

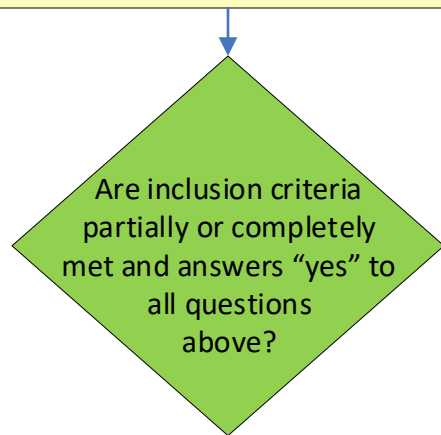
1. Initial Approach

Inclusion Criteria: ≥ 2 years old, onset of focal neurological deficit within last 24 hours

Screening questions

- Is there a focal neurological deficit?
 - Unilateral weakness or sensory change
 - Vision loss/double vision
 - Speech difficulty
 - Dizziness/trouble walking
- Did the problem start/worsen suddenly?
- Was child last seen well (at neurologic baseline) within the last 24 hours?

Exclusion criteria:
 Patients with brain tumor, history of seizures with Todd's paralysis, current signs of meningitis, endocarditis; onset of symptoms >24 hours ago; h/o hemorrhagic stroke



No
 Consider urgent Neurology consult and initiate neuroprotective care

- ED/PICU Immediate Actions**
- Stabilize patient
 - Use order set: "ED-ACUTE STROKE" or "PICU-ACUTE STROKE"
 - Assure STAT Head CT ordered
ED/ICU attending calls radiology attending for STAT stroke imaging
 - Physician performs and documents PedNIHSS (if able)
 - Vital signs, continuous monitoring
 - Start IV x2
 - STAT Labs: CBC, CMP, DIC panel, LFTs, ESR, CRP, urine tox screen, bHCG (if appropriate), type/screen, thromboelastogram; if SCD add Hb electrophoresis
 - NPO
 - HOB flat
 - EKG
 - Normotension: target SBP 50th-95th percentile for age (see BP Parameters sheet on page 4)
 - Normoglycemia: no glucose in IVF
 - Normal oxygenation. Notify MD before placing on supplemental O₂
 - Normothermia
 - Seizure control
 - Bedside RN completes MR checklist
 - Arrange transfer to PICU

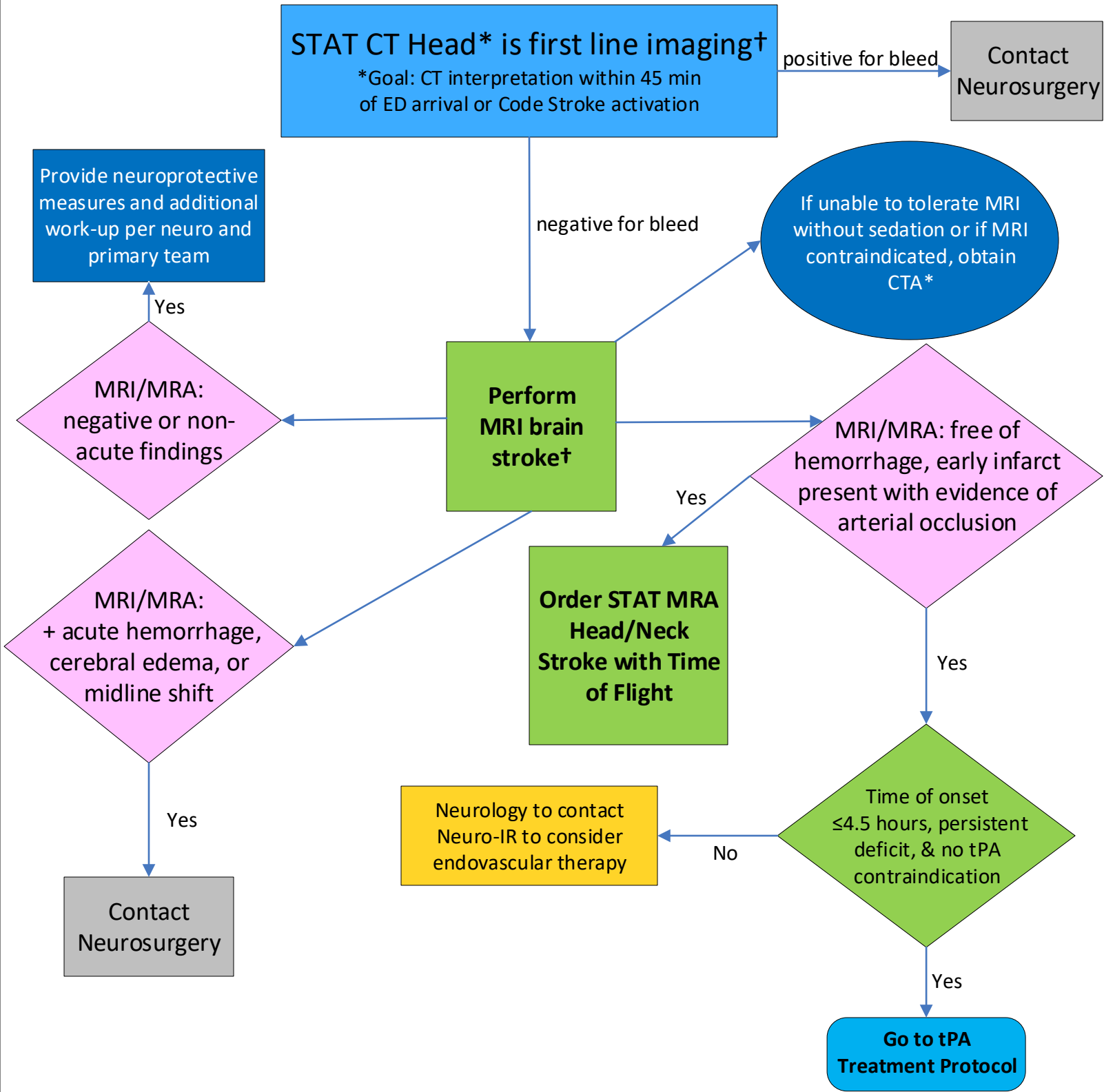
- Neurology Actions**
 Neurology resident* evaluation includes:
- Documents PedNIHSS
 - Confirms presentation consistent with acute arterial ischemic stroke
 - Documents last known well time
 - Verifies with radiology that correct imaging ordered
 - Completes t-PA and thrombectomy checklists
- * Evaluation occurs within 10 minutes, by telemedicine or at bedside.
- Attending neurologist will communicate with attending radiologist by the time the patient is en route to imaging.

Activate Code Stroke
 (see addendum for inpatient and ED process – page 6)

Code stroke alert goes to:
 Neurology attending and resident, CT tech, MRI tech, Radiology attending, Neuro-IR, ED Charge RN, PICU Charge RN, Pharmacy, Laboratory
 *If known sickle cell disease patient, page hematology stat

See written guidelines for more information

2. Imaging and tPA and Thrombectomy Candidacy



†Radiology reports imaging results to neurology and ED/PICU attending

*If unable to tolerate CTA, ED/PICU to call anesthesia for emergent sedation for imaging.

3. tPA Treatment Protocol

IV tPA Treatment candidate: ≤ 4.5 hours from onset, persistent focal deficits, no contraindications**, BOTH proven infarct AND arterial occlusion on MR or CT/CTA

Exclusion criteria:
 < 2 years old
 or any
 contraindication to
 tPA listed below

Neurology contacts Hematology and ED/PICU pharmacy, orders tPA via Acute Stroke tPA order set, verifies no contraindications, obtains consent from family

*Neurology attending provides final approval for tPA

ED Pharmacist prepares tPA infusion with STAT release.

TPA administration occurs in ED or PICU with close monitoring and tight blood pressure control as defined in BP Parameters and Management (see page 4)

TPA given as :
 Bolus: 10% of total dose, IV over 5 min
 Infusion: remaining 90%, IV over 1 hour
 Total dose: 0.9 mg/kg IV

**tPA Contraindications

HISTORY

- > 4.5 hours from last seen well or unknown time of sx onset
- Stroke, major head trauma, or intracranial surgery within 3 months
- History of prior intracranial hemorrhage, known AVM, aneurysm
- Major surgery or parenchymal biopsy within 10 days
- GI or GU bleeding within 21 days
- Neoplasm/malignancy within 1 month of completion of tx
- Underlying significant bleeding disorder
 (mild platelet dysfunction, mild vWF, other mild disorders are not excluded)
- Previously diagnosed primary CNS angiitis or secondary arteritis

PATIENT FACTORS

- Pt would decline blood transfusion if indicated
- Presentation c/w acute myocardial infarction or post-MI pericarditis that requires cardiology evaluation before tx
- Arterial puncture at non-compressible site or LP within 7 days
 (Pt with cardiac cath via compressible artery are NOT excluded).

ETIOLOGY

- Stroke due to SBE, sickle cell, meningitis, embolism (bone marrow, air, or fat), or Moya Moya

EXAM

- Persistent SBP $> 15\%$ above 95th percentile for age while sitting or supine
- Mild deficit (PedNIHSS < 6) at start of tPA infusion
- Severe deficit suggesting large territory stroke
- PedNIHSS > 25 , regardless of infarct volume on imaging

IMAGING

- Sx suggestive of SAH, even if normal imaging
- CT with hypodensity/sulcal effacement $> 33\%$ of MCA territory
- Intracranial cervicocephalic arterial dissection

LABS

- Glucose < 50 or > 400 mg/dL
- Platelets < 100 K, PT > 15 sec, INR > 1.4 , or PTT $>$ upper limit of normal range

4. Systolic blood pressure parameters and management

This guideline for systolic blood pressure parameters is for children in whom a “Code Stroke” has been activated

Maintain these blood pressure parameters for the first 48 hours if an acute stroke has been confirmed

Goals are to maintain systolic blood pressure between the 50th to 95th percentile for age with permissive hypertension up to 15% above the 95th percentile.

Treat to lower BP if >15% above the 95th percentile for age for more than 1 hour or if >20% above 95th percentile for age at any time

If a blood pressure lowering agent is used, avoid a precipitous drop in blood pressure that may worsen cerebral ischemia

Systolic Blood Pressure Parameter for Females

| Age | 50 th percentile | 95 th percentile | > 15% above 95 th percentile | > 20% above 95 th percentile |
|-------------|-----------------------------|-----------------------------|---|---|
| 1-4 years | 90 | 111 | 128 | 133 |
| 5 years | 94 | 113 | 130 | 136 |
| 6-10 years | 96 | 121 | 139 | 145 |
| 11-18 years | 105 | 131 | 151 | 157 |
| >18 years | 110 | 140 | 161 | 168 |

Systolic Blood Pressure Parameters for Males

| Age | 50 th percentile | 95 th percentile | > 15% above 95 th percentile | > 20% above 95 th percentile |
|-------------|-----------------------------|-----------------------------|---|---|
| 1-4 years | 90 | 112 | 129 | 134 |
| 5 years | 95 | 113 | 130 | 136 |
| 6-10 years | 96 | 121 | 139 | 145 |
| 11-18 years | 105 | 140 | 161 | 168 |
| >18 years | 110 | 140 | 161 | 168 |

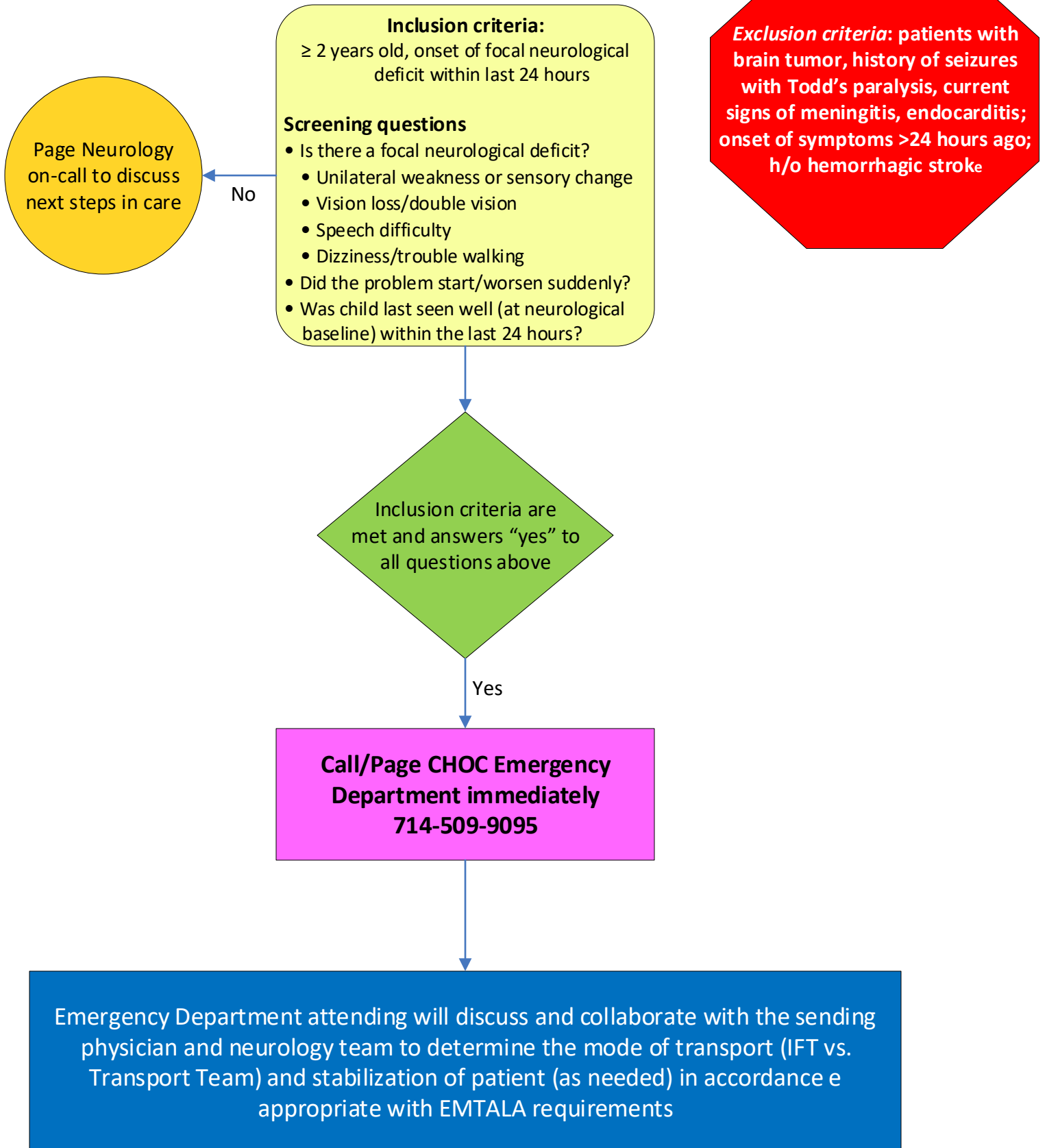
Hypertension should be treated with **labetalol** 0.2 mg/kg IV or **nicardipine** continuous infusion to lower blood pressure by approximately 25% over 24 hours.

Relative hypotension should be promptly treated with NS bolus

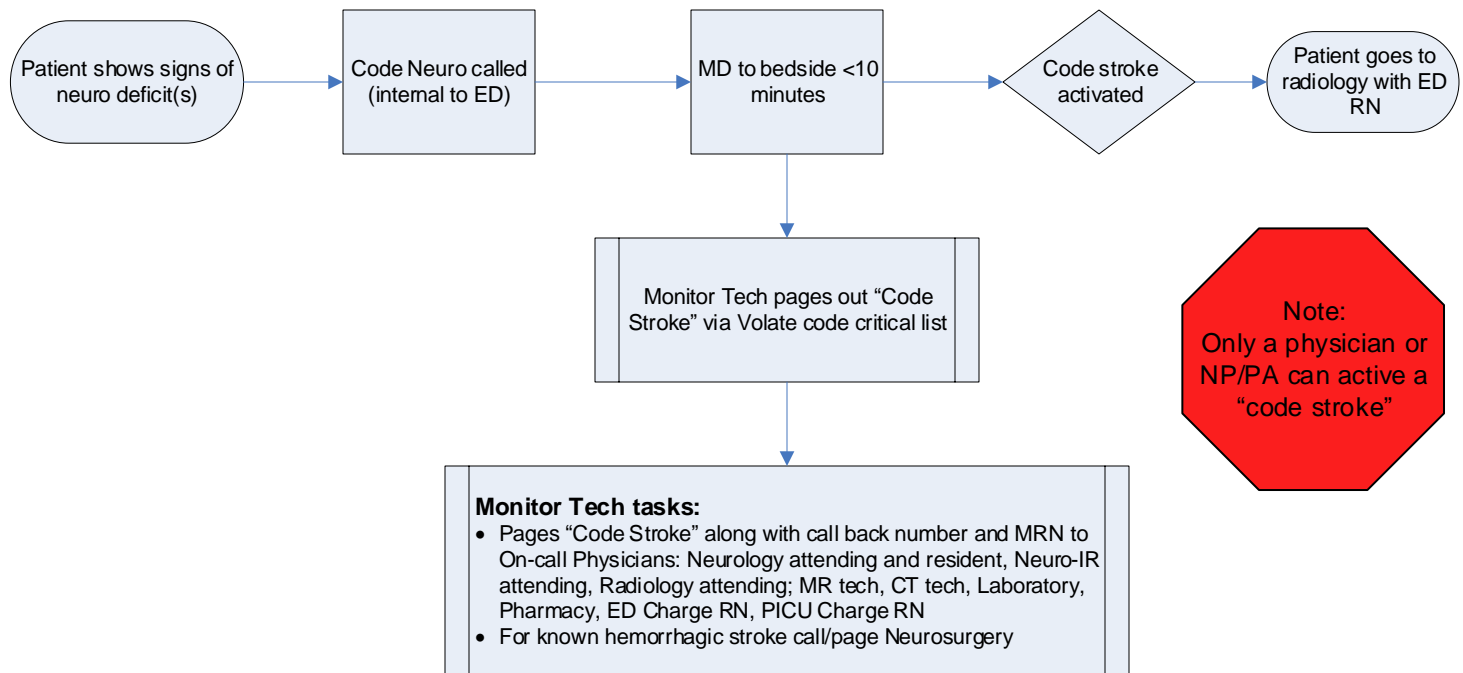
Caution!
Use of labetalol in children with bradycardia or severe asthma should be avoided.

Do not use nitroprusside as this can cause cerebral venous dilation and decrease cerebral perfusion

5. Outside Hospital Transfers

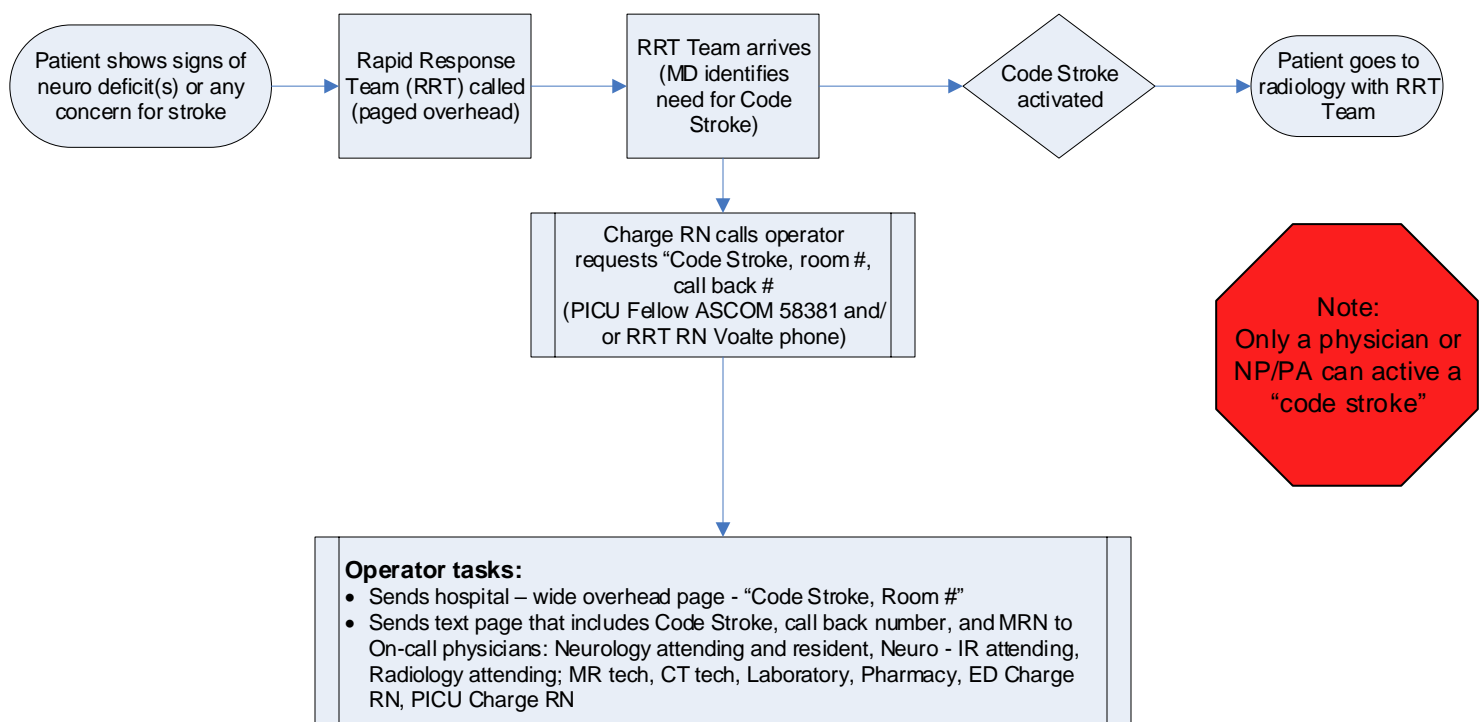


ED Code Stroke Activation Algorithm



Note:
Only a physician or NP/PA can activate a "code stroke"

Inpatient Code Stroke Activation Algorithm



Note:
Only a physician or NP/PA can activate a "code stroke"

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