# THE IN HOUSE STROKE CODE AND BEDSIDE NURSING MANAGEMENT

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# Learning Objectives

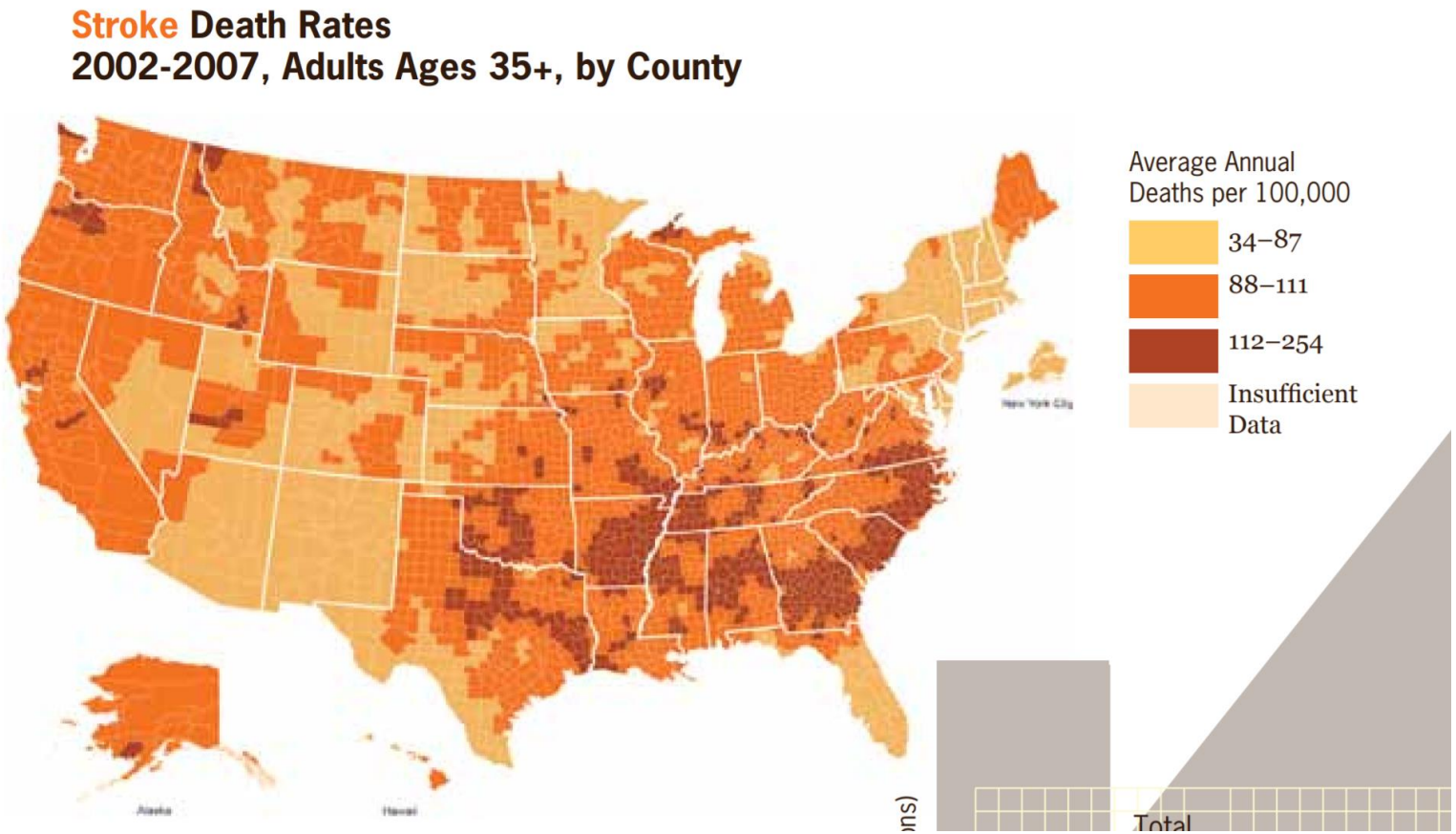
- Define stroke, its importance, and the “stroke code”
- Define the acute assessment and triage of the stroke code patient
- Discuss evaluation for appropriate administration of intravenous lytic tPA therapy
- Discuss evaluation for clot retrieval therapy for large vessel occlusion

# U.S. Stroke Statistics

- 5th leading cause of death
- Leading cause of disability
- Every 40 seconds someone has a stroke
- Every 4 minutes someone dies of stroke
- About 800,000 strokes a year
- ***Cost of stroke: 73.7 billion dollars per year***

American Stroke Association Statistics

# The Stroke Belt




Source CDC
https://upload.wikimedia.org/wikipedia/commons/f/f1/High_Blood_Pressure_and_Cholesterol-CDC_Vital_Signs-February_2011.pdf

# Piedmont ARMC Stroke by the numbers

- Overall strokes at ARMC approximately 700 per year

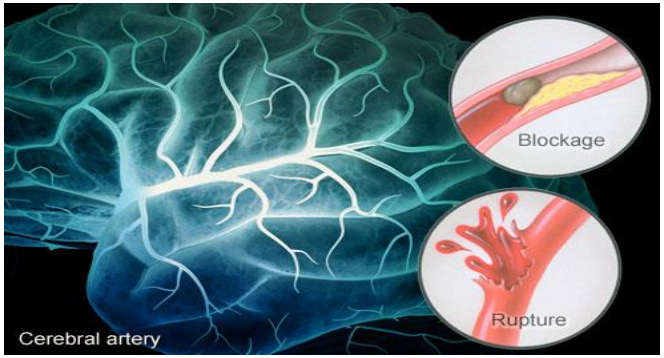
- 2018 In House Stroke Alert Numbers:
- 56 total
- 11 New CVA; 11 Admitted with CVA w/ worsening symptoms; 4 new TIA; 31 other
- No intervention eligible patients; tPA or transfers to Grady

- 2019 In House Stroke Alert Numbers YTD
- 29 total year to date
- 6 new CVA; 6 admitted with CVA w/worsening symptoms; 5 new TIA; 21 other
- No intervention eligible patients

American Stroke Association Statistics

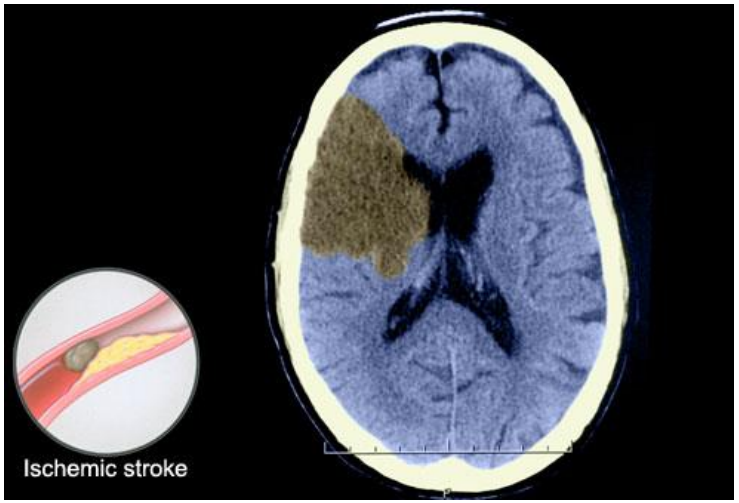
# Types of Strokes

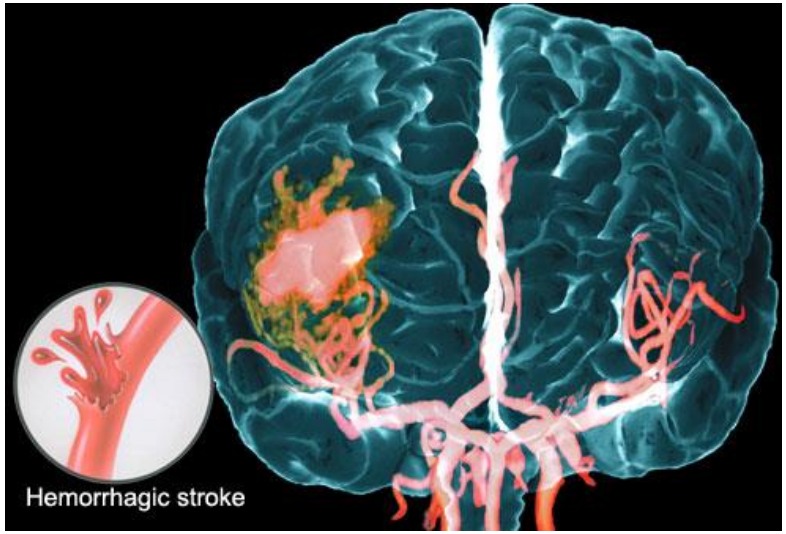
- Ischemic Stroke (87%)
  - A clot within the blood vessel that blocks normal blood flow and perfusion in the brain
  - CT of the head is usually "negative" in acute evaluation
- Hemorrhagic Stroke (13%)
  - Weakened blood vessel in the brain **spontaneously** ruptures resulting in bleeding into the surrounding parts of the brain (most commonly hypertension or aneurysm)
  - The type of hemorrhagic bleeding can depend on the site of rupture



# Another Look

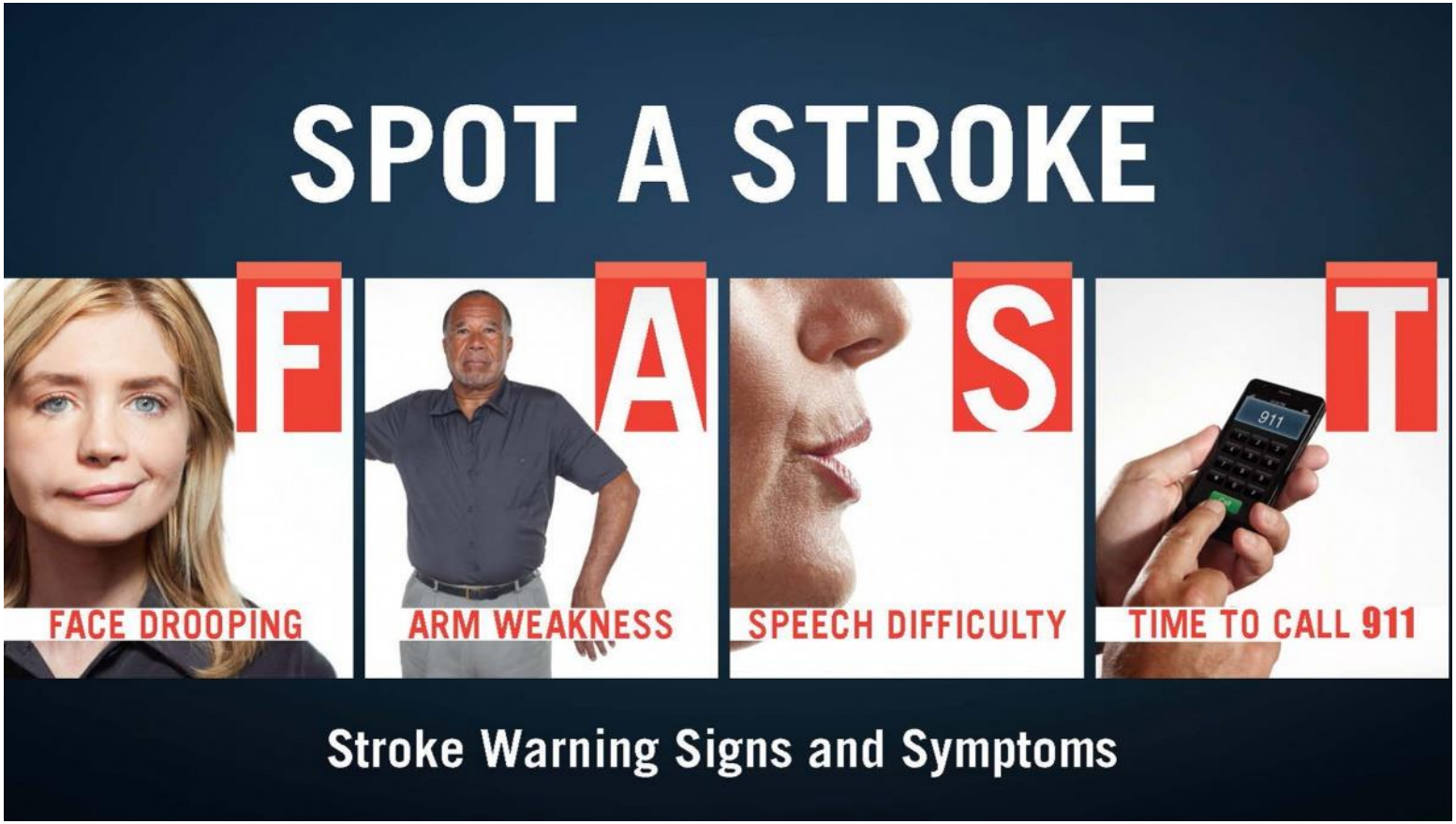
**Ischemic**
**CT NEGATIVE**



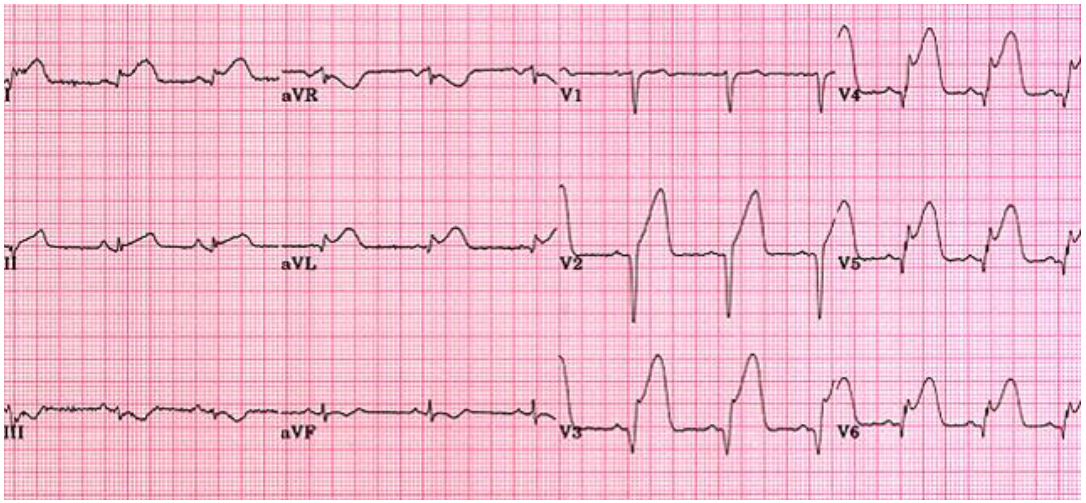

**Hemorrhagic**
**CT POSITIVE BLOOD**

# Stroke Signs and Symptoms



# Acute Stroke Diagnosis remains a bedside clinical assessment

Acute MI




Acute stroke

# Stroke Signs and Symptoms

## "Sudden onset" is key

- Numbness or weakness in the face, arm or leg, especially on one side of the body
- Trouble talking or understanding others (Aphasia)
- Sudden onset of confusion
- Blurred Vision in one or both eyes
- Trouble walking, dizziness, loss of balance or coordination
- Sudden onset of severe headache with no known cause
  - "Thunderclap headache" or chief complaint headache usually hemorrhagic
  - Ischemic stroke often mild/moderate headache

# Risk Factors for Stroke

- High blood pressure
- High blood pressure
- High blood pressure
- High cholesterol
  - LDL
- Diabetes
- Smoking and Drugs
- Afib/flutter
- Poor diet/obesity
- Lack of exercise
- Family history

- In house risk factors
  - Acute MI
  - Recent arterial catheterization procedure
  - Open heart surgery
  - Orthopedic surgery and trauma
  - Paradoxical embolus

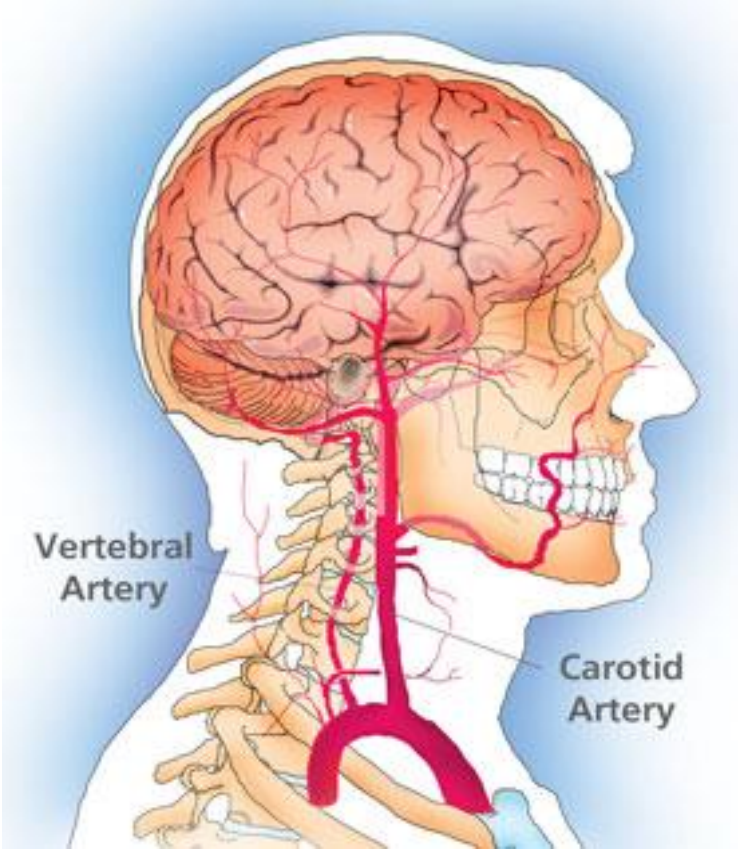
**If risk factors controlled, strokes could reduced by 80%!**

# Stroke Mimics

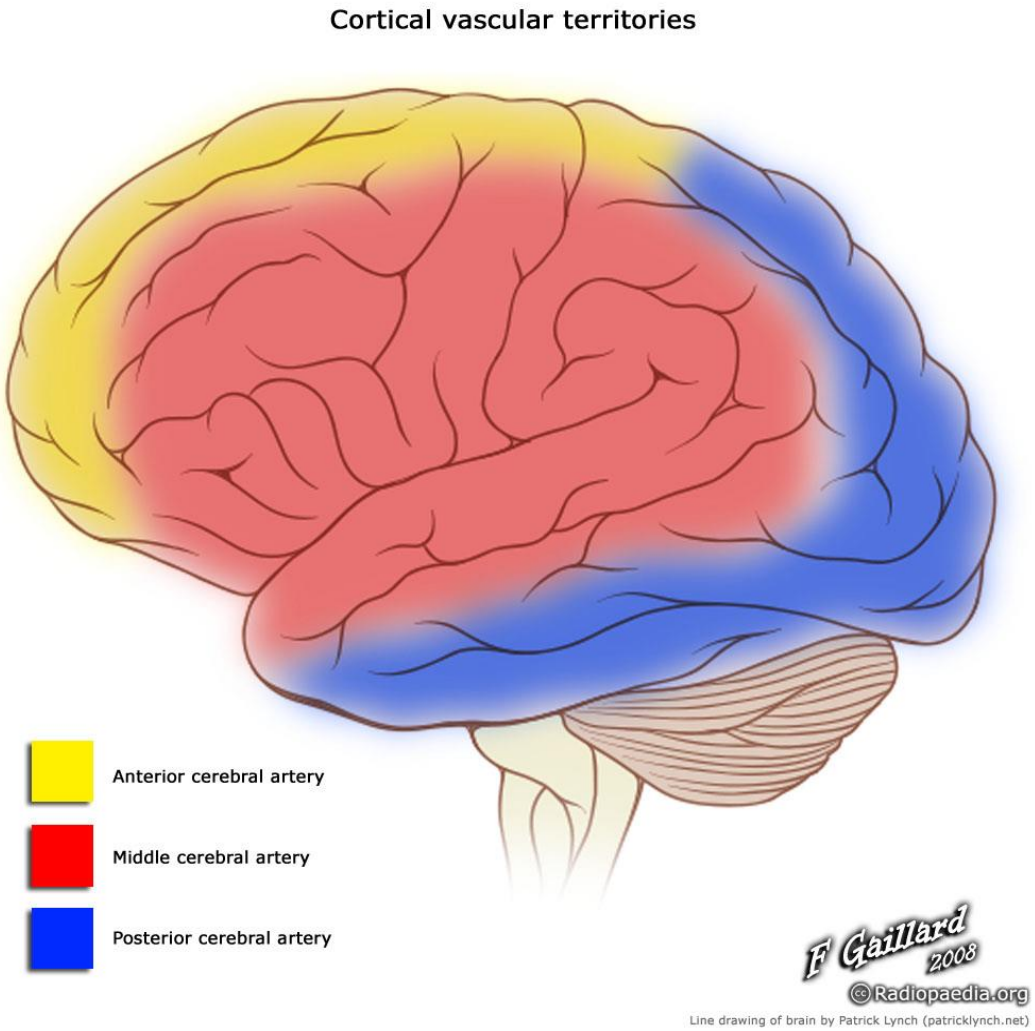
- Delirium and undiagnosed Dementia
- Drug overdose or withdrawal
- Diabetes – hypoglycemia/hyperglycemia
- Seizures and post-ictal state
- Parkinson's freezing episode
- Pseudo-stroke or conversion disorder
- Exacerbation of old stroke deficit by acute illness or infection
- Compression neuropathies, e.g. Saturday night palsy
- Syncope and orthostasis

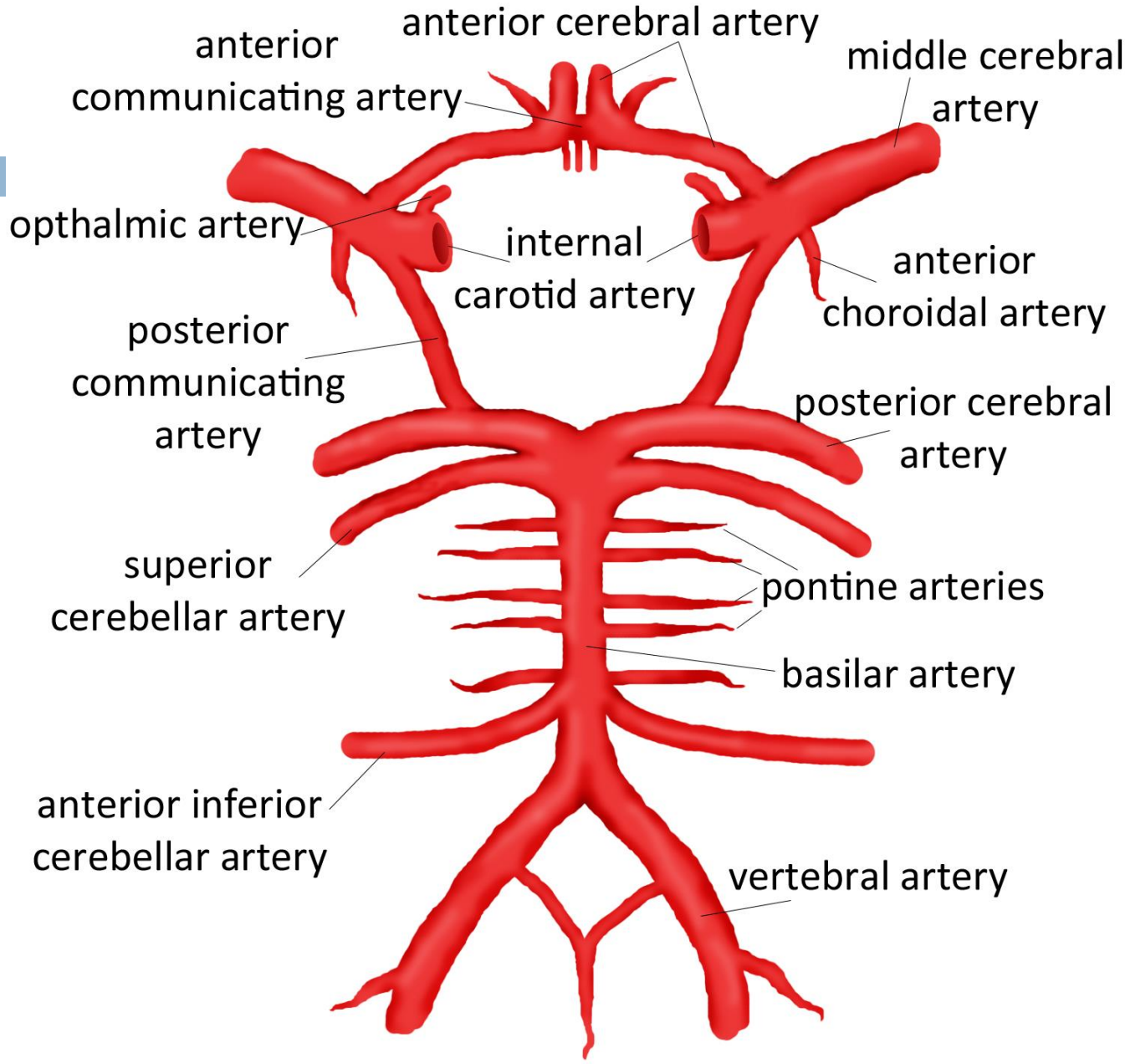
# Cerebral Blood Supply and Anatomy

- Two Major Artery Suppliers to the Brain
  - Anterior
    - Internal Carotids
  - Posterior
    - Vertebral Arteries



# Cerebral Blood Supply and Anatomy




anterior cerebral artery
anterior communicating artery
middle cerebral artery
opthalmic artery
internal carotid artery
anterior choroidal artery
posterior communicating artery
posterior cerebral artery
superior cerebellar artery
pontine arteries
basilar artery
anterior inferior cerebellar artery
vertebral artery

# OVERVIEW AND HISTORY OF STROKE CODE MANAGEMENT

# Stroke Care at Athens Regional 1

- Athens Regional Medical Center is a **Primary Stroke Center** certified by The Joint Commission

- ARMC first became a Primary Stroke Center in 2010

- As a Primary Stroke Center patient's receive top quality care during the acute phase of a stroke. Providers and clinicians follow clinical practice guidelines that provide evidence based practice (EBP) treatment for the patient.

# Stroke Care at Athens Regional 2

- Primary stroke center at PARMC uses ‘Minuteman method’ with team of ER, ICU nurses, neurologist.

**’time is brain’ at 1.9million neurons per minute**

- Other facilities use ‘robot telestroke method’ or combination code evaluations

# Bedside Specialist is Better: But does it matter?

## Safety of Intravenous Thrombolysis in Stroke Mimics

### Prospective 5-Year Study and Comprehensive Meta-Analysis

Georgios Tsivgoulis, MD; Ramin Zand, MD; Aristeidis H. Katsanos, MD; Nitin Goyal, MD; Ken Uchino, MD; Jason Chang, MD; Efthimios Dardiotis, MD; Jukka Putaala, MD; Anne W. Alexandrov, PhD; Marc D. Malkoff, MD; Andrei V. Alexandrov, MD

***Background and Purpose***—Shortening door-to-needle time may lead to inadvertent intravenous thrombolysis (IVT) administration in stroke mimics (SMs). We sought to determine the safety of IVT in SMs using prospective, single-center data and by conducting a comprehensive meta-analysis of reported case-series.

***Methods***—We prospectively analyzed consecutive IVT-treated patients during a 5-year period at a tertiary care stroke center. A systematic review and meta-analysis of case-series reporting safety of IVT in SMs and confirmed acute ischemic stroke were conducted. Symptomatic intracerebral hemorrhage was defined as imaging evidence of ICH with an National Institutes of Health Stroke scale increase of ≥4 points. Favorable functional outcome at hospital discharge was defined as a modified Rankin Scale score of 0 to 1.

***Results***—Of 516 consecutive IVT patients at our tertiary care center (50% men; mean age, 60±14 years; median National Institutes of Health Stroke scale, 11; range, 3–22), SMs comprised 75 cases. Symptomatic intracerebral hemorrhage occurred in 1 patient, whereas we documented no cases of orolingual edema or major extracranial hemorrhagic complications. In meta-analysis of 9 studies (8942 IVT-treated patients), the pooled rates of symptomatic intracerebral hemorrhage and orolingual edema among 392 patients with SM treated with IVT were 0.5% (95% confidence interval, 0%–2%) and 0.3% (95% confidence interval, 0%–2%), respectively. Patients with SM were found to have a significantly lower risk for symptomatic intracerebral hemorrhage compared with patients with acute ischemic stroke ( risk ratio=0.33; 95% confidence interval, 0.14–0.77; $P$=0.010), with no evidence of heterogeneity or publication bias. Favorable functional outcome was almost 3-fold higher in patients with SM in comparison with patients with acute ischemic stroke (risk ratio=2.78; 95% confidence interval, 2.07–3.73; $P$<0.00001).

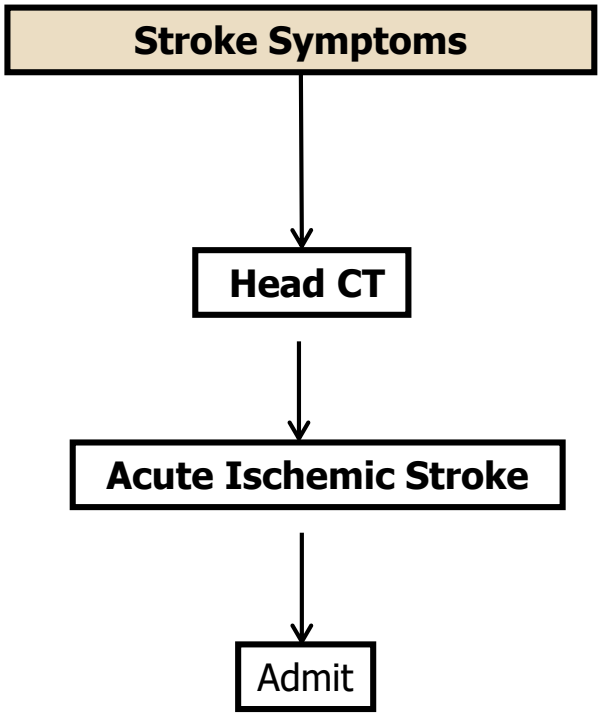
***Conclusions***—Our prospective, single-center experience coupled with the findings of the comprehensive meta-analysis underscores the safety of IVT in SM. **(*Stroke*. 2015;46:1281-1287. DOI: 10.1161/STROKEAHA.115.009012.)**

**Key Words:** intracranial hemorrhages ■ misdiagnosis ■ safety ■ stroke ■ tissue-type plasminogen activator

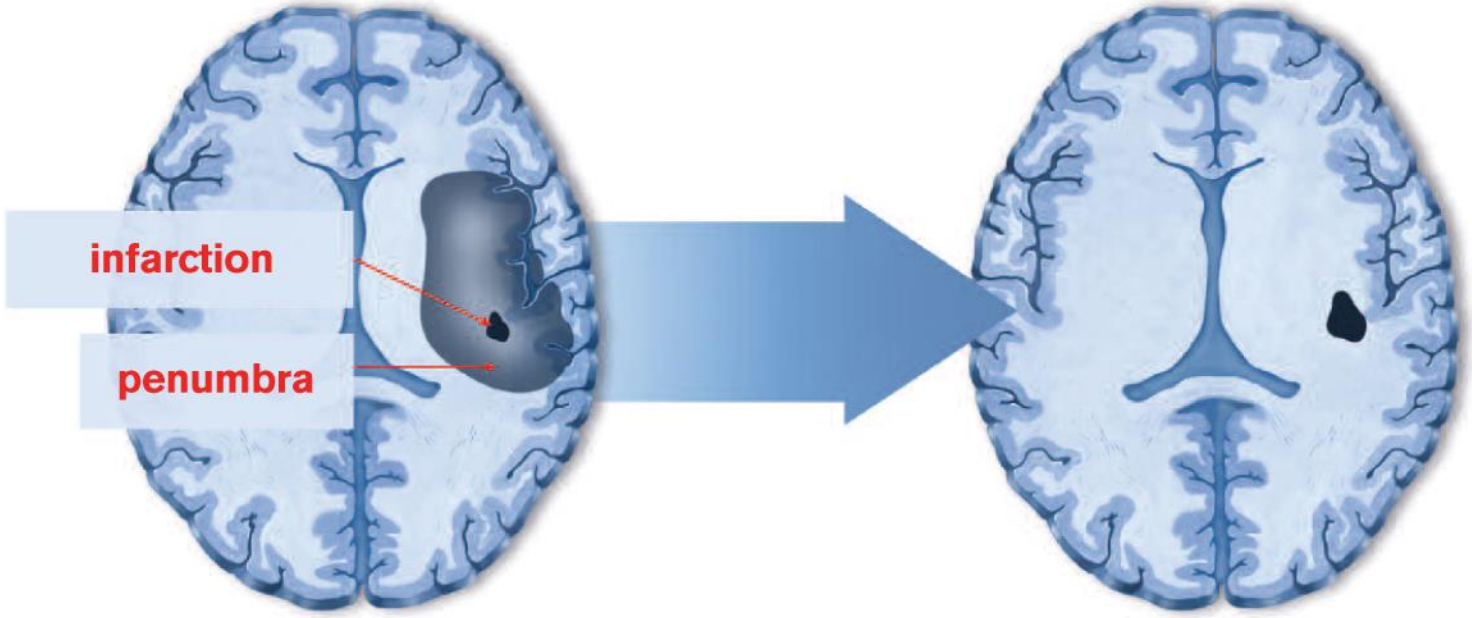
**Only 1 of 75 Stroke Mimic patients had symptomatic ICH

# Acute ischemic stroke decision-making

1995



# Activase (t-PA) is a thrombolytic agent; it works by dissolving the clot and restoring the flow of blood and oxygen to the brain



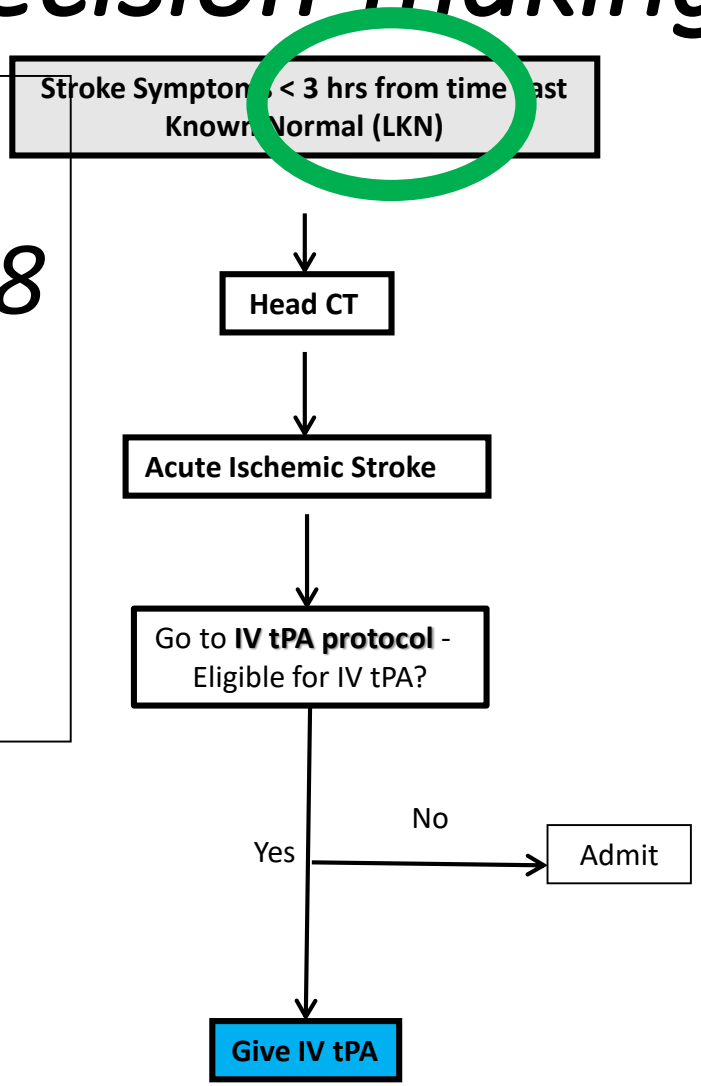

**The average stroke patient loses 32,000 brain cells every second[1]**

**Reperfusion offers the potential to reduce the extent of ischemic injury[2,3]**

**References: 1.** Saver JL. *Stroke.* 2006;37:263. **2.** González RG. *Am J Neuroradiol.* 2006;27:728. **3.** Donnan GA, Davis SM. *Lancet Neurol.* 2002;1:417.

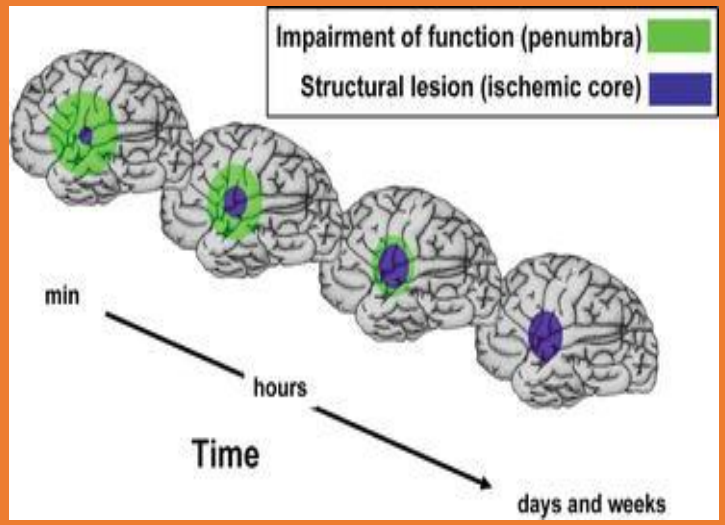
# *Acute ischemic stroke decision-making*

*1996+*
*<3hrs NNT=8*
*NNH=16*
*NINDS trial*
*NEJM 1995*




Update to 4.5hrs IV tPA window
NNT=14
ECASS3 trial 2008
***Overall 1.9 times as likely to have a favorable outcome*

# Expanding the Therapeutic Window for Acute Ischemic Stroke: *Is Time still Brain?*




Each minute destroys:

- 1.9 million neurons
- 14 billion synapses
- 7.5 miles of myelinated fibers

Metrics for Acute Stroke Treatment:

- Onset-to-door time
- Door-to-needle/puncture time
- Onset-to-needle/puncture time

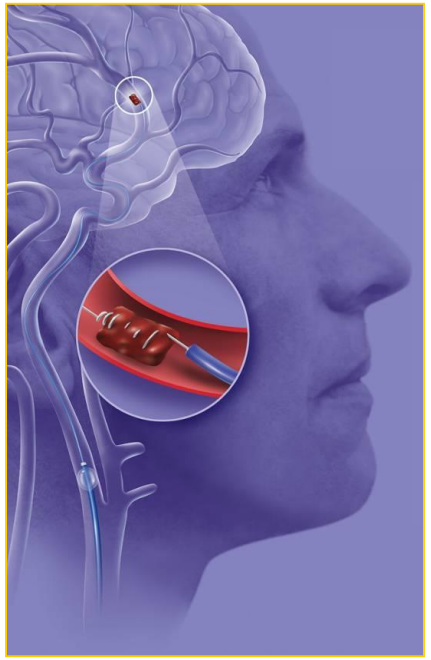
Saver. Stroke. 2006. 37(1):263-6.

# The unicorn is IV tPA for in house stroke alert?

Exclusions

1. Outside time window for LKWT
2. Major surgery last 14 days
3. Head Injury or stroke in the last 3months
4. Use of heparin or coumadin with prolonged PT/PTT; novel anticoagulants
5. Acute MI
6. GI/GU bleeding in the last 3 weeks
7. Too small NIHSS <4 or too big NIHSS >22
8. CT scan already positive with completed stroke

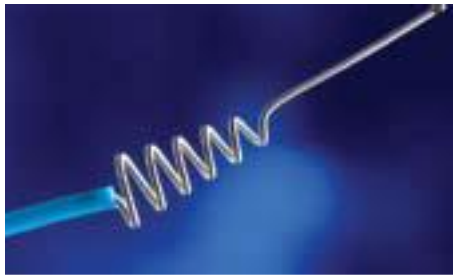
# Clot Retrieval



- Patients can be transferred to a Comprehensive Stroke Center-PARMC helipad

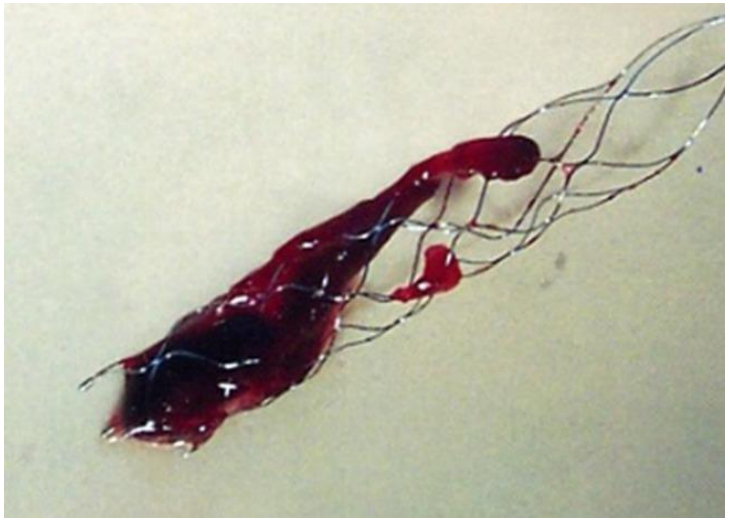
- Clot Retrieval procedure  can restore blood flow by removing clot in patients experiencing ischemic / blockage type stroke.

- Patients who are ineligible for t-PA or who fail IV t-PA therapy may be candidates for treatment.



# Endovascular therapy is a true revolution in acute stroke management

- Atleast 9 trials since 2014 have established safety and efficacy
- NNT is only 3
- Drawbacks specialized comprehensive center and 24/7 interventional team
- Only beneficial for large vessel occlusion and patients without major early CT findings
- Not recommended for patients with debility and baseline dependence of IADLs



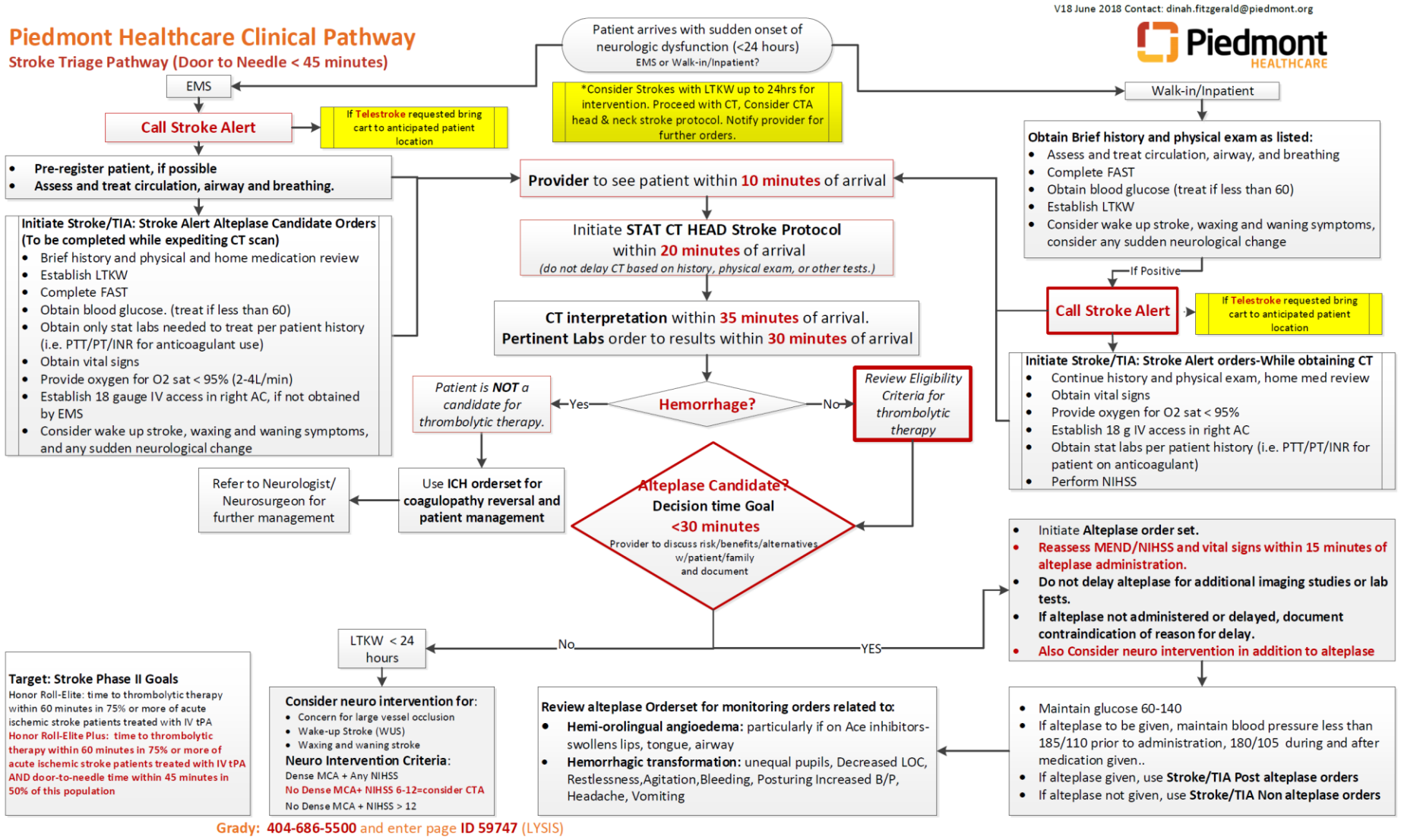
Pract Neurol. 2017 Aug; 17(4): 252–265.
Published online 2017 Jun 24. doi: 10.1136/practneurol-2017-001685

PMCID: PMC5537551
PMID: 28647705

Revolution in acute ischaemic stroke care: a practical guide to mechanical thrombectomy

Matthew R B Evans,[1] Phil White,[2] Peter Cowley,[1,3] and David J Werring[1]

# Acute Stroke Code 2019



# THE IN HOUSE STROKE ALERT SYSTEM

# What do you do if your patient suddenly develops the signs and symptoms of a stroke?

# Stroke Alert!

## Call the Operator to Notify the Stroke Alert Team:

- Triage ICU RN (medical and CVICU)
- Lab phlebotomy for “superstat” labs
- Respiratory therapy
- House supervisor
- Stroke coordinator

# Stroke Alert!

- Assess ABC's and obtain vital signs;  IV access adequate.
- Determine time of last sedative / narcotic, and D for drugs
- Do a rapid neuro assessment, ?focal deficit or just confused
- Determine **"Last Known Well Time"**
- If it appears to be a stroke, the stroke code team will:
  - Page Neurology on-call physician STAT
  - STAT CT Head and Labs; determine with the neurologist the need to also perform CT Arteriogram contrast study.
- Page the attending physician to notify of the condition change or if further medical/surgical management will be required acutely.

# **Nursing Care for Stroke:** Nurse Swallow Screen

- Nurse Swallow Screen before ***anything*** PO:
  - 30-60% of patients who have a stroke experience dysphasia
  - Aspiration occurs in 43-54% of stroke patients
    - 37% develop pneumonia
      - 3.8% will die

- **Document** Swallow Screen

***Located in the admission navigator and Daily Cares/Safety Flowsheet**

| Swallow Screen Assessment | |
|---|---|
| Does patient have a known history of Dysphagia or Aspiration? | No |
| Does the patient meet any of the following criteria? | No |
| Does patient meet all of the following criteria: Able to sit in an upright | Yes |
| Is the patient's mouth clean? | Yes |
| Is the patient able to: cough voluntarily (ask pt to cough 2 times)? | Yes |
| Swallow Screen Assessment Observation | No concerns noted ... |
| Swallow Screen Assessment Passed | Passed |

- **If patient fails swallow screen:**
  - Obtain order to change ASA PO to Rectal
  - Obtain order for dysphasia consult

# Nursing Care for Stroke: Assessment

- NIHSS
  - Baseline assessment
  - Call the "stroke nurse" on neuroscience on admission
- MEND Exam
  - Exam used for serial neuro checks for Stroke/TIA

| MEND Exam | | |
|---|---|---|
| Level of Consciousness | (Awake & alert) | 1 |
| Speech | (Repeats: "You | 1 |
| Questions | (Says the | 1 |
| Commands | (Closes & | 1 |
| Left Facial Droop | (Both sides | 0 |
| Right Facial Droop | (Both sides | 0 |
| Left Visual Fields | (Sees fingers in | 1 |
| Right Visual Fields | (Sees fingers | 1 |
| Left Horizontal Gaze | (Moves eyes completely | 1 |
| Right Horizontal Gaze | (Moves eyes completely | 1 |
| Left Motor-Arm Drift | (Raised arms do not drift | 1 |
| Right Motor-Arm Drift | (Raised arms do not drift | 1 |
| Left Motor-Leg Drift | (Each raised leg | 1 |
| Right Motor-Leg Drift | (Each raised leg | 1 |
| Left Sensory-Arm | (Feels touch on | 1 |
| Right Sensory-Arm | (Feels touch | 0 |
| Left Sensory-Leg | (Feels touch on | 0 |
| Right Sensory-Leg | (Feels touch on | 0 |
| Left Coordination-Arm | (Finger-to-nose | 0 |
| Right Coordination-Arm | (Finger-to-nose | 0 |
| Left Coordination Leg | (Heel-to-shin | 0 |
| Right Coordination-Leg | (Heel-to-shin | 0 |
| Mend Total | | 13 |
| Comparison to previous exam | | |

# **Nursing Care for Stroke:** Stroke Quality Measures

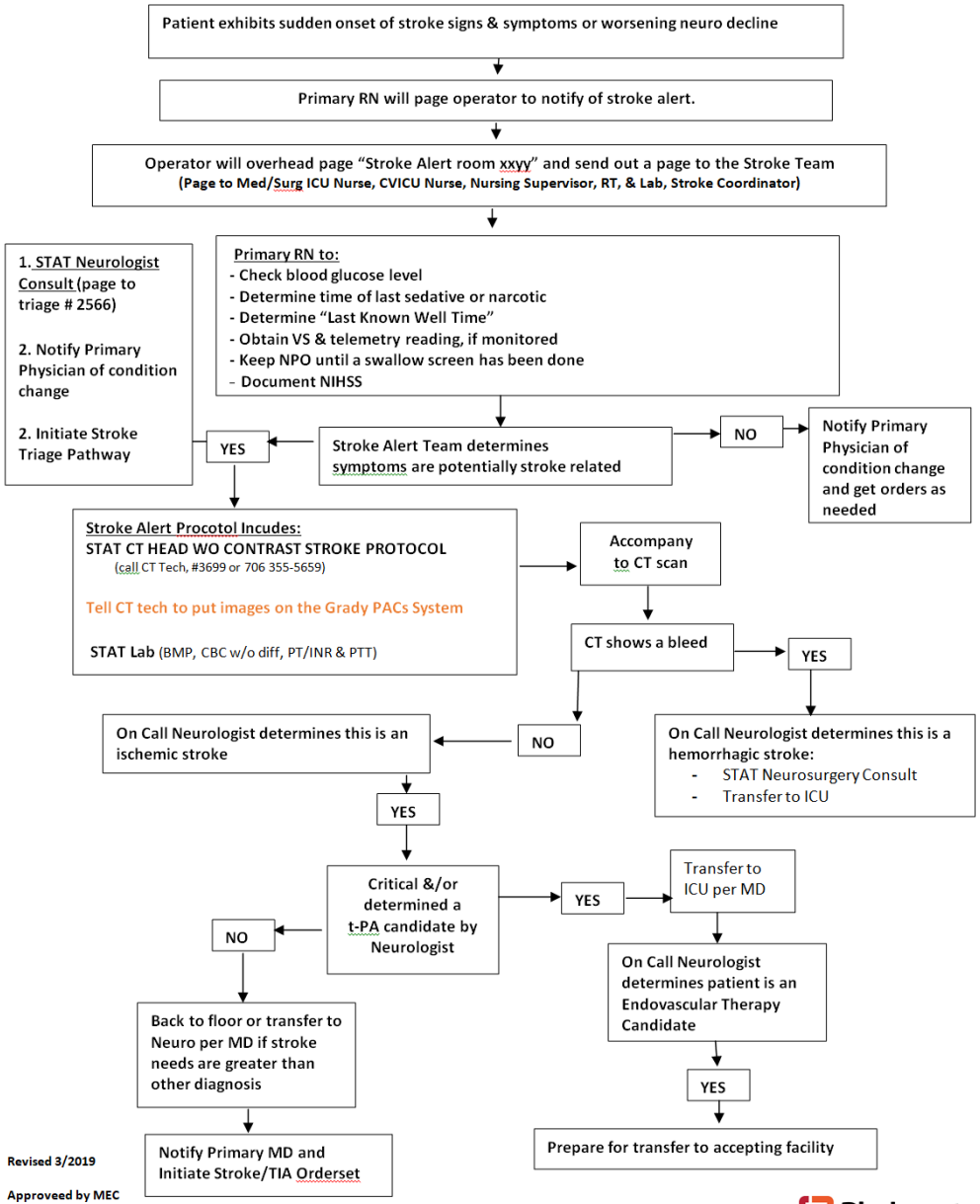
- **Thrombolytic Therapy**
  - If the patient arrives to the hospital within 2 hours of symptom onset and is a t-PA candidate, patient receives t-PA within 60 min of arrival
- **VTE Prophylaxis by Hospital Day 2**
  - Mechanical- **SCDs- Must be documented as on**
  - Pharmacologic- Lovenox, Heparin SQ, Coumadin, Xarelto
- **Antithrombotic by Hospital Day 2**
  - Aspirin PO or Rectal
  - Plavix
  - Aggrenox
- **Anticoagulation for Atrial Fibrillation/Flutter**

# **Nursing Care for Stroke:** Stroke Quality Measures

- **Antithrombotic prescribed at discharge**
  - ASA, Plavix, or Aggrenox
- **Statin Medication prescribed at discharge**
  - Unless contraindication documented by physician
- **Stroke Education**
  - Individual Risk Factors, Signs and Symptoms of a stroke, Call 911, Medications prescribed at discharge, Follow- Up
- **Assessed for Rehabilitation**
  - Or a reason why Rehab was not assessed

# Nursing Care for Stroke: Current approved protocol

## PAR In House Stroke Alert Process



# In Conclusion KISSs

- **K**nown last well time
- **I**s **I**t **I**schemic stroke

(while your patient is in STAT CT)

- **S**urgeries, baseline functional **S**tatus, and **S**urrogate decision makers identified

# THANK-YOU