

Acute Stroke Ready Hospital (ASRH) Designation Reference Guide

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Revised 6/2024

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Appendix 1A: Contact Information Form

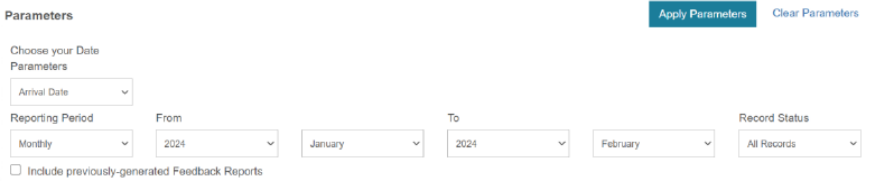
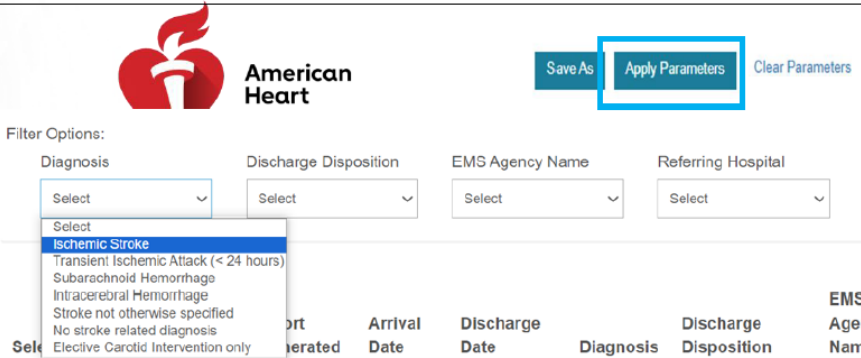
Facility:		
Street Address / PO Box:		City:
State:	ZIP Code:	Telephone Number:
CEO name, credentials, and title (print):		
CEO phone number:		CEO e-mail address:
Director of Nursing/CNO name, credentials, and title (print):		
Director of Nursing/CNO phone number:		Director of Nursing/CNO e-mail address:
Stroke Coordinator name, credentials, and title (print):		
Stroke Coordinator phone number:		Stroke Coordinator e-mail address:
Secondary Contact, if applicable, name, credentials, title (print):		
Secondary Contact phone number:		Secondary contact e-mail address:
Stroke Medical Director name, credentials, and title (print):		
Stroke Medical Director phone number:		Stroke Medical Director e-mail address:
Stroke Registry/Data Entry person name:		
Stroke Registry/Data Entry person phone number:		Stroke Registry/Data Entry person e-mail address:
Stroke Registry Reimbursement Contact person name:		
Stroke Registry Reimbursement Contact person phone number:		Stroke Registry Reimbursement Contact person e-mail address:

Appendix 2A: GWTG-Stroke EMS Feedback Form



How to Generate Get With The Guidelines®- Stroke Feedback Forms

The steps outlined in this document will provide instructions as to how to generate Feedback Forms within the Get With The Guidelines®– Stroke Registry. These feedback forms pre-populate from the registry selections and can be modified and utilized to share feedback with EMS agency and referring hospital care teams as an tool to support collaborative communication and feedback loop closure.

1	From the <i>Community Page</i> under Get Started, select "Reports". Under <i>Configurable Reports</i> select "EMS Feedback Log"	 Community Page Get Started Add/Find Patients Reports Library Get With The Guidelines: Stroke EMS Feedback Log Provides the feedback details of the patient entered for the study
2	Select the desired reporting period for the report. Interval options include annual, monthly, quarterly, or daily. Check the <i>Include "Previously Generated Feedback Reports"</i> box if desired.	 Parameters Apply Parameters Clear Parameters Choose your Date Parameters Arrival Date Reporting Period From To Record Status Monthly 2024 January 2024 February All Records ☐ Include previously-generated Feedback Reports
3	Select at least one of the following from the available drop downs: <i>Diagnosis, Discharge Disposition, EMS Agency, and/or Referring Hospital.</i>	 American Heart Save As Apply Parameters Clear Parameters Filter Options: Diagnosis Discharge Disposition EMS Agency Name Referring Hospital Select Select Ischemic Stroke Transient Ischemic Attack (< 24 hours) Subarachnoid Hemorrhage Intracerebral Hemorrhage Stroke not otherwise specified No stroke related diagnosis Elective Carotid Intervention only Report Generated Arrival Date Discharge Date Diagnosis Discharge Disposition EMS Agency Name Referring Hospital Form Status Complete 0: 1:
4	Select the individual records or select all available records.	
	Select "Generate Feedback Report(s)"	
	Once the report is generated, it will export as downloaded file in the upper right hand of your screen.	

- 5 The feedback form will open in Word document that can be modified, saved, and/or printed.

Downloads

 Retrieve_Letter (15).zip
[Open file](#)

 Retrieve_Letter (14).zip
[Open file](#)

 Retrieve_Letter (13).zip
[Open file](#)

6 Sample Feedback Form

[illegible][illegible]

Appendix 2B: Example EMS Feedback Form

Stroke Code Feedback Form					
The information contained herein is deemed confidential and/or privileged and is protected from disclosure in accordance with North Dakota law.					
Patient ID (Call #):			Date of Code:		
Patient Scenario					
EMS Service		EMS Crew			
Event		Actual Time (Documented)	Minutes	GOALS (Documentation)	Status
RUN TIMES	Dispatch Time			GOAL - 15 mins on scene	Met/Not Met
	Arrive Scene		0:00	Scene Time	
	Leave Scene		0:00		
	Arrive Destination		0:00		
	ER Check-In Time (DOOR):		0:00		
Protocol utilized?					Met/Not Met
Stroke Code Activated/Prenotification			0:00		Met/Not Met
Last known well (LKW)/Symptom onset			Time since LKW		Met/Not Met
			0:00		Met/Not Met
Blood Glucose Done			0:00		Met/Not Met
EKG Performed			0:00		Met/Not Met
Stroke Recognition Assessment Documented (BEFAST)			0:00		Met/Not Met
Stroke Severity Assessment Documented (FAST-ED)			0:00		Met/Not Met
IV/Saline Lock			0:00		Met/Not Met
SUMMARY					
What Went Well:					
Opportunities for Improvement:					
Patient Outcome:					
To continue the quality care we provide our patients, we are sending you this Stroke Code feedback. Its purpose is to help identify process improvement opportunities, and to ensure the integrity of the quality data reported. Any times noted below in red designate that the time exceeds the benchmark. Constructive feedback and review of the case will be most helpful as we refine process issues.					

Appendix 3A: GWTG-Stroke Time Tracker Report (Stroke Log)



How to Run Get With The Guidelines®-Stroke Time Tracker Report

The steps outlined in this document will provide instruction as to how to pull a Time Tracker Report in the Get With The Guidelines®-Stroke IQVIA Registry Platform (IRP). This patient level report generates a Stroke Log with time elements. This list includes 100% of the patients entered in the registry and can be used to review the timing aliquots during the acute phase of stroke care.

1

From the Community Page, select **Operational Reports** from the ribbon on the left side of the tool

Under Configurable Reports select **Get With the Guidelines Stroke Time Tracker Report**

2

You have the option to select defined bundles, or individual time variables by clicking the + icon next to the bundle name.

Set your desired time period and click **Apply Parameters**.

3

A live interactive case list is created with the ability to sort and filter by each element.

The **Time Tracker Report** includes columns with data elements and columns with time calculations.

Currently Viewing

Get With The Guidelines® Stroke
MHA Demo - Stroke - STK, CSTK, CPT - 91002

Switch Current View

DASHBOARD

Community Page

PLATFORM

Patients

Upload

Form Management

Notifications

ANALYTICS

Operational Reports

HELP

Configurable Reports

Get With The Guidelines® Stroke Measures Report
This report provides the ability to select your own parameters for the GWTC stroke measures report.

Get With The Guidelines® Stroke Time Tracker Report
This report provides time intervals between various points of care pertaining to acute stroke

EMS Feedback Log
Provides the feedback details of the patient entered for the study

List of Patients Expected to Have a Follow-Up
This report provides a listing of patients that require a follow up form entered

Get With The Guidelines® Stroke Advanced Analytics
This report provides the ability to select your own parameters for the Mission/LifeLine® regional report.

Data Download Report
This report provides the ability to review and download

Operational Reports

Time Tracker Report

Time Tracker Report

Parameters

Choose your Date Parameters

Discharge Date

Reporting Period

From

To

Report Status

Apply Parameters

Clear Parameters

Save All

Stroke Time Tracker

Stroke Time Tracker

EMS Time Tracker

Stroke Time Tracker

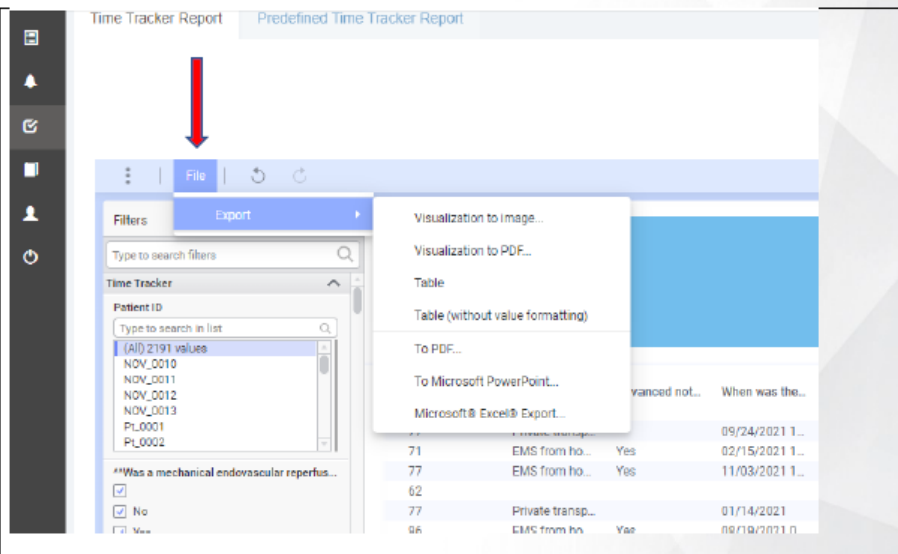
Time Tracker Report

Report Status:

Age:	How patient a...	Advanced not...	When was the...	Arrival Date/T...	Time from LK...	Date/Time Str...	Date/Time Str...	Door to Strok...	Dat
71				12/21/2021 8...					
77	Private transp...		09/04/2021 1...	09/04/2021 2...	26				
71	EMS from ho...	Yes	02/15/2021 1...	02/15/2021 1...	126	02/15/2021 1...	02/15/2021 1...	0	02/...
77	EMS from ho...	Yes	11/03/2021 1...	11/03/2021 1...	87	11/03/2021 1...	11/03/2021 1...	16	11/...
82	Private transp...		01/14/2021	01/15/2021 1...					
96	EMS from ho...	Yes	06/16/2021 0...	06/16/2021 1...	696	06/16/2021 1...	06/16/2021 1...	0	06/...
83				12/01/2021 2...					
88	EMS from ho...	Yes	02/18/2021 0...	02/18/2021 1...	67	02/18/2021 0...	02/18/2021 1...	0	02/...
76	Transfer from ...		01/12/2021	01/16/2021 8...					
32	Private transp...		03/26/2021 0...	03/26/2021 1...	70				
74	EMS from ho...	No/NO	06/06/2021 1...	06/06/2021 1...	74	06/06/2021 1...	06/06/2021 1...	0	06/...
54	EMS from ho...	Yes	03/01/2021 1...	03/01/2021 2...	113	03/01/2021 2...	03/01/2021 2...	12	03/...
89	EMS from ho...	Yes	09/10/2021 8...	09/10/2021 8...		09/10/2021 0...	09/10/2021 0...	1	09/...
40	Private transp...		07/04/2021 2...	07/05/2021 8...	677	07/05/2021 0...	07/05/2021 0...	10	07/...
54	Private transp...		03/09/2021	03/09/2021 1...					
29	EMS from ho...	Yes	02/08/2021 1...	02/08/2021 2...	100	02/08/2021 2...	02/08/2021 2...	0	02/...
94	EMS from ho...	Yes	03/17/2021 0...	03/17/2021 1...	220	03/17/2021 1...	03/17/2021 1...	0	03/...
90	EMS from ho...	Yes	03/27/2021 1...	03/27/2021 1...	85	03/27/2021 1...	03/27/2021 1...	0	03/...
77	Private transp...		03/23/2021	03/25/2021 1...					

4

Once the report is generated, it can be exported, saved, and/or printed by clicking *File* in the upper left corner.



Appendix 5A: Example Stroke Activation Protocol

Department: Nursing
Developed: 10/2015
Revision: 7/2017; 9/2018; 2/2020; 4/2021; 2/2024; 5/2024
Reviewed:

Title: STROKE CODE ACTIVATION PROTOCOL

Policy: To provide a standard, well-coordinated and interdisciplinary approach to the recognition and treatment of any patient exhibiting signs and symptoms of acute stroke utilizing the most current ND Acute Stroke Treatment Guidelines

Definition:

Stroke Code: Phrase describing process used to rapidly evaluate and treat patients who present with acute stroke symptoms.

1. Stroke Code Team Members:
 - a. ED Provider
 - b. ED Nurse
 - c. Charge Nurse
 - d. Paramedic/EMS
 - e. Radiology Technician
 - f. Lab Technician
 - g. Receiving Facility, Neurologist on-call
2. Stroke Code Activation Criteria:
 - a. BE FAST acronym (Balance, Eyes, Face, Arms, Speech, Time)
 - b. Last Known Well (LKW) within 24 hours

Goals:

ED Door to Provider at bedside: < 15 minutes

- may use telestroke if provider unable to see within 15 minutes

ED Door to CT: < 25 minutes

ED Door to CT Interpretation: < 45 minutes

ED Door to lab results: < 45 minutes

ED Door to IV TNKase administration: < 60 minutes

ED Door to Transfer: < 120 minutes

Procedure:

1. Activation of Stroke Code
 - a. Arrival per EMS:
 - i. If advanced notification is provided by EMS that a patient with stroke-like symptoms or stroke code is coming in, the nurse receiving this report will activate Stroke Code and provide ETA to stroke team
 - ii. Nurse will inform ED provider and obtain direction regarding CT scan
 - iii. ED will communicate with CT. Goal is to take patient directly to CT prior to going to ED bay when appropriate.
 - b. Arrival per private vehicle, ED activation:
 - i. ED provider or nurse recognizes stroke like symptoms and activates stroke code
 - ii. Nurse will inform ED physician and obtain orders
 - c. Inpatient Stroke:
 - i. Stroke Code activated when patient in house is exhibiting stroke-like symptoms
 - ii. Call Stroke Team
 - iii. Nurse will inform ED provider and obtain orders
 - iv. Patient will be transferred to ED bay for critical care if appropriate
2. Roles and Responsibilities of Stroke Code Team Members:
 - a. ED Provider
 - i. Assess ABCs and vital signs
 - i. Place orders using Stroke Code order set
 - ii. Ensure prompt transport to CT scanner
 - iii. Take history and review criteria for treatment
 - iv. Obtain NIHSS score from ED nurse
 - v. Blood pressure management:
 - a. *If giving TNKase*, order antihypertensive treatment if BP >185/110
 - b. *If not giving TNKase*, consider ordering antihypertensive if SBP >220 or DBP >120
 - vi. Receive Radiologist CT interpretation
 - vii. Review initial assessment, NIHSS, TNKase inclusion/exclusion criteria, along with CT & lab results with neurologist by phone consultation
 - viii. TNKase to be ordered and administered per the provider's discretion and consultation of neurologist

- ix. Discuss treatment options with patient/family regarding TNKase risks, benefits, and alternatives and consistently document in patient note. Obtain and document verbal consent if giving TNKase
- x. Initiate transfer to a tertiary center
- b. ED Nurse
 - i. Assess ABC's
 - ii. Verify patient identity by using two patient identifiers and place name band on patient
 - iii. Keep patient on EMS stretcher if arriving via ambulance until after completion of CT imaging
 - iv. Accompany patient to CT and ensure timely transportation
 - v. Inform EMS to remain in facility until plan of care is established for patient
 - vi. Perform bedside glucose if not previously performed by EMS
 - vii. Perform NIHSS
 - 1. Promptly upon arrival (do not delay CT)
 - 2. After administration of TNKase
 - 3. Prior to transfer if applicable
 - 4. With any neurological changes
 - viii. Obtain full set of vital signs and upon admission to ED and then every 15 minutes thereafter
 - ix. Discuss arranging for air med transportation with provider
 - x. Obtain a concise LKW and recent history
 - xi. Ensure labs are drawn promptly
 - 1. Notify lab tech and provider if patient is on Coumadin or has known low platelets
 - xii. Place patient on cardiac monitor, pulse oximetry, titrate oxygen, if needed, to maintain SpO2 sats >94%
 - xiii. Obtain weight
 - xiv. Review medical history and home medication list
 - xv. Perform neurological assessments every 15 minutes
 - xvi. Keep patient NPO (including oral meds) until patient passes the dysphagia screening
 - xvii. Obtain EKG
 - xviii. Place peripheral IV x2
 - xix. Acute Ischemic Stroke
 - 1. Notify provider if BP >185/110
 - 2. Administer TNKase if ordered
 - 3. See TNKase policy
 - 4. Notify MD if BP >180/105 during and post infusion for 24 hours

- xx. Hemorrhagic Stroke
 - 1. Notify provider if patient is on an anticoagulant
 - 2. Have medications readily available to administer as ordered
 - a. Kcentra (if on Eliquis & Xarelto- Flight team may have on hand if needed), **or**
 - b. Vitamin K (if on warfarin)
 - 3. Notify Respiratory Therapy and have intubation equipment ready at bedside if needed
 - 4. Notify provider if SBP <130 or >150 (goal of 140)
 - a. Have antihypertensives available and ready to administer if ordered by provider
- xxi. Assist in prompt transfer to tertiary center
- c. Lab Technician
 - i. Draw STAT Labs
 - 1. CMP
 - 2. CBC with platelets
 - 3. Troponin
 - 4. PT/INR
 - 5. PTT
 - 6. HCG, serum if applicable
 - ii. Perform EKG if not previously completed by nurse
- d. Radiology Technician
 - i. Clear or hold table for stroke patient
 - ii. Perform and obtain STAT CT HEAD W/O CONTRAST
 - iii. Load results to PACS and send for STAT read by neurologist
 - iv. Prepare to push images to other hospital PACS if necessary
 - v. Perform other imaging if ordered
- e. Performance Improvement
 - i. Review and debrief after every stroke code
 - ii. ED nurse initiates filling out Stroke Code Activation Review form
 - 1. Place form in stroke coordinator folder
 - 2. Form to be reviewed by stroke coordinator
 - iii. Stroke cases will be presented at quarterly QAPI meetings
 - 1. Radiology manager will monitor for delayed CT read times and present findings to QAPI committee.
- 3. CT Down Time Protocol
 - a. Radiology staff to notify Chief Nursing Officer (CNO) or designee and Medical Director of Stroke Care if CT scanner is down

Appendix 5B: CAH Example-Stroke Activation Protocol

POLICIES AND PROCEDURES	DEPARTMENT:	Patient Care: General Nursing
	SUBJECT:	ED Acute Stroke Code Policy
	EFFECTIVE DATE:	May 2023
	Attachments:	1. Stroke Code Activation Instructions & Calling Tree 2. Stroke Algorithm 3. Stroke Code Paperwork 2023
	References:	American Heart Association Stroke Council (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. <i>Stroke</i> , 50(12), e344-e418. https://doi.org/10.1161/str.0000000000000211 American Heart Association Stroke Council (2018). 2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. <i>Stroke</i> , 49(3), e46-e99. https://doi.org/10.1161/STR.0000000000000158 <u>ND Stroke System of Care (2022) ND Acute Stroke Treatment Guidelines.</u> <u>ND Stroke System of Care (2019) ND Transient Ischemic Attack (TIA) Treatment Guidelines.</u>
	Key Words:	Stroke, Tenecteplase, Code, TIA, IV Thrombolytic
	Annually Reviewed By:	Stroke Coordinator
	Approved By:	Stroke Leadership Team
	Last Review /Amendment:	May 2023

PURPOSE

The purpose of this policy is to provide guidance to the multidisciplinary team providing care to stroke patients in the ED. Time to treatment is critical in treating patients with stroke symptoms. The ED Acute Stroke Code is a multidisciplinary team approach to ensure prompt assessment, evaluation and treatment of patients exhibiting signs and symptoms of stroke. The goal of this Stroke Code is to provide early intervention in order to promote optimal patient outcomes.

TARGET TIMES:	
Door to Stroke Code Activation	≤ 10 minutes
Door to MD Assessment	≤ 10 minutes
Door to Head CT Scan	≤ 20 minutes
Door to CT Interpretation	≤ 45 minutes
Door to IV Tenecteplase Bolus	≤ 60 minutes
Door to Transfer	≤ 90 minutes

POLICY

A. Activation Criteria

1. Stroke Code should be activated immediately upon identification of these **sudden BEFAST** symptoms: refer to Stroke Screening Tools (page #2) within the Stroke Code Paperwork (Attachment #3).
 - Loss of **balance** or **coordination**, difficulty walking or **dizziness**.
 - Trouble seeing out of one or both eyes or **double vision**. **Loss of vision**, blurring in 1 or both eyes.
 - **Weakness, drooping**, or **numbness** on one side of **face**, uneven appearance.
 - **Numbness** or **weakness** of the **arm/leg** on **one side** of the body. **Drift** when tested.
 - **Slurred speech, trouble speaking** or understanding, **confusion**.
 - **Severe headache** with no known cause.

BEFAST to stop stroke in its tracks

If you think someone is having a stroke, BE FAST and do these simple tests:



2. If symptom(s) are present and **onset is ≤ 24 hours**, activate Stroke Code. And immediately determine IV Tenecteplase and IR eligibility by utilizing the FAST-ED Stroke Severity Tool: refer to Stroke Screening Tools (page #2) within the Stroke Code Paperwork (Attachment #3).
3. Multidisciplinary Team Notification:
 - **ED Stroke Code Team:**
 - Patient Access Personnel/Admissions
 - ED Nurse
 - ED Provider
 - Nursing Supervisor
 - CT Technician (Radiology Tech may come in place if CT Tech is prepping CT)
 - Laboratory
 - Respiratory Therapy
 - Med-Surg Nurse

B. Procedure

1. The ED Acute Stroke Code Team is activated by EMS or ED staff based on our facility's established criteria. Our Stroke Code Activation Criteria (BEFAST) is on display in all ED patient care areas, nursing/provider workstation in the ED, and within our Stroke Code Paperwork (Attachment #3)
2. See attached Stroke Algorithm (Attachment #2) for further understanding of our process of caring for stroke patients in the ED.

C. Roles and Responsibilities

1. Patient Access Personnel:

- Immediately announce *Stroke Code Activation* overhead at the direction of the ED Nurse & ED provider.
 - Paging overhead the type of activation (Stroke Code), the location of the activation (ED), the number of patients, and the ETA of patient(s) arrival.
 - I.e., "*Stroke Code in the ED x1 in 3 minutes.*" or "*Stroke Code in the ED x1 Now*". (Please see Attachment #1: Stroke Code Activation Instructions & Calling Tree, this is also kept in Admissions' Code Binder)
- Collaborates to notify the appropriate Stroke Code Team member using the specific Stroke Code Calling Tree (this is also found in Admissions' Code Binder).
 - Complete attached Calling Tree Form for the stroke code activation and place it in the completed section of their Code Binder. An On-Call List with phone numbers is updated daily and can be found on the intranet and with Admissions.

2. ED Nurse:

- Initiates the ED Acute Stroke Code Activation & completes the ED Stroke Code Flowsheet (page #3), found in the Stroke Code Paperwork (Attachment #3).
- Obtains POC glucose, if not completed by EMS, treat if <60mg/dL
- Initiate continuous cardiac monitoring and check vital signs with quick neuro assessment every 15mins.
 - Maintains patient's SpO₂ >94%
 - Closely monitor BP & immediately notify ED provider if >180/105
- Keep patient NPO until YALE Swallow Protocol Bedside Screen can be done.
- Obtains and documents **actual patient weight prior to CT scan**.
- Accompanies patient directly to CT.
- Completes NIHSS (may complete alongside ED Provider) found on pages # 4-5 in Stroke Code Paperwork (Attachment #3).
- Obtains IV access and blood draw for labs, if possible. IV Normal Saline TKO.
- Administers IV Tenecteplase per protocol, if ordered.
 - Complete Tenecteplase Time-Out (page #8) within the Stroke Code Paperwork (Attachment #3).
 - Document IV Tenecteplase Documentation time-out in the comment section of the MAR, including 2nd Nurse/Provider Verification.
 - Complete documentation on Post-Tenecteplase Monitoring (page #9) in Stroke Code Paperwork (Attachment #3).
- Continues to assessment and monitor stroke patient until definitive disposition.
- Completes YALE Swallow Protocol Bedside Screening, if not NPO.
- Maintains patient's SpO₂ >94%
- Refer to other treatment guidelines for Acute Stroke (page #6) and TIA (page #10) published and supported by the ND Department of Health & State Stroke Task Force. Both found within the Stroke Code Paperwork (Attachment #3).
- Completes ABCD² Score for all patients diagnosed with TIA. This can be found on page #11 of the Stroke Code Paperwork (Attachment #3)

3. ED Provider:

- Initiates the ED Stroke Code Activation & consider activating transport for possible transfer(s).
- Establish last known well time (LKWT) and history of anticoagulant use.
- Enters non-contrast head CT and basic orders from the ED Stroke Code Order Set in Meditech.
- Completes and documents neuro-assessment and NIHSS.
- Completes and documents **FAST-ED Score** (page #2) and **Tenecteplase Eligibility** (page #7) on **ALL** potential stroke patients. Both are found within Stroke Code Paperwork (Attachment #3).
 - FAST-ED score of 4 or more indicates a 60% chance of large vessel occlusion (LVO), indicating the patient is a potential candidate for interventional radiology-guided thrombectomy. Thus, requiring appropriate vascular imaging and immediate IR consult/transfer.
 - Collaborate with Radiologist to rule out possibility of Hemorrhagic Stroke and determine patient's eligibility for prompt IV Tenecteplase treatment and the need for more advanced vascular imaging (Head & Neck CTA).
- If eligible, orders IV Tenecteplase per **Tenecteplase Stroke Wt Based Protocol** in Meditech.
 - Discuss plan of care regarding IV Tenecteplase (risks & benefits) with patient and/or patient's family.
- Collaborate with ED Charge Nurse to initiate transfer to a Stroke Center or admission:
 - Stroke Transfer:
 - Communicate with accepting provider/neurologist at the receiving facility.
 - Coordinate with ED Charge RN to get the accepting provider the information, images, and or documentation that they are requesting.
 - Complete and sign the required transfer paperwork.
 - Assist ED Charge RN in coordinating transport arrangements.
 - Stroke Admissions:
 - Consult with the hospitalist regarding the need for patient to be admitted for observation to rule out CVA/TIA, non IV Tenecteplase stroke care, and/or comfort care.
- Refer to other treatment guidelines for Acute Stroke (page #6) and TIA (page #10) published and supported by the ND Department of Health & State Stroke Task Force. Both found within the Stroke Code Paperwork (Attachment #3).

4. Nursing Supervisor:

- Collaborate with ED Charge RN to ensure all Stroke Team Roles are filled and other ED duties are delegated. (i.e., triage, answering phones, other ED patient care, etc.)
- Facilitate resource management as needed.
- Assist with patient care in the ED if needed.
- Help coordinate stroke patient's admissions, transfers, and transport arrangements when needed.

5. CT Technician:

- Prepares to receive patient for STAT CT and additional imaging, as ordered.
- Communicates with Radiologist regarding urgent need to review scans.
- Radiologist notifies ED MD of non-contrast CT results immediately via phone.

6. Laboratory:

- Collaborate with ED nursing staff to obtain blood draw for STAT Stroke Panel labs:
 - CBC, Platelets, PT-INR, PTT, BMP, & Troponin
 - Serum HCG for women of childbearing age

7. Respiratory Therapy:

- Collaborate with ED nursing staff to STAT EKG after patient returns from Radiology
 - CBC, Platelets, PT-INR, PTT, BMP, & Troponin
 - Serum HCG for women of childbearing age

8. Med-Surg Nurse:

- Assist with ED patient care or tasks delegated by ED Charge RN and/or Nursing Supervisor.
- If assisting with stroke care, it is done at the direction of the Primary RN.
- Facilitate resource management as needed.

Appendix 6A: North Dakota Acute Stroke Treatment Guidelines

ND Acute Stroke Treatment Guideline			
0-15 minutes	Patient Name: _____ Date of Birth: _____ ED Arrival: Date _____ Time _____ Last Known Well: Date _____ Time _____ ☐ Activate Stroke Response Team ☐ Prepare for Stat CT ☐ Consider activating transport	Assess the following: ☐ BP _____ mm/hg ☐ Pulse _____ bpm ☐ O2 Saturation _____ % ☐ Bedside Glucose _____ mg/dL (Do not repeat if completed by EMS. Treat if <60) ☐ VS q 15 min with neuro checks ☐ Continuous cardiac monitoring ☐ NIHSS on arrival _____	☐ O2 to keep SATS >94% (do not administer O2 if patient non-hypoxic) ☐ Keep NPO (including meds and ice chips) ☐ Establish 1-2 large bore IVs ☐ Normal Saline 0.9% TKO ☐ Consider activating telehealth <i>*Do not delay CT scan for any of the preceding</i>
15-45 minutes	☐ CT Scan head w/o contrast <i>(Door to CT scan goal <25 minutes)</i> ☐ Request stat read of CT scan ☐ Stroke Panel: CBC, Platelets, PT-INR, PTT, BMP, Troponin ☐ Serum pregnancy test for females of childbearing age ☐ 12L ECG if time allows ☐ Weight _____ kg	CT Scan Results: <i>(Door to CT scan results goal <45 minutes)</i> ☐ No acute findings ☐ New Ischemic Stroke ☐ Hemorrhage ☐ Other _____ ☐ Consult with accepting neurologist once CT scan results obtained. Send images if able. ☐ Arrange transport plans if not already done	☐ If CT is negative for hemorrhage or other acute findings, complete Inclusion and Exclusion Criteria for IV Thrombolytic Treatment of Ischemic Stroke checklist to determine IV thrombolytic eligibility ☐ If patient is ruled ineligible for IV thrombolytic due to BP >185/110, refer to BP Management section
45-60 minutes	<u>Choose one of the following:</u> IV Thrombolytic Eligible Ischemic Stroke Patient- Alteplase Administration ☐ IV Alteplase 0.9 mg/kg (max dose 90 mg) Total IV Alteplase. Total Dose _____ mg ☐ 10% total IV Alteplase dose as bolus over one minute. Bolus Dose _____ mg Time of bolus _____ ☐ Remainder of IV Alteplase over 60 minutes Rate of infusion _____ ml/hr ☐ Follow IV Alteplase with 50 ml Normal Saline 0.9% at same rate as IV Alteplase infusion <u>OR</u> IV Thrombolytic Eligible Ischemic Stroke Patient- Tenecteplase Administration ☐ IV Tenecteplase 0.25 mg/kg (max dose 25 mg) Total IV Tenecteplase. Total Dose _____ mg ☐ IV Tenecteplase bolus over 5 seconds ☐ Flush IV line with 3-10 ml Normal Saline 0.9% before and after Tenecteplase bolus (not compatible with dextrose)	IV Thrombolytic Eligible Ischemic Stroke Patient ☐ VS and neuro checks q 15 min during infusion, then q 15 min x 2 hr, q 30 min x 6 hr, then hourly until 24 hours after treatment ☐ If BP > 180/105, refer to BP Management section below ☐ Repeat head CT if neuro status declines ☐ If symptom onset <24 hours, screen for large vessel occlusion (see below) ☐ No anticoagulant/antiplatelet for 24 hours ☐ NIHSS post infusion _____ Non-IV Thrombolytic Eligible Ischemic Stroke Patient ☐ ASA 300 mg PR ☐ If BP >220/120, consult with accepting neurologist regarding possible BP management ☐ If symptom onset <24 hours, screen for one or more of the following criteria indicating a possible large vessel occlusion (LVO): ☐ NIHSS >6 score _____ ☐ FAST ED >4 score _____ ☐ Signs of cortical stroke: confusion, aphasia, neglect, visual field changes, head or gaze deviation ☐ If symptom onset is >24 hours consult neurologist regarding possible treatment options	Hemorrhagic Stroke Patient ☐ If SBP between 150-220 administer medications as listed in BP management section below to achieve BP <140/90. ☐ If SBP >220 mmHg, consult neurologist regarding BP management. ☐ If patient is on oral anticoagulant, follow local ED protocol regarding use of reversal agents ☐ Elevate HOB 30 degrees ☐ Discuss possible anti-seizure and ICP lowering measures with consulting neurologist
BP Management	If ischemic stroke patient is ruled ineligible for IV thrombolytic due to BP >185/110, lower to acceptable range (SBP 140-180) with agents below. For hemorrhagic stroke, lower SBP to <140 with agents below. ☐ Labetalol 10-20 mg IV over 1-2 minutes, may repeat x 1 <i>OR</i> ☐ Nicardipine infusion: 5 mg/hr, titrate up by 2.5 mg/hr at 5-15 min intervals, max dose 15 mg/hr <i>OR</i> ☐ Consider other agents (hydralazine, enalapril, diltiazem) when appropriate. AVOID NITRATES.		
Disposition	If BP > 180/105 during and within 24 hours after treatment with IV thrombolytic, administer the following: ☐ Labetalol 10 mg IV followed by continuous IV infusion 2-8 mg/min <i>OR</i> ☐ Nicardipine 5 mg/hr IV, titrate up to desired effect by 2.5 mg/hr q 5-15 min, max 15 mg/hr Report the following to accepting hospital staff: ☐ H&P, Last Known Well, Medications, Lab results ☐ NIHSS at Discharge _____ Contact name: _____ Cell #: _____		

Revised 10-20-22

Inclusion and Exclusion Criteria for IV Thrombolytic Treatment of Ischemic Stroke

For consideration of eligibility within less than 4.5 hours of last known well, wake-up, or unknown time of onset:

Date _____ Time _____

INCLUSION CRITERIA - Patient who should receive IV Thrombolytic

- ☐ Symptoms suggestive of ischemic stroke that are deemed to be disabling*, regardless of improvement (see Reference Table below for considered disabling symptoms)
- ☐ Able to initiate treatment within 4.5 hours of Time Last Known Well (document clock time)
- ☐ Age 18 years or older
- ☐ WAKE-UP or unknown time of onset Acute Ischemic Stroke (If MRI Available) -IV alteplase administered within 4.5 hour of stroke symptom recognition can be beneficial in patients with AIS who awake with stroke symptoms or have unknown time of onset >4.5 hour from last known well or at baseline state and who have a DW-MRI lesion smaller than one-third of MCA territory and no visible signal change on FLAIR. (COR IIa; LOE B-R)

IV Thrombolytic Medications

- ☐ IV Alteplase (0.9mg/kg, maximum dose 90mg over 60 minutes with initial 10% of dose given as bolus over 1 minute) is recommended for selected patients who can be treated within 3 and 4.5 hour of ischemic stroke symptom onset or patient last known well (COR I; LOE B-R)
- ☐ It may be reasonable to choose Tenecteplase single IV bolus of 0.25mg/kg, maximum 25mg over IV alteplase in patients without contraindications for IV fibrinolytics who are also eligible to undergo mechanical thrombectomy (COR IIa; LOE B-R)

ABSOLUTE EXCLUSION CRITERIA - If patient has any of these, do NOT initiate IV Thrombolytic

- ☐ CT scan demonstrating intracranial hemorrhage or subarachnoid hemorrhage
- ☐ CT exhibits extensive regions (> 1/3 MCA Territory on CT) of clear hypo attenuation
- ☐ Unable to maintain BP <185/110 despite aggressive antihypertensive treatment
- ☐ Ischemic stroke within last 3 months
- ☐ History of intracranial hemorrhage
- ☐ Severe head trauma within last 3 months
- ☐ Active internal bleeding (i.e., Aortic Dissection known or suspected)
- ☐ Arterial puncture at non-compressible site within last 7 days
- ☐ Infective endocarditis
- ☐ Gastrointestinal bleeding within last 21 days or structural GI malignancy
- ☐ Intracranial or spinal surgery within last 3 months

Laboratory:

- ☐ Blood glucose <50 mg/dL (however should treat if stroke symptoms persist after glucose normalized)
Results not required before treatment unless patient is on anticoagulant therapy or there is another reason to suspect an abnormality:
- ☐ INR >1.7
- ☐ Platelet count <100,000, PT >15 sec, aPTT >40 sec

Medications:

- ☐ **Full dose low molecular weight heparin (LMWH) within last 24 hours (patients on prophylactic dose of LMWH should NOT be excluded)
- ☐ Received direct oral anticoagulant (DOAC) within last 48 hours (assuming normal renal metabolizing function)
 - Commonly prescribed DOACs: apixaban (Eliquis), dabigatran (Pradaxa), rivaroxaban (Xarelto), edoxaban (Savaysa)

CONSIDERATION for EXCLUSION (RELATIVE) - Seek Neurology consultation from a Stroke Expert

- ☐ Stroke severity too mild (non-disabling)
- ☐ IV or IA thrombolysis/thrombectomy at an outside hospital prior to arrival
- ☐ Life expectancy < 1 year or severe co-morbid illness or comfort measure only (CMO) on admission
- ☐ Patient/family refusal
- ☐ Pregnancy
- ☐ Major surgery or major trauma within 14 days
- ☐ Seizure at onset and postictal impairment without evidence of stroke
- ☐ Myocardial infarction within last 3 months
- ☐ Acute pericarditis
- ☐ Lumbar puncture within 7 days
- ☐ Past gastrointestinal or genitourinary bleeding
- ☐ Any other condition or history of bleeding diathesis which would pose significant bleeding risk to patient. Conditions may include acute pericarditis, SBE (spontaneous bacterial endocarditis), hemostatic defects, diabetic hemorrhagic retinopathy, septic thrombophlebitis, occluded AV cannula, or patient is currently receiving oral anticoagulants (e.g., Warfarin or DOACS).
- ☐ Presence of known intracranial conditions that may increase risk of bleeding (arteriovenous malformation, aneurysms >10mm, intracranial neoplasm, amyloid angiopathy)
- ☐ High likelihood of left heart thrombus (e.g., mitral stenosis with atrial fibrillation)
- ☐ Blood glucose > 400 mg/dL (however should treat with IV alteplase if stroke symptoms persist after glucose normalized)

*Considered disabling symptoms: should be considered for IV Thrombolytic treatment

Complete hemianopsia (* 2 on NIHSS question 3) or severe aphasia (* 2 on NIHSS question 9), or
Visual or sensory extinction (* 1 on NIHSS question 11) or
Any weakness limiting sustained effort against gravity (* 2 on NIHSS question 6 or 7) or
Any deficits that lead to a total NIHSS score > 5 or
Any remaining symptoms considered potentially disabling in the view of the patient and the treating practitioner. i.e., Do presenting symptoms interfere with lifestyle (work, hobbies, entertainment?) Clinical judgment is required**

**Note: This is an example based on current best practices for hospitals to implement and operationalize. Specific criteria may vary by hospital.

REFERENCE: 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 Volume 50, Issue 12, December 2019, Pages e344- e418; 2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association Stroke. 2018;49:e46–e99.

**Inclusion and Exclusion Criteria for IV
Thrombolytic Treatment of Ischemic Stroke**
Int. 08/19 Revised 9/21

Not A Permanent Chart Copy

ND Transient Ischemic Attack (TIA) Guideline

TIA Diagnosis Criteria	The following criteria should be considered as a possible TIA: ☐ History of clinical symptoms including, but not limited to: Balance- Sudden trouble walking, dizziness, loss of balance or coordination Eyes- Sudden double vision or trouble seeing out of one or both eyes. Face- Sudden drooping or numbness on one side of the face. Arm- Sudden numbness or weakness of the arm, especially on one side of the body. Speech- Sudden confusion, trouble speaking or understanding. ☐ Complete resolution of symptoms with no active fluctuation. ☐ Stable neuro exam and NIHSS without any appreciable deficits as compared to baseline
Emergency Department Work-Up	☐ Neurology phone consult or in-house evaluation if available ☐ CT Scan head without contrast- rule out hemorrhage, early ischemia (ideally followed by an MRI brain if available) ☐ Basic Labs: Bedside Glucose, CBC, BMP, Platelets, PT-INR, PTT, Troponin ☐ 12 lead ECG ☐ Continuous cardiac monitoring for duration of ED visit ☐ Normal Saline 0.9% IV TKO ☐ Permissive hypertension if CT negative for hemorrhage (BP goal <220/120) ☐ HOB 30 degrees until basic work-up is completed <i>If Neurology confirms TIA diagnosis based on discussion, patient should have vascular imaging prior to discharge. If unavailable at the presenting facility, transfer to a *PSC/PSC Plus/TSC/CSC should be arranged.</i> ☐ Stat CTA or MRA head & neck if available OR ☐ Carotid duplex (only if contraindication to CTA/MRA) <i>Re-consult with Neurology based on findings of vascular imaging.</i>
Transfer Criteria	Transfer to PSC/PSC Plus/TSC/CSC should be arranged for patients meeting any of the following criteria. ☐ Abnormal vascular imaging (significant intracranial or extra cranial atherosclerotic disease -may need intervention vs close observation in intensive care unit) ☐ Ischemic lesion on CT/MRI brain- Diagnosis of stroke not TIA. (Tissue based definition update) ☐ Fluctuating symptoms with more than 1 TIA in the past one month ☐ Medical instability (New onset atrial fibrillation, hypertensive emergency, cardiac instability and others) ☐ ABCD² (Age, Blood Pressure, Clinical features of TIA, Duration/Diabetes-see guide) score 2-7 ☐ ABCD² score 0-1, but completion of stroke workup cannot be arranged within 7 days (based on availability of outpatient neurology provider urgent openings, non-compliance suspected)
Disposition	☐ All TIA patients should be discussed with neurology prior to discharge. ☐ Ideally based on ABCD² score, if the initial imaging workup is negative: ABCD² score 0-1 → Refer to neurology clinic in 7 days ABCD² score 2-7 → Admission to PSC/PSC Plus/TSC/CSC <i>These numbers are based on availability of neurology clinic appointment within 7 days.</i> ☐ For patients not currently on antithrombotic therapy with suspicion of TIA and no contraindications to antithrombotic therapy, Aspirin 325 mg po should be initiated. ☐ If decision to discharge; transthoracic echo, fasting lipid panel, HbA1c should be ordered prior to outpatient neurology follow up. Patients should also be scheduled for a 1 week follow up with PCP.

Final 6-12-19

*PSC-Primary Stroke Center PSC Plus- Primary Stroke Center Plus TSC- Thrombectomy Capable Stroke Center CSC-Comprehensive Stroke Center

ABCD² Score

The ABCD² Score is a risk assessment tool designed to improve the prediction of short-term stroke risk after a transient ischemic attack (TIA). The score is optimized to predict the risk of stroke within 2 days after a TIA, but also predicts stroke risk within 90 days. The ABCD² score is calculated by summing up the points for five independent risk factors. Patients without the below risk factors for each category are scored a 0. Higher ABCD² scores are associated with greater risk.

Risk Factor	Points	Score
Age ≥60 years	1	
Blood Pressure Initial Systolic BP ≥140 mm Hg OR Diastolic BP ≥90 mm Hg	1	
Clinical features of TIA (choose one)* Unilateral weakness with or without speech impairment OR Speech impairment without unilateral weakness	2 1	
Duration TIA duration >60 minutes TIA duration 10-59 minutes	2 1	
Diabetes	1	
Total ABCD ² Score	0-7	

*If a patient presents with clinical features not listed on the above table;
consult with a neurologist.

Using the ABCD² Score

The ABCD² score should not be used as a substitute for clinical judgement.

Please see the *ND Transient Ischemic Attack (TIA) Guideline* for directions on how to incorporate the ABCD² score into decision making.

References

- Johnston, S. C., Sidney, S. et al. (2007, January 27). Validation and refinement of scores to predict very early stroke risk after transient ischaemic attack. *The Lancet*, 369(9558), 283–293. doi: [https://doi.org/10.1016/S0140-6736\(07\)60150-0](https://doi.org/10.1016/S0140-6736(07)60150-0)
- Jarhult, S. J., Goldstein, J. N. et al (2018, February 8). Implementation of a Rapid, Protocol-based TIA Management Pathway. *Western Journal of American Medicine*, 12(02), 216–223. doi: 10.5811/westjem.2017.9.35341

ND STROKE TRIAGE AND TRANSFER GUIDELINE

For use at Clinics and Hospitals That Do Not Administer IV Thrombolytics

Patient experiencing one or more of the following stroke signs and symptoms:

- **Balance-** Sudden trouble walking, dizziness, loss of balance or coordination. *Perform bilateral index finger to nose test and bilateral heel to shin test.*
- **Eyes-** Sudden double vision or trouble seeing out of one or both eyes. *Assess 4 quadrants of visual field.*
- **Face-** Sudden drooping or numbness on one side of the face. *Ask the person to smile or show teeth.*
- **Arm-** Sudden numbness or weakness of the arm, especially on one side of the body. *Ask the person to close eyes, raise and extend both arms with palms up. Does one arm drift downward?*
- **Speech-** Sudden confusion, trouble speaking or understanding. *Have patient repeat phrase such as "You can't teach an old dog new tricks".*
- **Time to dispatch transport-** Consider timeliness of ground vs. air options
- Sudden severe headache with no known cause.

Contact nearest tertiary hospital to consult with neurologist regarding appropriate transfer destination. In most cases patient will be transferred to closest stroke ready hospital.

PATIENT SHOULD BE TRANSPORTED AS SOON AS EMS UNIT IS AVAILABLE

Door-in to Door-out Goal <30 minutes

1. Obtain vital signs stat and every 15 minutes
2. Monitor pulse oximetry and administer oxygen as needed to maintain a SpO2 of >94%; starting at 2L/min per nasal cannula. Oxygen is not recommended if patient able to maintain SpO2 >94% on room air.
3. Assess bedside glucose. Treat if <60 mg/dL.
4. Perform neuro assessment and FAST ED scoring if able (consider utilizing FAST ED app)
5. Establish last known well (LKW)- the time when the patient was last known to be neurologically normal. If the patient was sleeping and wakes up with symptoms, time last known well is the last time the patient was seen to be normal (i.e. before bed).
6. Keep NPO (including ice chips and meds)
7. Keep HOB elevated at 30 degrees
8. Insert 1-2 large bore IV sites if able (AC preferred). Maintain IV patency with 0.9% Normal Saline at TKO.
9. Acquire medical history. Determine if patient takes anticoagulants or has previous history of stroke.
10. Obtain weight in kg if able.
11. If time allows, complete Inclusion and Exclusion Criteria for IV Thrombolytic Treatment checklist to determine IV thrombolytic eligibility.

Report the following to accepting provider or nurse:

- | | |
|---------------------------------|--|
| • Symptom onset/Last Known Well | • Weight in kg if available |
| • Results of neuro assessment | • Blood glucose results (send with patient or fax) |
| • Vital Signs | • Medical History |
| • Anticoagulant status | • Contact information for family |

Patient label

NIH STROKE SCALE IN PLAIN ENGLISH

Sedating medications affecting scale? (Circle Y or N) →		Y / N	Y / N	Y / N	Y / N	Y / N
Date / Time / Initials →						
1a. Level of Consciousness	0= Alert 1= Sleepy but arouses 2= Can't stay awake 3= No purposeful response					
1b. Questions (month, age)	0=Both correct 1=One correct /intubated 2=Neither correct					
1c. Commands (Close eyes, make fist)	0= Obeys both 1= Obeys one 2= Obeys neither					
2. Lateral Gaze (Eyes open. Eyes follow examiners fingers/face side-to-side)	0= Normal side-to-side eye movement 1= Partial side-to-side eye movement 2= No side-to-side eye movement					
3. Visual Fields (Both eyes open, count 1/2/5 fingers/detect movement, 4 visual fields)	0= Normal visual fields ⊕ 1= Blind upper <u>or</u> lower field one side. ⊕ 2= Blind upper & lower field one side. ⊕ 3= Blind in both eyes/4 fields ●					
4. Facial Weakness (Smile/grimace, raise eyebrows, squeeze eyes shut)	0= Normal 1= Mild one-sided droop with smile 2= Obvious droop at rest 3= Upper & lower face weak					
5a. Arm Weakness– Left	0= No drift X= Untestable-joint fused/amp 1= Drifts down, does not hit bed	Lt.				
5b. Arm Weakness– Right (Pt. holds arm at 90° if sitting, 45° if supine for 10 sec.)	2= Drifts down to hit bed 3= Can move but can't lift 4= No movement	Rt.				
6a. Leg Weakness– Lt	0= No drift X= Untestable, joint fused, etc. 1=Drifts down, does not hit bed	Lt.				
6b. Leg Weakness– Rt (Pt. holds leg straight out if sitting, 30° if supine) 5 sec.	2= Drifts down to hit bed 3= Can move but can't lift 4= No movement	Rt.				
7. Coordination (Finger-to-nose, heel-to-shin. Score <u>only</u> if not caused by weakness.)	0= Normal or no movement 1= Clumsy in one limb 2= Clumsy in two limbs					
8. Sensation (feeling) (Pin prick face, arm, leg – compare sides)	0= Normal 1= Decreased sensation 2= Can't feel, no pain withdrawal					
9. Speech (content) (Intubated pt can write. Give blind pt objects to name. (name objects, describe cookie picture)	0= Correct full sentences 1= Wrong or incomplete sentences 2= Words don't make sense 3= Can't speak at all					
10. Speech (slurring) (Slurring. (Listen to patient read/repeat words)	0= No slurring X= Intubated/physical barrier 1= Slurs but you can understand 2= Slurs and you can't understand <u>or</u> mute					
11. Neglect (Ignores one side of body; test vision then test touch on both sides at once)	0= Sees & feels when both sides tested at once. 1= Doesn't see <u>or</u> feel one side when tested at once 2= Doesn't see & feel one side when tested at once					
Total Score:						
Date & time	Signature	Date & time	Signature	Date & time	Signature	

NIHSS Scoring Tips

1. **Level of consciousness/questions/commands.** Use patient-appropriate questions, commands:
 - Use voice then touch to wake sleeping patient. May require vigorous stimulation.
 - Intubated or otherwise unable to speak give score of 1.
 - Person with one arm amputated and the other paralyzed can wiggle their toes.
- 2&3. **Eye movement and visual fields:**
 - If patient cannot open eyes, examiner may gently lift lids open for exam.
 - Test both eyes at same time for movement and fields.
 - May roll patient's head side to side if not following (oculocephalic maneuver).
- 4, 5, 6. **Facial and extremity strength:**
 - If patient not following commands, examiner may show patient what to do (ie, lift arm) for patient to mimic or maintain position.
 - Test each side separately to avoid confusing neglect for weakness.
7. **Limb coordination (ataxia):**
 - Only score if patient is able to move the limb, and the precision of movement is abnormal out of proportion to weakness.
8. **Sensation:**
 - Test arm and leg; many people have numb hands (carpal tunnel) and feet (diabetic neuropathy).
9. **Language:**
 - Testing for cognitive content of speech—naming objects, fluent sentences.
10. **Slurring (dysarthria):**
 - Testing for clarity of speech—the actual motor function of getting the words out.
11. **Neglect (Inattention or extinction):**
 - Can patient pay attention to stimuli on both sides at the same time?
 - Must have some vision in both fields to test: if scores 2 on #3 (visual fields), cannot score visual neglect.
 - Must have some sensation on both sides to test: if scores 2 on #8 (sensation), cannot score sensory neglect.
 - If patient does not acknowledge one side of space (does not recognize own arm when held in their good visual field; does not acknowledge they have any problem with a paralyzed side, etc), score is 2.

Time IV Thrombolytic Given: _____

Document Full NIHSS in EHR before starting IV thrombolytic and prior to transfer.

BP MUST be $\leq 185/110$ prior to IV thrombolytic and REMAIN $\leq 180/105$. If > 180 systolic or 105 diastolic; recheck, document, and treat accordingly.

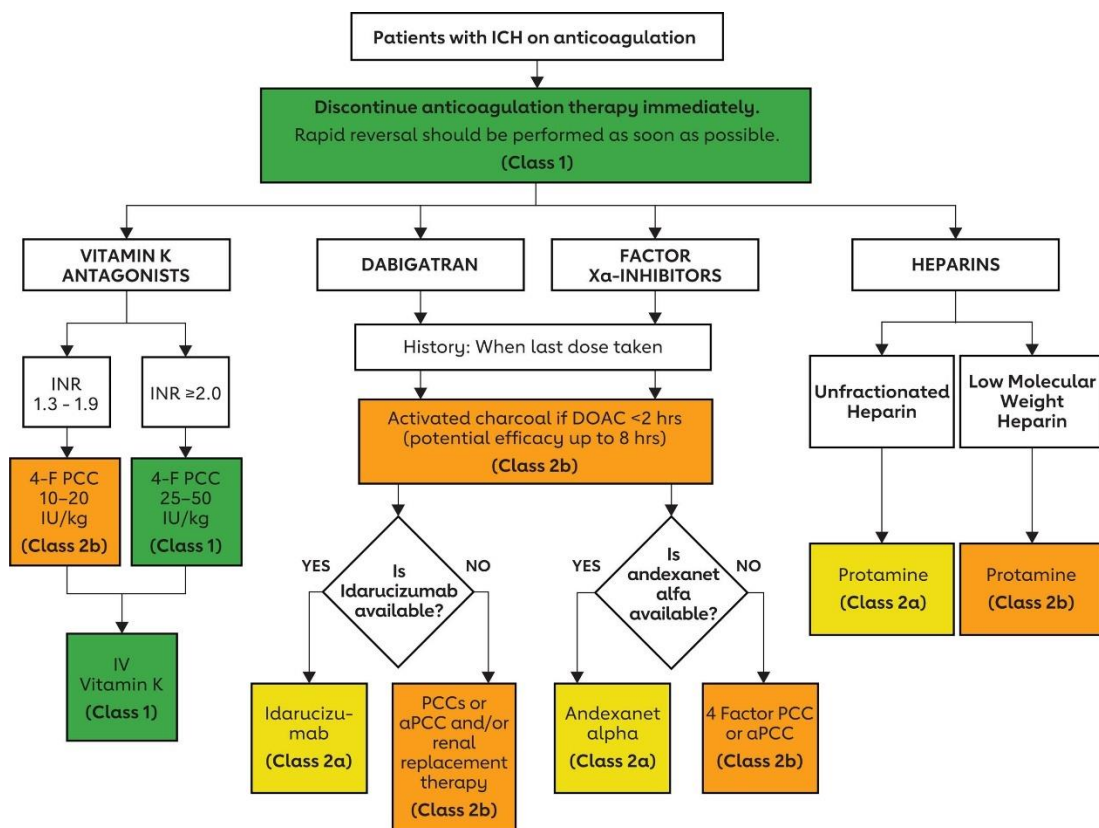
Date																							
Time																							
		Pre-lytic	15 min	15 min	15 min	15 min	15 min	15 min	15 min	15 min	15 min	15 min	15 min	30 min	30 min	30 min	30 min	30 min	30 min	30 min	30 min	30 min	30 min
		Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials	Initials
	BP																						
	Pulse																						
	Respirations																						
	Pulse Oximetry																						
	Temperature																						
	Level of Consciousness																						
	Visual Fields																						
	Facial Palsy																						
	Best Language																						
	Sensory																						
Pupils (R, L)		R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L
Orolingual Angioedema: Tongue or Lip Swelling																							
Motor Arm																							
Motor Leg																							
Comment:																							

SIGNATURE	INITIALS	SIGNATURE	INITIALS	SIGNATURE	INITIALS
Level of Consciousness 0 = Alert 1 = Drowsy 2 = Stuporous 3 = Coma		Facial Palsy ("Show me your teeth", "raise your eyebrows", "close your eyes") 0 = Normal symmetrical movements 1 = Minor paralysis 2 = Partial paralysis 3 = Complete paralysis		Best Language: Use pictures and sentence list. "Describe what you see in this picture." "Name the items in this picture." "Read these sentences." 0 = No aphasia 1 = Mild to moderate aphasia 2 = Severe aphasia 3 = Mute, global aphasia	
Visual Fields 0 = No visual loss 1 = Partial hemianopia 2 = Complete hemianopia 3 = Bilateral hemianopia		Pupils Write in number for pupillary size (mm) and letter for reaction: B = Brisk S = Sluggish NR = Nonreactive		Orolingual Angioedema: Tongue or Lip Swelling 0 = Not present 1 = Tongue Swelling 2 = Lip Swelling 3 = Tongue and Lip Swelling	
Comment: GD = Gaze Deviation SS = Slurred Speech AX = Ataxia DZ = Dizziness EI = Extinction/Inattention HA = Terrible Headache BP = BP Treatment		Sensory 0 = Normal (No sensory loss) 1 = Mild/Moderate (Dull on affected side) 2 = Severe (Total sensory loss)			
		Motor Arm/Leg 0 = No drift 1 = Drift 2 = Some effort vs gravity 3 = No effort vs gravity 4 = No movement UN = Amputation or joint fusion			

Appendix 6B: American Heart Association's Clinical Practice Guidelines Reference

- Ideal Foundational Requirements for Stroke Program Development and Growth: A Scientific Statement From the American Heart Association
<https://www.ahajournals.org/doi/10.1161/STR.0000000000000424>
- Recommendations for the Establishment of Stroke Systems of Care: A 2019 Update
A Policy Statement From the American Stroke Association
<https://www.ahajournals.org/doi/full/10.1161/STR.0000000000000173>
- Guidelines for Adult Stroke Rehabilitation and Recovery
A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association
<https://www.ahajournals.org/doi/full/10.1161/STR.0000000000000098>
- 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
<https://www.ahajournals.org/doi/10.1161/STR.0000000000000375>
- Identifying Best Practices to Improve Evaluation and Management of In-Hospital Stroke: A Scientific Statement From the American Heart Association
<https://www.ahajournals.org/doi/10.1161/STR.0000000000000402>
- 2023 Guideline for the Management of Patients With Aneurysmal Subarachnoid Hemorrhage: A Guideline From the American Heart Association/American Stroke Association
<https://www.ahajournals.org/doi/10.1161/STR.0000000000000436>
- 2022 Guideline for the Management of Patients With Spontaneous Intracerebral Hemorrhage: A Guideline From the American Heart Association/American Stroke Association
<https://www.ahajournals.org/doi/full/10.1161/STR.0000000000000407>
- 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
<https://www.ahajournals.org/doi/10.1161/STR.0000000000000211>
- 2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association
<https://www.ahajournals.org/doi/10.1161/STR.0000000000000158>

Appendix 6C: ICH Anticoagulation Reversal Clinical Practice Guideline



Reference:

[2022 Guideline for the Management of Patients With Spontaneous Intracerebral Hemorrhage: A Guideline From the American Heart Association/American Stroke Association \(ahajournals.org\)](https://www.ahajournals.org/doi/full/10.1161/STROKEAHA.121.045000)

Appendix 6D: Post-IV Thrombolytic Complication Management Guideline

Post-IV Thrombolytics Complication Management Guideline

Developed 4/2024

Suspected Hemorrhagic Transformation after IV Thrombolytic Therapy:

- Watch for:
 - Neurological decline
 - Headache
 - Decrease in level of consciousness
 - Nausea/vomiting
 - Sudden rise in blood pressure
- If bleeding is suspected:
 - Discontinue IV Alteplase infusion (if applicable)
 - Notify Provider
 - Obtain STAT non-contrast head CT
 - Draw CBC, PT/INR, aPTT, fibrinogen level, type and crossmatch
 - Consult Neurologist/Neurosurgeon
- Bleeding Confirmed, consider giving:
 - Cryoprecipitate 10 units infused over 10-30 min.
 - If cryoprecipitate is contraindicated or unavailable, administer:
 - Tranexamic Acid 1000 mg IV infused over 10 minutes **OR**
 - Aminocaproic acid 4-5 g IV infused over 1 hour, followed by 1 g IV until bleeding is controlled.
- Supportive Therapy:
 - Blood pressure management
 - Blood glucose control

Orolingual Angioedema:

- Watch for:
 - Swelling of the tongue and lips
 - Slurred speech
 - Difficulty breathing
- Maintain Airway
 - May require endotracheal intubation
- Notify Provider
- Discontinue IV Alteplase infusion (if applicable)
- Hold ACE inhibitors

- Administer:
 - Methylprednisolone 125 mg IV
 - Diphenhydramine 50 mg IV
 - Famotidine 20 mg IV
 - If there is a further increase in angioedema, administer Epinephrine (0.1%) 0.3 mL subcutaneously or by nebulizer 0.5 mL

Reference:

Powers, W. J., Rabinstein, A. A., Ackerson, T., Adeoye, O. M., Bambakidis, N. C., Becker, K., Biller, J, Brown M, Demaerschak BM, Hoh B, et al.. (2019). Correction to: 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(12), <https://doi.org/10.1161/str.0000000000000215>

Appendix 7A: Example Stroke Order Sets

Stroke Code Standard Order Set

GENERAL

- Vital Signs / Monitoring
 - ☒ Neuro signs every 15 minutes x 4, then per unit routine
 - ☒ Continuous oximetry
 - ☒ Vital signs every 15 minutes x 4, then per unit routine
 - ☒ Cardiac monitor
- Diet **required, single select**
 - ☒ Diet – NPO (including meds) **add to comments: NPO unless dysphagia screen is successful**
- Diet Message / Swallow Screening
 - ☒ Dysphagia / Swallow screen **add to comments: Nursing bedside dysphagia screen prior to any food, fluid, or oral medication**
- Nursing Assessment
 - ☒ Weigh patient – actual patient weight in kg **default to once**
- Nursing Intervention
 - ☒ Complete NIH Stroke Scale
 - ☒ Alert: Minimize all punctures and lines, tubes, and/or catheter insertions after thrombolytic administration
- Nursing Intervention – Tubes and Drains
 - ☐ Panel – Indwelling Foley catheter protocol
- Notify Provider
 - ☒ Notify provider – vital signs parameters **defaults: Pulse less than 50, SBP greater than 180 mmHg, SBP less than 100 mmHg, DBP greater than 105 mmHg, DBP less than 60 mmHg**
- Respiratory
 - ☒ Oxygen therapy adult and pediatrics **default follow oxygen protocol: Yes; default SpO₂: Other (specify) and add to comments: Maintain SpO₂ greater than 94%**
- Consults – Physician
 - ☒ Consult Neuro / Vascular Interventional (stroke/TIA)
 - ☒ Consult Neurology

- ☒ Consult Neurovascular
- ☒ Consult Neuro Telemedicine / One Call
- ☐ Consult provider

LABS

- Hematology
 - ☒ Complete blood count with differential STAT
 - ☐ ESR STAT
- Coagulation
 - ☒ Protime/INR STAT
 - ☒ PTT STAT
- Point of Care Testing
 - ☒ POCT glucose x 1 STAT
- Chemistry
 - ☐ C-reactive protein (inflammation) STAT
 - ☒ Comprehensive metabolic panel STAT
 - ☐ Lactic acid reflex to repeat STAT
 - ☐ Thyroid panel (FT4/TSH) STAT
- Cardiac
 - ☒ Troponin I STAT
- HCG Screening

Add text: Applies to all menstruating females, unless done within the last 48 hours, post tubal ligation, past hysterectomy, post fallopian tube coil, or past bilateral oophorectomy

 - ☐ HCG screen ASAP

DIAGNOSTIC

- Cardiovascular
 - ☒ EKG default reason for exam: Stroke; add to comments: Do not delay CT scan to obtain EKG

IMAGING

- X-Ray
 - ☐ X-ray chest PA and lateral default reason for exam: Stroke

- ☐ X-ray chest portable default reason for exam: Stroke
- Computerized Tomography
 - ☒ CT head without contrast STAT default reason for exam: Stroke
 - ☐ Panel CT brain without contrast STAT
 - ☐ Panel prep CT Brain Perfusion
 - ☐ CTA head
 - ☐ CTA neck

IV FLUIDS

- Venous / Arterial Access
 - ☒ 2 large bore IVs (18 or 20-gauge, antecubital preferred for at least one PIV)
 - ☒ Peripheral IV with saline flush
 - ☒ Peripheral IV
 - ☒ 0.9% NaCl 10 mL IV two times a day (0900-2100) and PRN administration instructions: Flush IV line as scheduled and as often as necessary before and after meds
- IV Fluid
 - ☐ IV lock
 - ☐ 0.9% NaCl IV solution at 75 mL/hour
 - ☐ Lactated ringers IV solution

MEDICATIONS

- Antipyretic
 - ☐ Acetaminophen (Tylenol) 650 mg rectal one time PRN fever > (indicate temp) PRN comment: temperature greater than 100.4 degrees F
- Cardiovascular Medication – Other
 - ☒ Antihypertensives – IV Push
 - Labetalol (Trandate) 10 mg IV every 10 minutes PRN specified parameter PRN comment: SBP greater than 220 mmHg or DBP greater than 120 mmHg administration instructions: Use FIRST unless HR less than 60 bpm. Administer over 1 – 2 minutes. Maximum dose of 300 mg in 24 hours. After 2 doses of any IV push antihypertensive, start nicardipine infusion and contact provider.

OR

Hydralazine (Apresoline) 10 mg IV every 15 minutes PRN specified parameter x 2 doses PRN comment: SBP greater than 220 mmHg or DBP greater than 120 mmHg administration instructions: Administer over 1 – 2 minutes. Use SECOND unless HR less than 60 bpm. After 2 doses of any IV push antihypertensive, start nicardipine infusion and contact provider.

☒ Antihypertensives – Continuous Infusion single select

☒ Nicardipine (Cardene) 0 – 15 mg/hour IV titrate administration instructions: Start infusion at 5 mg/hour or previous rate; titrate by 2.5 mg/hour every 5 minutes as needed to maintain desired blood pressure response. Max dose of 15 mg/hour. SBP goal less than 220 mmHg or DBP less than 120 mmHg unless otherwise ordered by provider. When weaning, decrease infusion by 2.5 mg/hour every 2 hours as tolerated. To minimize the risk of peripheral venous irritation and extravasation, administer through large peripheral vein and change site of drug infusion every 12 hours. If site rotation is not able to be maintained, consider central line administration.

☐ Clevidipine (Cleviprex) 0.5 mg/mL IV emulsion: 0 – 21 mg/hour IV titrate administration instructions: Begin infusion at 1 mg/hour. Titrate infusion by doubling the rate every 90 seconds as needed to keep SBP goal less than 220 mmHg or DBP less than 120 mmHg, unless otherwise specified by provider. As BP approaches the goal, reduce intensity of titrations to 1 - 2 mg/hour every 5 minutes (this titration typically results in 2 - 4 mmHg reduction in BP). Usual dose 4 - 6 mg/hour; maximum recommended dose is 16 mg/hour but doses up to 21 mg/hour can be used. Do not infuse via the same IV line as other lipid products. Change infusion set and bottle at least every 12 hours. Discard unused medication. **Medication already infusing will continue at the current rate.** **Bottle and tubing should not hang longer than 12 hours. Do not infuse via the same IV line as other lipid products.**

- Antithrombotic

Add text: Refer to thrombolytic checklist for inclusion / exclusion criteria

IV Thrombolytic Order Set

- Vital Signs / Monitoring
 - ☐ Vital signs every 15 minutes x 2 hours, every 30 minutes x 6 hours, then every 1 hour x 16 hours
 - ☐ Neuro checks every 15 minutes x 2 hours, every 30 minutes x 6 hours, then every 1 hour x 16 hours
- Nursing Intervention
 - ☐ Complete NIHSS post Tenecteplase administration
 - ☐ Complete NIHSS on handoff and with any neurological decline
- Notify Provider
 - ☐ Notify provider – vital signs parameters:
 - Pulse less than 50
 - Respiratory rate greater than 24
 - Systolic blood pressure greater than 180
 - Systolic blood pressure less than 100
 - Diastolic blood pressure greater than 105
 - Diastolic blood pressure less than 70
 - ☐ Notify provider for evidence of bleeding, neurological deterioration, or orolingual angioedema

THROMBOLYTIC MEDICATIONS – CHOOSE ONLY ONE

- ☐ Tenecteplase (TNKase)

Tenecteplase (TNKase) IV bolus (CVA) 0.25 mg/kg IV now x 1 dose (max dose 25 mg) administration instructions: Dilute 50 mg vial with 10 mL sterile water diluent provided to = 5 mg/mL concentration. SWIRL GENTLY - DO NOT SHAKE. Do not administer entire contents of the vial. Draw up patient specific dose in a syringe (0.25 mg/kg, MAX 25 mg), discard remainder. Flush line with 10 mL sodium chloride 0.9%, then administer bolus rapidly IV push over 5 seconds, followed by an immediate flush with 10 mL sodium chloride 0.9%.

FOLLOWED BY Sodium chloride 0.9% flush 10 mL IV one time x 1 dose

-OR-

- ☐ Alteplase

IV Alteplase 0.9 mg/kg (max dose 90 mg) administration instructions: IV **bolus** 10% total IV alteplase dose over 1 minute. Then administer the remainder IV Alteplase infusion over 60 minutes, followed by 50 mL sodium chloride 0.9% at same rate as IV Alteplase infusion.

☐ No anticoagulants / antiplatelets for 24 hours

- Hypertensive Management

Goal SBP less than 180 mmHg and DBP less than 105 mmHg for 24 hours after thrombolytic treatment

☐ Labetalol or Hydralazine

Labetalol (Normodyne, Trandate) 10 mg IV every 10 minutes PRN SBP greater than 180 mmHg or DBP greater than 105 mmHg administration instructions: USE FIRST UNLESS HR LESS THAN 60, THEN USE HYDRALAZINE FIRST. Administer over 1 – 2 minutes, may repeat x 1. Max 2 doses. Max 300 mg per 24 hours.

OR

Hydralazine (Apresoline) 10 mg IV every 15 minutes PRN SBP greater than 180 mmHg or DBP greater than 105 mmHg administration instructions: USE FIRST IF HR LESS THAN 60. If multiple hypertension medications are ordered, give second. Administer over 1 – 2 minutes, may repeat x 1. Max 2 doses. After 2 doses, start Nicardipine infusion and contact provider.

☐ Nicardipine (Cardene) 0 – 15 mg/hour IV titrate administration instructions: USE SECOND. INITIAL: Start at 5 mg/hour or previous dose and titrate by 2.5 mg/hour every 5 minutes (rapid titration) to 15 minutes (gradual titration). Max dose 15 mg/hour. MAINTENANCE: Adjust rate of infusion as necessary to maintain desired blood pressure response. SBP goal is 170 – 180 mmHg and DBP goal is 95 – 105 mmHg unless otherwise ordered by provider. When weaning, decrease infusion by 2.5 mg/hour every 15 minutes as tolerated.

Hemorrhagic Stroke Order Set

Hemorrhagic Stroke: Intracerebral Hemorrhage (ICH) or Subarachnoid Hemorrhage (SAH)

- ☐ Vital signs every 30 minutes x 2 hours, then every 1 hour
 - If titrating an antihypertensive infusion, perform vital signs every 15 minutes.
- ☐ Neuro signs every 30 minutes x 2 hours, then every 1 hour
- ☐ Cardiac monitor
- ☐ Diet – NPO All stroke patients are to remain NPO, including PO medications, until successfully passes nursing dysphagia screen
- ☐ Dysphagia / Swallow screen nursing bedside dysphagia screen prior to any food, fluid, or oral medication
- ☐ Weigh patient
- ☐ Seizure Precautions
- ☐ Head of bed elevated at least 30 degrees
- ☐ Complete NIH Stroke Scale
- ☐ Notify provider – Vital sign parameters
 - Temperature greater than: 100.4 degrees F
 - Pulse greater than: 120 bpm
 - Pulse less than: 50 bpm
 - Respiratory rate greater than: 24
- ☐ Notify provider – systolic blood pressure (SBP)
 - Unable to achieve and maintain SBP goals within one hour of initiation of antihypertensive medications
 - Significant fluctuations in SBP
 - Peaks and large variability in SBP
 - SBP less than 100 mmHg
- ☐ Fall precautions: High risk - Right Hemisphere or Cerebellar stroke patients may be at higher fall risk
- ☐ Respiratory
- ☐ Oxygen therapy Maintain saturations greater than 94%
- ☐ Cardiovascular Medications – Other

- ❑ Systolic blood pressure (SBP) LESS than 220 mmHg on initial presentation – SBP goal 130 – 150 mmHg
- ❑ If antihypertensive medications contain conflicting SBP goals, contact ordering provider to clarify target SBP
- ❑ Hydralazine (Apresoline) 5 – 10 mg IV every 15 minutes PRN per parameter

Administration instructions:

- For systolic blood pressure (SBP) greater than 150 mmHg: 5 mg
- For systolic blood pressure (SBP) greater than 170 mmHg: 10 mg
- Notify provider if more than 3 doses are administered within 60 minutes.
- If multiple hypertension medications are ordered, give this as SECOND choice.

- ❑ Labetalol (Normodyne; Trandate) 10 – 20 mg IV every 15 minutes PRN per parameter

Administration instructions:

- For systolic blood pressure (SBP) greater than 150 mmHg: 10 mg
- For systolic blood pressure (SBP) greater than 170 mmHg: 20 mg
- Hold if heart rate is less than 60 beats per minute.
- Maximum dose of 300 mg per 24 hours.
- Notify provider if more than 2 doses are administered within 30 minutes.
- If multiple hypertension medications are ordered, give this as FIRST choice.

- ❑ Nicardipine (Cardene) infusion 0 – 15 mg IV titrate

Administration instructions:

- Initiate infusion at 5 mg/hour or continue current dose if transferred in.
- Increase or decrease by 2.5 mg/hour as needed every 5 minutes to maintain SBP 130 - 150 mmHg, not to exceed maximum ordered dose.
- Notify provider if maximum ordered dose is not sufficient to achieve hemodynamic goal.
- When discontinuing, decrease infusion by 2.5 mg/hour every 2 hours until off, while maintaining goal parameters.
- To minimize the risk of peripheral venous irritation and extravasation administer through large peripheral vein and change

site of drug infusion every 12 hours. If site rotation is not able to be maintained, consider central line administration.

❑ Systolic blood pressure (SBP) GREATER than 220 mmHg on initial presentation – SBP goal 140 – 160 mmHg

❑ If antihypertensive medications contain conflicting SBP goals, contact ordering provider to clarify target SBP

❑ Hydralazine (Apresoline) 5 – 10 mg IV every 15 minutes PRN per parameter

Administration instructions:

- For systolic blood pressure (SBP) greater than 160 mmHg: 5 mg
- For systolic blood pressure (SBP) greater than 180 mmHg: 10 mg
- Notify provider if more than 3 doses are administered within 60 minutes.
- If multiple hypertension medications are ordered, give this as SECOND choice.

❑ Labetalol (Normodyne; Trandate) 10 – 20 mg IV every 15 minutes PRN per parameter

Administration instructions:

- For systolic blood pressure (SBP) greater than 160 mmHg: 10 mg
- For systolic blood pressure (SBP) greater than 180 mmHg: 20 mg
- Hold if heart rate is less than 60 beats per minute.
- Maximum dose of 300 mg per 24 hours.
- Notify provider if more than 2 doses are administered within 30 minutes.
- If multiple hypertension medications are ordered, give this as FIRST choice.

❑ Nicardipine (Cardene) infusion 0 – 15 mg IV titrate

Administration instructions:

- Initiate infusion at 5 mg/hour or continue current dose if transferred in.
- Increase or decrease by 2.5 mg/hour as needed every 5 minutes to maintain SBP 140 - 160 mmHg, not to exceed maximum ordered dose.
- Notify provider if maximum ordered dose is not sufficient to achieve hemodynamic goal.

- When discontinuing, decrease infusion by 2.5 mg/hour every 2 hours until off, while maintaining goal parameters.
- To minimize the risk of peripheral venous irritation and extravasation administer through large peripheral vein and change site of drug infusion every 12 hours. If site rotation is not able to be maintained, consider central line administration.

Disclaimer: This is an example of what your stroke order sets may look like. This document is meant to be a resource for developing order sets. Order sets should be specific to your facility's stroke code process, follow clinical practice treatment guidelines, and be developed with the collaboration of your stroke management team.

Appendix 8A: Evidence-Based Dysphagia Screen (Fillable Form)

YALE SWALLOW PROTOCOL

ADMINISTRATION FORMS (3)

Administration Form 1.

Yale Swallow Protocol

Step 1: Exclusion Criteria

_____ Protocol Deferred: NO risk factors for aspiration.

Protocol deferred if any YES answer to the following criteria

Yes	No	
_____	_____	Unable to remain alert for testing
_____	_____	No thin liquids due to preexisting dysphagia
_____	_____	Head-of-Bed restricted to <30°
_____	_____	Tracheotomy tube present
_____	_____	NPO order for medical/surgical reason

If a patient's clinical status changes resulting in a new risk for aspiration re-administer protocol before oral intake of food or medicine.

Administration Form 2.

Yale Swallow Protocol

Step 2: Administration Instructions

Perform protocol if patient is an aspiration risk and

ALL Step 1 boxes are checked NO

- **Brief Cognitive Screen^a:**

_____ What is your name?	_____ Open your mouth
_____ Where are you right now?	_____ Stick out your tongue
_____ What year is it?	_____ Smile

- **Oral-Mechanism Examination^b:**

_____ Labial closure

_____ Lingual range of motion

_____ Facial symmetry (smile/pucker)

- **3-Ounce Water Swallow Challenge^c:**

- Sit patient upright at 80-90° (or as high as tolerated >30°)
- Ask patient to drink the entire 3 ounces (90cc) of water from a cup or with a straw, in sequential swallows, and slow and steady but without stopping (Note: Cup or straw can be held by staff or patient)
- Assess patient for coughing or choking during or immediately after completion of drinking

^{a,b} Information from the brief cognitive screen and oral mechanism examination provide information only on odds of aspiration risk with the 3 ounces water swallow challenge and should not be used as exclusionary criteria for screening. Nursing discretion is acceptable.

^c It is permissible to repeat the 3 ounce water swallow challenge if it is thought the patient may pass with a second attempt.

Administration Form 3.

Yale Swallow Protocol

Step 3: Pass/Fail Criteria

Results and Recommendation

_____ PASS: Successful uninterrupted drinking of all 3 ounces of water without overt signs of aspiration (coughing/choking) either during or immediately after completion.

- If patient passes, collaborate with MD/APP to order appropriate oral diet.
- If adequate dentition order a soft solid consistency or regular consistency diet
- If inadequate dentition or edentulous order a liquid and puree diet
- Consult with speech-language pathologist for other diet modifications

_____ FAIL: Inability to drink the entire 3 ounces in sequential swallows due to interrupted drinking (stopping/starting) or patient exhibits overt signs of aspiration (coughing/choking) either during or immediately after completion.

- If patient fails, keep NPO (including medications) and request the MD/PA/LIP to order a consult for a swallow evaluation by speech-language pathology.

OR

- Continue NPO status and re-administer the protocol in 24 hours if patient shows clinical improvement
- If patient fails again request the MD/PA/LIP to order a consult for a swallow evaluation by speech-language pathology.

Appendix 8B: Evidence-Based Dysphagia Screen-Infographic.

YALE SWALLOW SCREEN

AN EVIDENCE BASED DYSPHAGIA SCREEN

WHAT IS DYSPHAGIA?

SYMPTOMS OF DYSPHAGIA

- Choking on food or drink
- Coughing during or after swallowing
- Coughing or vomiting up food
- Having a weak, soft voice
- Aspirating (getting food or liquid into your lungs)
- Excessive saliva or drooling
- Difficulty chewing
- Trouble moving food to the back of your mouth
- Food sticking in your throat

GUIDELINE RECOMMENDATIONS

DYSPHAGIA SCREENING BEFORE THE PATIENT BEGINS EATING, DRINKING, OR RECEIVING ORAL MEDICATIONS IS EFFECTIVE TO IDENTIFY PATIENTS AT INCREASED RISK FOR ASPIRATION. (LEVEL OF EVIDENCE: C-LD) (CITATION 1, P. E382)

A FORMAL SCREENING PROCEDURE FOR DYSPHAGIA SHOULD BE PERFORMED IN ALL PATIENTS BEFORE THE INITIATION OF ORAL INTAKE TO REDUCE THE RISK OF PNEUMONIA (LEVEL OF EVIDENCE B). (CITATION 2, P. 2042)

4.7. Dysphagia	COR	LOE
1. Dysphagia screening before the patient begins eating, drinking, or receiving oral medications is effective to identify patients at increased risk for aspiration.	I	C-LD

RATIONALE

DYSPHAGIA, A COMMON (37%–78%) COMPLICATION OF ACUTE STROKE, IS A RISK FACTOR FOR ASPIRATION PNEUMONIA AND IS ASSOCIATED WITH HIGHER MORTALITY AND WORSE PATIENT OUTCOMES. DYSPHAGIA AND ASPIRATION ARE MAJOR RISK FACTORS FOR THE DEVELOPMENT OF PNEUMONIA. (CITATION 2, P. E382)

YALE SWALLOW PROTOCOL (YSP)

EXCLUSION CRITERIA: RISK IS TOO HIGH-DEFER ADMINISTRATION
Do Not Continue if yes to any of the following:

- Unable to remain alert
- Baseline modified diet/thickened liquid
- Tube feeding in place
- Head of bed restrictions < 30 degrees
- Tracheostomy tube
- NPO by physician order

STEP 1: BRIEF COGNITIVE SCREEN: Failure may be associated with an increased risk of aspiration and may warrant SLP consult, but does not prevent YSP

- What is your name?
- Where are you?
- What year is it?

STEP 2: ORAL MECHANICAL EXAM: Weakness and/or asymmetry may warrant modified solid textures and indicates need for SLP consult.

- Tongue Range of Motion: Stick out your tongue, move it side to side
- Facial Symmetry: Smile/Pucker
- Lip Closure: Puff up your cheeks with air and hold

STEP 3: 3 (three) OZ WATER SWALLOW CHALLENGE: Stopping while drinking, coughing, or throat clearing indicates a failure and elevated risk.

- Sit patient upright at 90 degrees or as high as tolerated > 30 degrees
- Ask the patient to drink 3 oz. of water from a cup or straw with sequential swallows-slow and steady but without stopping

PASS: Collaboration with MD/SLP for appropriate oral diet order, e.g., soft foods

FAIL: Keep patient NPO including medications and order SLP clinic and/or instrumental swallow evaluation as soon as possible. YSP can be re-administered in 24 hours with clinical improvement.

TIPS AND TRICKS

- Perform before any oral intake-food, fluids, or medications.
- Perform even if symptoms resolved.
- YSP is a nursing protocol; do not need MD order.
- If clinical condition declines, consider rescreening.
- If patient fails or screen is contraindicated, please document in patient chart.
- If patient has failed and medications ordered, consider changing administration route.
- If medications given, document correct route on patient's MAR.

RESOURCES

- HEMPHILL JC 3RD, GREENBERG SM, ANDERSON CS, BECKER K, BENDOK BR, CUSHMAN M, FUNG GL, GOLDSTEIN JN, MACDONALD RL, MITCHELL PH, SCOTT PA, SELIM MH, WOO D; ON BEHALF OF THE AMERICAN HEART ASSOCIATION STROKE COUNCIL, COUNCIL ON CARDIOVASCULAR AND STROKE NURSING, AND COUNCIL ON CLINICAL CARDIOLOGY. GUIDELINES FOR THE MANAGEMENT OF SPONTANEOUS INTRACEREBRAL HEMORRHAGE: A GUIDELINE FOR HEALTHCARE PROFESSIONALS FROM THE AMERICAN HEART ASSOCIATION/AMERICAN STROKE ASSOCIATION. STROKE. 2015;46:2032-2060. AVAILABLE AT: <https://www.ahajournals.org/lookup/doi/10.1161/STR.0000000000000069>.
- POWERS WJ, BABINSTEIN AA, ACKERSON T, ADEJOYE GM, BAMBAKIDIS NC, BECKER K, BILLER J, BROWN M, DEVAERSCHALK BM, HOH B, JAUCH EC, KIDWELL CS, LESLIE-MAZWITM, OVIAGELE B, SCOTT PA, SHETH KN, SOUTHERLAND AM, SUMMERS DV, TRISCHWELL DL; ON BEHALF OF THE AMERICAN HEART ASSOCIATION STROKE COUNCIL. 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. 2019;50:E344-E418 DOI: 10.1161/STR.0000000000000211. AVAILABLE AT: <https://www.ahajournals.org/doi/abs/10.1161/STR.0000000000000211>.
- LEDER, S.B. & SUITER, D.M. (2014) THE YALE SWALLOW PROTOCOL: AN EVIDENCE-BASED APPROACH TO DECISION MAKING. CHAM, SWITZERLAND: SPRINGER INTERNATIONAL PUBLISHING.

Available at:

<https://www.hhs.nd.gov/sites/www/files/documents/DOH%20Legacy/EMS/Stroke/Education/2023%20Updated%20Yale%20Swallow%20Screen.pdf>

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- Where are you?
- What year is it?

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- Tongue Range of Motion: Stick out your tongue, move it side to side
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STEP 3: 3 (three) OZ WATER SWALLOW CHALLENGE: Stopping while drinking, coughing, or throat clearing indicates a failure and elevated risk.

- Sit patient upright at 90 degrees or as high as tolerated > 30 degrees
- Ask the patient to drink 3 oz. of water from a cup or straw with sequential swallows-slow and steady but without stopping

PASS: Collaboration with MD/SLP for appropriate oral diet order, e.g., soft foods

FAIL: Keep patient NPO including medications and order SLP clinic and/or instrumental swallow evaluation as soon as possible. YSP can be re-administered in 24 hours with clinical improvement.

Appendix 9A: Example Education Plan and Record

Education Plan 2023-2025

2023	Content Hours	2024	Content Hours	2025	Content Hours
Mock Stroke Code -Jan. 11, 2023	1 hour	IV Thrombolytic Administration Education -with Pharmacist -Jan. 31, 2024	1 hour	State dysphagia screen webinar, infographic review -Assigned to staff Jan 2025 -Test	1 hour
Stroke Case Review -May 13, 2023 -At monthly staff meeting	0.5 hours	Stroke Boot Camp -March 20, 2024	2 hours	Advanced Stroke Life Support -June 25, 2025	8 hours
ND Cardiac and Stroke Conference -October 25-26, 2023	7.25 hours	Stroke Activation Protocol Review -Review policy, test -October 2024	0.5 hours	Acute Stroke Protocol Review -Review policy, test -October 2025	0.5 hours

AST Member Education Tracking

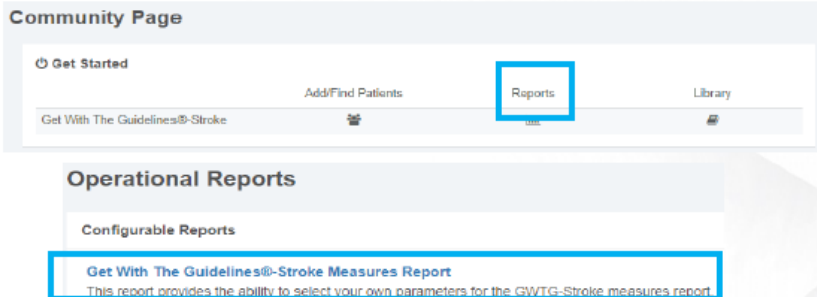
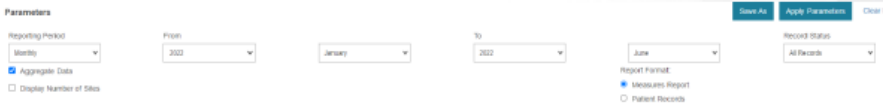
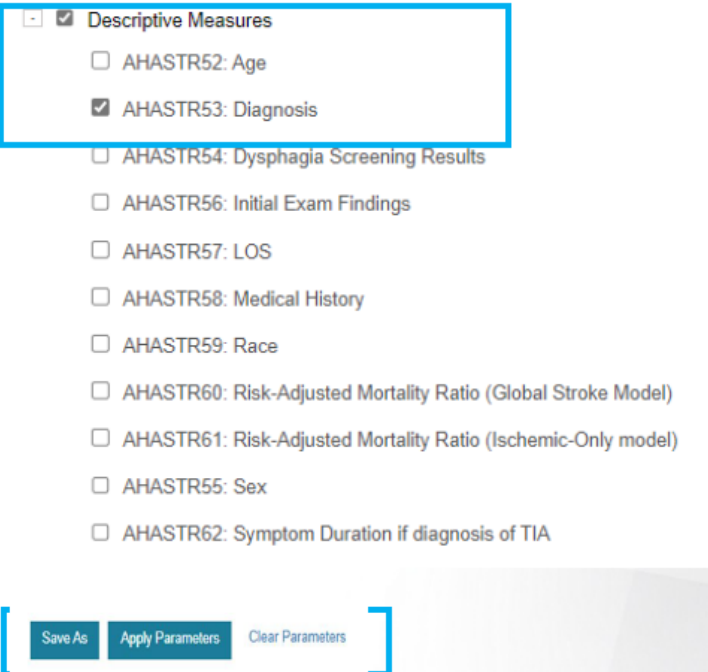
Education	Employee #1	Employee #2
Stroke Activation Protocol	Date completed	Date completed
Acute Stroke Protocol		
NIHSS Certification		
IV Thrombolytic Administration		
Dysphagia Screen		
Mock Stroke Code		
Stroke Boot Camp		

Appendix 13A: GWTG-Stroke How to Pull Your Patient List



How to Pull Your Patient List by Diagnosis in Get With The Guidelines®-Stroke

The steps outlined in this document will provide instruction as to how to obtain a patient list report within the Get With The Guidelines®– Stroke IQVIA Registry Platform (IRP). The reports can provide insight on a participating facility's compliance and Acute Stroke award recognition progress.

1 From the <i>Community Page</i> under <i>Get Started</i>, select <i>Reports</i>. Under <i>Configurable Reports</i> select <i>Get With The Guidelines®-Stroke Measures Report</i>	 The screenshot shows the 'Community Page' with a navigation bar containing 'Get Started', 'Add/Find Patients', 'Reports' (highlighted with a blue box), and 'Library'. Below the navigation bar, under 'Operational Reports', the 'Configurable Reports' section has 'Get With The Guidelines®-Stroke Measures Report' highlighted with a blue box. A tooltip below it states: 'This report provides the ability to select your own parameters for the GWTG-Stroke measures report.'
2 Select the desired reporting period for the report. Interval options include annual, monthly, quarterly, or daily. Check the <i>Aggregate Data</i> box to have the selected time reflected as one interval.	 The screenshot shows the 'Parameters' section with the following settings: Reporting Period: Monthly; From: 2022; To: 2022; Report Format: Measures Report (selected); Record Status: All Records. The 'Aggregate Data' checkbox is checked, and 'Display Number of Sites' is unchecked.
3 The <i>Descriptive Measures</i> includes the <i>Diagnosis</i> option. Select <i>Diagnosis</i> and <i>Apply Parameters</i>.	 The screenshot shows the 'Descriptive Measures' section with a list of checkboxes. The 'Diagnosis' option (AHASTR53) is checked. Other options include Age (AHASTR52), Dysphagia Screening Results (AHASTR54), Initial Exam Findings (AHASTR56), LOS (AHASTR57), Medical History (AHASTR58), Race (AHASTR59), Risk-Adjusted Mortality Ratio (Global Stroke Model) (AHASTR60), Risk-Adjusted Mortality Ratio (Ischemic-Only model) (AHASTR61), Sex (AHASTR55), and Symptom Duration if diagnosis of TIA (AHASTR62). At the bottom, there are buttons for 'Save As', 'Apply Parameters', and 'Clear Parameters'.

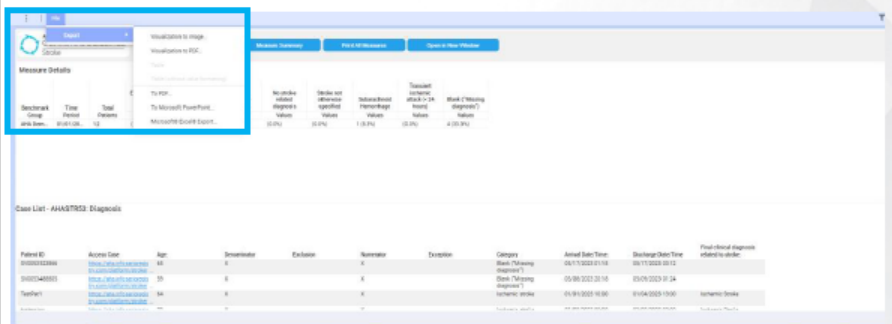
A diagnosis report will group patients by the data element "Final Clinical Diagnosis Related to Stroke".

The screenshot displays the AHA2023 Diagnostic tool interface. On the left, there is a sidebar with navigation options: 'Collapse Filter', 'Measure Detailed results' (selected), 'Find Top Measures', 'Find All Measures', and 'Open in New Window'. Below these are sections for 'Measure Group' (Diagnostic Measures), 'Measures' (AHA2023 Diagnostic), 'Benchmarks' (AHA Diagnostic GPTS Mode), 'Display Formats' (Bar Chart), and 'Comparison Variables' (None). The main area is titled 'Measure Summary' and contains a bar chart. The chart shows the percentage of patients for various stroke subtypes. The y-axis is labeled '% of Patients' and ranges from 0% to 100%. The x-axis lists the stroke subtypes. The data is as follows:

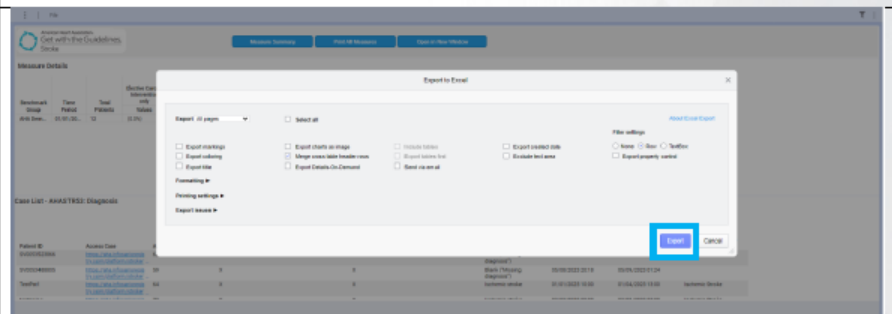
Stroke Subtype	% of Patients
Ischemic stroke	58.2%
No stroke related diag. - Stroke not otherwise sp. - Subarachnoid hemorrh. - Transient ischemic att. - Birth Defecting diag.	0.2%
Stroke	22.2%

At the bottom of the chart area, it says 'AHA2023 Diagnostic'. On the right side of the chart, there is a legend indicating 'AHA2023 Diagnostic' with a blue dot.

Once the report is generated, it can be exported, saved, and/or printed by clicking **File** in the upper left corner, then **Export**, then **Microsoft Excel Export**.



To export to Excel, select *Export*.



Open the Excel File. Select the *Case List* tab from the tab selection. (Be sure to enable editing on the worksheet.) Delete the first 3 rows. The patient list is now ready to be saved.

[illegible]

Appendix 13B: GWTG-Stroke Rural Stroke Recognition Report (Quality Metrics)



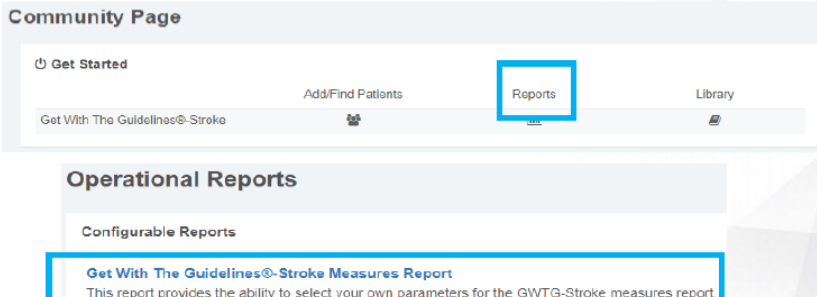
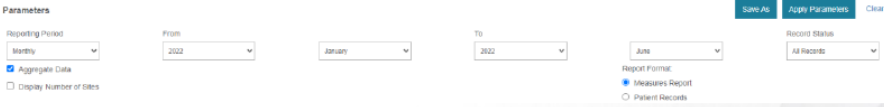
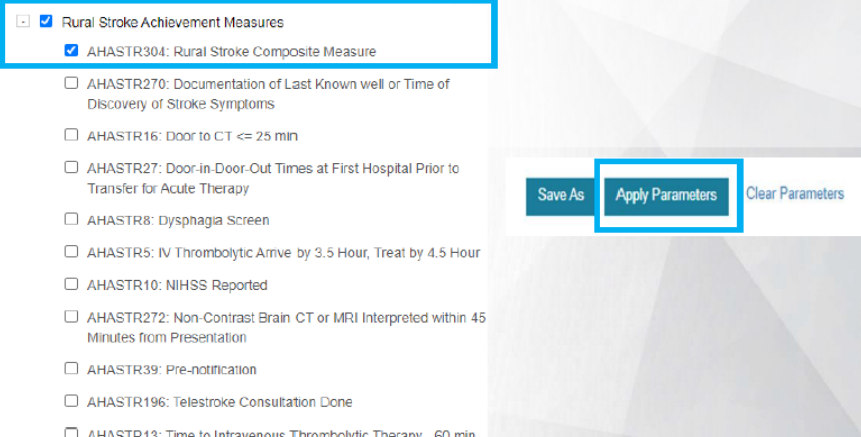
American
Heart
Association.

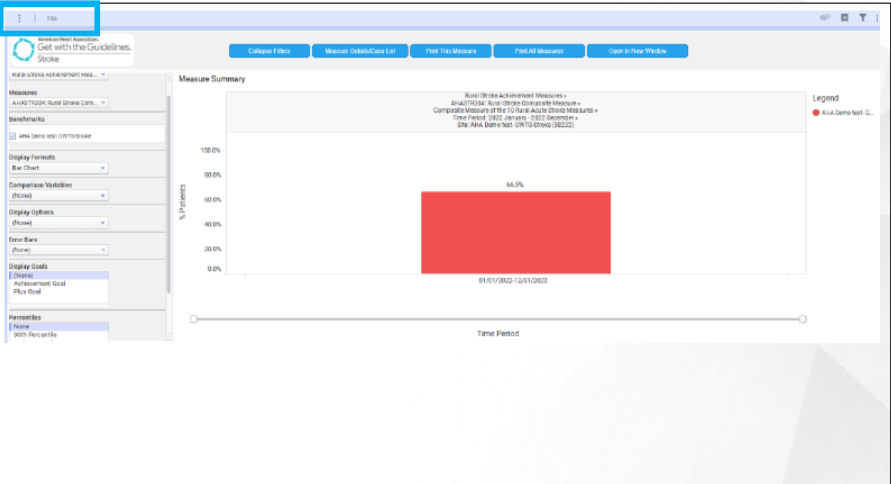


American Heart Association.
Get With The Guidelines.
Stroke

How to Run Get With The Guidelines®-Stroke Rural Stroke Recognition Report

The steps outlined in this document will provide instruction on how to pull a Rural Stroke Achievement report within the Get With The Guidelines® – Stroke IQVIA Registry Platform (IRP). The reports can provide insight on a participating facility's compliance and Rural Acute Stroke award recognition progress.

1 From the <i>Community Page</i> under <i>Get Started</i>, select <i>Reports</i>. Under <i>Configurable Reports</i> select <i>Get With The Guidelines®-Stroke Measures Report</i>	
2 Select the desired reporting period for the report. Interval options include annual, monthly, quarterly, or daily. Check the <i>Aggregate Data</i> box to have the selected time reflected as one interval.	
3 The <i>Rural Stroke Achievement Measures Bundle</i> includes the <i>Rural Stroke Composite Measure</i> and 10 individual Rural Acute Stroke component measures. Select the <i>Rural Acute Stroke Composite Measure</i> and <i>Apply Parameters</i>.	

4 An Overall Rural Stroke Composite Score of $\geq 75\%$ is required for the time of compliance to achieve Rural Stroke Recognition. Once the report is generated, it can be exported, saved, and/or printed by clicking <i>File</i> in the upper left corner.	 Measure Summary Rural Stroke Achievement Measures Time Period: 2020 January - 2022 Site: AHA Demo test - GWTO-Stroke (86232) Legend: AHA Demo test - G... % Patients 100.0% 80.0% 60.0% 40.0% 20.0% 0.0% 66.0% 01/01/2020 - 12/31/2022 Time Period
5 To view all 10 individual Rural Acute Stroke Measures, Select Rural Stroke Achievement Measures, Select the Measure Group: Rural Stroke Achievement Measures If you'd like the measures to display together Select: <i>Display Options Graph Similar Measures</i>	 Measure Group: Rural Stroke Achievement Measures Measures: AHA Demo test - GWTO-Stroke Benchmarks: AHA Demo test - GWTO-Stroke Display Formats: Bar Chart Comparison Variables: (None) Display Options: Graph Similar Measures Error Bars: (None) Display Goals: (None) Achievement Goal Measure Summary Rural Stroke Achievement Measures Time Period: 2020 January - 2022 Site: AHA Demo test - GWTO-Stroke (86232) Legend: AHA Demo test - G... % Patients 100.0% 90.0% 80.0% 70.0% 60.0% 50.0% 40.0% 30.0% 20.0% 10.0% 0.0% 93.2% 100.0% 70.5% 3.8% 73.3% 94.2% 95.9% 97.3% 76.5% AHASTR 10: NIHSS... to Intra... to CT <= 196: 27: Door 270: 272: 39: Pre- 5: IV 8: Throm... Dysph... 01/01/2020 - 12/31/2022

Appendix 14A: Stroke Case Review Form

Stroke Case Review Form for Performance Improvement			
Arrival Date:	Stroke Type:		IV Thrombolytic: Y/N
Question	Comment	Recommendation	Timing Indicators
Arrival mode (EMS/Walk-in)			
EMS pre-notification? (y/n)			
Blood glucose obtained? (y/n)			
EMS stroke assessment? (y/n)			
ED Arrival Time			Door:
Last Known Well (LKW) Time			LKW to Door:
Stroke Code Activation		≤ 15 minutes	Door to Code:
Acute Stroke Team Assembled		≤ 15 minutes	Door to AST:
Telestroke Activation			Door to Telestroke:
CT Initiated		≤ 25 minutes	Door to CT:
CT Read		≤ 45 minutes	Door to CT read:
Transfer out of ED		≤ 120 minutes	Door to Transfer:
IV Thrombolytic			
Question	Comment	Recommendation	Timing Indicators
Weight obtained (method)		Actual weight (bed scale)	
Dual Sign Off			
Risks/Benefits/Alternatives/Consent			
Inclusion/Exclusion Criteria			
BP Prior to IV Thrombolytic		BP and pulse documented within 5 minutes of IV thrombolytic bolus. BP <185/110	
Bolus Time		≤ 60 minutes	Door to Needle:
Infusion Time (if applicable)			
Post IV Thrombolytic Monitoring		BP maintained at <180/105 after IV thrombolytic administered.	VS q. 15 minutes
Post IV Thrombolytic Complication Monitoring		Assess for orolingual angioedema and bleeding.	q. 15 minutes with neuro checks
Hemorrhagic			
Question	Comment	Recommendation	
Blood Pressure Control		Utilize clinical practice guidelines blood pressure management medications to achieve BP <140/90.	
Reversal to Anticoagulation		Per facility reversal protocol. Consult Neurologist.	

Documentation			
Question	Comment	Recommendation	Timing Indicators
VS and Neuro Checks		q. 15 min.	
NPO Order and/or Dysphagia Screen Documented (y/n)		Prior to any PO intake, recommend evidence-based dysphagia screen	
NIHSS Documented (y/n)		On admit/before IV thrombolytic and after IV thrombolytic/before discharge	
Stroke Order Sets Used (y/n)			
Reason No IV Thrombolytic Given (y/n)		Must be documented if within treatment window	
Reason for Delay in Stroke Treatment or Transfer Documented (y/n)			
Consideration of Endovascular Treatment (y/n)			
Comments/Summary of Case Review			
Is workflow in record consistent with best practice and with facility protocol?			
Are there any opportunities for improvement noted?			
Are there any concerns for patient safety?			
EMS and clinical staff feedback provided (y/n)			

Appendix 14B: Performance Improvement Action Plan Templates

Problem Solving Plan-Do-Study-Act (PDSA)			
Name:		Date:	
	Problem Statement:	Do	Action Plan:
	Background/Current State:		
	Goal(s)/Target State:	Study	Results/Learnings:
	Analysis/Root Cause(s) Identified:	Act	Sustainment Plan:

Notes/Additional Details:

Performance Improvement Action Plan

Name:

Date:

Objective:

Metric (GWTG: Measure):

Analysis:

Action:

Barriers:

Next Step:

Timeline:

Appendix 15A: Example Stroke Transfer Protocol

Protocol: Stroke Specific Transfer Protocol	Developed: 4/2024
Department:	Revised:

Purpose: To facilitate rapid and appropriate treatment and transfer of patients experiencing stroke-like symptoms who will require a higher-level stroke center for further evaluation, intervention, and management.

Procedure:

1. The Acute Stroke Team (AST) Provider will consult with a neurologist at the receiving stroke center and discuss recommended treatment and patient disposition.
2. The AST Provider will order transfer and determine best transportation method.
 - a. Transfer to higher-level stroke center based on neurologist recommendation.
 - b. Consider direct transfer to Comprehensive Stroke Center for aneurysmal subarachnoid hemorrhage.
 - c. Consider transfer of large vessel occlusion (LVO) to higher-level stroke center with endovascular treatment availability.
 - d. Consider best transportation method based on neurologist recommendation, weather conditions, delays in transfer, transport times, and availability of emergency transport services.
3. AST nursing staff will activate Emergency Medical Services (EMS) with the appropriate method of transportation.
4. AST primary nurse will call report to receiving facility.
5. AST will send all patient records and imaging to the receiving facility.
6. Patient transported after stabilization and orders to be completed prior to transfer (*i.e.*, initiation of IV thrombolytic) are implemented.
7. Patient will be transported via ordered transportation method with qualified transport personnel to higher-level of stroke care facility within a goal of ≤ 120 minutes.

Higher-Level Stroke Center One Call Numbers:

Altru Health System - Grand Forks <u>Phone:</u> 701-780-5206 or 1-855-425-8781 <u>Fax:</u> 701-780-1097	CHI St. Alexius Health - Bismarck <u>Phone:</u> 701-530-7699 or 1-877-735-7699 <u>Fax:</u> 701-530-7005
Essentia Health System - Fargo <u>Phone:</u> 701-364-CALL (2255) or 844-865-CALL (2255) <u>Fax:</u> 701-364-8405	Sanford Health System - Bismarck <u>Phone:</u> 1-855-550-1225 <u>Fax:</u> 701-323-5751

Sanford Health System - Fargo

Phone: 701-234-6304 or 1-877-647-1225

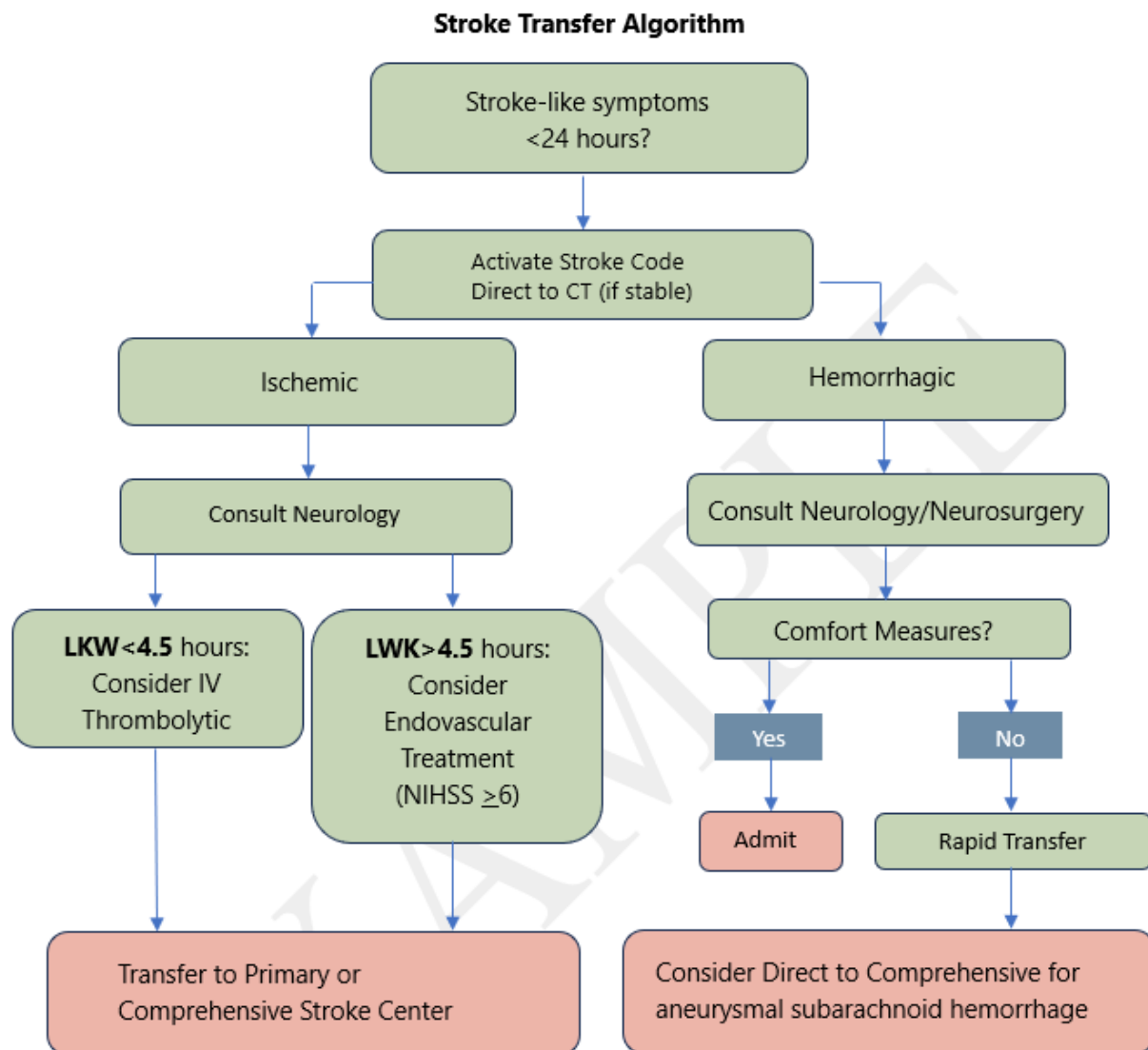
Fax: 701-234-7203

Trinity Health System - Minot

Phone: 701-857-3000 or 1-800-223-1596

Fax: 701-857-3260

Appendix 15B: Example Transfer Algorithm



Appendix 16A: Stroke Leadership Attestation Letter

[Your Hospital Letterhead]

-OR-

Hospital Name:
Hospital Address:
Phone Number:
Email Address:

[Date]

Christine Greff
Stroke System Coordinator
ND Department of Health & Human Services
Emergency Medical Systems
1720 Burlington Drive, Suite A
Bismarck, ND 58504

Letter of Attestation

To the State Stroke System of Care Coordinator,

We certify that **[HOSPITAL NAME]** has policies and procedures in place that comply with the Acute Stroke Ready Hospital designation criteria and clinical practice guidelines for stroke. We attest that our facility's application and attached documents are accurate and current and, to the best of our knowledge, are true representations of our processes, protocols, and capabilities.

Sincerely,

Signature

Chief Executive Officer
Title

Signature

Stroke Medical Director
Title