

Designation Reference Guide: Acute Stroke Ready Hospital (ASRH) Designation

MINNESOTA STROKE PROGRAM 4.0

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Welcome

We are pleased that your facility has decided to apply for initial designation or re-designation as an Acute Stroke Ready Hospital (ASRH)! This resource is your all-in-one guide to organizing everything you need for the designation application process. The designation application is comprised of two components: the electronic submission of documents for each criteria in the Minnesota Stroke Portal, and the one-day site visit facilitated by the Minnesota Department of Health (MDH) review team. Both components are combined to approve or deny designation.

This guide includes overview of the requirements, specifics about what to submit, an Appendix full of samples to reference, and what to expect at the site visit for validation of each criteria.

The Stroke System Designation Coordinator will be contacting you to schedule your hospital's site visit PRIOR to application deadline. The site visit will typically occur prior to the designation effective date (July 1 or January 1).

If you have questions or need clarification about any of the following criteria and supplemental documentation that you will be asked to submit as part of your ASRH designation application, please contact the Minnesota Stroke Program by email at health.stroke@state.mn.us.

Tips for Successful Submission

Please pay particular attention to the following documentation details asked of you for each submission requirement. This will benefit you and the Minnesota Department of Health (MDH) greatly by making the process much more efficient. Be mindful of the deadline for submission (April 1 or October 1).

Getting Started:

- Please use the checklist at the end of this document when organizing your documents for submission: Acute Stroke Ready Hospital Designation Checklist
- Review the Minnesota Stroke Portal Navigation Guide, Designation Section, available on the Minnesota Stroke Program (<http://health.mn.gov/diseases/cardiovascular/stroke/index.html>) for step by step instructions on how to successfully submit a designation application.
- After you sign into the Portal, the Designation section is located at the top menu banner from the homepage. Click on New Application. Select your facility and designation level (MDH Acute Stroke Ready Hospital).

At any point in time if you need any clinical or technical support, please contact the MDH Stroke Program at health.stroke@state.mn.us

Application Sections & Submission

Contacts

- Update Contacts section in your application. If primary or secondary contacts need to be updated, please contact the MDH Stroke Program at health.stroke@state.mn.us. Required components for primary/secondary contacts include Title/position, First name, Last name, Phone, Email.
- All fields marked with an asterisk* must be completed. To save click **Update**.
 - CEO- The administrative leader at your facility. Titles may vary.
 - Primary Contact- The on-site designated stroke coordinator. This person manages the workload of the stroke program. This role, in collaboration with the stroke medical director, comprises the Stroke Program Leadership Team.
 - Secondary Contact- The designated program staff member that supports the stroke program and would be point of contact in the absence of the primary contact. (i.e., DON, quality department, ED nursing director)
 - Stroke Medical Director- The on-site physician (or mid-level professional) that has experience in acute stroke care and is provides medical leadership for the stroke program.
 - Registry/Data Entry- The staff member who submits data into the Minnesota Stroke Registry for your hospital.

Facility

- Update Facility section by entering the name of the facility you are applying for. Important to note- This is the name that will appear on the certificate we will send you once your application has been approved. To save click **Update**.

Documents:

- All attachments must be in PDF format.
- Once an attachment is successfully uploaded, it is saved into your application.
- Name files with short titles that are pertinent to the document you are submitting.
- Eliminate pages of unnecessary documentation by uploading only the documents, or sections of documents, that are necessary to illustrate the required criteria.
- Ensure uploads are easy to read (i.e., not upside down, not vertical layout when should be horizontal, are legible, etc.)
- Ensure all documentation (protocols, policies, order sets, agreements, letters, etc.) are up-to-date and are signed.
- Follow the instructions on each page of the required section. Respond to the questions in the narrative box (if applicable to your level of designation) and click **Update** when finished to save narrative. A message in green will appear at the top of your screen

once the file has been uploaded successfully. Select **Choose File** to browse for the appropriate PDF and double click on the file you would like to upload. Click **Attach** after each document. A message will appear at the top of your screen once the file has been uploaded successfully.

Official Documents:

This section will be used for MDH staff to upload your facilities official ASRH documentation.

- ASRH site visit report
- ASRH immediate action plan
- ASRH certificate/letter
- ASRH Midcycle report

Submitting the Application:

- Once all required documentation has been updated and uploaded, the number next to the title of each section will be zero and the circles will have changed from red to green.



- To submit your completed application, click on Submit Application.
- A message will appear at the top of the screen stating the application was submitted successfully. The status of your application will change from In progress to Submitted.
- An automated email from health.stroke@state.mn.us will be sent to you verifying application submission.

What to Expect after Submission:

DESIGNATION REFERENCE GUIDE FOR ASRH DESIGNATION

- Step 1: SUBMITTED - Internal MDH review of your electronic application. We will follow up with you as needed.
- Step 2: IN REVIEW - ASRH Application Review Committee completes clinical review of your application. Site visit conducted by clinical stroke expert and MDH staff (MDH review team) to verify that submitted documents coincide with clinical practice.
- Step 3: PENDING APPROVAL – Feedback/recommendations are compiled by MDH staff and shared with site reviewer. Feedback provided during site visit and/or within official site visit report. Site does not receive any formal recommendations prior to visit.
- Step 4: APPROVED - Notification of designation status, including emailed copy of the ASRH Site Visit Report and copy of the signed ASRH designation letter and certificate. Copies will be uploaded to the Official Documents tab.
- Mid-cycle survey: Approximately one year post submission you will receive an email to complete the mid-cycle survey via the assigned link. This process is to ensure the monitoring of immediate action plans as submitted and recommendations as outlined in the ASRH Site Visit Report.

Designation Criteria and Required Documentation

Criteria 1- STROKE CODE ACTIVATION LOG

Activation log is evidence of an Acute Stroke Team (AST) available 24 hours a day, 7 days a week.

Rationale: An acute stroke team (AST) is a key component of an Acute Stroke Ready Hospital. Studies have shown the importance of such a response team to provide organized care in a safe and efficient manner. The presence of an AST is an independent predictor of the ability to administer intravenous thrombolytic therapy and improve the outcomes of stroke patients.

The AST may be staffed by a variety of healthcare personnel depending on the resources available at a particular facility. The AST includes all nurses and providers that respond to stroke, at a minimum, one nurse and one physician. Hospitals not staffed with an emergency department physician may assign a licensed independent practitioner (LIP) instead of a physician. Members of the AST should be available and/or on-call 24 hours a day, 7 days a week. *Your stroke protocol (to be submitted in #2) must detail the roles of this Acute Stroke Team.*

- Implementing a stroke code activation log is required. At a minimum the log should include the following: date and time of activation, response time to bedside, final admitting diagnosis in the ED, treatments, and discharge disposition (admit, discharge, transfer). The stroke coordinator should reference the log regularly in order evaluate the stroke team activation process. We encourage recording all stroke team activations regardless of final clinical diagnosis. This will enable your program to thoroughly evaluate the entire code process and identify any areas for improvement.
- Keeping this at a consistent, accessible location is imperative.

What do I need to submit?

- **Complete Narrative Section:** Describe how the stroke code activation log and the stroke code activation process works at your facility. How do you track stroke code activations in real time? How does this document support your performance improvement process?
- Please submit a **TEMPLATE of your log**. We require tracking of all stroke code activations and will validate tracking process at the time of your site visit.

What do I need for the site visit?

- The site review team will ask to see your log and want to have an active discussion as to how it is utilized.

Example: Appendix A: Sample Stroke Code Activation Log (Sanford Bemidji)

Example: Appendix A1: Sample PI Log from Portal

Criteria 2- WRITTEN STROKE PROTOCOLS, ALGORITHM, & SUPPORTING DOCUMENTS

Written stroke protocols, order sets and supporting documents for acute treatment in the Emergency Department.

Rationale: An ASRH should be able to deliver initial acute therapies that can improve outcomes for patients with a variety of strokes. In addition, the stroke-ready hospital should have an organized set of protocols to address various clinical presentations and complications which may arise in acute stroke patients.

- These documents should encompass care in the ED. If you have a protocol that addresses acute neurological changes or inpatient stroke code activation, please submit that as well. Documents should be developed by a multidisciplinary team, reviewed, and revised to reflect changes in medical knowledge, care standards, and guidelines. Most hospitals review their policies on an annual basis. We recommend that policies are reviewed and updated prior to submission.
- Include protocols for the diagnostic work-up, intervention (including IV thrombolytic dosing and administration guidelines), and patient monitoring. Include guidelines for identification of contraindications to IV thrombolytics (often referred to as inclusion/exclusion criteria) and blood pressure management prior to and during IV alteplase.

What do I need to submit?

- **Complete Narrative Section:** Who are the key staff involved in the stroke code process? Describe what happens when you active your code process. Describe what order sets are used and when.
- A **written stroke protocol** for the Emergency Department, which should demonstrate diagnosis and acute treatment of ischemic stroke, transient ischemic attack (TIA), and hemorrhagic stroke patients. Your protocol should coincide with the most recent stroke guidelines and highlight a process that allows for stroke code activation for patients presenting within *24 hours of last known well*. This document should include, at a minimum, the following components: activation criteria, roles and responsibilities of the Acute Stroke Team members, time goals, and patient monitoring.
- A one-to-two-page **algorithm** that supports your written protocol and serves as a guide for stroke care in the code process.
- **Order sets that reflect the protocol.** Include specific Emergency Department order sets that address: initial work up of an ischemic or hemorrhagic stroke, acute treatment after CT is read, and thrombolytic dosing, administration, and monitoring.
- Document that supports **inclusion/exclusion** criteria used for thrombolytic treatment decision-making.
- If you regularly admit patients treated with thrombolytics:

- Please attach a **supporting letter signed by the coordinator**, explaining circumstances in which you admit alteplase patients.
- Please attach **admitting order sets** that are used for the care of these patients
- Please attach your facility-based **dysphagia screening protocol**

What do I need for the site visit?

- MDH review team will ask to see where the protocols, algorithm, inclusion exclusion criteria and other helpful resources are located for staff to reference in the Emergency Department.
- MDH review team will conduct case tracer activity that will include review of order sets utilized in the care of stroke patients.
- MDH review team will discuss thrombolytic administration with program staff. We recommend the best practice approach of a dual sign-off for this high alert medication with low frequency administration. Reference the ISMP List of High-Alert Medication in Acute Care Settings- <https://www.ismp.org/sites/default/files/attachments/2018-08/highAlert2018-Acute-Final.pdf>

Example:

Appendix B: Sample Written Protocol and Algorithm (Allina Health)

Appendix B1: Inclusion Exclusion Criteria

Criteria 3- EMS COLLABORATION

The EMS stroke protocols should detail how patients with suspected stroke will be triaged and routed to the most appropriate designated hospital.

Rationale: The ability of EMS personnel to recognize patients with a possible stroke, provide pre-notification to the receiving hospital, and stabilize and transport such patients is a key element of an Acute Stroke Ready Hospital. Data from recent studies have shown that EMS communication and notification to the ED that a potential stroke patient is en route can shorten door to imaging and door to needle times, both of which are key parameters in receiving IV thrombolytic therapy.

What do I need to submit?

- **Complete Narrative Section:** Which EMS agencies deliver stroke patients to you? How do you collaborate? Does EMS participate in your stroke committee? Do you provide education to EMS? Do you provide feedback to EMS on stroke cases?
- **EMS Stroke Protocol** for each service that represents more than 30% of your stroke volume. (Optional documents to showcase relationship and collaboration: Drip and Ship/ Neuro-assessment protocol from EMS, or a letter detailing process; feedback form to EMS).
- (Optional) **EMS Transfer Protocol** that addresses transporting post alteplase patients. For example, Drip and Ship/neuro-assessment protocols, or letter detailing process.

What do I need for the site visit?

- EMS program involvement to be validated at time of site visit (e.g., included in stroke committee meetings, feedback process, education, PI). EMS staff members should be invited to attend the opening and closing session. During the facility tour the MDH review team will interview staff and would appreciate the opportunity to discuss EMS arrivals with an EMS representative. An interactive discussion regarding prehospital stroke protocols and EMS agency protocols that address transporting post-thrombolytic treatment.

Example: Appendix C: EMS Stroke Protocol- Essentia Health

Example: Appendix C1: EMS Feedback Form (Maple Grove Hospital)

Example: Appendix C2: EMS Post Tenecteplase Transfer Procedure (Welia Health)

Criteria 4- EDUCATION

Education on identification and treatment of acute stroke. To provide timely treatment to stroke patients a dedicated team of health care professionals needs to be organized and should have defined roles and responsibilities. The Acute Stroke Team (AST) is available 24/7 and should be comprised of at a minimum a nurse and a provider that respond to stroke in the Emergency Department. The Acute Stroke Ready Hospital should identify members of the Acute Stroke Team. Each member of the AST (all nurses and providers that respond to stroke code in the ED) are required to receive stroke education at least two hours or two times per year. Note, the AST may also include laboratory, radiology, pharmacy, and other departments and may be incorporated into the educational plan.

Rationale: Most patients with acute stroke will enter the ASRH through the Emergency Department (ED). It is essential for ED providers to have protocols for the acute diagnosis, treatment, and monitoring of stroke patients. Staying up to date on current guidelines of care is vitally important to ensure safe care.

What do I need to submit?

- **Complete Narrative Section:** How do you address staff education? Who is responsible for assigning and/or providing stroke education to staff? Who is responsible for tracking stroke education of staff?
- **A detailed table of the stroke education plan for the next three years** with estimated date, staff targeted (AST) and expected educational hours. (Be sure to include providers.) Locums and casual providers should also be included if used at your facility.
- **Onboarding education for new hires** is required to be included in the education plan.
 - Please do NOT include your educational materials, PowerPoints, agendas, or attendance lists. (Keep these education details in your files for validation at the site visit.)
 - Stroke education does not need to be formal CEU/CME. It is recommended that education is clinically based and supports bedside care of stroke patients. Examples of stroke education for your AST members and other staff involved in the care of stroke patients may include but is not limited to:
 - Mock Stroke Codes
 - IV alteplase mixing and administration competencies
 - IV alteplase post monitoring including BP, neuro checks, and complications
 - NIHSS certification or training
 - Case reviews
 - BP management
 - MDH learnings
 - Policy review
 - AHA/ASA Guidelines

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****For ASRHs that admit IV alteplase patients, it is strongly encouraged to include ICU nursing staff and admitting providers in the required stroke education.**

What do I need for the site visit?

The MDH review team will request to view your educational tracking system/records. Be prepared to illustrate the educational offerings that have been provided over the last twelve months and be prepared to validate nurse and provider participation in education. Acceptable options to track may include educational records maintained in each individual employee personnel file or keeping a master list of participants for each educational offering, attestation forms, sign-in sheets, etc.

- **For locum providers or casual providers,** it is acceptable to use an attestation letter completed by the provider detailing the date and stroke education completed externally.

Example: Appendix D: Sample Stroke Education Plan

Example: Appendix D1: Sample Locum/Casual provider attestation letter

Criteria 5- LAB TESTING CAPABILITY

The capacity to complete basic laboratory tests 24 hours a day, 7 days a week.

Rationale: The ability to perform and complete basic laboratory testing on patients with a stroke is essential for diagnosing metabolic and infectious disorders that can masquerade as a stroke syndrome, to ensure stroke patients can be treated with the proper medications, and to determine the possible etiology of some types of stroke.

What do I need to submit?

- **Complete Narrative Section:** Is laboratory staff in-house 24/7 or do they have on-call hours? What is their response time when on call? What is the typical turn-around time for stat labs?
- Scope of Service (SOS) or policy document- delineating:
 - Lab hours of operation
 - On-site
 - On-call including response times
 - Process for STAT labs

What do I need for the site visit?

- The MDH review team will ask to speak to lab staff to validate submitted documents.

Criteria 6- BRAIN IMAGING CAPABILITY

The capacity to perform and interpret brain imaging studies 24/7.

Rationale: Brain imaging confirms the absence of contraindications to thrombolytic therapy and help diagnose hemorrhagic strokes. This is an essential function of an ASRH. In most cases, the first (and perhaps only) imaging study readily available will be a non-contrast head CT scan.

- Acute brain imaging capabilities and interpretation services must be available on a 24/7 basis. It is acceptable to have stroke providers that have experience in reading scans to provide the initial interpretation. Personnel providing the final read should be board-certified radiologists.
- If your facility has CT-angiogram capabilities, work closely with your Primary or Comprehensive Stroke Center partner to implement a process to evaluate patients for endovascular therapy (e.g., mechanical thrombectomy).

What do I need to submit?

- **Complete Narrative Section:** Are radiology technicians in-house 24/7 or do they have on-call hours? What is their response time when on call? Who completes radiology CT reads? What is the expected turnaround time for stat CT reads?
- Scope of Service (SOS) or policy document delineating
 - Radiology hours of operation
 - On-site
 - On-call including response times
 - Radiology services
 - Coverage times
 - Read back times
 - STAT status for stroke

What do I need for the site visit?

- The MDH review team will ask to speak to Radiology staff to validate submitted documents.

Criteria 7- DATA COLLECTION AND UTILIZATION

Demonstrate collection of data and utilization of data for performance improvement.

Rationale: A successful, effective, and sustainable stroke program at an Acute Stroke Ready Hospital requires dedicated staff, establishment of key structural processes, and a commitment to continuous quality improvement.

- Demonstrate that there is a process in place to utilize the data you capture. What do you do with the data that you collect?
- Review your data in a regularly convened meeting. This can be in an existing structure, such as an ED or trauma meeting, or in a separate Stroke Committee meeting, and should involve the Acute Stroke Team and other providers who touch stroke patients (e.g., ED physicians, nurses, radiology, lab, and registration). This provides an opportunity for all to review care and identify areas to improve.

What do I need to submit?

- **Ensure you are up to date on data submission in the Minnesota Stroke Registry**
- **Complete Narrative Section:** Explain how your program conducts performance improvement and quality improvement work. What is the process of case identification, case review and abstraction at your facility? What is the process of aggregating cases to help identify meaningful PI projects?
- **Evidence of data collection:** Upload reports on key stroke metrics that you track (i.e., door to CT, door to CT read, door to needle, door to door) that support your data collection and performance improvement efforts.
- **Evidence of utilization of data for performance improvement.** Upload an example that demonstrates your performance improvement efforts. This may include action plans, data tracking sheets, meeting minutes and results. **Limit to 5 documents.**
- **Stroke Meeting agendas and meeting minutes** from last year.
- **Template or example of case review or feedback forms.**

What do I need for the site visit?

- The afternoon includes the data and performance improvement session. Utilize the PowerPoint template that is available for showcasing your data and program PI efforts.
- Please include trends over time.
- Include information about other PI efforts that may not coincide with door-to metric tracking (i.e., neuro check/bp monitoring/documentation). Make sure to include program specifics regarding how you do case review and follow-up.

Example: Appendix E: Stroke Code Evaluation Form (Alomere Health)

Example Appendix E1: Stroke Code Timeline (Alomere Health)

Example Appendix E2: Staff Feedback Form (Maple Grove Hospital)

Example Appendix E3: Sample PDSA Dysphagia Screening (St. Francis)

Example: Appendix E4: Sample Portal Reports

Example: Appendix E5: ASRH Designation Site Visit Case Tracer Form

Criteria 8- TRANSFER PROTOCOLS

Transfer protocols and agreements for stroke patients.

Rationale: Many stroke patients at an ASRH will require emergent transportation to a Primary and/or Comprehensive Stroke Center. In some cases, the transfer will occur as soon as possible after acute therapy is initiated; in other cases, the patient might require a longer stay at the ASRH if medically unstable. Even in such cases, transfer to a Primary and or Comprehensive Stroke Center with more resources should occur as soon as possible. Written transfer protocols and agreements ensure that ground or air transportation arrangements are unambiguous, expectations for en-route care are clear, and appropriate documentation on the patient is provided to the receiving hospital.

What do I need to submit?

- **Complete Narrative Section:** How do you initiate a transfer? Are patients typically transferred by ground or air service? Who is the primary transfer service utilized? Who is your primary receiving facility? Do you receive feedback on transferred patients?
- A **stroke specific transfer protocol** from your own facility. This document should outline what you do to initiate and complete a transfer of a stroke patient. Include specifics such as phone numbers for receiving facility and for EMS options, considerations for mode of transport, medical management, and information transfer.
- A **stroke-specific transfer agreement or memorandum of agreement (MOA)** with at least one Primary or Comprehensive Stroke Center. This document must include the 24/7 availability of neurosurgery and endovascular therapy (mechanical thrombectomy) capabilities. This may require a second agreement with a hospital that has endovascular therapy (mechanical thrombectomy) capabilities.

What do I need for the site visit?

- MDH review team will facilitate an active discussion with acute stroke team response members regarding the process of transferring an acute stroke patient to higher level of care.

Example: Appendix F: Sample Stroke Specific Transfer Protocol and Memorandum of Agreement (CentraCare)

Criteria 9- STROKE LEADERSHIP TEAM

A designated stroke program leadership team, including a stroke coordinator and medical director.

Rationale: Medical leadership for the stroke program at an ASRH is essential. In some settings, advanced practice nurses have been very successful in leading a stroke center. Whoever the leader is, they should demonstrate experience and expertise in the care of patients with cerebrovascular disease.

The manager/coordinator's position description must define their roles and responsibilities for the management and leadership of the stroke program and the stroke performance improvement process.

What do I need to submit?

- **Letter on hospital letterhead *co-signed*** by the designated stroke medical director, designated stroke coordinator and CEO attesting that each will serve in this capacity for the hospital.

What do I need for the site visit?

- Data and performance improvement session should include active discussion on roles and responsibilities of the stroke coordinator and how responsibilities for program components are divided among staff. Including but not limited to: FTE allotment, position description and roles such as: telestroke, EMS feedback, collaboration; protocols and maintenance; education; data abstraction; PI

Example: Appendix G: Stroke Leadership Letter

CEO ATTESTATION LETTER

Rationale: The CEO must attest that the application is accurate and current. The signed letter should declare that the documentation provided is a true representation of the hospital's processes, protocols, and capabilities.

What do I need to submit?

- **Letter on hospital letterhead** signed by the CEO, attesting to the accuracy of the application. A template can be generated from the CEO Attestation Letter section by clicking on the blue hyperlinked CEO Attestation Letter Download.

Example: Appendix H: CEO Attestation Letter

Appendices

Appendix A: Sample Stroke Code Activation Log (Sanford Bemidji)

We require tracking of all stroke code activations. We encourage you to review all activations regardless of final clinical diagnosis.

The following example provided by Sanford Bemidji is a robust resource and includes more than the minimum tracking requirements.

MONTH	Date	MRN	HAR	Age	RACE	GENDE R	Nurse	Provider	Scribe	Arrival Mode	TDA/Event	STROK E CODE Activated?	Time Code called	Provid er Order Set Used	CT orde r as part of order set	Last known Well Time	Time since LMV	Time Protocol Utilized	Initial VS	Time from door to VS	Time of First Medical Contact	Time of PDC/BS	Time of NIHSS	NIHSS Score	Radiologist	Report Time document ed in CT note	Time CT Initiated	Time CT Reported	Time Labs Drawn	Time Rx	
												Y or N		Y or N	Y or N		0.00								V-D Banejee	Y or N					
radiologist	Report Time document ed in CT note	Time CT Initiated	Time CT Reported	Time Labs Drawn	Time of INR Result	Time of PTT	Time of Platelets	Time of Creatini ne	Time of EKG	Time of Swallow Assessm ent	Modified Rankin at disch arge (Final)	Time of Telestro ke Consult (initial attemp)	Telestroke type	Telestr oke connec t min	Time (if document ed) to Stroke provider from initial attemp	Neurologis t (if document ed) disconnec ted from	Consultin g Provider	Throm bolytic ordere d	Thrombol ytic Risk & Benefit/ Rational for no use	Time of Thromboly tic Order Placed	Thromboly tic order verified by Pharmacy	Thromboly tic prepped by tech	Thromboly tic Dispensed checked by pharmacy	Time Thrombol tic bolus initiate							
V-D Banejee	Y or N													0.00				Y or N	Y or N												

Appendix A1: Sample PI log from the Portal

You may choose to enter all stroke code activations into the Registry for performance tracking. When using the Portal to track all stroke code activations you can visualize all your cases together via the PI log report function. The following minimum elements, and more, are included in the PI Log report.

Last known well date and time:

- Last known well date
- Last known well time

Date and time of activation:

- Stroke Team Activation
- Stroke Team Activation date
- Stroke Team Activation time

APPENDICES

Response time to bedside:

- ED Provider Assessment date
- ED Provider Assessment time

Final admitting diagnosis in the ED:

- Final clinical diagnosis related to stroke

Treatments

- Imaging date
- Imaging time
- IV thrombolytic date
- IV thrombolytic time

Discharge disposition:

- Discharge disposition
- ED discharge date
- ED discharge time
- Admitted
- Hospital discharge date, if admitted

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	
1	HOSPITAL	PATIENT I	AGE	GENDER	RACE	INSURANC	STROKE DI	ARRIVAL N	EMS AGEN	PRE-NOTH	STROKE TE	STROKE TE	STROKE TE	DOOR TO	ED PROVID	ED PROVIE	DOOR TO	TELESTRO	TELESTRO	TELESTRO	DOOR TO	TELESTRO	TELESTRO
2	Minnesota	NK																					
3	Minnesota	Ally	68	Female	Unknown/	Insurance	Ischemic s	Private transportation/taxi/othe	Yes		1/1/2021	8:00	0	1/1/2021	8:05	5	Video	1/1/2021	8:15	15	1/1/2021	8:20	
4	Minnesota	MSG93	78	Female	White;	Medicare/	Ischemic stroke																
5	Minnesota	PT12345	78	Male	White;Blac	Medicare/	Ischemic s	Private transportation/taxi/other															
6	Minnesota	1.23E+08																					
7	Minnesota	1.23E+08	75	Male	White;	Medicare/	Ischemic s	EMS from Allina Heal	Yes	Yes	1/1/2021	1:02	2	1/1/2021	1:10	10	Video	1/1/2021	1:11	11	1/1/2021	1:20	
8	Minnesota	TNKpatien	44	Female	White;	Private/VA	Ischemic s	Private transportation/taxi/othe	No														
9	Minnesota	newfuncti	88	Male	White;	Medicaid;	Ischemic s	Private transportation/taxi/othe	No														
10	Minnesota	test patien	85	Male	White;	Hispanic or Latino;																	

Appendix B: Sample Written Protocol and Algorithm (Allina Health)

Burnett Medical Center

Telestroke Code Process

Purpose: To establish a standard protocol for the care of patients presenting with stroke or stroke-like symptoms within 24 hours of last known well. The stroke team is a group of providers and staff who will be called to assist in the immediate care of a patient who presents with stroke symptoms. The team may be activated by EMS personnel via radio or phone prior to arrival in the ED, by staff members in the ED upon the arrival of a patient, or by any healthcare team member in the hospital who assesses a patient in any location who may be exhibiting signs and symptoms of a stroke in an appropriate time frame for code stroke activation.

Indications:

Code Stroke Activation Criteria – any patient presenting with signs and symptoms of acute stroke within 24 hours of last known well.

Sudden onset of any one of the following:

1. Numbness or weakness in the face, arms, or legs, particularly on one side of the body
2. Confusion or aphasia (difficulty speaking or understanding what others are saying)
3. Difficulty walking, loss of balance or coordination
4. Nonspecific visual complaints **with** partial, complete, or bilateral visual field loss or double vision
5. Severe thunderclap headache that does not have obvious or known cause
6. Sudden onset of continuous vertigo with focal symptoms or sudden onset of continuous vertigo without other focal symptoms and **ANY of the following***
 - a. 65 years of age or older
 - b. Younger than 65 with risk factors (i.e., Smoking, diabetes, HTN, etc.)
 - c. Neck pain in setting of recent manipulation or injury (suggesting dissection)

Definitions:

Code Stroke: Consistent phrase used to identify all patients meeting inclusion criteria, regardless of the transportation destination.

Team Members:

ED Provider, Allina Telestroke Neurologist (ATN), Inpatient Provider or Tele Hospitalist (Avel Ecare), Registration Staff, ED Nurse or Inpatient Nurse, Inpatient Charge Nurse, EMS Personnel, Radiology Technologist, Radiologist, Laboratory Tech, Pharmacist

Protocol: Ports of patient entry

1. **Emergency department – Ambulatory arrival**
 - a. Ambulatory patients with stroke like symptoms will be taken to a room and triaged
 - b. ED nurse will activate a code stroke by overhead page– state ED room number
 - c. ED nurse will call Allina Patient Access Center (ACC) at **612-863-1301** to have the on-call neurologist paged with the following information

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- i. Request to have the neurologist paged for a **STROKE CODE**
 - ii. Site Name – Grantsburg
 - iii. Location of patient – ED
 - iv. Patient first and last name (if known)
 - v. Patient DOB (if known)
 - vi. Provider caring for the patient
 - vii. Direct call back number 1-715-463-7250
- a. ED nurse will contact radiology tech to provide them with neurologist on call

2. Emergency department – EMS arrival

- a. Pre-alert provided
- i. EMS calls with a pre-alert and provides the following items to ED staff
 1. Name, DOB/age
 2. Time last know well (clock time)
 3. Description of focal deficit
 4. Vital signs (BP, HR, and oxygen saturation)
 5. Blood glucose
 6. Pertinent medications (anticoagulants, pain medication, sedatives, insulin, etc.)
 7. Pertinent medical history (recent surgery, diabetic, etc.)
 8. ETA
 - ii. ED nurse will immediately activate a code stroke by overhead page– state ED room number, ETA
 - iii. ED nurse will immediately call Allina Patient Access Center (ACC) at **612-863-1301** to have the on-call neurologist paged with the following information
 1. Request to have the neurologist paged for a **STROKE CODE**
 2. Site Name – Grantsburg
 3. Location of patient – ED
 4. Patient first and last name (if known)
 5. Patient DOB (if known)
 6. Provider caring for the patient
 7. Direct call back number 1-715-463-7250
 - iv. ED nurse will contact radiology tech to provide them with neurologist on call
 - v. Patient will remain on the EMS stretcher, quickly assessed and taken to CT
 - vi. Radiology Tech or nurse will bring ED cart to CT
- b. Pre-alert not provided
- i. If symptoms of a stroke are noted prior to transfer to the ED bed, patient will remain on the EMS stretcher
 - ii. ED nurse will activate a code stroke by overhead page– state ED room number
 - iii. ED nurse will call Allina Patient Access Center (ACC) at **612-863-1301** to have the on-call neurologist paged with the following information
 1. Request to have the neurologist paged for a **STROKE CODE**
 2. Site Name – Grantsburg
 3. Location of patient –ED

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4. Patient first and last name (if known)
 5. Patient DOB (if known)
 6. Provider caring for the patient
 7. Direct call back number 1-715-463-7250
- iv. ED nurse will contact radiology tech to provide them with neurologist on call
 - v. Radiology Tech or nurse will bring ED cart to CT

3. Inpatient

- a. Inpatient nurse identifies a patient with stroke symptoms
- b. Inpatient nurse will notify on call provider
- c. Activate code stroke by overhead page
- d. Inpatient charge nurse will call Allina Patient Access Center (ACC) at 612-863-1301 to have the on-call neurologist paged with the following information
 - i. Request to have the neurologist paged for a **STROKE CODE**
 - ii. Site Name – Grantsburg
 - iii. Location of patient – Inpt
 - iv. Patient first and last name (if known)
 - v. Patient DOB (if known)
 - vi. Provider caring for the patient
 - vii. Direct call back number to provider or nurse
- e. Inpatient Charge Nurse will contact radiology tech to provide them with neurologist on call

Protocol: Members of the Stroke Team

1. ED Provider

- a. Initial patient contact will occur at the door for primary survey when EMS has been directed to CT
- b. Initiate stroke code order set
- c. Obtain history and review criteria for treatment
- d. Review initial case with telestroke neurologist
- e. Order antihypertensive treatment if SBP > 185 or DBP > 110 prior to tenecteplase
- f. Oversee that at least one 18-20 gauge right sided IV (antecubital preferred) with power injectable tubing is started and blood drawn after CT
- g. Upon patient's return from CT, perform the National Institute of Health Stroke Scale (NIHSS) with the telestroke neurologist
- h. Treatment decision discussion with telestroke neurologist
- i. Final review of inclusion/exclusion criteria with telestroke neurologist
- j. Place order for tenecteplase as directed by the telestroke neurologist using order set
- k. Enter order for CTA as directed by the telestroke neurologist
- l. Transfer disposition planning with telestroke neurologist if intervention or higher level of care is indicated
- m. Respond to inpatient codes as requested and as able

2. Allina Telestroke Neurologist (ATN)

- a. Calls to triage the case with the provider or nurse caring for the patient
- b. Connects via video if indicated

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- c. Review medical record
- d. Take history from family, EMS, provider and/or other staff – may do this while patient is in CT
- e. Review CT images remotely via PACS
- f. Receives call from reading radiologist regarding imaging results
- g. Completion of exam, including NIHSS with local staff following CT
- h. Discuss imaging results with local provider
- i. Confirmation of treatment decision with local provider
- j. Final review of inclusion/exclusion criteria with local provider
- k. Consent discussion with patient and/or family and document consent in EMR
- l. Decide whether patient should return to radiology for CTA after IV tenecteplase is given
- m. Complete transfer disposition plan with local provider
- n. If code stroke is cancelled, instruct staff to cancel the code stroke and update all departments

3. EMS Personnel

- a. Obtain blood glucose prior to arrival
- b. Establish 2 functional peripheral IVs (at least one 18-20 gauge right sided IV antecubital preferred)
- c. Perform Stroke Scale
- d. Call hospital prior to arrival to notify them of patient with stroke symptoms
- e. Provide the following to ED staff
 - i. Name, DOB/age
 - ii. Time last know well (clock time)
 - iii. Description of focal deficit
 - iv. Vital signs (BP, HR, and oxygen saturation)
 - v. Blood glucose
 - vi. Pertinent medications (anticoagulants, pain medication, sedatives, insulin, etc.)
 - vii. Pertinent medical history (recent surgery, diabetic, etc.)
 - viii. ETA
- f. Take patient directly to CT upon arrival and assist in the transfer to the CT table

4. Registration Staff (7a-930p – nursing after hours)

- a. Enter patient into Centriq ASAP
- b. Arrive patient in Centriq, apply name band
- c. As per visitor guidelines, assist family or visitors to patients' room for collateral information about last known well time
- d. Assist with obtaining transport as necessary

5. Emergency Department Nurse

- a. Assess stability with ED provider
- b. Call Allina Patient Access Center (ACC) at **612-863-1301** to have the on-call neurologist paged with the following information
 - i. Request to have the neurologist paged for a **STROKE CODE**
 - ii. Site Name – Grantsburg
 - iii. Location of patient –ED

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- iv. Patient first and last name (if known)
- v. Patient DOB (if known)
- vi. Provider caring for the patient
- vii. Direct call back number 1-715-463-7250
- c. Contact radiology tech to provide them with neurologist on call
- d. Bring telehealth cart to ED room and position at foot of the bed
- e. Accompany patient to and from CT scan (on EMS cart for EMS arrivals).
- f. Notify radiology technologist of which telestroke neurologist is on call
- g. Cardiac monitor, oxygen saturations, check vital signs, abbreviated NIHSS
- h. Perform EKG
- i. Finger stick glucose
- j. Remain in room with patient to assist Telehealth neurologist during exam
- k. Obtain or determine patient weight in kg for tenecteplase dosing
- l. Notify ED provider if SBP > 185 or DBP > 110 prior to tenecteplase
- m. Administer antihypertensive treatment if needed
- n. Obtain medication list and allergies
- o. Start IVs
 - i. Do not delay patient getting to CT for IV
 - 1. For stable patients, IVs can be placed after CT
 - ii. Establish 2 functional peripheral IVs (at least one 18-20 gauge right sided IV (antecubital preferred) with power injectable tubing) prior to tenecteplase administration
 - iii. Obtain lab specimen during IV start and send for stroke code labs
- p. Remain available to provide status updates and lab results to incoming staff
- q. Ensure tenecteplase is administered in a timely manner when instructed to do so
 - i. Verify order to administer
 - ii. Verify drug dosage is weight appropriate (0.25 mg/kg) and total dose is no more than 25 mg
 - iii. Reconstitute with 10 mL sterile water
 - iv. Withdraw the appropriate volume of tenecteplase
 - v. Perform dual sign off prior to tenecteplase administration
 - vi. Tenecteplase is incompatible with dextrose solutions. Dextrose-containing lines must be flushed with a saline solution prior to and following administration of tenecteplase
 - vii. Administer as IV push bolus over 5 seconds
- r. Vital signs and neuro checks every 15 minutes for 2 hours, every 30 minutes for 6 hours, then every 1 hour for 16 hours post tenecteplase
- s. Monitor for signs and symptoms of CNS hemorrhage and angioedema
- t. Keep NPO until swallow evaluation has been completed.
- u. For inpatient stroke codes, respond to patient location as needed and as available

6. Inpatient Provider or Tele Hospitalist (Avel Ecare)

- a. Complete quick neuro assessment – if unable, triage case by phone
- b. Gather patient information including stability, VS, blood sugar, and time last known well.
- c. Order CT head stroke protocol using order set
- d. Review initial case with telestroke neurologist

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- e. Oversee that at least one 18-20 gauge right sided IV (antecubital preferred) with power injectable tubing is started and blood drawn after CT
- f. If thrombolytic treatment is indicated, order tenecteplase using order set
- g. If thrombectomy candidate, transfer to appropriate stroke receiving hospital
- h. Complete transfer disposition plan with neurologist

7. Inpatient Nurse (ED nurse when inpatient nurse not available)

- a. Identifies a patient with stroke symptoms
- b. Activate code stroke
- c. Notify on call provider requesting a stat call back
- d. Start IVs
 - i. Do not delay patient getting to CT for IV
 - 1. For stable patients, IVs can be placed after CT
 - ii. Establish 2 functional peripheral IVs (at least one 18-20 gauge right sided IV (antecubital preferred) with power injectable tubing) prior to tenecteplase administration
 - iii. Obtain lab specimen during IV start and send for stroke code labs
- e. Accompany patient to CT
- f. Administer antihypertensives as ordered
- g. Notify provider if SBP > 185 or DBP > 110 prior to tenecteplase
- h. Monitor vital signs/abbreviated neuro checks during imaging
- i. Provide team with update of patient status after CT
- j. Ensure tenecteplase is administered in a timely manner when instructed to do so
 - i. Verify order to administer
 - ii. Verify drug dosage is weight appropriate (0.25 mg/kg) and total dose is no more than 25 mg
 - iii. Reconstitute with 10 mL sterile water
 - iv. Withdraw the appropriate volume of tenecteplase
 - v. Perform dual sign off prior to tenecteplase administration
 - vi. Tenecteplase is incompatible with dextrose solutions. Dextrose-containing lines must be flushed with a saline solution prior to and following administration of tenecteplase
 - vii. Administer as IV push bolus over 5 seconds
- k. Keep NPO until swallow evaluation has been completed.

8. Inpatient Charge Nurse

- a. Call ACC at **612-863-1301** to have the on call telestroke neurologist paged
 - i. Request to have the telestroke neurologist paged for a stroke code
 - ii. Site Name – Grantsburg
 - iii. Location of patient – Inpt
 - iv. Patient first and last name (if known)
 - v. Patient DOB (if known)
 - vi. Provider caring for the patient
 - vii. Direct call back number to provider or nurse
- b. Notify radiology technologist of which telestroke neurologist is on call
- c. Offer support/information to family members

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- d. Assist with potential transfer
- e. Assist with transport to CT
- f. Start IVs
 - i. Do not delay patient getting to CT for IV
 - 1. For stable patients, IVs can be placed after CT
 - ii. Establish 2 functional peripheral IVs (at least one 18-20 gauge right sided IV (antecubital preferred) with power injectable tubing) prior to tenecteplase administration
 - iii. Obtain lab specimen during IV start and send for stroke code labs
- g. Administer antihypertensives as ordered
- h. Notify ED provider if SBP > 185 or DBP > 110 prior to tenecteplase
- i. Monitor vital signs/abbreviated neuro checks during imaging
- j. Provide team with update of patient status after CT
- k. Reconstitute tenecteplase if pharmacy is not in house
- l. Ensure tenecteplase is administered in a timely manner when instructed to do so
 - i. Verify order to administer
 - ii. Verify drug dosage is weight appropriate (0.25 mg/kg) and total dose is no more than 25 mg
 - iii. Reconstitute with 10 mL sterile water
 - iv. Withdraw the appropriate volume of tenecteplase
 - v. Perform dual sign off prior to tenecteplase administration
 - vi. Tenecteplase is incompatible with dextrose solutions. Dextrose-containing lines must be flushed with a saline solution prior to and following administration of tenecteplase
 - vii. Administer as IV push bolus over 5 seconds
- m. Keep NPO until swallow evaluation has been completed
- n. If transfer is planned, assist as needed

9. Radiology Technologist

- a. Clear the CT room
- b. Confirm availability of the radiologist
- c. Provide telestroke neurologist contact information to reading radiologist
- d. Perform CT
- e. Push images to radiologist (do not push all images at once)
- f. Push all images for stroke codes manually to Allina PACS

10. Radiologist

- a. View CT images
- b. Call results of CT directly to telestroke neurologist

11. Laboratory Technician

- a. Arrive at patient location upon receipt of stroke code notification page
- b. Draw labs AFTER patient returns from CT

12. Pharmacist (Nursing to complete when not available)

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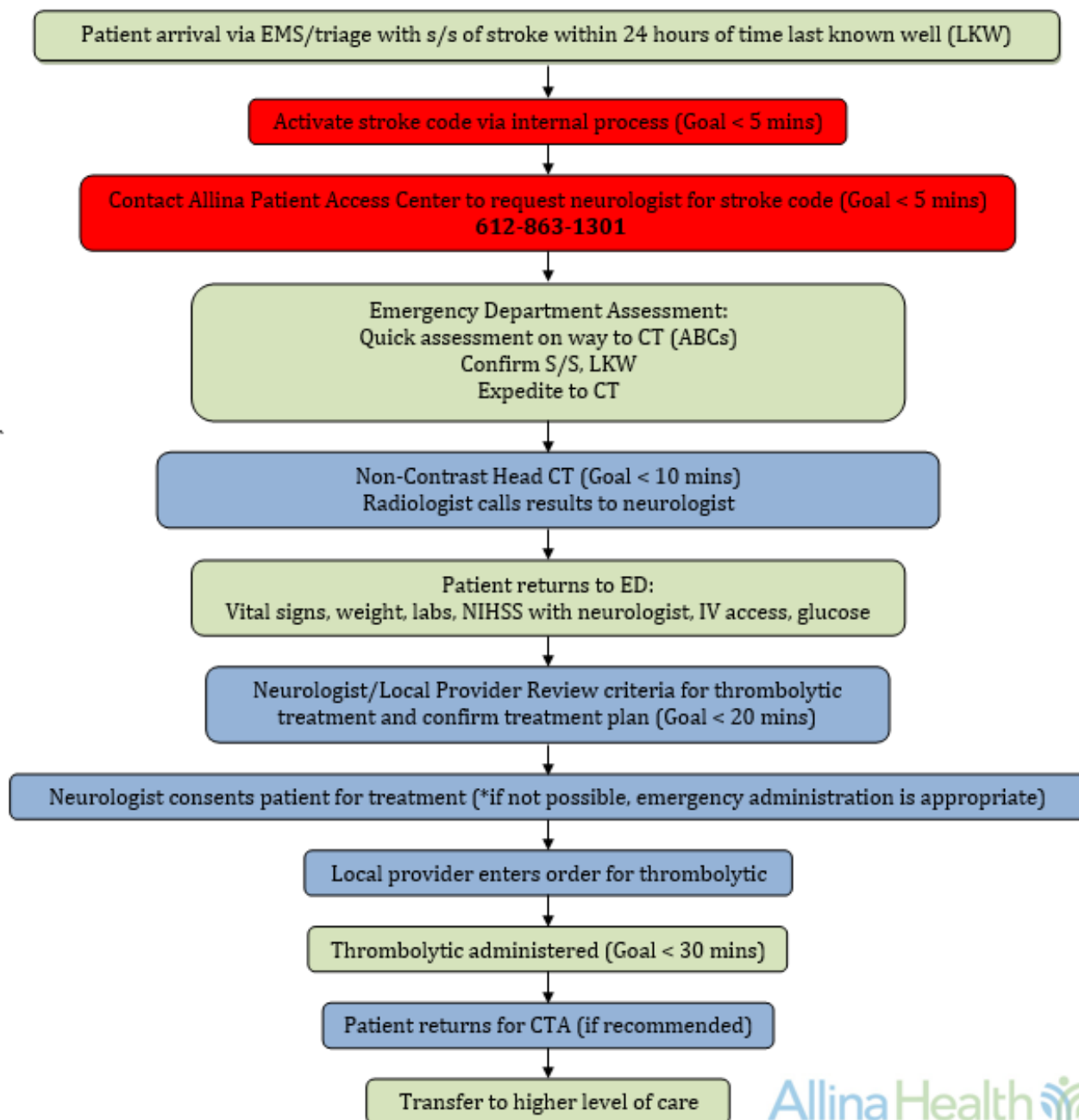
- a. In house hours: M-F 0730 - 1930, Saturday and Sunday 0800 - 1200
 - i. Fairview covers off hours
- b. Upon receipt of stroke code notification, be alert to a possible need for IV thrombolytic
- c. Await order from ED provider or hospitalist
- d. Verify tenecteplase order
- e. Ensure the patient's weight, real or estimated, has been entered in the EMR
- f. Complete dosage calculation for tenecteplase. **Reminder: 0.25 mg/kg with max dose of 25 mg**
- g. Draw up medications and label, if needed.

Protocol: Transfers

- a. Depending on the severity of the stroke and wishes of the patient, consideration for transfer should be made early.
- b. If the patient is a candidate for tenecteplase or endovascular intervention, transfer should be arranged as soon as possible
- c. Early consultation with telestroke neurologist regarding recommendations on treatment and transfer is recommended for those patients who do not meet criteria for tenecteplase

ALLINA HEALTH NEUROSCIENCE INSTITUTE

Referring Hospital Acute Ischemic Stroke Protocol



Appendix B1: Inclusion and Exclusion Criteria for IV Thrombolytic Treatment of Ischemic Stroke

****Reference the Minnesota Stroke Program Website: Resources page for the most up to date version**



Inclusion and Exclusion Criteria for IV Thrombolytic Treatment of Ischemic Stroke

FOR CONSIDERATION OF ELIGIBILITY WITHIN 0-4.5 HOURS OF TIME LAST KNOWN WELL

INCLUSION CRITERIA: Patients who should receive IV thrombolytic

- Symptoms suggestive of ischemic stroke that are deemed to be disabling, regardless of improvement. *Refer to the list at the end of this document 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

EXCLUSION CRITERIA: If patient has any of these, do NOT initiate IV thrombolytic

- CT scan demonstrating intracranial hemorrhage
- CT exhibits extensive regions (>1/3 MCA Territory on CT) of clear hypoattenuation
- Unable to maintain BP <185/110 despite aggressive antihypertensive treatment
- Severe head trauma within last 3 months
- Active internal bleeding
- Arterial puncture at non-compressible site within last 7 days
- Infective endocarditis
- Gastrointestinal or genitourinary bleeding within last 21 days or structural GI malignancy
- Intracranial or spinal surgery within last 3 months

Laboratory:

- Blood glucose <60 mg/dL; however, should treat if stroke symptoms persist after glucose normalized.
- INR >1.7 *Results not required before treatment unless patient is on anticoagulant therapy or there is another reason to suspect an abnormality*
- 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 novel 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: Seek neurology consultation from a stroke expert

- Mild stroke with **non-disabling** symptoms
- 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
- Ischemic stroke within last 3 months
- Any other condition or history of bleeding diathesis which would pose significant bleeding risk to patient
- History of intracranial hemorrhage
- Presence of known intracranial conditions that may increase risk of bleeding (arteriovenous malformation, aneurysms >10mm, intracranial neoplasm)
- 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)
- For wake up strokes and unknown time of onset seek neurology consultation for advanced imaging recommendations to establish eligibility for acute reperfusion therapies. Protocols may be personalized to hospitals individually to include these presentations in their process.

CONSIDERED DISABLING SYMPTOMS: Should be considered for IV alteplase treatment

1. Symptoms are considered potentially disabling in the view of the patient and the treating practitioner? i.e., do presenting symptoms interfere with lifestyle (work, hobbies, and entertainment)? Clinical judgement is required.
2. Complete hemianopsia (≥ 2 on NIHSS question 3) or **severe aphasia** (≥ 2 on NIHSS question 9) or
3. **Visual or sensory extinction** (≥ 1 on NIHSS question 11) or
4. **Any weakness limiting sustained effort against gravity** (≥ 2 on NIHSS question 6 or 7) or
5. **Any deficits that lead to a total NIHSS score >5**
 - a. Note: this is an example based on current best practices for hospitals to implement and operationalize. Specific criteria may vary by hospital.

APPENDICES

Reference: 2019 Update to the 2018 Guidelines for Management of Acute Ischemic Stroke. A Guideline for Healthcare Professionals from the American Heart/American Stroke Association. *Stroke, Vol. 49*

This document was developed by the Minnesota Primary and Comprehensive Stroke Center Advisory Group. Created 03/30/17; Updated 08/15/18; Updated 05/08/2019; Updated 02/15/2020; Updated 08/12/2020; Updated 04/08/2021

For questions, please contact MDH Stroke Program at health.stroke@state.mn.us

Appendix B2: Hemorrhagic Stroke Considerations



Hemorrhagic Stroke

CONSIDERATIONS FOR MANAGEMENT OF NON TRAUMATIC INTRACEREBRAL & SUBARACHNOID HEMORRHAGES IN THE ED

Approximately 10% of the 795,000 strokes per year in the United States are intracerebral hemorrhages. Per the Minnesota Stroke Registry data, intracerebral hemorrhages are responsible for nearly 10% of stroke cases entered. The purpose of this document is to offer considerations for the management of hemorrhagic stroke patients including non-traumatic intracerebral and subarachnoid hemorrhages in the Emergency Department. It specifically provides guidance on the immediate clinical work up, neurology consultation, blood pressure management, coagulopathy reversal, disposition recommendations including considerations for admitting locally, and other treatments for this patient population. It is designed to promote quality and consistency in practice across stroke hospitals throughout the Minnesota Stroke System.

Triage & Management

- Stroke code activation if meets activation criteria
 - Otherwise, contact stroke expert **as soon as possible**- provide neurological exam findings, BP, medical history, medications, code status (if available)
 - **The use of standardized order sets and protocols for prevention of complications is well established in the literature for all types of stroke events.**
- Stabilize- adequate airway and ventilation
- Stat Imaging- non-contrast head CT
- IV start
- Stat labs- glucose, CBC, BMP, PT, PTT, INR, consider troponin, inflammatory markers, specific tests for DOACs (if on DOAC)
 - Recommended to treat hypoglycemia 40-60 mg/d to reduce mortality
- Focused neurologic exam- (e.g., NIHSS, GCS) Frequent neurological assessments should be performed to assess change in status, neurological exam, or level of consciousness.
- Vital signs & BP control- contact neurology for recommendations for target BP. Work with your Primary or Comprehensive Stroke Center partners to include BP parameters within your protocols.
 - Medication titration to ensure continuous smooth & sustained control of BP, avoiding peaks and large variability in SBP, can be beneficial. (2a)
 - Initiating treatment within 2 hours of ICH onset and reaching target within 1 hour can be beneficial to reduce the risk of hematoma expansion (2a)
 - Labetalol 10-20 mg IVP over 1-2 minutes, may repeat every 10 mins for a max of 300mg
 - Nicardipine 5mg/hr IV infusion- titrate by increasing 2.5mg/hr every 5 mins to max of 15mg/hr

- Clevidipine 1-2mg/hr IV- titrate by doubling the dose every 2-5 min until desired BP reached; maximum 21 mg/hr
- For intracerebral hemorrhage patients, there is an increased risk of poor outcome for those with SBP reduction greater than 40 mm Hg. Rather than solely aiming for a SBP level, consider initial hematoma volume, baseline SBP level and magnitude of early SBP reduction. For those presenting with systolic blood pressure (SBP) ≥ 220 mm Hg, avoid lowering more than 40 mm Hg in the first 6 hours.⁵

Coagulopathy Reversal for Patients with ICH on anticoagulation

- **Discontinue anticoagulation therapy immediately**
- Rapid reversal should be performed as soon as possible (Class 1)

Vitamin K Antagonists

- INR 1.3-1.9
 - 4-F PCC 10-20 IU/kg (Class 2b)
 - IV Vitamin K (Class 1)
- INR ≥ 2.0
 - 4-F PCC 25-50 IU/kg (Class 1)
 - IV Vitamin K (Class 1)

Dabigatran

- History of when last dose taken
- Activated charcoal if DOAC < 2 hours (potential efficacy up to 8 hours) (Class 2b)
- Is Idarucizumab available?
 - Yes: Idarucizumab (Class 2a)
 - No: PCCs or aPCC and/or renal replacement therapy (Class 2b)

Factor Xa-Inhibitors

- History of when last dose taken
- Activated charcoal if DOAC < 2 hours (potential efficacy up to 8 hours) (Class 2b)
- Is andexanet alfa available?
 - Yes: Andexanet alpha (Class 2a)
 - No: 4 Factor PCC or aPCC (Class 2b)

Heparins

- Unfractionated Heparin
 - Protamine (Class 2a)
- Low Molecular Weight Heparin
 - Protamine (Class 2a)

Source: AHA Clinical Update Slide Set (PPTX)- <https://professional.heart.org/en/science-news/2022-guideline-for-the-management-of-patients-with-spontaneous-intracerebral-hemorrhage>

Transfer & Other Treatment Considerations

- **Arrange rapid transport to neurosurgery capable center**
- **Considerations for admitting locally:**
 - *Family/patient wishes- consider comfort cares: age, size of infarct, prognosis*
 - Encourage neurology partners to participate in active discussion with patient/family regarding prognosis
- Other treatments/considerations:
 - Seizure precautions, HOB 30 degrees, NPO (until screening)
 - Seizure prophylaxis is not recommended for intracerebral hemorrhage, but it is reasonable for known/suspected aneurysmal subarachnoid hemorrhage
 - Nausea management: Zofran- preferred
 - Consult neurology for:
 - Seizure management: lorazepam (Ativan), levetiracetam (Keppra),
 - phenytoin (Dilantin) and fosphenytoin (Cerebyx) are avoided, when possible, as they have been linked to poorer cognitive outcomes
 - ICP management: mannitol or hypertonic saline (prophylactic hyperosmolar therapy has not been shown to be of benefit)

References:

1. 2022 Guideline for the Management of Patients With Spontaneous Intracerebral Hemorrhage: A Guideline From the American Heart Association/American Stroke Association. *Stroke*.2022;53:e282-e361
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Top Things to Know: 2022 Guideline for the Management of Patients With Spontaneous Intracerebral Hemorrhage

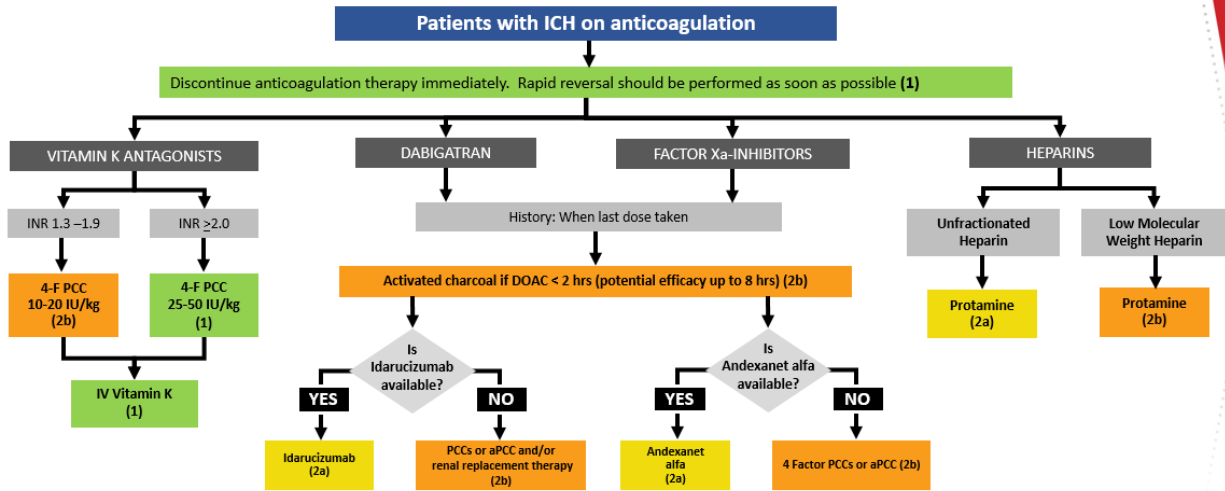
1. ICHs are the deadliest form of acute stroke with early mortality ranging between 30%-40%.
2. Approximately 10% of the 795,000 strokes per year in the United States are intracerebral hemorrhages or ICHs. They are defined as a brain injury attributable to acute blood extravasation into the brain parenchyma (brain tissue) from a ruptured cerebral blood vessel.
3. ICH disproportionately affects lower-resourced populations in the U.S. and internationally.
4. ICH can occur in adults at any age, but the incidence increases with age. Another growing source of ICH is the more widespread use of anticoagulants.
5. ICHs, like other forms of stroke, occur as the consequence of a defined set of vascular pathologies. This guideline emphasizes the importance of, and approaches to, identifying markers of both microvascular and macrovascular hemorrhage etiologies.
6. Small vessel disease with arteriolosclerosis and cerebral amyloid angiopathy are the main causes of ICH. The main risk factor for ICH is uncontrolled hypertension.
7. The organization of healthcare systems is increasingly recognized as a key component of optimal stroke care. This guideline recommends development of regional systems that provide initial intracerebral hemorrhage (ICH) care and the capacity, when appropriate, for rapid transfer to facilities with neurocritical care and neurosurgical capabilities.
8. Hematoma expansion (HE) is associated with worse ICH outcome. There are now a range of neuroimaging markers that, along with clinical markers such as time since stroke onset and use of antithrombotic agents, help to predict the risk of HE. These neuroimaging markers include signs detectable by non-contrast computed tomography (NCCT) - the most widely used neuroimaging modality for ICH.
9. When implementing acute blood pressure (BP) lowering following mild-to-moderate ICH, treatment regimens that limit BP variability and achieve smooth, sustained BP control appear to reduce HE and yield better functional outcome.
10. ICH while anticoagulated has extremely high mortality and morbidity. This guideline provides updated recommendations for acute reversal of anticoagulation following ICH, highlighting use of protein complex concentrate for reversal of vitamin K antagonists such as warfarin, idarucizumab for reversal of the thrombin inhibitor dabigatran, and andexanet for reversal of factor Xa inhibitors such as rivaroxaban, apixaban, and edoxaban.
11. Several in-hospital therapies that have historically been used to treat ICH patients appear to confer either no benefit or harm. For emergency or critical care treatment of ICH, prophylactic corticosteroids or continuous hyperosmolar therapy appear to have no benefit for outcome, while use of platelet transfusions outside the setting of emergency surgery or severe thrombocytopenia appears to worsen outcome. Similar considerations apply to some prophylactic treatments historically used to prevent medical complications following ICH. Use of graduated knee- or thigh-high compression stockings alone are not effective prophylactic therapy for prevention of deep vein thrombosis, and prophylactic antiseizure medications in the absence of evidence for seizures do not improve long-term seizure control or functional outcome.

12. Minimally invasive approaches for evacuation of supratentorial intracerebral and intraventricular hemorrhages (compared to medical management alone) have demonstrated reductions in mortality. The clinical trial evidence for improvement of functional outcome with these procedures is neutral, however. For patients with cerebellar hemorrhage, indications for immediate surgical evacuation with or without external ventricular drain (EVD) to reduce mortality now include larger volume (>15mL) in addition to previously recommended indications of neurologic deterioration, brainstem compression, and hydrocephalus.
13. The decision of when and how to limit life-sustaining treatments following ICH remains complex and highly dependent on individual preference. This guideline emphasizes that the decision to assign do-not-attempt-resuscitation status is entirely distinct from the decision to limit other medical and surgical interventions and should not be used to do so. On the other hand, the decision to implement an intervention should be shared between the medical provider and patient or surrogate and should reflect the patient's wishes as best as can be discerned. Baseline severity scales can be useful to provide an overall measure of hemorrhage severity but should not be used as the sole basis for limiting life-sustaining treatments.
14. Rehabilitation and recovery are important determinants of ICH outcome and quality of life. This guideline recommends use of coordinated multidisciplinary inpatient team care with early assessment of discharge planning and a goal of early supported discharge for mild-to-moderate ICH. Implementation of rehabilitation activities such as stretching and functional task training may be considered 24-48 hours after moderate ICH; however early aggressive mobilization within the first 24 hours following ICH appears to worsen 14-day mortality. Multiple randomized trials did not confirm an earlier suggestion that fluoxetine might improve functional recovery after ICH. Fluoxetine reduced depression in these trials but also increased the incidence of fractures.
15. A key and sometimes overlooked member of the ICH care team is the patient's home caregiver. This guideline recommends psychosocial education, practical support, and training for the caregiver to improve the patient's balance, activity level, and overall quality of life

Greenberg SM, Ziai WC, Cordonnier C, Dowlatshahi D, Francis B, Goldstein JN, Hemphill JC 3rd, Johnson R, Keigher KM, Mack WJ, Mocco J, Newton EJ, Ruff IM, Sansing LH, Schulman S, Selim MH, Sheth KN, Sprigg N, Sunnerhagen KS; on behalf of the American Heart Association/American Stroke Association. [2022 Guideline for the management of patients with spontaneous intracerebral hemorrhage: a guideline from the American Heart Association/American Stroke Association](#) [published online ahead of print May 17, 2022]. *Stroke*. doi: 10.1161/STR.0000000000000407

2022 Guideline for the Management of Patients With Spontaneous Intracerebral Hemorrhage: A Guideline From the American Heart Association/American Stroke Association

Hemostasis & Coagulopathy Management of Anticoagulant-Related Hemorrhage



Abbreviations: 4-F PCC indicates four-factor prothrombin complex concentrate; aPCC, activated prothrombin complex concentrate; DOAC, direct oral anticoagulant; ICH, intracerebral hemorrhage; and INR, international normalized ratio.

Greenberg, S. M. 2022 AHA/ASA . Guideline for the Management of Patients with Spontaneous Intracerebral Hemorrhage. *Circulation*.

<https://www.ahajournals.org/doi/10.1161/STR.0000000000000407>

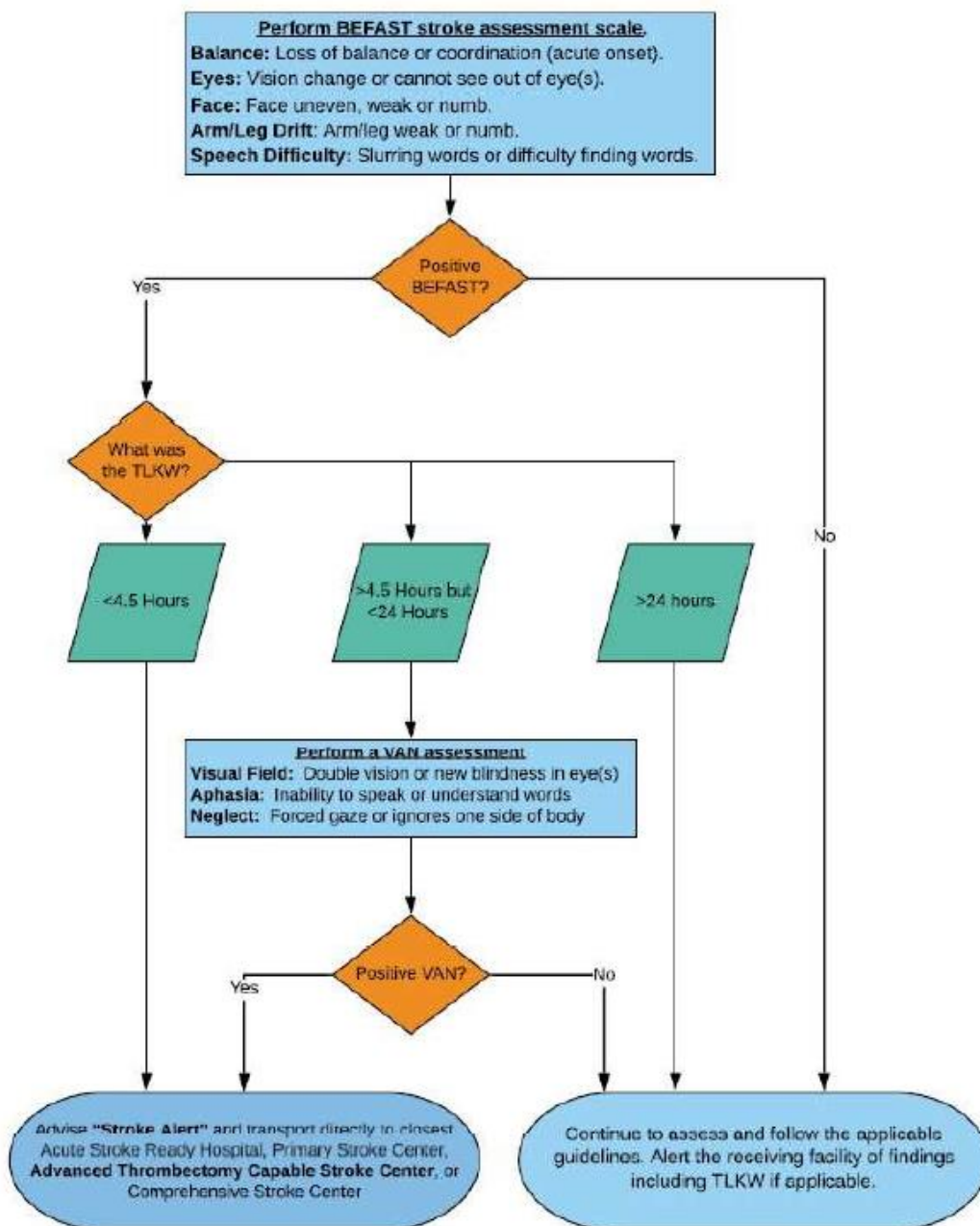
Appendix C: EMS Stroke Protocol (Essentia Health)



A8. PATIENT DISPOSITION – STROKE/TIA

ALL PROVIDERS (BLS) (ALS) (STP)

1. Positive **BEFAST** stroke assessment scale.
 - A. Balance: Loss of balance or coordination (acute onset)
 - B. Eyes: Vision change or cannot see out of eye(s)
 - C. Face: Face uneven, weak or numb.
 - D. Arm/Leg Drift: Arm/leg weak or numb
 - E. Speech Difficulty: Slurring words or difficulty finding words
2. Advise **“Stroke Alert”** if BEFAST is positive and the Time Last Known Well Time (TLKW) is less than 4.5 hours. Provide patient identifiers when possible.
3. If the TLKW is greater than 4.5 hours but less than 24 hours AND one-sided weakness is present, perform a VAN assessment scale.
 - A. **Visual Field:** Double vision or new blindness in eye(s)
 - B. **Aphasia:** Inability to speak or understand words
 - C. **Neglect:** Forced gaze or ignores one side of body
4. If VAN assessment is positive, advise receiving hospital of **“Stroke Alert.”** Provide patient identifiers when possible.
5. If BLS ambulance on scene and providing care, and patient is showing any signs of clinical deterioration: Begin rapid transport to ALS level care, Intercept, or hospital whichever is closer.
6. Transport directly to closest **Acute Stroke Ready Hospital, Primary Stroke Center, Advanced Thrombectomy Capable Stroke Center, or Comprehensive Stroke Center** for treatment if TLKW <4.5 hours or <24 hours with positive VAN and one-sided weakness.
7. Consider requesting aeromedical transport, direct aircraft to land at closest **Acute Stroke Ready Hospital** for patient transport.



These Patient care guidelines were developed within a peer review committee and therefore are considered to be privileged and confidential material of the Essentia Health EMS peer review committee.

E. NEUROLOGICAL

E1. STROKE - TIA

Patient care goals

1. Detect neurological deficits.
2. Determine eligibility for transport to a Stroke Center

Inclusion Criteria

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

Exclusion criteria

1. If glucose is <60mg/dl refer to [Hypoglycemia Guideline](#).
2. If trauma and GCS <13, refer to [Head Injury](#) and [General Trauma Management Guideline](#)

ALL PROVIDERS (BLS) (ALS) (STP)

ADULT PATIENTS

1. Initial assessment and care should be provided according to the [Universal Care and Assessment Guideline \(B,1\)](#), which may include: **Oxygen**, **Monitoring**, and **IV access**.
2. Perform **BEFAST** stroke assessment scale.
 - A. Balance:** Loss of balance or coordination (acute onset)
 - B. Eyes:** Vision change or cannot see out of eye(s)
 - C. Face:** Face uneven, weak or numb.
 - D. Arm/Leg Drift:** Arm/leg weak or numb
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6. If BLS ambulance on scene and providing care, and patient is showing any signs of clinical deterioration: Begin rapid transport to ALS level care, Intercept, or hospital whichever is closer.

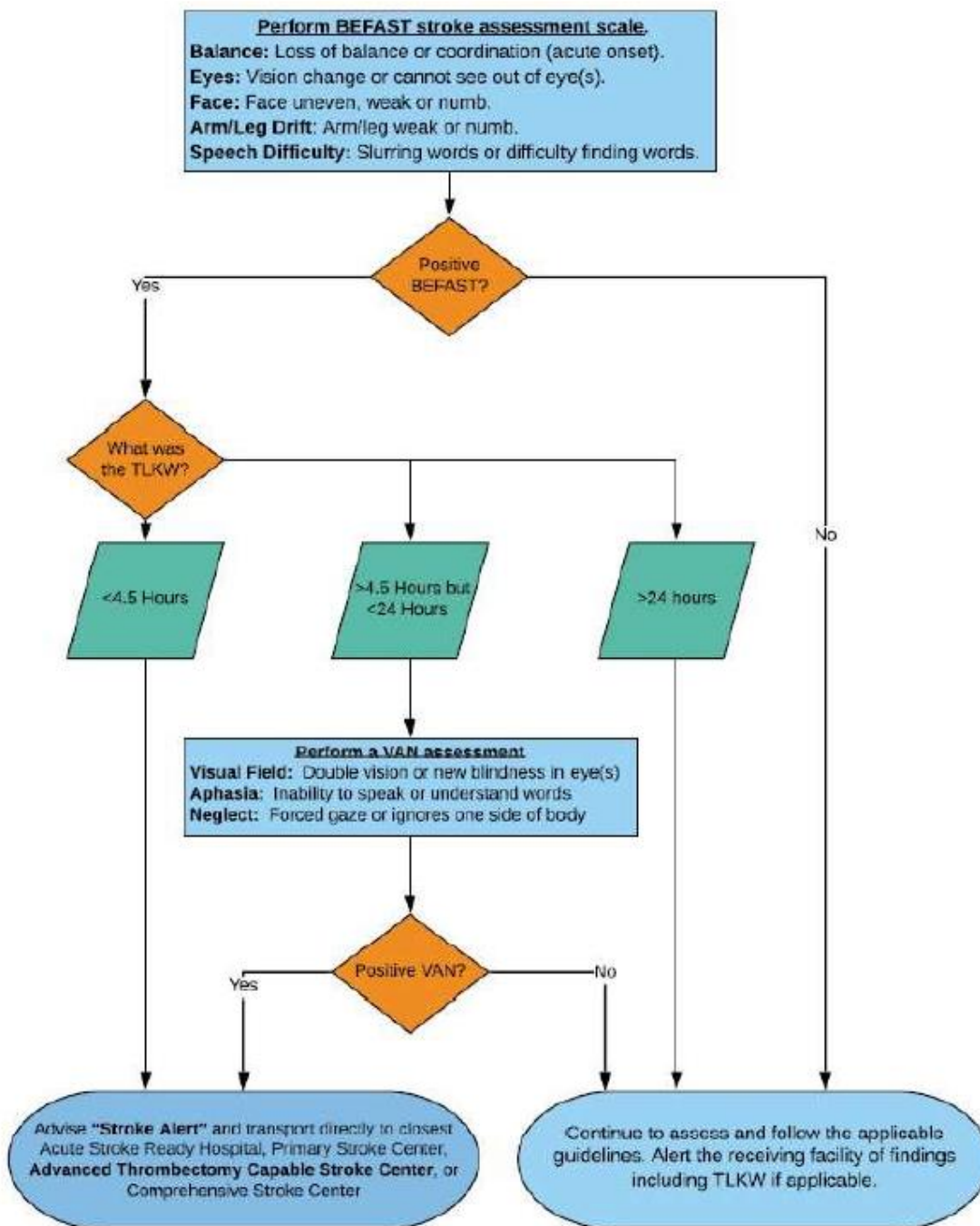
A. Manage all other care and start IV en route (18 gauge is preferred in right AC). One attempt while en route unless the patient is hemodynamically unstable.

7. Obtain blood glucose and treat if the blood sugar is **<60 mg/dl** per [Hypoglycemia Guideline](#).

8. Transport directly to closest **Acute Stroke Ready Hospital, Primary Stroke Center, Advanced Thrombectomy Capable Stroke Center, or Comprehensive Stroke Center** for treatment if TLKW <4.5 hours or <24 hours with positive VAN and one-sided weakness.

9. Contact medical control for further orders.

10. Consider requesting aeromedical transport, direct aircraft to land at closest **Acute Stroke Ready Hospital** for patient transport.



These Patient care guidelines were developed within a peer review committee and therefore are considered to be privileged and confidential material of the Essentia Health EMS peer review committee.

ADVANCED LIFE SUPPORT (ALS) (STP)
ADULT PATIENTS

8. Start IV of normal saline (TKO) or saline lock (18ga preferred in right AC). One attempt while en route unless hemodynamically unstable.
9. Monitor cardiac rhythm for A-fib and consider 12-lead if time permits while en route.
10. Transport directly to closest **Acute Stroke Ready Hospital, Primary Stroke Center, Advanced Thrombectomy Capable Stroke Center, or Comprehensive Stroke Center** for treatment if TLKW <4.5 hours or <24 hours with positive VAN and one-sided weakness.
11. Contact medical control for further orders.

SPECIALLY TRAINED PARAMEDIC (STP)
ADULT PATIENTS
CNS Emergencies: Stroke/Bleed

12. If the patient is hypertensive:

- Target Blood Pressures:**
1. Patients **not** receiving IV Thrombolytic or **not a candidate** for IV Thrombolytic should
 - not be treated for Hypertension **unless** Systolic is >220 and/or Diastolic is >120mmHg
 2. Intracerebral Hemorrhage: 140/80 or physician's orders.
 3. Ischemic Stroke **and** candidate for IV Thrombolytic:
 - BEFORE IV Thrombolytic administration: Systolic <185/110
 - DURING and AFTER Thrombolytic administration: Maintain at or below 180/105 (**See post IV Thrombolytic guidelines below #15**)

Caution: Review precautions and contraindications carefully prior to administration of any antihypertensive medications.

A. Nicardipine infusion 5mg/hr,(preferred) titrate by **2.5 mg/hr every 5-15 min**, maximum dose of **15mg/hr.**

OR

B. Labetalol given by repeated IV injection **10-20 mg IV slowly over 2 minutes**. Repeat injections every 10 minutes until desired result, Monitor blood pressure closely, every 5 minutes during and after administration

OR

C. Hydralazine Bolus: 10mg bolus over 2 min, may repeat in 10 min if no response, max

dose 20mg.

13. If the patient sustains a drop in blood pressure to <90mmHg.

A. Refer to [Shock Guideline](#)

14. Monitor for any lateralizing neurological signs including posturing, blown pupils, and or paralysis. Increased ICP (intracranial pressure), Midline shift or herniation may be present. If observed:

A. Ventilate the intubated patient to maintain an ETCO₂ level 35-45 mm/hg.

B. Consider **Hypertonic Saline 3% 150 ml over 15 min** or **Mannitol** infusion at **1 Gm/kg** over 1 hour (*or as prescribed per physician orders*) if patient is not hypotensive.

15. **Alteplase maintenance and post-IV Alteplase guideline OR Tenecteplase (TNK) given prior to arrival** (Interfacility transports):

Note: In most cases, the sending facility will be calculating and initiating the Alteplase infusion. Transport personnel are expected to maintain a Alteplase infusion during a transfer to a tertiary care facility.

A) Assess baseline vitals and neuro checks,

B) IV Thrombolytic (generally one of the two listed below)

Tenecteplase (TNK)

i. Verify dose given (typically 0.25mg/kg IV over 5 minutes) and ensure dose is documented in EMS ePCR

Alteplase:

i. Verify total dose given or that is currently being infused.
(Standard dose is 0.9mg/kg, max 90mg with 10% of the total dose being administered as IV bolus over 1 minute following by an infusion of the remainder over 1 hour.)

ii. Document total alteplase dose to be administered; start and stop times, if tubing must be changed for EMS IV pump; assure correct dose of alteplase is administered,

iii. Following alteplase administration, begin 50ml 0.9% NS infusion at existing rate to ensure alteplase remaining in the IV tubing has been administered.

iv. No other medications may be administered through alteplase infusion line.

Note: If ALTEPLASE infusion will continue during transfer, verify with sending facility that excess ALTEPLASE has been withdrawn from the ALTEPLASE bottle and wasted. The bottle should be labeled by the sending hospital with the total dose/volume that was in the bottle initially to be administered.

C) Oxygen to maintain SpO₂ > 94%.

D) Strict NPO, including oral medications.

E) Monitor Vitals and Neuro checks: every 15 min for first 2 hours, every 30 min for the next 6 hours, Document Vitals and Neuro checks on the form included in the "Drip and Ship" packet included with transfer paperwork. Ensure that the IV Thrombolytic (ALTEPLASE or Tenecteplase (TNK)), Vitals, and Neuro Check record is left at the receiving facility.

F) If necessary, transport with head of bed elevated no higher than 30°.

G) BP Guidelines: Indications: SBP>180 or DBP>105.

i. Nicardipine drip: 5mg/hr, may increase dose by 2.5mg/hr every 5 min to max dose of 15mg/hr until SBP<180 and DBP<105, and then decrease maintenance infusion to 3mg/hr. If SBP<140 or DBP<80 or HR<60, discontinue infusion and contact Medical Control for further orders.

ii. Labetalol drip: 2-8mg/min, may increase 1-2mg/min every 10 minutes to max dose of 8mg/min, with a maximum total dose of 300mg, until SBP<180 and/or DBP<105. If SBP<140 or DBP<80 or HR<60, discontinue infusion and contact Medical Control for future orders.

*Contact medical control if SBP<140 or DBP<80 or HR<60, discontinue infusion and contact Medical Control for future orders.

H) Potential side effects of Alteplase or Tenecteplase (TNK):

i. Changes in neurologic condition: (Develops severe headache, acute hypertension and/or bradycardia, nausea or vomiting, or decrease in LOC)

1. Discontinue alteplase, maintain NS infusion to keep line open

2. Contact Medical Control for further orders, adjustment in BP medications, antiemetics, or possible diversion to closest facility

3. Monitor VS, prehospital stroke scale neuro exam q 15 min

ii. Oropharyngeal edema: if signs of angioedema are present:

1. Discontinue alteplase, maintain NS infusion to keep line open

2. Treat according to appropriate guideline for allergic reaction/anaphylaxis

3. Monitor airway, consider intubation if persistent swelling

4. Notify Medical Control and receiving facility of changes

QUALITY IMPROVEMENT**Key documentation elements**

1. "Time Last Known Well" must be specific. If the patient was last seen normal prior to bedtime the night before, this is the time to be documented. (Not the time the patient woke up with symptoms present).
2. Blood glucose results.
3. Specific validated stroke scale used and findings.
4. Stroke Center notification and documented time of "Stroke Alert" activation.
5. Patients receiving Alteplase should have vitals and neuro checks documented at the times specified in the "Acute Stroke Drip and Ship Guideline."
6. Document total dosage of Alteplase administered during transport or at the time of discontinuing Alteplase infusion.

Performance measures

1. Documentation of neuro assessment status changes pre-hospital including validated stroke scale used and findings.

Appendix C1: EMS Stroke Code Feedback Form (Maple Grove Hospital)



EMS Feedback Form – Patient’s with final diagnosis of Stroke/TIA			
Date of Service:	Enter a date	Incident Number	Click here to enter ID
Service	Click here to enter name		
EMS	Click here to enter name		
Patient MRN	Click here to enter ID	Patient HAR	Click here to enter ID

Reason for call: [Click or tap here to enter text.](#)

Discharge Diagnosis: [Click or tap here to enter text.](#)

Discharge Destination: [Click or tap here to enter text.](#)

- Stroke Scale Complete
- Blood Glucose
- Medications/use of anticoagulant documented
- Last Known Well Time documented
- IV access established
- Blood pressure Treatment enroute if needed
- Activation of stroke code

[Click or tap here to enter text.](#)

This information being shared with you for the sole purpose of quality review and improvement per the direction of the MN Department of Health.

Thank you for your partnership. If you have any question or suggestions, please contact Morgan Hill at 763-581-1223 or morgan.hill@maplegrovehospital.org

Appendix C2: EMS Post Tenecteplase Transfer Procedure (Welia Health)

**EMS Post Tenecteplase transfer procedure**

1. Document vitals prior to transport to verify: SBP less than 180 and DBP less than 105. If BP above limits, sending facility should stabilize prior to transport.
2. Obtain contact method for family or caregivers to allow contact during transport or on arrival to receiving facility.
3. Perform and Document initial Neuro exam
 - a. Cincinnati Stroke Scale
 - b. Perform and record GCS and pupil exam
4. Continuous pulse oximetry monitoring. Apply oxygen via NC or mask to maintain oxygen sats greater than 94%.
5. Keep the head of the cot elevated at semi fowler or higher
6. Continuous cardiac monitoring; Call Med Control if hemodynamically unstable or symptoms due to tachycardia or bradycardia occur.
7. Nothing by mouth.
8. Monitor and document vital signs and neuro checks every 15 minutes
9. Anti-hypertensive therapy en route:
 - a. IV infusion started at sending facility if patient is not within the BP limits and BP continues to rise throughout transport. Target BP should be SBP <180 and DBP <105
 - i. Labetalol infusion: increase by 2 mg/min every 10 minutes (max of 8 mg/min) until desired BP is reached.
 - ii. Nicardipine infusion: increase dose by 2.5 mg/hr every 5 minutes (max of 15 mg/hr) until desired BP is reached.
 - b. If no continuous infusion was started then give Labetalol bolus 10 mg over 1-2 minutes. Repeat as needed every 10 minutes for a max dose of 300 mg.
10. For any acute worsening of neurological condition, or if patient develops severe headache, acute hypertension, nausea or vomiting (suggestive of an intracerebral hemorrhage):
 - a. Call Medical Control for further instructions including decisions about BP medication and possible need for diversion to the closest appropriate facility
 - b. Continue to monitor vitals and neuro checks every 15 minutes.
11. Treating Angioedema
 - a. Notify Medical Control if tongue begins to swell and initiate the following treatment:
 - i. Diphenhydramine (Benadryl) 50 mg IV
 - ii. Famotidine (Pepcid) 20 mg IV
 - b. Consider the following if swelling increases and continues:
 - i. Epinephrine 1 mg/mL – give 0.3 mL IM
 - ii. Methylprednisolone (Solumedrol) 80 mg IV

Contact the receiving facility when you are 10 minutes from ETA.

If there are any clinical concerns en route, contact receiving Stroke Neurologist. Contact information is located on back

Weila EMS Transport Protocol for Tenecteplase patients/CVA

Patient Sticker

Appendix D: Sample Stroke Education Plan

Department	Hours needed	Content	Content hours
2023			
ED & ICU nursing	2 hours or 2x annually	IV thrombolytic competency NIHSS certification	0.5 hours 3 hours
All nursing staff	Annual	Stroke code process	0.5 hours
ED providers	2 hours or 2x annually	Annual Stroke education- provided by Telestroke partners NIHSS refresher	1 hours 1 hours
2024			
ED & ICU nursing	2 hours or 2x annually	IV thrombolytic competency Mock code	0.5 hours 1 hour
All nursing staff	Annual	Stroke code process	0.5 hours
ED providers	2 hours or 2x annually	Annual Stroke education- provided by Telestroke partners Mock code	1 hours 1 hours
2025			
ED & ICU nursing	2 hours or 2x annually	IV thrombolytic competency Dysphagia screening	0.5 hours 0.5 hours
All nursing staff	Annual	Stroke code process	0.5 hours
ED providers	2 hours or 2x annually	Annual Stroke education- provided by Telestroke partners Inclusion/exclusion criteria IV thrombolytics	1 hours 0.5 hours

Onboarding Education Plan	
ED & ICU nursing	IV thrombolytic competency Neuro checks & BP management Stroke code process Dysphagia screening
All nursing staff	Stroke code process Dysphagia screening Neuro checks & BP management
ED providers	Stroke code process NIHSS
All new employees	Stroke code process

Appendix D1: Sample Locum/Casual provider attestation letter



<<Fill in date here>>

To whom it may concern,

Acute Stroke Ready Hospital Designation criteria 4- All AST (Acute Stroke Team) members (at a minimum all nurses and providers that respond to stroke) are required to receive stroke education at least two hours or two times per year.

I understand the education requirements of the designated Acute Stroke Ready Hospital that of which I am currently employed. I have completed at least two hours or two educational sessions specific to stroke in the last 12 months as outlined below.

By my signature below, I attest that the information provided above is true and correct to the best of my knowledge.

Sincerely,

Handwritten Signature

Date

Appendix E: Sample Stroke Code Case Evaluation Form (Alomere Health)



Patient Sticker

Stroke Code Evaluation

Not a part of the permanent record.
Send to Lori Rosch, ER Director when complete.

Date:		
Primary RN:		
Provider		
Stroke Neurologist:		
Was Stroke Team paged?	<input type="checkbox"/> Yes	<input type="checkbox"/> No <i>If no, please explain:</i>
Was the Stroke Code timeline completed?	<input type="checkbox"/> Yes	<input type="checkbox"/> No <i>If no, please explain:</i>
Was there any delay with STAT head CT/CTA?	<input type="checkbox"/> Yes	<input type="checkbox"/> No <i>If yes, please explain:</i>
Was there any delay in lab draw?	<input type="checkbox"/> Yes	<input type="checkbox"/> No <i>If yes, please explain:</i>
Was there a delay in administering IV thrombolytics? (goal < 45 min)	<input type="checkbox"/> Yes	<input type="checkbox"/> No <i>If yes, please explain:</i>
Was there any problem with teleconnect?	<input type="checkbox"/> Yes	<input type="checkbox"/> No <i>If yes, please explain:</i>
Problems encountered during Stroke Code? Suggestions for improvement?		
What went well?		
<p>Stroke Code Evaluation</p> <p style="color: red;"><i>Not a part of the permanent record. Send to Lori Rosch, ER Director when complete.</i></p>		

Appendix E1: Stroke Code Timeline (Alomere Health)



Patient Sticker

Stroke Code Timeline

(Permanent part of the Medical Record – send form to HIM)

Date: _____

*Stroke Code Initial Evaluation/Tenecteplase/Alteplase Treatment Orders (18536)

Event	Time	Comments
Patient arrival		
<input type="checkbox"/> EMS <input type="checkbox"/> Private Vehicle		
EMS call Stroke Alert: <input type="checkbox"/> Yes <input type="checkbox"/> No		
Symptoms onset <input type="checkbox"/> Unknown or (time)		
Initial call request Telehealth (Goal < 10 mins)		
Provider at bedside		
BE FAST Exam (if LTKW <4.5 hours)		
VAN Screen (if LTKW is 4.5-24 hours)		
CT notified of Stroke Code Activation		
Pharmacy notified of Stroke Code Activation		
Stroke Code/Team called (Goal < 5 mins)		
Blood glucose	<input type="checkbox"/> Per EMS	
Patient to CT Scan (Goal < 15 mins)		
Patient return from CT scan		
CT results received (Goal < 30 mins)		
Telestroke connection time (Goal < 15 mins)		
Oxygen applied if Sats < 94%		
12 Lead EKG *CT Scan priority		
Labs drawn *CT Scan priority		
IV Line #1		
#2		
HOB elevated 30°		
Portable x-ray completed		
NG placed		
Foley placed		
IV Thrombolytic decision: <input type="checkbox"/> Contraindicated <input type="checkbox"/> Onset time unclear <input type="checkbox"/> Patient refused <input type="checkbox"/> Symptoms improving <input type="checkbox"/> IV Tenecteplase initiated (25 mg max dose) (Goal < 45 minutes)		
Admit/Transfer: <input type="checkbox"/> Admit <input type="checkbox"/> Transfer (Goal < 120 minutes)		

Return completed form to Health Information Management

Appendix E2: Staff Feedback Form (Maple Grove Hospital)

Staff Feedback Form Stroke			
Triage Nurse	Click here to enter name	Feedback Date	Enter a date
Primary Nurse	Click here to enter name		
Provider		Visit Date	Enter a date
Patient MRN	Click here to enter ID	Patient HAR	Click here to enter ID

Admitting Diagnosis: [Click or tap here to enter text.](#)

Discharge Diagnosis: [Click or tap here to enter text.](#)

Last known well documented:

Date ([Click or tap here to enter text.](#)) – arrived [Click or tap here to enter text.](#)

Time ([Click or tap here to enter text.](#)) – arrived [Click or tap here to enter text.](#)

Stroke team called

Point of care glucose completed

Utilization of stroke narrator

Completed FULL NIH scale

NPO during stay/Swallow screen completed (if not NPO)

Detailed Note

Imaging within 25 minutes of arrival

CT

MRI

Tenecteplase administered within 60 minutes of arrival (if applicable)

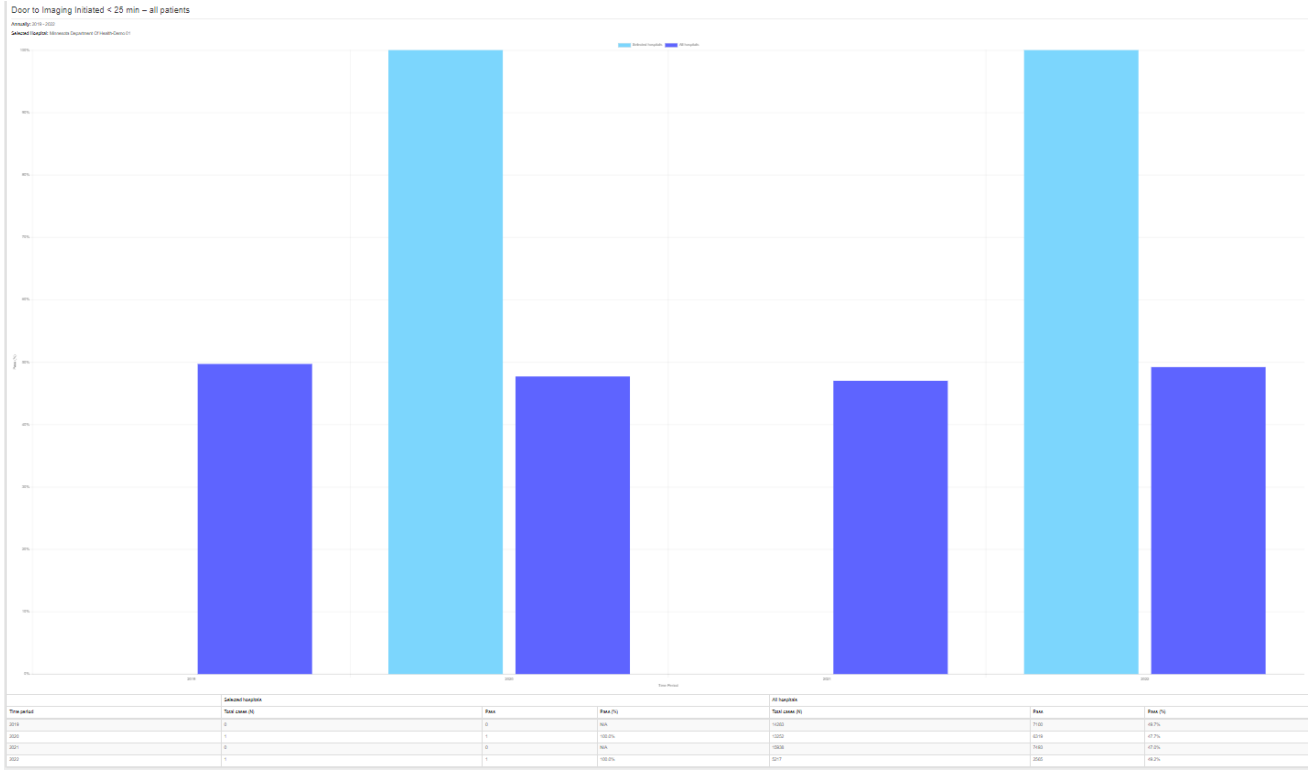


Appendix E3: PDSA Dysphagia Screening (St. Francis Medical Center)

Site Name																																																										
Patient Safety and Performance Improvement Summary																																																										
Dysphagia Screening Compliance																																																										
8/1/2021																																																										
AIM (Topic/Problem) Statement		Rationale for Selection																																																								
Improve swallow screen compliance in stroke & TIA patients.		Dysphagia is a potentially serious complication of stroke. The importance of assessing a patient's ability to swallow, before approving the oral intake of fluids, food, or medication has been noted in multiple practice guidelines. Site swallow screen performance is below the system average and the state average.																																																								
Summary of Findings																																																										
<table border="1" style="margin: 10px auto; border-collapse: collapse;"> <caption>Dysphagia Screen Compliance Data</caption> <thead> <tr> <th>Quarter</th> <th>Site (%)</th> <th>System (%)</th> <th>All MN Hospitals (%)</th> <th>Linear (Site) (%)</th> </tr> </thead> <tbody> <tr><td>Q1 2019</td><td>70%</td><td>70%</td><td>78%</td><td>70%</td></tr> <tr><td>Q2 2019</td><td>59%</td><td>75%</td><td>78%</td><td>70%</td></tr> <tr><td>Q3 2019</td><td>76%</td><td>80%</td><td>78%</td><td>70%</td></tr> <tr><td>Q4 2019</td><td>77%</td><td>75%</td><td>78%</td><td>70%</td></tr> <tr><td>Q1 2020</td><td>75%</td><td>78%</td><td>78%</td><td>70%</td></tr> <tr><td>Q2 2020</td><td>62%</td><td>78%</td><td>78%</td><td>70%</td></tr> <tr><td>Q3 2020</td><td>63%</td><td>78%</td><td>78%</td><td>70%</td></tr> <tr><td>Q4 2020</td><td>90%</td><td>75%</td><td>78%</td><td>70%</td></tr> <tr><td>Q1 2021</td><td>50%</td><td>75%</td><td>78%</td><td>70%</td></tr> <tr><td>Q2 2021</td><td>61%</td><td>72%</td><td>78%</td><td>70%</td></tr> </tbody> </table>				Quarter	Site (%)	System (%)	All MN Hospitals (%)	Linear (Site) (%)	Q1 2019	70%	70%	78%	70%	Q2 2019	59%	75%	78%	70%	Q3 2019	76%	80%	78%	70%	Q4 2019	77%	75%	78%	70%	Q1 2020	75%	78%	78%	70%	Q2 2020	62%	78%	78%	70%	Q3 2020	63%	78%	78%	70%	Q4 2020	90%	75%	78%	70%	Q1 2021	50%	75%	78%	70%	Q2 2021	61%	72%	78%	70%
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64% of failures occur in the ED. In over half of the failures, the swallow screen wasn't performed/documented. Other reasons for failure include: timing and delayed diagnosis.																																																										
Measurement (Criteria)		Analysis and Conclusions																																																								
STK 7 – Dysphagia Screening – 2021 goal set at >80% compliance		In over half of the failures, the swallow screen wasn't performed/documented. Other reasons for failure include timing and delayed diagnosis. Emails have been routinely sent to individual nursing staff with fall-outs . No change in performance has been achieved. It was determined that nursing needed more intensive education.																																																								
Improvement Strategy																																																										
PLAN/DO		STUDY	ACT																																																							
Interventions Dysphagia screen module was built at the system level. Site was included in the build. Module was completed in time for Q4 2020 roll-out.	Accountability Module was mandatory for all ED and 2 nd floor nurses in conjunction with Q4 2020 mandatory education. Individual feedback will continue in real-time.	Measures of Success Marked improvement noted in Q4 2020 performance.	Next Steps Improvement not sustained – Swallow Study module reassigned in Q2 2021. Awaiting Q3 data completion. Real-time monitoring occurring with PVSR's for misses and Care on the Spots for successes.																																																							

APPENDICES

Appendix E4: Sample Portal Reports



APPENDICES

Appendix E5: ASRH Designation Site Visit Case Tracer Form

ASRH Designation Site Visit Case Tracer Form

Hospital:	MDH Code (not medical record):
Arrival Date:	Transfer/Discharge Date:

Thrombolytic Transfer
 Other Transfer: _____
 Thrombolytic Admit
 Other Admit: _____

Process	Time	Timing Indicators	ASRH GOAL
Arrival Mode (EMS / Walk-In)			
EMS pre-notification (Y / N)			
Glucose obtained (Y / N)			
ED Arrival Time		Door Time:	
Last Known Well <u>Clock Time</u>		LKW to Door:	
Provider Evaluation		Door to Provider:	10 minutes
Stroke Code Activation		Door to Code:	15 minutes
Telestroke Activation		Door to Telestroke activation:	15 minutes
<i>Telestroke Connection/Consultation Who activated telestroke?</i>		<i>Door to Telestroke connection:</i>	<i>20 minutes from activation time</i>
CT Initiated		Door to CT:	25 minutes
CT Read		Door to CT read:	45 minutes
Transfer out of ED		Door to Transfer:	120 minutes
IV Thrombolytic Therapy		Door to Needle:	60 minutes
Weight obtained (method)			
Discussion of Risks and Benefits			
Double Check			
BP prior to infusion			
Thrombolytic used: Tenecteplase (Y / N) Bolus time: Alteplase (Y / N) Bolus time: Infusion time: Flush time:			
Post-Thrombolytic Monitoring		VS 15 15 15 15 15 15 15 15 N 15 15 15 15 15 15 15 15	
Documentation			
Dysphagia Screen documented	Y / N		
NIHSS documented (whom)	Y / N		
Reason no thrombolytic documented	Y / N		
<i>Consideration of disability for treatment</i>	Y / N		
<i>Considered for endovascular treatment</i>	Y / N		

Appendix F: Sample Stroke Specific Transfer Protocol and Memorandum of Agreement (CentraCare)

MEMORANDUM OF AGREEMENT

THIS MEMORANDUM OF AGREEMENT (the "MOA") is made and entered into as of _____ between **Telestroke site Name** and ~~the~~ St. Cloud Hospital.

- A. **PARTIES.** The parties in this agreement are **XXXX**, a Community Hospital, and St. Cloud Hospital, a Certified Comprehensive Stroke Center with 24/7/365 neurosurgery and endovascular capabilities.
- B. **PURPOSE.** This MOA is a voluntary Agreement among the hospitals that establishes an agreement for transfer of stroke patients requiring neurosurgical evaluation and/or treatment.
- C. **AGREEMENTS. XXXX** - agrees to perform neurological assessment and diagnostic procedures to determine neurosurgical, stroke or endovascular intervention eligibility according to current guidelines **XXXX** agrees to the established transfer protocol to access neurosurgical, stroke or endovascular consultation 24/7/365 with St. Cloud Hospital, including, but not limited to:
1. Consultation via telephone or TeleStroke as an initial point of contact.
 2. Providers from both hospitals discuss the physiological status of the patient and decide on the appropriate medical procedures and mode of transfer (air or ground).
 3. **XXXX** contacts St. Cloud Hospital for transfer at (888) 387-2862 and determines the appropriate aero medical or ground transportation and obtains an ETA.
 4. **XXXX** makes copies of all available documentation to accompany the patient (examples include the EMS run sheet, CT scans, and lab results).
- D. **TRANSFER PROTOCOL.** An interfacility Transfer Agreement supplements this MOA.
- E. **TERMS.** The term of this agreement is for three (3) years, commencing on the date of final signature and will be automatically renewed unless written notification is received ninety days prior to the expiration of the applicable term. Either party may terminate this relationship, with or without cause, upon fifteen (15) days written notice to the other party.

TELESTROKE SITE NAME

ST. CLOUD HOSPITAL

By:

By:

Date:

Date:

Its:

St. Cloud Hospital President

By:

By:

Date:

Date:

Its:

CCH Physician VP Acute Care VPMA

PATIENT TRANSFER AGREEMENT

This agreement is entered into and effective as of _____ (the “Effective Date”), between **TELESTROKE SITE NAME** and St. Cloud Hospital. The parties mutually agree with each other on the following:

Neither party discriminates against patients/clients on the basis of race, color, creed, national origin or ability to pay. Each party will inform the other of changes in policy, procedure or protocol which may influence patient care activities.

Therefore, the following agreement is affected by both **TELESTROKE SITE NAME** and St. Cloud Hospital each in independent status from the other. Both parties desire to cooperate in a plan to furnish quality, comprehensive care to patients/clients seeking their services. **TELESTROKE SITE NAME** and St. Cloud Hospital mutually agree with each other on the following responsibilities:

Responsibilities of St. Cloud Hospital:

1. To accept all patient transfers, including stroke patients, from the **TELESTROKE SITE NAME** within the resources of St. Cloud Hospital and in compliance with EMTALA.
2. To maintain complete control over the care of patients once they have been admitted to St. Cloud Hospital in accordance with medical staff rules, regulations, and policies.
3. To provide all nursing care including documentation of care rendered and maintenance of medical records as required by law.
4. At the time of discharge, the attending physician will send a copy of the Discharge Summary / Emergency Admission Note to the referring physician in a timely manner.

Responsibilities TELESTROKE SITE NAME

1. To make initial contact with the emergency department physician who will be assuming care of the patient at St. Cloud Hospital in the Emergency Room.
2. To give notice of transfer in advance of patient arrival.
3. To arrange for patient's transportation to St. Cloud Hospital.
4. To send copies of all pertinent and helpful patient records and information with the patient at time of admission.
5. To complete all necessary patient transfer forms.
6. Other communications between the facilities shall be as mutually agreed by the parties, and in compliance with federal and state confidentiality laws and regulations.

General Provisions:

1. This Agreement shall be valid for three (3) years and will be automatically renewed unless written notification is received ninety days prior to the expiration of the applicable term. Either party may terminate this agreement, with or without cause, upon sixty (60) days notice.

TELESTROKE SITE NAME

ST. CLOUD HOSPITAL

By:

By:

Date:

Date:

Its:

St. Cloud Hospital President

By:

By:

Date:

Date:

Its:

CCH Physician VP Acute Care VPMA

Appendix G: Stroke Leadership Letter

<<Fill in hospital address here>>

<<Fill in date here>>

Minnesota Stroke Program
Minnesota Department of Health
P.O. Box 64882, St. Paul, MN 55164-0882

Dear Minnesota Stroke Program:

This letter is attesting that HOSPITAL has designated NAME to serve as the on-site Stroke Medical Director. Insert experience here.

Additionally, NAME is the stroke coordinator for our facility. Insert experience here.

In these roles at HOSPITAL these staff are responsible for: Insert roles/responsibilities here.

Closing statement

Signatures of the CEO, Stroke Medical Director and Stroke Coordinator

Appendix H: CEO Attestation Letter

<<Fill in hospital address here>>

<<Fill in date here>>

Minnesota Stroke Program
Minnesota Department of Health
P.O. Box 64882, St. Paul, MN 55164-0882

Dear Minnesota Stroke Program:

In 2013, the Minnesota Legislature authorized the Minnesota Department of Health (MDH) to designate hospitals in Minnesota as "stroke hospitals." A hospital that meets the criteria for a Comprehensive Stroke Center (CSC), Primary Stroke Center (PSC), or Acute Stroke Ready Hospital (ASRH) may voluntarily apply to the Commissioner of Health for designation, and upon MDH's review and approval of the application, shall be designated as a CSC, PSC, or an ASRH for a three-year period.

As the CEO, I hereby attest that the application submitted by <<Fill in hospital name>> for <<Fill in designation level>> designation is accurate and current to the best of the hospital's ability, and I declare that the documentation provided is a true representation of the hospital's processes, protocols and capabilities as outlined by the designation criteria in Minnesota Statutes 2013 Section 144.493.

Sincerely,

Fill in CEO NAME

Handwritten signature

Date

Acute Stroke Ready Hospital Designation Checklist

Use this checklist to organize your documents to ensure that you have considered all relevant materials to submit a complete application.

Activation Log as evidence of Acute Stroke Team availability 24/7

- **Complete Narrative Section:** Describe how the stroke code activation log and the stroke code activation process works at your facility. How do you track stroke code activations in real time? How does this document support your performance improvement process?
- Activation log: TEMPLATE Log to include minimum details- Activation Date and Time, Time of AST response, Diagnosis, Treatment, and Final Diagnosis.

Written stroke protocols or algorithms for acute treatment in the ED

- **Complete Narrative Section:** Who are the key staff involved in the stroke code process? Describe what happens when you active your code process. Describe what order sets are used and when.
- **Protocol that reflects ED process for stroke**
 - Roles and Responsibilities of staff
 - Time goals [Door to Provider, Door to Telestroke, Door to CT, Door to CT read, Door to Needle, Door to Door (Transfer out)]
 - Time Frame for Activation/ Clock Time Last Known Well
 - Symptoms and criteria for Activation
 - Labs (glucose, coags, etc.)
 - IV access
 - Vitals and BP parameters and BP meds
 - NIHSS/Neuro assessment
 - Non-contrast Head CT (do you also provide CTA? Add this into narrative/protocol/algorithm)
 - Consultation with Neurology/Tele-stroke
 - Consideration of treatment by times from last known well (consideration of thrombolytic treatment, endovascular, hemorrhage)
 - Inclusion/Exclusion criteria for thrombolytics
 - Thrombolytic dosing and administration (accurate weights)
 - Post-thrombolytic management and consideration of complications
 - Endovascular consideration
- **Algorithm that depicts stroke code process (compliments protocol)**
- **Protocol/policy for inpatient stroke code**
- **Inclusion/Exclusion criteria**
- **Order sets** to support protocol/algorithm
- **ED order sets** (ischemic with/without treatment, which include the initial work-up and management of stroke) to include at a minimum the following:
 - Weights

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- Vital signs and neuro checks
- BP parameters
- Pre-checked labs
- Radiology orders
- Dysphagia screen/order for strict NPO until screened
- IV access
- **Thrombolytic treatment order set** and/or supporting documentation (this can be included in above order set)
 - Dosing and administration instructions
 - Patient monitoring during and after alteplase infusion
 - Vital signs and neuro checks
 - BP parameters and medications
 - Complications to monitor for and actions to take if they occur
 - Avoid antiplatelets, anticoagulants, IV starts, etc.
 - Transfer (if not admitted)
 - For those who admit IV thrombolytic patients:
 - **Letter** describing the circumstances when you will admit a treated patient, signed by the stroke coordinator.
 - **Admission order sets for stroke with IV thrombolytics** (only if your hospital routinely keeps these patients).
 - Vital signs and neuro assessments
 - BP parameter and BP meds
 - Imaging - CT/CTA, MRI/MRA, CUS, echocardiogram, TEE
 - Labs
 - Dysphagia screening
 - Core measure related orders
 - PT/OT/SLP
 - Meds - ASA, Plavix, statins
 - Stroke education
 - Cardiac monitoring
 - When to call the provider
 - **Dysphagia screening protocol**

EMS

- **Complete Narrative Section:** Which EMS agencies deliver stroke patients to you? How do you collaborate? Does EMS participate in your stroke committee? Do you provide education to EMS? Do you provide feedback to EMS on stroke cases?
- EMS stroke protocol

Optional: Interfacility Transport Protocol for Alteplase Patients (Drip and Ship)

Education

- **Complete Narrative Section:** How do you address staff education? Who is responsible for assigning and/or providing stroke education to staff? Who is responsible for tracking stroke education of staff?
- **A detailed table of the stroke education plan for the next three years** with estimated date, staff targeted (AST) and expected educational hours.
- **Onboarding education for new hires** is required to be included in the education plan.
- **For locum providers or casual providers,** it is acceptable to use an attestation letter completed by the provider detailing the date and stroke education completed elsewhere.

Lab

- **Complete Narrative Section:** Is laboratory staff in-house 24/7 or do they have on-call hours? What is their response time when on call? What is the typical turn-around time for stat labs?
- **Scope of Service** showing 24/7 availability - including on-call response times. If missing from SOS, include information in your narrative.
- **STAT labs** reflected in order set

Radiology

- **Complete Narrative Section:** Are radiology technicians in-house 24/7 or do they have on-call hours? What is their response time when on call? Who completes radiology CT reads? What is the expected turnaround time for stat CT reads?
- **Scope of Service** that contains the below. If missing from SOS, include information in your narrative.
 - CT tech on site or on call, specify hours, specify expected response time when called in
 - Radiologist on site or teleradiology, specify hours, specify expected turnaround time (read back) for stroke
 - STAT read for stroke (can be in order sets)

Data collection and utilization

- **Complete Narrative Section:** Explain how your program conducts performance improvement and quality improvement work. What is the process of case identification, case review and abstraction at your facility? What is the process of aggregating cases to help identify meaningful PI projects?
- **UP TO DATE IN THE REGISTRY with case abstraction.**
- **Evidence of data collection:** Upload reports on key stroke metrics that you track (i.e., door to CT, door to CT read, door to needle, door to door) that support your data collection and performance improvement efforts.

- **Evidence of utilization of data for performance improvement.** Upload an example that demonstrates your performance improvement efforts. This may include action plans, data tracking sheets, meeting minutes and results. **Limit to 5 documents.**
- Stroke Meeting agendas and meeting minutes from last year.
- Template or example of case review or feedback forms.

Transfer agreements

- **Complete Narrative Section:** How do you initiate a transfer? Are patients typically transferred by ground or air service? Who is the primary transfer service utilized? Who is your primary receiving facility? Do you receive feedback on transferred patients?
- **Protocol or algorithm** that describes how you prepare a patient to transfer out of your ED. Must contain:
 - Phone number to call for transfer to next level of care (transfer center or similar at receiving facility – if you commonly transfer to more than one facility, include contact information for each)
 - Who makes decisions on air vs ground transport?
 - Phone number to call for EMS (or who contacts them if done by receiving facility)
 - Handoff to EMS: Consideration of tubing and pump exchange if sending with alteplase infusion
 - Consideration of how to get records to next hospital (if no shared electronic health record, which records/imaging is sent?)
 - Report to next facility
- MOA or transfer agreement
 - Stroke-specific, including mechanical thrombectomy and neurosurgical capabilities
 - Signed by CEO or designee of both hospitals
 - **Must be active**

Stroke Leadership

- Letter co-signed by CEO, stroke coordinator and stroke medical provider, attesting to roles
 - Stroke coordinator and medical director must have some time on-site to manage stroke program.
 - MD should be on-site **and** can have medical direction provided through telestroke with engaged case review.