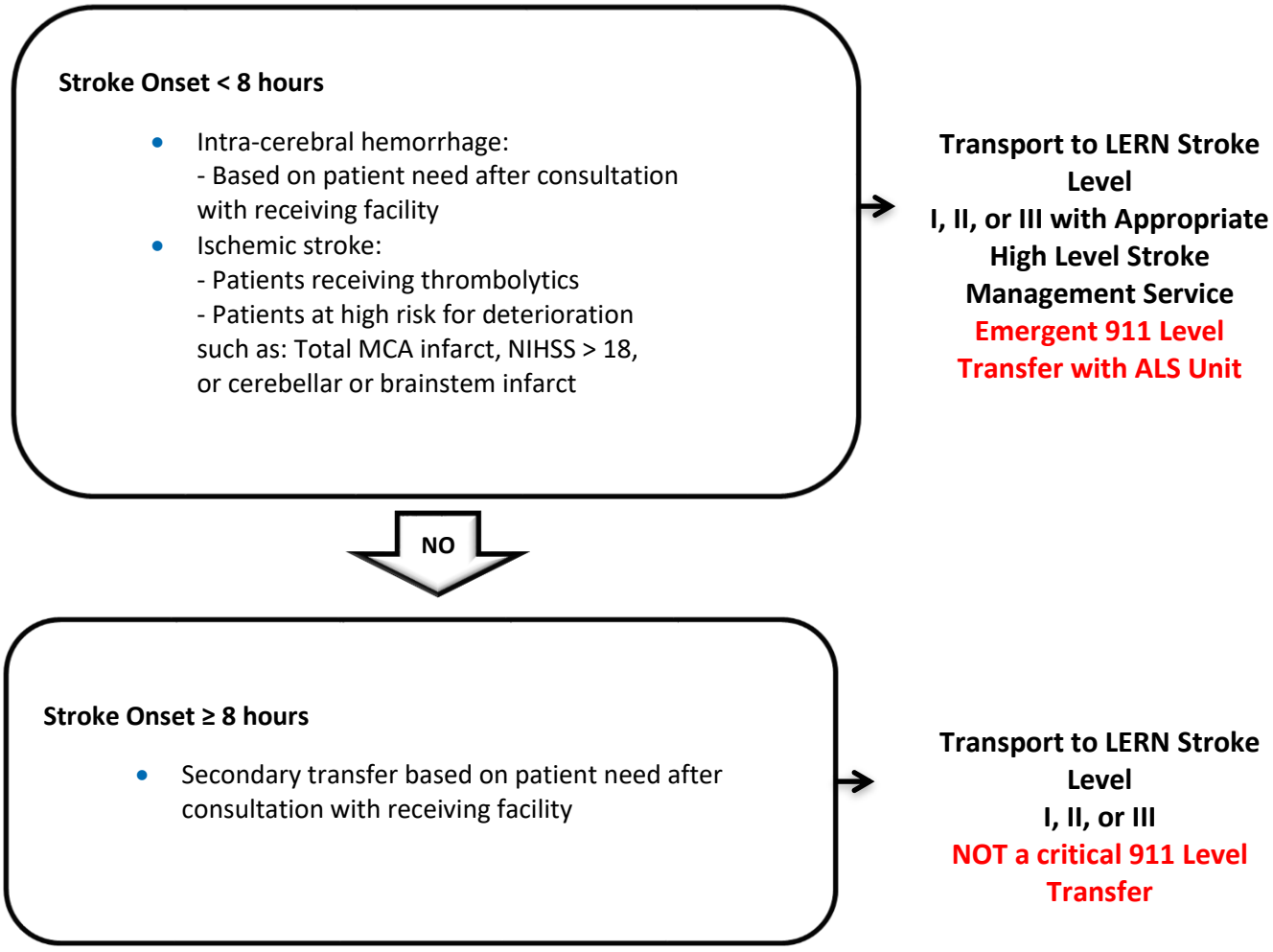




LOUISIANA EMERGENCY RESPONSE NETWORK

LERN Transfer Guideline: Stroke

The following guideline applies to patients with suspected stroke requiring transfer:



* Based on current recommendations from AHA/ASA outlined in the document "*Interactions Within Stroke Systems of Care*." Protocols for inter-hospital transfer of patients should be established and approved beforehand so that efficient patient transfers can be accomplished at all hours of the day and night.

LOUISIANA EMERGENCY RESPONSE NETWORK

DIDO Best Practice Strategies (AHA/ASA)

The Western States Task Force advocates these 9 key best practice strategies for improving door-in-door-out times for acute ischemic stroke patients requiring transfer for a higher level of care. These strategies were developed with a focus on mechanical endovascular reperfusion (MER) eligible cases, but could also be applied to other stroke transfers.

- Target Door-in-Door-out Times: Establish a policy that specifies the expected door-in-door-out times—ideally a goal of ≤90 minutes in 50 percent or more of acute ischemic stroke patients transferred.
- Rapid Administration of IV Thrombolysis: Follow Target: Stroke Phase I, II, and III Key Best Practice Strategies. Target: Stroke Key Best Practice Strategies available at: https://www.heart.org/en/professional/quality-improvement/target-stroke/clinical-toolsand-resources
- Rapid Initiation of Transfer Process:
- Consider developing pre-existing transfer agreements with automatic acceptance.
- Formalize agreements with transporting EMS agencies; include their capabilities and expected response times.
- Implement parallel workflows for the assessment and transfer process.
- Initiate the transfer process early when appropriate based on exam; may not need to wait for large vessel occlusion (LVO) confirmation.
- Participate in a Regional System of Care: •
- Complete prehospital screening, use an LVO scale, and ensure prenotification by EMS.
- Where EMS is both the 911 and transfer provider, consider having EMS stand-by for suspected LVO patients for immediate transfer once imaging is performed.
- Use of Telemedicine:
- Integrate telemedicine into the transfer process, where utilized.
- Initiate contact with the telemedicine provider early so they are involved in initial patient evaluation.
- Ensure imaging is available to the telemedicine provider to help inform decision making.
- Rapid Acquisition, Interpretation, and Transmission of Neuro Imaging:
- Perform CT/MR Angiography concurrently with non-contrast CT (NCCT).
- Send NCCT and CT/MR Angiography for imaging interpretation immediately.
- Do not delay IV thrombolysis for any advanced imaging beyond NCCT (or MR).
- Expedited Transport Handoff:
- Create standardized templates for the handoff process.
- When possible, complete EMS handoff while the transporting provider is en route to the transferring facility.
- Expedite direct handoff from transferring facility (Spoke) to receiving facility (Hub) without delaying patient's departure.
- Mock Code Strokes: Encourage routine mock codes that include transfer scenarios; include external staff who are involved in the transfer process (e.g., EMS, receiving facility).
- Prompt Data Collection, Feedback and Quality Improvement: Measure and track performance at the hospital and system of care levels, and promptly provide feedback

Mock Stroke Codes

Evidence supports improved door to needle times after instituting multidisciplinary mock stroke codes. For Hospitals who do not meet stroke codes of 6 patients presenting <3.5 hrs from last seen normal per quarter will have to submit a least 1 mock stroke code form per month. Mock Stroke Code Scenarios can be found on LERN's website: https://lern.la.gov/lern-stroke-system/stroke-data-collection/

Mock Stroke Code			
Date:	**Time:**	**Shift (circle):** Day Evening Night	**Hospital Name:**
AHA Scenario number:	**Participants Responding:**		

Time	**Patient Arrival**: Private Vehicle Ambulance	**Response deficiencies**:
	Last seen normal	
	Symptoms noted	
	Arrival (door in)	
	Mock Code Activated	
	Physician at Bedside (ED vs hospitalist/neurologist for inpatients)	
	Stroke activation order-set (CT, CTA, labs, tele stroke consult)	
	Blood pressure, result: (BP should be <185/110 prior to administration of lytic)	
	Capillary Blood Glucose, result:	
	LVO screening, result:	
	LVO screening method/s:	
	Decision on need to transfer	
	Transfer requested	
	IV inserted #1/ Labs drawn	
	NIHSS score (Not to Delay CT), result:	
	Access to Neurologist (or Teleneurology/Telestroke)	
	CT completed	
	CT interpreted, by:	
	Needed labs resulted	
	IV #2 inserted	
	Decision on thrombolytic	
	If thrombolytic not given, reason:	
	Thrombolytic ordered	
	Thrombolytic at bedside	
	Thrombolytic administered	
	If delay in thrombolytic, reason:	
	Additional Documentation: Document vital signs and neuro assessments as ordered (Q15 for 1st 2 hours, then Q30 x 6 hours, then hourly x 16 hours) – address SBP >180 or DBP >105mmHg; notify MD for neurological worsening, angioedema, or evidence of bleeding	
	Swallow Screen prior to oral intake/medication administration	

Other Notes: