

Stony Brook Medicine Comprehensive Stroke Program

Stroke Program Orientation for Medical Staff



The Joint
Commission®



American Heart
Association®
American Stroke
Association®



Comprehensive Stroke Center

CERTIFICATION

Meets standards for

Comprehensive Stroke Center



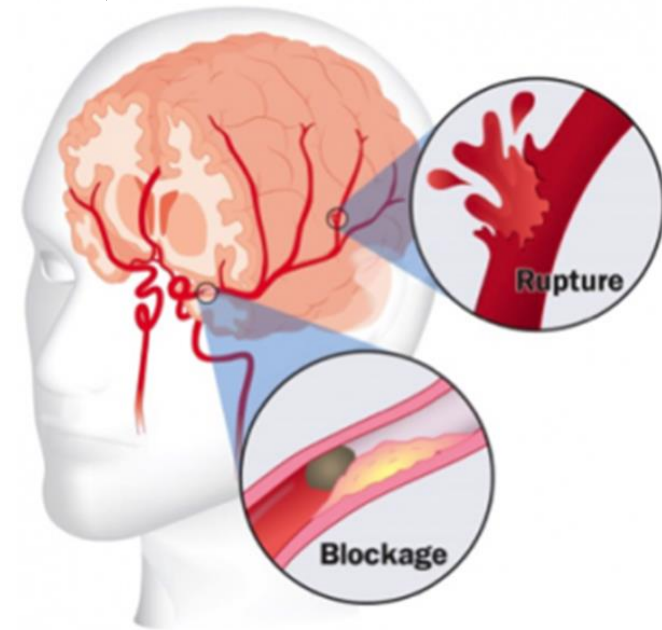
STROKE

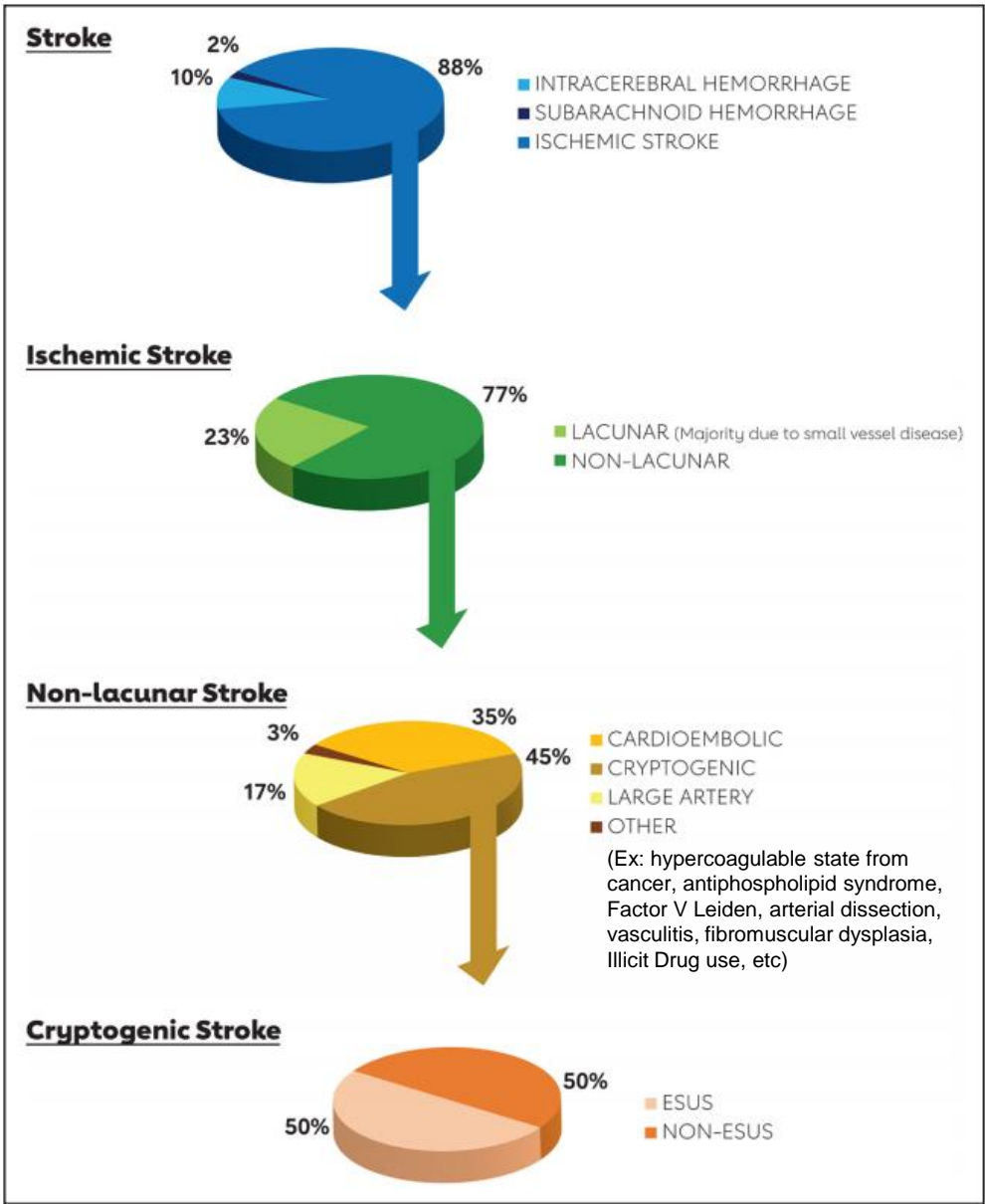


Objectives:

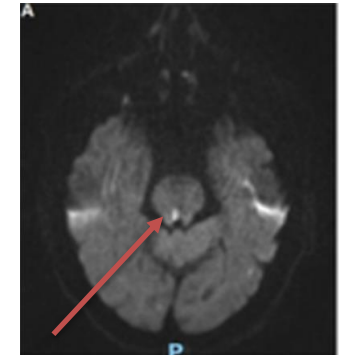
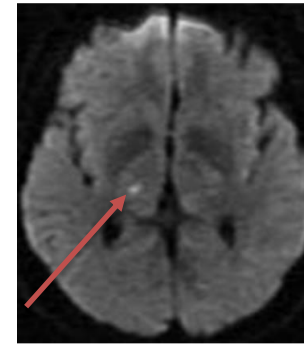
- Familiarize with acute stroke response time targets
- Familiarize with the available acute stroke codes and call criteria -
CODE BAT (Brain Attack Team)
CODE CSI (Complex Stroke Intervention)
- Understand responsibilities of the primary team during an Inpatient CODE BAT
- Verbalize where to locate stroke-related clinical practice guidelines and protocols
- Familiarize with Joint Commission, New York State Department of Health and Stroke: Get-With-The-Guidelines core measures and quality requirements

- Each year, about 795,000 people experience a new or recurrent stroke
 - Approximately 610,000 of these are first attacks
 - 185,000 are recurrent attacks
- On average, every 40 seconds, someone in the United States has a stroke
- Stroke is a leading cause of serious long-term disability in the United States
- Stroke is the No. 5 cause of death in United States; 1 of every 19 deaths
- 87% of the stroke risk could be attributed to modifiable risk factors such as HTN, obesity, DM, HLD, and renal dysfunction; 47% could be attributed to behavioral risk factors such as smoking, sedentary lifestyle, and an unhealthy diet.

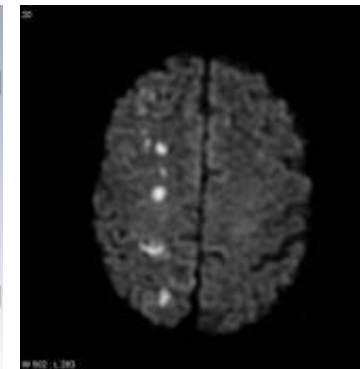
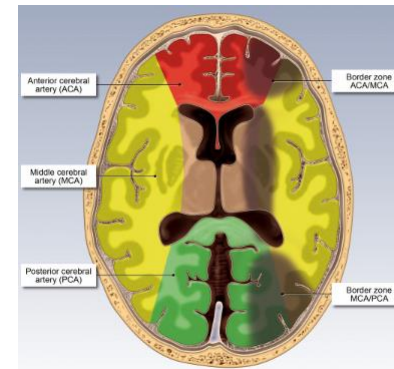




Lacunar infarct - are small (<20 mm) infarcts in the distal distribution of deep penetrating vessels result from occlusion of one of the small penetrating end arteries result primarily from in situ microatheroma formation or lipohyalinosis



Watershed infarct – are ischemic lesions which are situated along the border zones between the territories of two major arteries usually caused by hypoperfusion or decreased blood flow.



- The direct and indirect cost of stroke in the United States was \$56.2 billion
- Common complications after stroke include both short-term complications such as seizures, DVT, PE, urinary infection, aspiration pneumonia, decubitus ulcers, and constipation and long-term sequelae, including pain syndromes, pseudobulbar affect, depression and anxiety, cognitive impairment and dementia, epilepsy, gait instability, and falls and fractures







ACUTE STROKE IS A MEDICAL EMERGENCY

	Neurons Lost
Per Stroke	1.2 billion
Per Hour	120 million
Per Minute	1.9 million
Per Second	32 000

SPOT A STROKE

LEARN THE WARNING SIGNS AND ACT FAST

B **E** **F** **A** **S** **T**

BALANCE
LOSS OF BALANCE,
HEADACHE
OR DIZZINESS

EYES
BLURRED VISION

FACE
ONE SIDE OF THE
FACE IS DROOPING

ARMS
ARM OR LEG
WEAKNESS

SPEECH
SPEECH DIFFICULTY

TIME
TIME TO CALL
FOR AMBULANCE
IMMEDIATELY



Target Response Times:

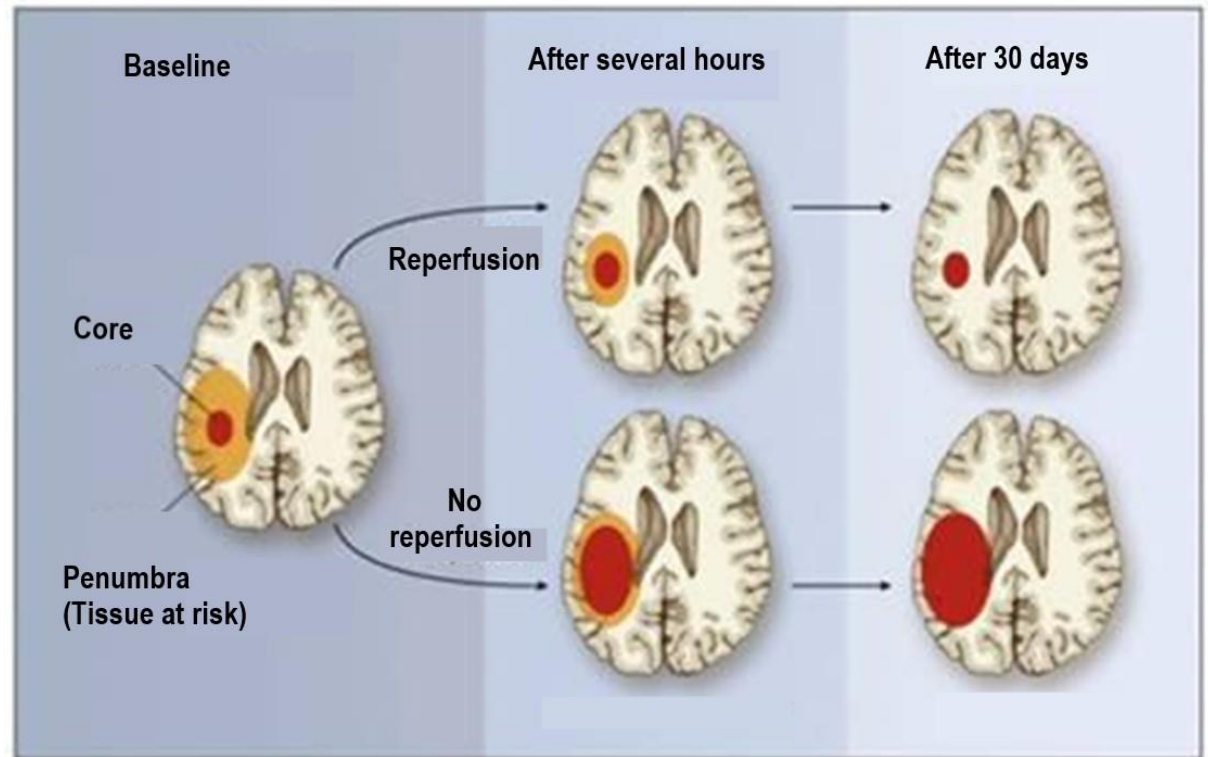
- **EMS recognition of stroke in the field** → hospital pre-notification, pre-hospital stroke scale finding
- **MD Evaluation:** ≤10 minutes
- **Stroke Team:** ≤ 15 minutes
- **CT Initiation Time :** ≤ 15 minutes
- **Lab result :** ≤ 45 minutes ; only the assessment of blood glucose level must precede the administration of IV thrombolytic unless there is a suspicion of abnormal hematologic or coagulation test.
- **IV thrombolytic administration :** ≤ 45 minutes
- **Mechanical Thrombectomy: First Pass :** ≤ 60 minutes for Transfers and Mobile Stroke Unit;
≤ 90 minutes for patients presenting directly to Stony Brook ED

Rationale for rapid evaluation and treatment

- At the onset of stroke symptoms, the stroke is evolving
- Rapid clot lysis reperfuses ischemic tissue limiting the eventual size of the infarct
- Timely restoration of blood flow in ischemic stroke patients is effective in reducing long-term morbidity.

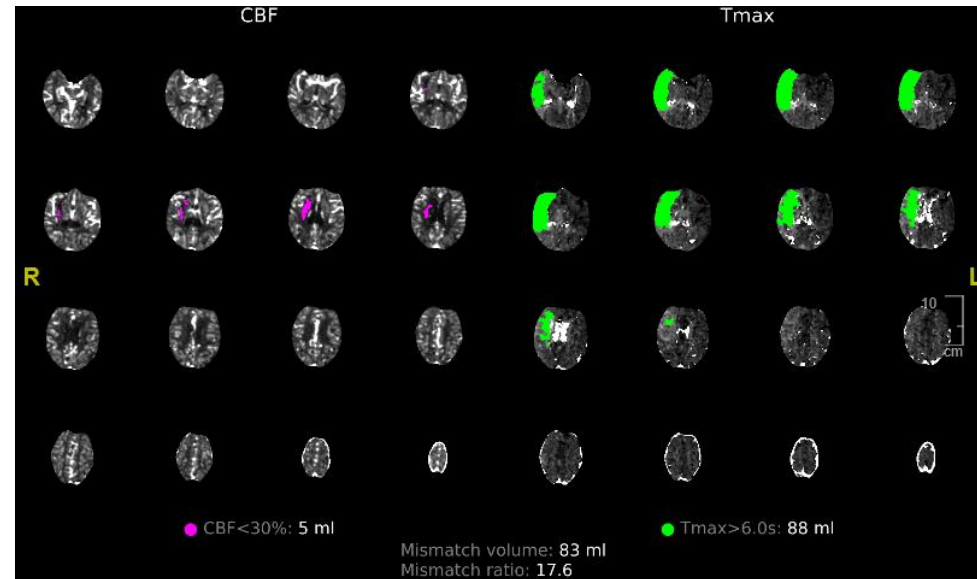
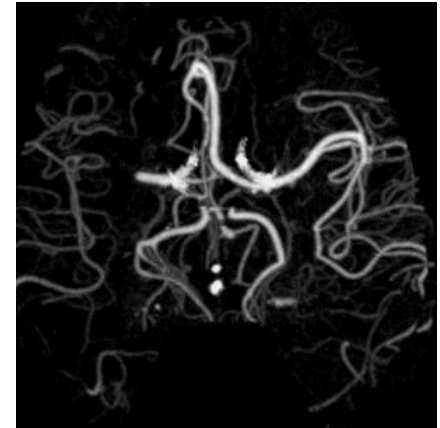
Ischemic Penumbra

- brain tissue at risk of progressing to infarction but is still salvageable if re-perfused.
- generally located around an infarct core which represents the tissue which has already infarcted or is going to infarct regardless of reperfusion.



Acute ischemic stroke treatment:

- IV thrombolytic for eligible acute ischemic stroke patients with last known well time up to 4.5 hours
 - Tenecteplase (TNKase), first choice, ordered using the Stroke-Tenecteplase (TNK) Power Plan
 - Alteplase (Activase), ordered using Stroke-Alteplase (rT-PA) Power Plan
 - [Click to review IV thrombolytic inclusion/exclusion criteria for stroke](#)
- Mechanical thrombectomy for eligible patients
 - [Click to review criteria for endovascular intervention](#)



**Right MCA occlusion
Pre-thrombectomy**



**Right MCA revascularization
Post thrombectomy**



- ✓ Review PC0078 Code BAT Brain Attack Team for Acute Stroke Adult and Pediatric policy for more information

Code BAT (Brain Attack Team)

- called in the **inpatient units** for suspected stroke patients within 0-24 hours of last known well time
- called in the **ED** for suspected stroke patients with last known well time less than 6 hours AND Los Angeles Motor Scale (LAMS) + Speech Score less than 4
- **Code BAT-Pediatric**: is called for patients less than 18 years of age with last known well time within 0-24 hours.

Code CSI (Complex Stroke Intervention)

- called in the **inpatient units** by the Stroke Attending or designee to upgrade a Code BAT to a code CSI due to suspicion of a large vessel occlusion (LVO) or a bleed after imaging needing expeditious neurosurgical evaluation
- called in the **ED** for patients presenting within 0-24 hours of last known well time with LAMS + Speech score ≥ to 4, unknown last known well time, possible LVO on exam or if imaging showed vessel occlusion needing endovascular intervention, intracerebral hemorrhage or subarachnoid hemorrhage needing neurosurgical evaluation/intervention

Imaging orders:

- ✓ **“CODE BAT BAT CT Head w/o Contrast”** is ordered STAT to rule-out ICH
- ✓ **“CODE BAT CT Angio Head/ Neck W IV Con with Perfusion”** is ordered to evaluate vessels and perfusion mismatch/penumbra

Stony Brook Emergency Department Acute Stroke Team Activations

Pathway #1

Patient arrives to ED via EMS or walk in with ACTIVE signs and or symptoms of a stroke
(Patients with resolved symptoms will follow the TIA pathway)

Triage staff member performs and documents LAMS +Speech Score

Score < 4 AND 0-6 hours from last known well at presentation

Score < 4 AND > 6 hours from last known well at presentation

Score ≥ 4 AND 0-24 hours from last known well at presentation

Triage Nurse activates CODE BAT

NO CODE
Notify MD "potential stroke"
MD may activate CODE BAT or CODE CSI IF APPROPRIATE

Triage Nurse activates CODE CSI

EMS activates CODE CSI
"EMS TRANSFER" at 10 minute ETA

Neurology responds to rapidly evaluate the patient for TPA and intervention

If ICH or LVO is discovered the clinician will activate CODE CSI

Neurology, Neurosurgery and Cerebrovascular Team respond to rapidly evaluate the patient for intervention

Pathway #2

Patient is transferred from another hospital with an ischemic stroke or spontaneous, non-traumatic intracranial hemorrhage

Transfer approved by the Cerebrovascular Attending or Stroke Neurology Attending

EMS notifies Stroke Neurology Resident and Neurosurgery PA/NP of the estimated time of arrival.

The accepting Physician or designee will notify EMS if a CODE BAT or CODE CSI is to be called, if any imaging is needed on arrival and if the patient will bypass the ED for OR/Cerebrovascular suite

EMS activates CODE BAT
"EMS TRANSFER" at 10 minute ETA

Pathway #3

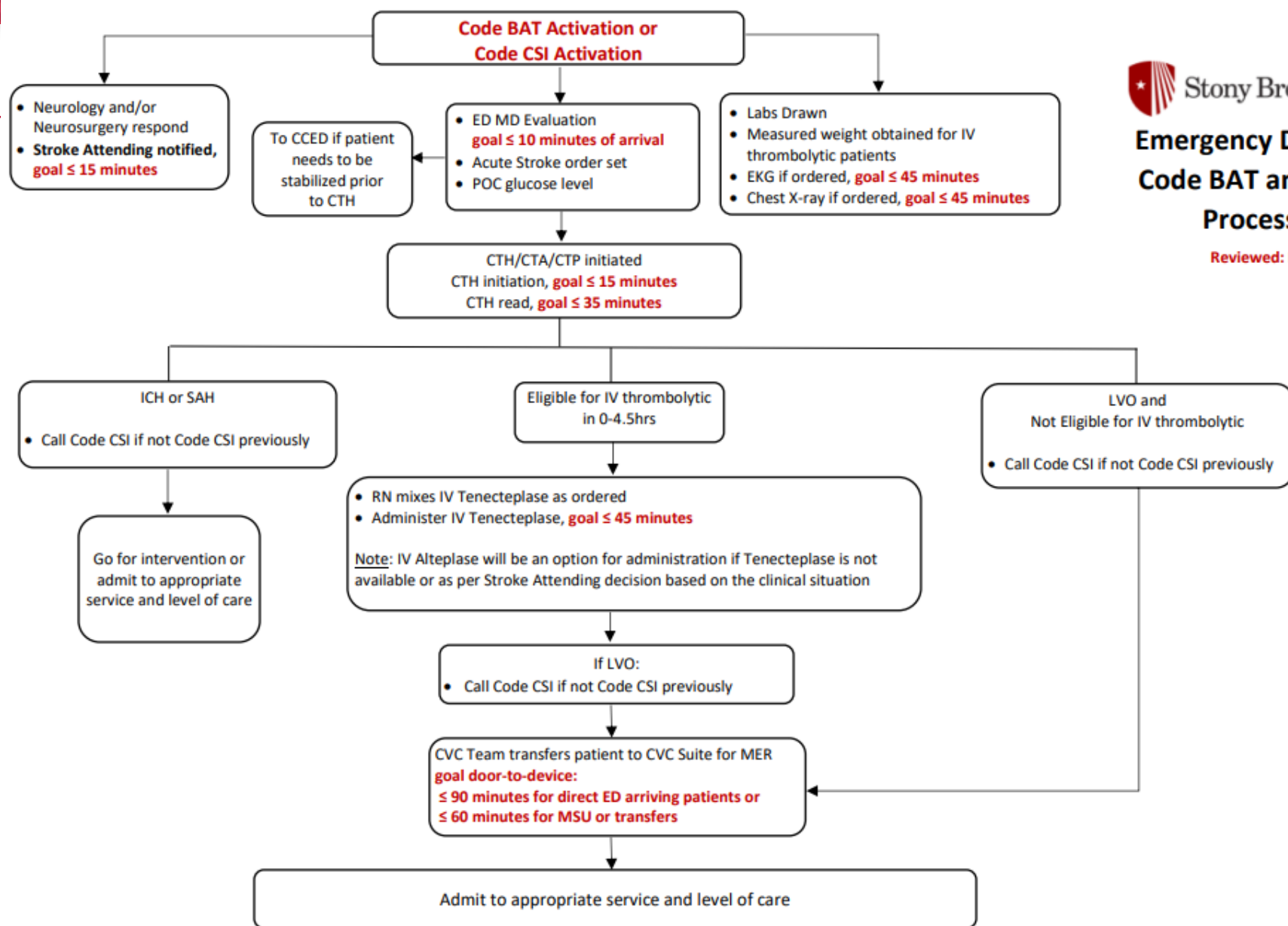
Any ED patient NOT previously assessed as part of a stroke "CODE", found to have a new spontaneous, non-traumatic intracranial hemorrhage

MD activates CODE CSI

Reviewed: May 2023

Emergency Department Code BAT and Code CSI Process Flow

Reviewed: May 2023



When more than one patient arrives at the same time and fulfill the Code BAT or Code CSI criteria:

The Stroke Attending (or his/her designee) in collaboration with the ED Attending Physician or Neurosurgery Attending are responsible for overseeing the decision-making process for prioritizing and expediting a rapid primary survey, evaluation, stabilization, management, and treatment for suspected acute stroke/TIA patients.

BAT- Brain Attack Team

CSI – Complex Stroke Intervention

MER – Mechanical Endovascular Reperfusion

LVO – Large Vessel Occlusion

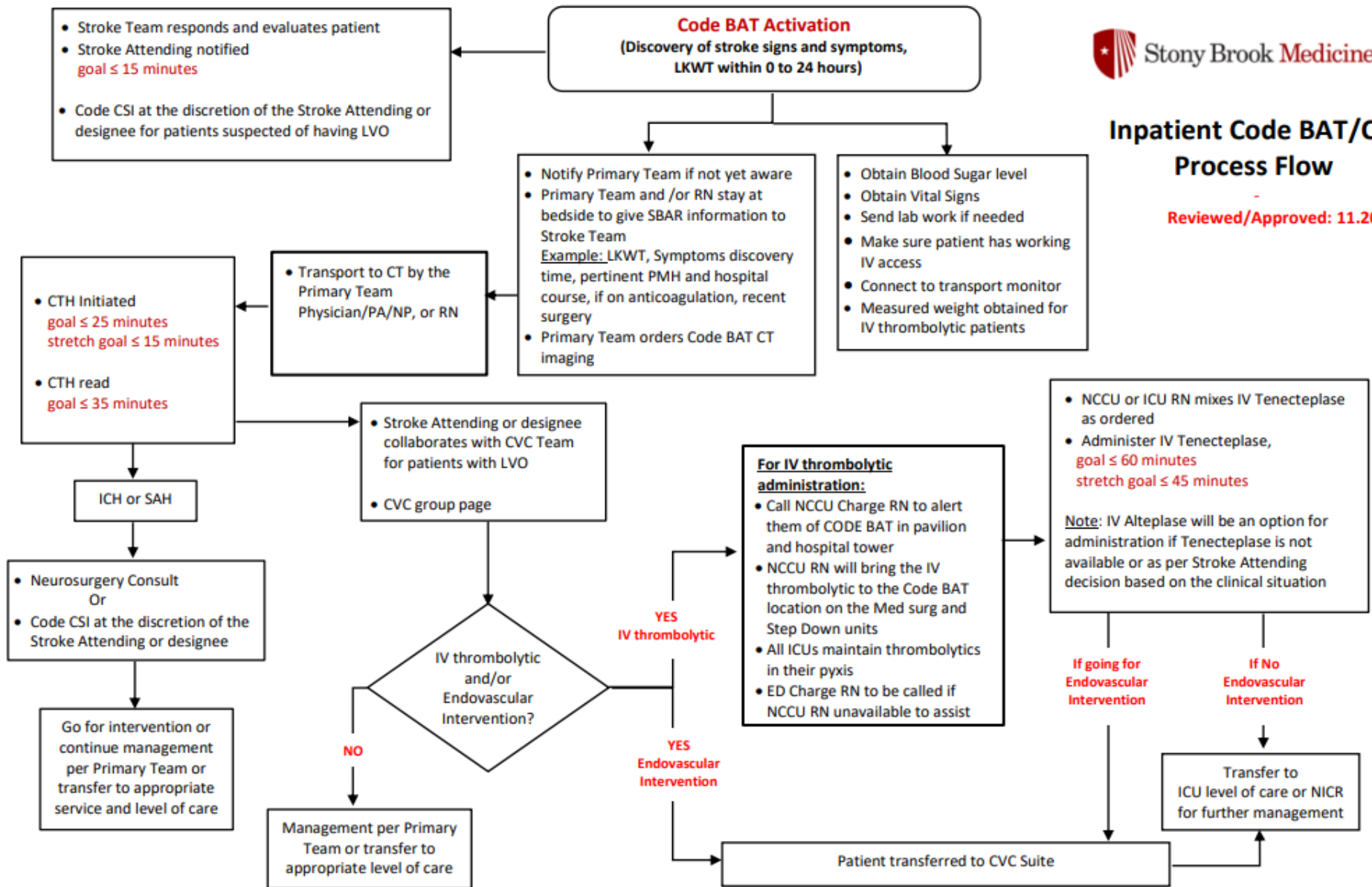
Door-to-Device - arrival to first pass with thrombectomy device

MSU – Mobile Stroke Unit

LKWT- Last known well time

Inpatient Code BAT/CSI Process Flow

Reviewed/Approved: 11.2023



When there is more than one Code BAT called simultaneously:

The Stroke Attending (or designee) in collaboration with the Primary Team are responsible for overseeing the decision-making process for prioritizing and expediting a rapid primary survey, evaluation, stabilization, management, and treatment for suspected acute stroke patients.

BAT- Brain Attack Team

CSI – Complex Stroke Intervention

LKWT – Last Known Well Time or last known time to be at baseline

LVO – Large Vessel Occlusion

CVC – Cerebrovascular Center

To help expedite inpatient Code BAT/CSI process:

- Primary Team Physician/NP/PA and/or Primary RN to stay at bedside to give SBAR to Stroke Team
Ex: Pertinent PMH/hospital course, stroke symptoms, last known well time, symptoms discovery time, if patient is on anticoagulation, if recent surgery, pertinent lab result
- Obtain blood sugar level to rule-out hypoglycemia
- Make sure a working IV is in place, 2 IVs preferable
- Primary Team to order:
 - **“CODE BAT CT Head w/o Contrast”** STAT to rule-out ICH.
 - **“CODE BAT CT Angio Head/ Neck with IV CON with Perfusion”** to evaluate vessels and perfusion.
- Connect patient to a portable cardiac monitor for transport, have oxygen available if needed
- **Patient is transported to CT Scan by the Primary Team Physician/NP/PA.**
 - To avoid delays in the event the Primary Team is not available, the patient may be transported to CT by an authorized provider or an RN.
- Notify CT staff if patient is en route to CT, if Code BAT is being cancelled or if there is delay in transporting patient

For IV thrombolytic:

- Call the NCCU charge nurse if IV thrombolytic is needed for an inpatient Code BAT/CSI in the MedSurg or ICR units
- IV thrombolytics are available in the ICU Pyxis and all ICU RNs have competency to administer IV thrombolytics
- Collaborate with ADN if patient needs transfer to another service or higher level of care
- The ED may be contacted if additional assistance is needed for IV thrombolytic administration

Note: Measured weight is needed for IV thrombolytic dosing

- STK-1** VTE prophylaxis on the day of or the day after hospital admission.
- STK-2** Antithrombotic therapy at hospital discharge.
- STK-3** Anticoagulation for Atrial fibrillation/flutter at hospital discharge.
- STK-4** IV t-PA initiated at this hospital within 3 hours of time last known well.
- STK-5** Antithrombotic therapy by the end of hospital day 2.
- STK-6** Statin medication at hospital discharge.
- STK-8** Patient and/or caregiver stroke education: EMS Activation/calling 911, need for follow-up after discharge, medications prescribed at discharge, personal risk factors for stroke and warning signs and symptoms of stroke.
- STK-10** Rehabilitation services assessment

- ✓ LIPs must be mindful of the specific time period of the core measures for compliance.
- ✓ Reason(s) must be documented in the medical record if a core measure is not implemented for the patient

Example:

- No antithrombotic started by hospital day 2 secondary to concern for bleeding.
- No statin on discharge due to patient refusal of statin recommendation.
- No PT or OT evaluation needed as patient is back to baseline, no symptoms from stroke, ambulating steady

CSTK 01 – Initial NIH Stroke Scale score

CSTK 02 - Modified Rankin Score at 90 Days

CSTK 03a - Severity Measurement Performed : Hunt and Hess Scale performed for SAH patients

CSTK 03b – Severity Measurement Performed: ICH Score performed for ICH patients

CSTK 04 - Procoagulant Reversal Agent Initiation for ICH patients

CSTK 05a - Hemorrhagic Transformation for IV t-PA patients

CSTK 05b - Hemorrhagic Transformation for IA t-PA and/or Endovascular Reperfusion Therapy patients

CSTK 06 - Nimodipine Treatment Administered

CSTK 07 - Median Time to Revascularization

CSTK 08 - Thrombolysis in Cerebral Infarction (TICI) post-treatment reperfusion grade

CSTK 09 - Arrival Time to Skin Puncture

CSTK 10 - Modified Rankin Score at 90 Days

CSTK 11 - Timeliness of Reperfusion: Arrival Time to TICI 2B or Higher

CSTK 12 - Timeliness of Reperfusion: Skin Puncture to TICI 2B or Higher


Requirements for New York State and Get-With-The-Guidelines:

- Annual 8 hours of cerebrovascular-related continuing education for Physicians, NP, PAs and RNs taking care of stroke patients
- Dysphagia Screen before being given any food, fluids, or medication by mouth
 - RN or LIP completes bedside swallow evaluation using the Yale Swallow Protocol
 - If indicated, formal swallow evaluation by Speech and Language Pathologist
 - For patients who failed swallow evaluation and need to be on an antithrombotic: Consider ordering Aspirin Per Rectum or place NGT for patients who need Plavix (Clopidogrel), Brilinta (Ticagrelor) or an oral anticoagulant
- HgbA1C
- Lipid profile
- Intensive statin therapy:
 - Lipitor (Atorvastatin) \geq 40mg, Crestor (Rosuvastatin) \geq 20mg
 - Need documentation of reason if intensive statin dose is not ordered at patient discharge
- Stroke-Diabetes measures
 - Diabetes Treatment (diet or medication, follow-up for diabetes management at discharge), Therapeutic lifestyle recommendation (diet, target BMI \leq 25, increasing physical activity), antihyperglycemic medication with proven CVD benefit (GLP-1 receptor agonist or SGLT-2 inhibitor)
 - Need documentation of reason if antihyperglycemic medication with proven CVD benefit is not ordered at discharge
- modified Rankin Score documentation at discharge
- NIH Stroke Scale score documentation at discharge

- [Guidelines for the early management of patients with acute ischemic stroke \(AHA/ASA 2019\)](#)
- [Diagnosis, Workup, Risk Reduction of Transient Ischemic Attack in the Emergency Department Setting \(AHA/ASA 2023\)](#)
- [Guidelines for the management of spontaneous ICH \(AHA/ASA, 2022\)](#)
- [Guidelines for prevention of stroke in patients with stroke and TIA \(AHA/ASA 2021\)](#)
- [Guidelines for adult stroke rehabilitation and recovery \(AHA/ASA 2016\)](#)
- [Guidelines for the management of patients with unruptured intracranial aneurysms \(AHA/ASA, 2015\)](#)
- [Guideline for the Management of Patients With Aneurysmal Subarachnoid Hemorrhage \(AHA/ASA 2023\)](#)
- [Guidelines for the acute treatment of cerebral edema in neurocritical care patients \(NCS 2020\)](#)
- [Clinical practice guidelines for management of extracranial cerebrovascular disease \(Society for Vascular Surgery 2022\)](#)
- [The Society for Vascular Surgery practice guidelines on follow-up after vascular surgery arterial procedures \(Society for Vascular Surgery, 2018\)](#)
- [Scientific Statement on Cognitive Impairment After Ischemic and Hemorrhagic Stroke \(AHA 2023\)](#)

- [AHA/ASA 2019 - Recommendations for the Implementation of Stroke Systems of Care](#)
- [AHA/ASA 2023 - Ideal Foundational Requirements for Stroke Program Development and Growth](#)

- ✓ Check-out the Stroke Intranet Site in ThePulse.
- ✓ It contains the Stroke-related Clinical Practice Guidelines (CPGs), protocols, staff and patient resources.



The screenshot shows the 'ThePulse' intranet interface. At the top left is the Stony Brook Medicine logo. To its right is the word 'ThePulse' in a large, bold font. Further right is a search bar with a magnifying glass icon and the text 'Search'. Below this is a dark red navigation bar with a home icon and the following menu items: 'EMPLOYEE RECOGNITION', 'RESOURCES', 'NURSING', 'PHYSICIAN PORTAL', and 'PATIENT EXPERIENCE'. The main content area features a large image of healthcare professionals in scrubs and masks, and a woman hugging a child. A 'Quick Links' sidebar is on the right, listing various system links. The link '[Stroke - Protocols / Code BAT / Code CSI](#)' is highlighted with a yellow box and a yellow arrow pointing to it from the left. Below the sidebar, there is a footer with text: 'Stony Brook Medicine's advertising campaign, All We Do Is All for you, is running on TV, radio, social media,'.

Click to review

- Dispatched by Suffolk County EMS/911
- Assessment on scene
 - CC ED RN, Paramedic, Neurologist-telemedicine
- Imaging on scene immediately sent to PACS
 - CT Head to see bleeding/stroke
 - CTA Head to see vessel occlusion
- Treatment provided en route
 - IV thrombolytic for eligible patients
 - KCentra for bleeding due to anticoagulant
 - Critical Care medicines and equipment for blood pressure and airway emergencies
- Disposition to the appropriate hospital coordinated by Stony Brook EMS
 - Stony Brook or nearest Comprehensive Stroke Center for complex stroke:
 - ICH/SAH
 - Large Vessel Occlusion requiring mechanical thrombectomy
 - Nearest Primary Stroke Center for non-interventional stroke care



Stroke Support Group

Receive encouragement, feedback and inspiration. Gain knowledge. Learn about helpful programs and resources. Open to all stroke survivors, family members and caregivers.

Stroke Caregiver Support Group - Meets the second Tuesday of every month, 7pm-8pm

Stroke Survivor Support Group - Meets the last Tuesday of every Month, 7pm-8pm

For more information, contact:

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Thank you for all you do everyday for our stroke patients.

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