Improving Stroke Care by Following Guidelines

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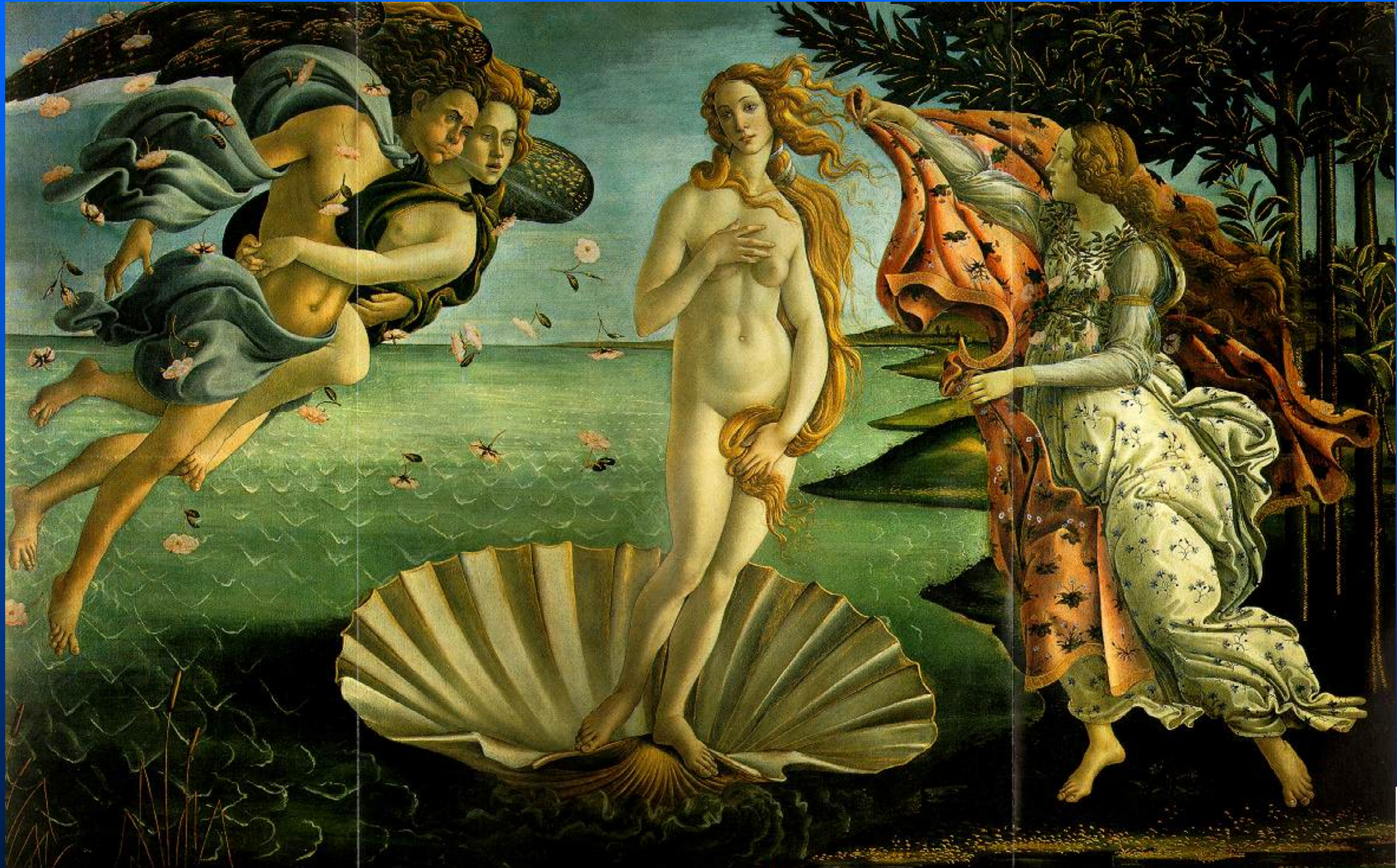
- Mission Neurology
- Stroke: Pursuit of Clinical Excellence

Disclosures

- No financial links to any vendors or pharmaceutical interests

What is the best way to present the value of a relational database that allows tracking of various stroke care measures and comparison to other hospitals?

Sandro Botocelli
The Birth of Venus
Painted 1485



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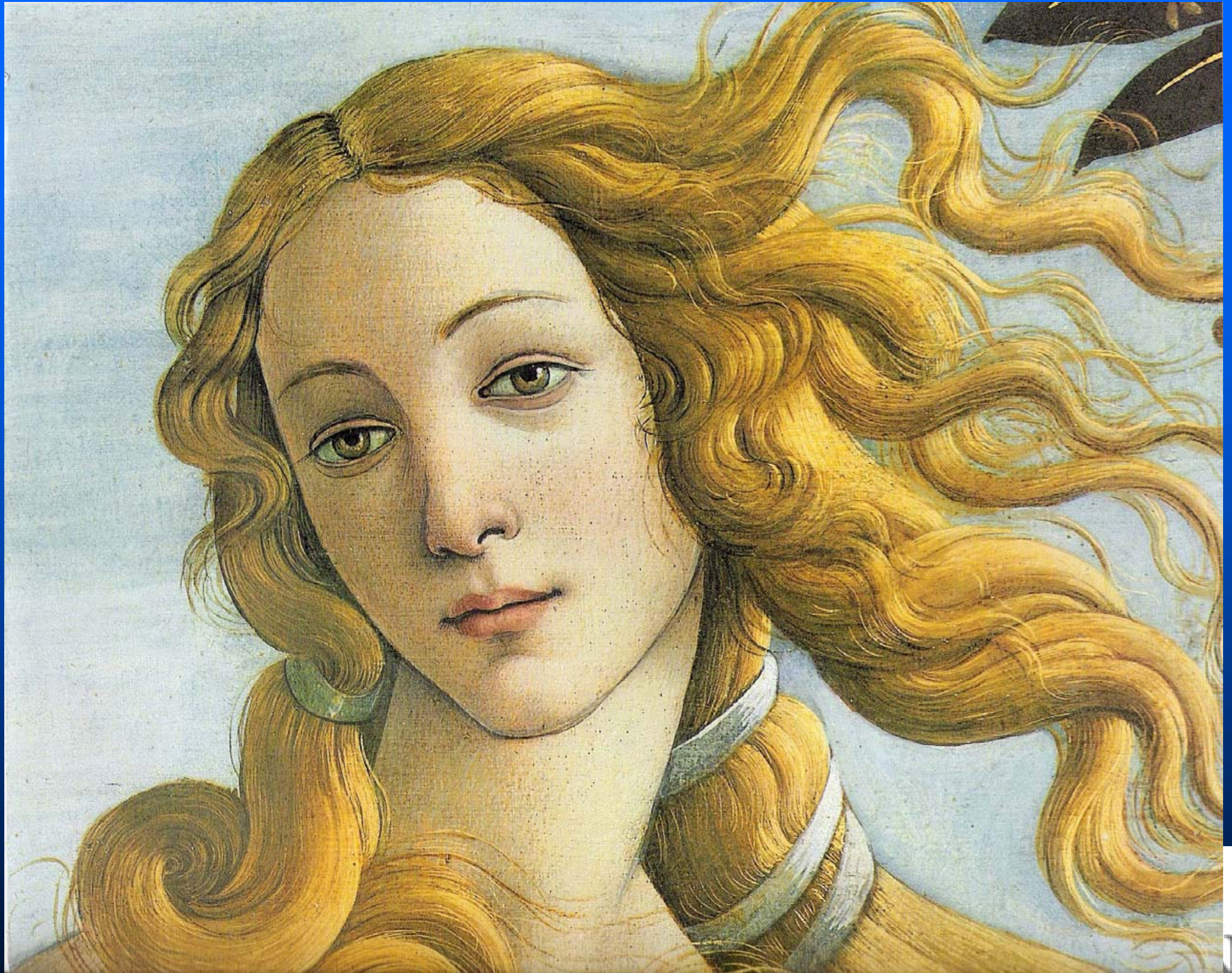

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The Calumny of Apelles
1495

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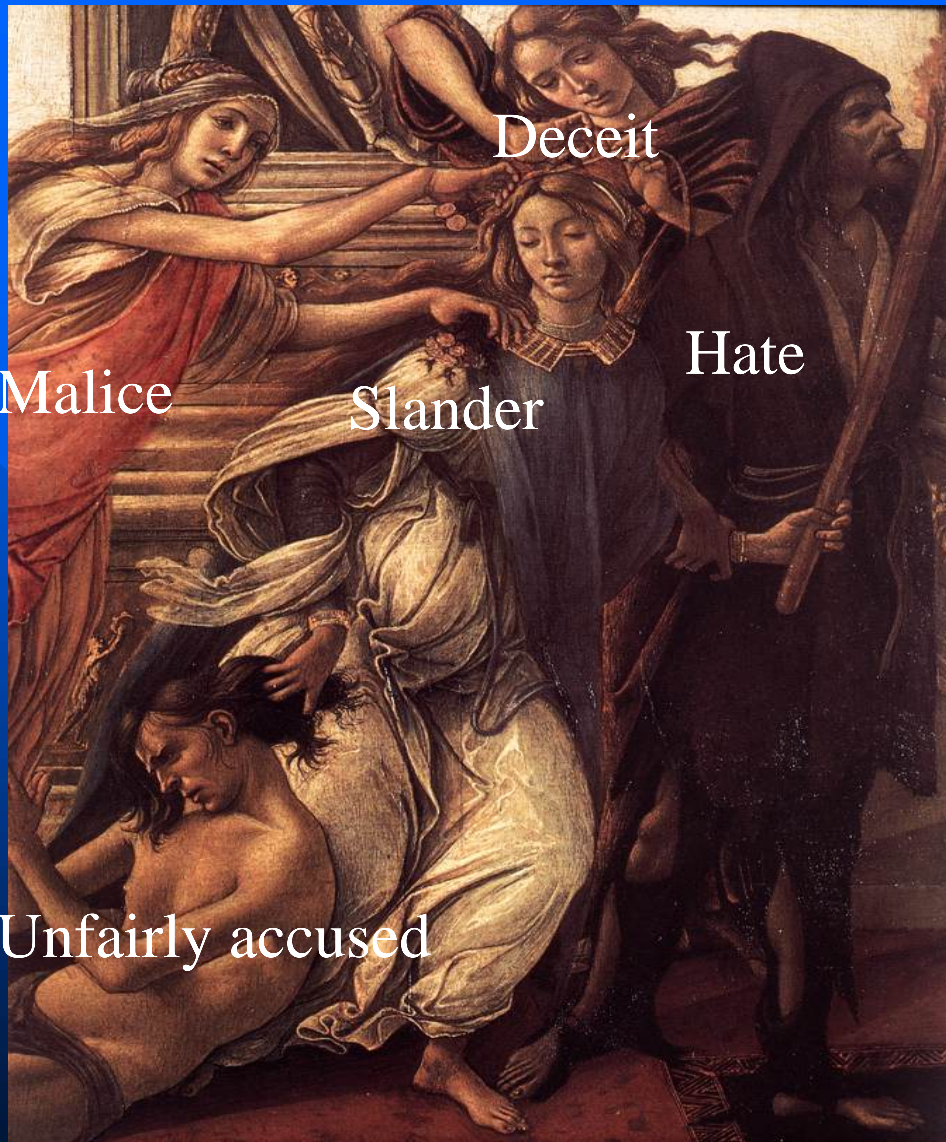

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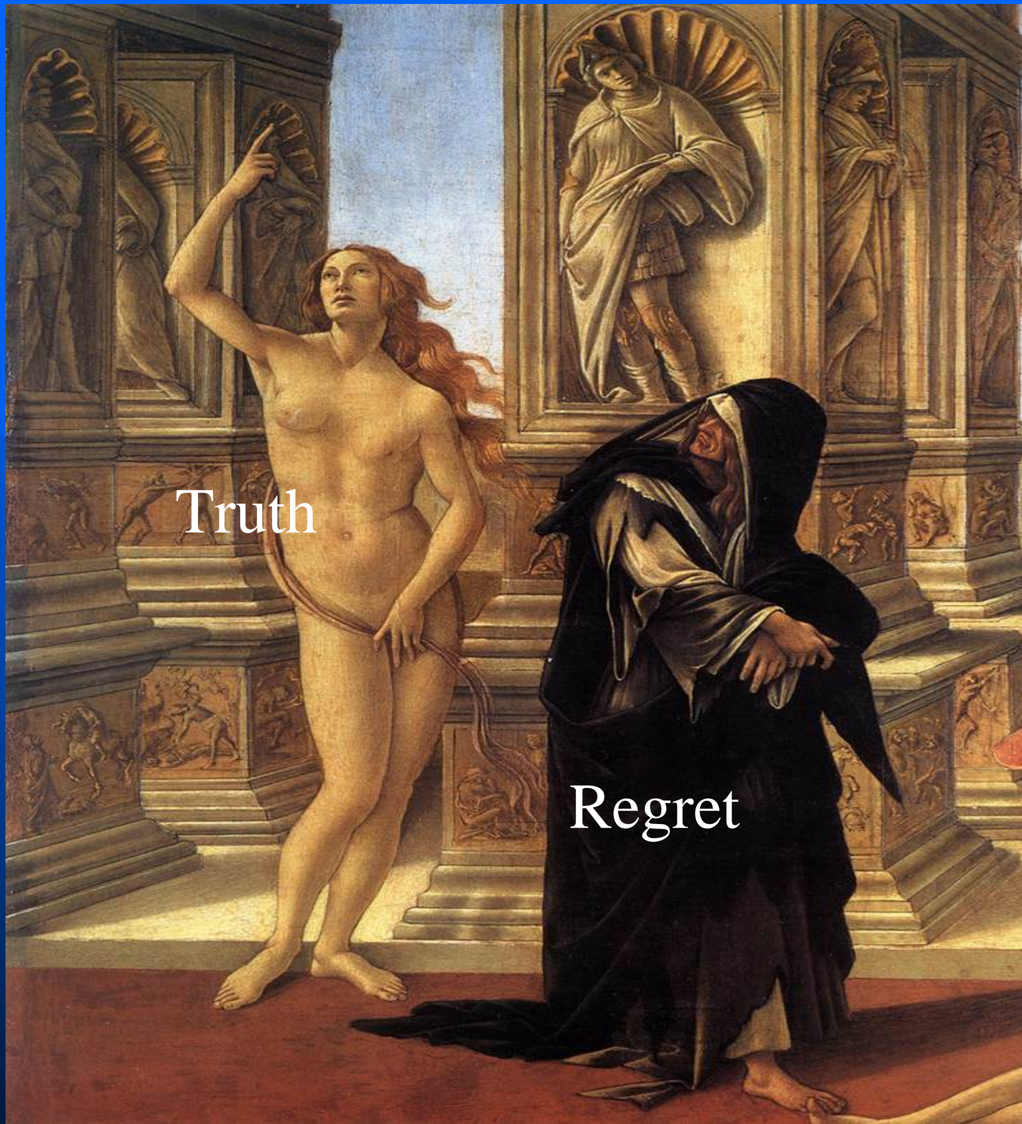

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Get With the Guidelines: How did we use it?

- Memory lane: clinical pathways and stroke
- tPA as a starting point for a stroke team
- Implementing advances in evidence based medicine
- Code stroke teams and collaboration for process
- Review of the outcomes at Mission Hospital

“Guidelines” 1988-1991

- What IS a stroke?
- Review of the way we were treating strokes at the time-1991
- Data on length of stay, tests ordered, time to rehabilitation transfer
- “Drill down” on data
- Tried to get someone to help make a database

Order Sets for Stroke

- Case management
- “What are the tests needed for any single stroke patient? How do we get them ordered?”
- Evidence based medicine (or variability???)
- Strokes were admitted by 30+ different doctors, many admitted as few as one/year

Vincent Van Gogh
Starry Night 1889

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Order Sets and Efficiency

- The majority of those 30 doctors never learned much about the order sets
- Studies about order sets showed that they never really impacted costs or other measures of care (remember, this was the 1990’s)
- Even in smaller groups of doctors, buy in was difficult

1990's Education Efforts: Regional

- Grand Rounds: what's the latest on stroke treatment?
- Antiplatelet drugs as a source of educational hook. (Ticlid 1991, Plavix 1997, Aggrenox 1999)
- Avoid hypotension in acute stroke- "don't crack a nifedipine under someone's tongue"
- ARIES: allied resources for intervention and education in stroke

Intravenous tPA

- Proven FDA treatment for acute ischemic stroke
- ~15% absolute risk reduction for disability
- 6% risk of symptomatic ICH
- Must be given within three hours*****
- Selection criteria require an experienced team
- Earlier administration leads to better outcome

Number Needed to Treat to Benefit from IV TPA Across Full Range of Functional Outcomes

Outcome	NNT
Normal/Near Normal	8.3
Improved	3.1

- For every 100 patients treated with tPA,
- 32 benefit, 3 harmed

tPA and Acute Treatment

- tPA was given approval in June 1996
- We didn’t treat our first patient until 1998
- Even into the early years of this century we treated no more than a dozen cases per year

Behind the Scenes

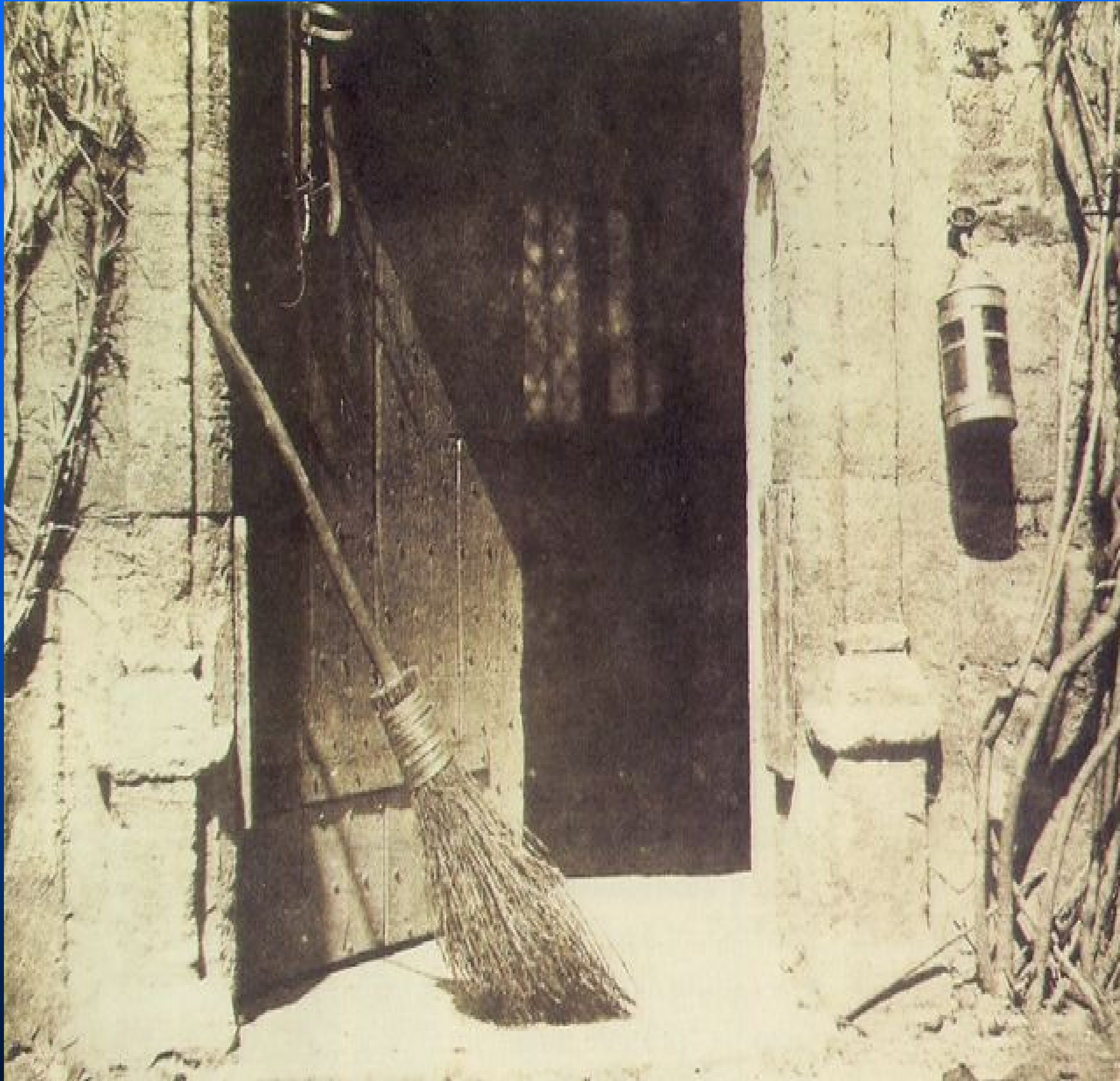
- The rise of hospitalists: one group, new people, different expectations
- The demise of a large neurology group
- An interventional radiologist came to town in 1999
- The gradual institution of electronic medical records/CPOE

Thrombolysis: Debatable?

- The literature on thrombolysis is very well developed
- Early treatment with thrombolytic agents have shown reproducible benefits to outcome.
- There is a modest increase in absolute rates of hemorrhage with thrombolysis in acute stroke

References for Thrombolysis

1. *N Engl J Med.* Aug 9, 2007; 357(6): 572-9
2. *Stroke*. May 2007;38(5):1655-711
3. *Stroke*. May 2003;34(5):1106-13
4. *Br Med J*. 2002;324:727-729.
5. *N Engl J Med*. Dec 14 1995;333(24):1581-7
6. *Lancet*. Jan 27 2007;369(9558):275-82
7. http://www.emedicine.com/neuro/topic370.htm



William Talbot

1844

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Getting a Team Together

- 2004: Mission Hospital hires a stroke neurologist
- There is a “culture” change from an exclusion culture to an inclusion culture
- The code stroke team is formed and records different times of the code stroke

Code Stroke Team

- Modeled after code blue teams
- Designed primarily to cover ED patients
- Since the individual ED staff may see only a few patients with acute stroke, a code stroke nurse leaves neurosciences to evaluate the acute stroke patient
- The ED is instructed to call a code stroke for neurological change, <6 hours from onset

Code Stroke Team

- An internal 511 call sets off a burst pager notification of EKG, CT, laboratory, chaplain, code stroke nurse, and neurologist
- The “door to needle” parameter is less than one hour: this means history, physical, labs, and CT done with drug ordered and started in 60 minutes

"Well, yes, I knew that communicating was crucial

to good collaboration…

But, I never knew that <u>I</u> was the one who

had to communicate well"

EMS
Emergency Department
Pharmacy
Labs
CT
Doctors
Nurses
Other Emergency Departments

Code Stroke Process

- The code stroke nurses are all certified in NIH stroke scale
- The protocol includes stat labs, large bore IV's, and "code stroke" CT
- The code stroke nurse helps to streamline the process, call pharmacy for meds, document parameters, find families, and interact with MD's

Stroke Treatment: Jan ’06 – Oct ‘07

- The code stroke team was called to see 568 patients during that time period
- The patients were evaluated for emergency treatment by taking a rapid history, examining them, scanning the brain and doing blood tests
- We treated 154 (27%) patients with some type of acute intervention
- This is 17% of stroke patients for that time period.

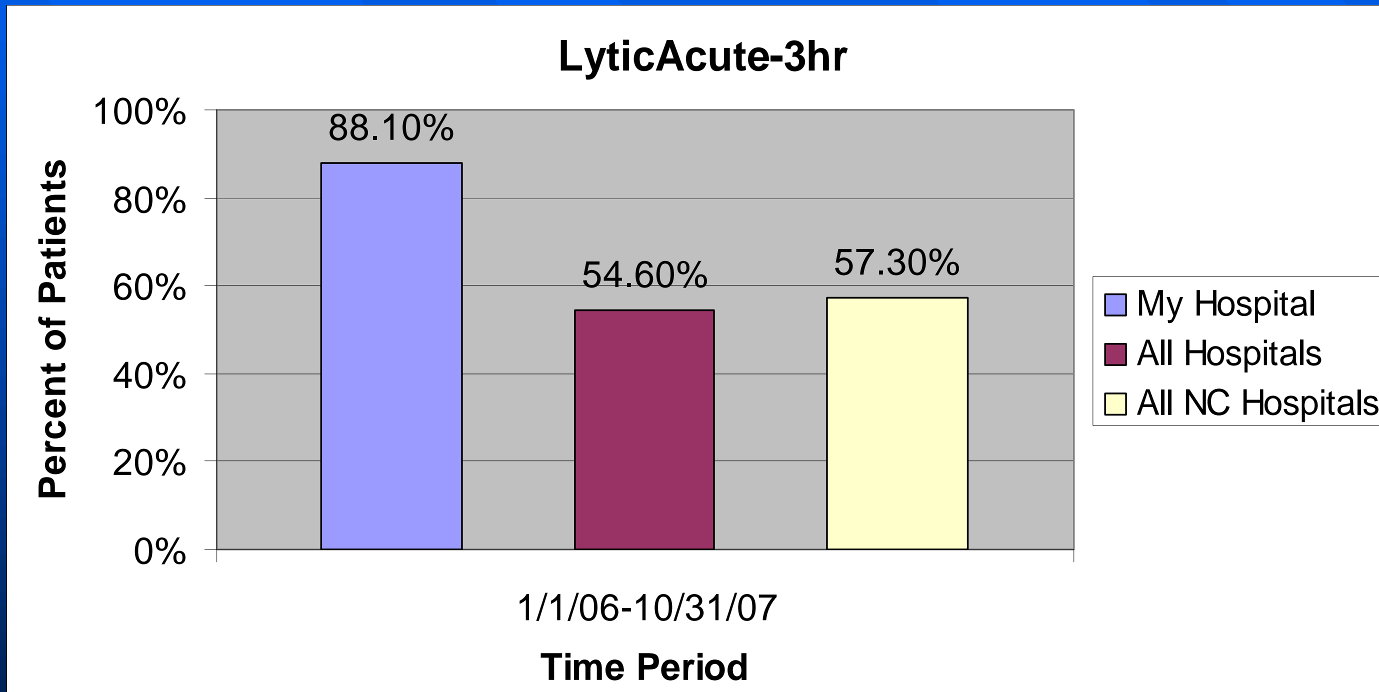
568 Code Strokes: January ’06 to October ‘07

- The majority of code stroke patients were seen in the ER (92%, N=524)
- The average is 25.8/month, but the record has been seven in 24 hours
- Reasons for non-treatment include rapid improvement (137 cases), onset time (98 cases), CT with hemorrhage or mass (68 cases), and INR > 1.7 (9 cases)

Get with the Guidelines:Stroke

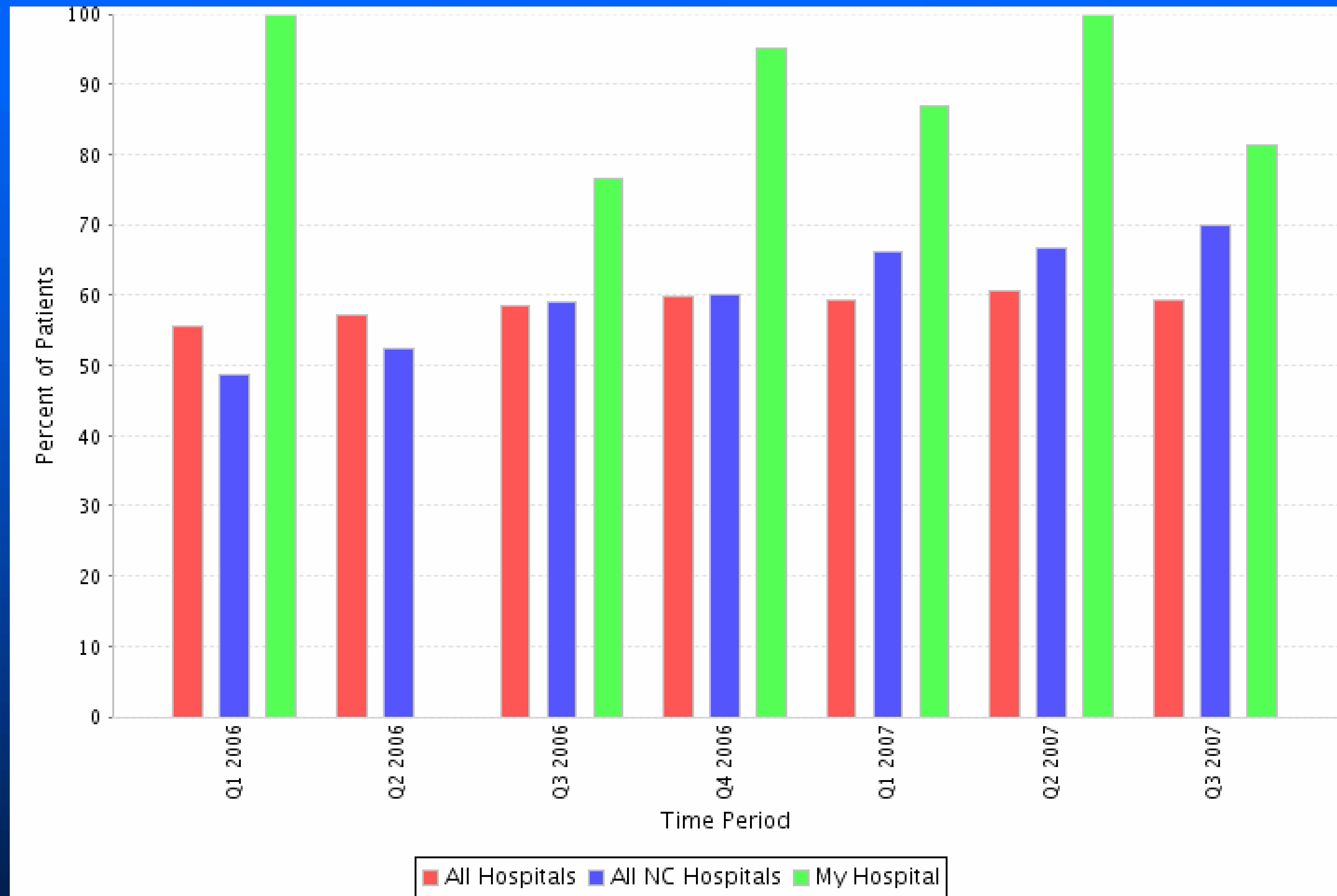
- An in-hospital program that addresses treatment protocols and outcomes
- Patient Management Tool is an online, interactive system for tracking and comparison to other hospitals
- This program helps to evaluate quality outcomes and discharge plans

Get with the Guidelines: A Program by the America Stroke Association



www.strokeassociation.org

Percent of patients arriving within 120 minutes treated with thrombolytics within 180 minutes



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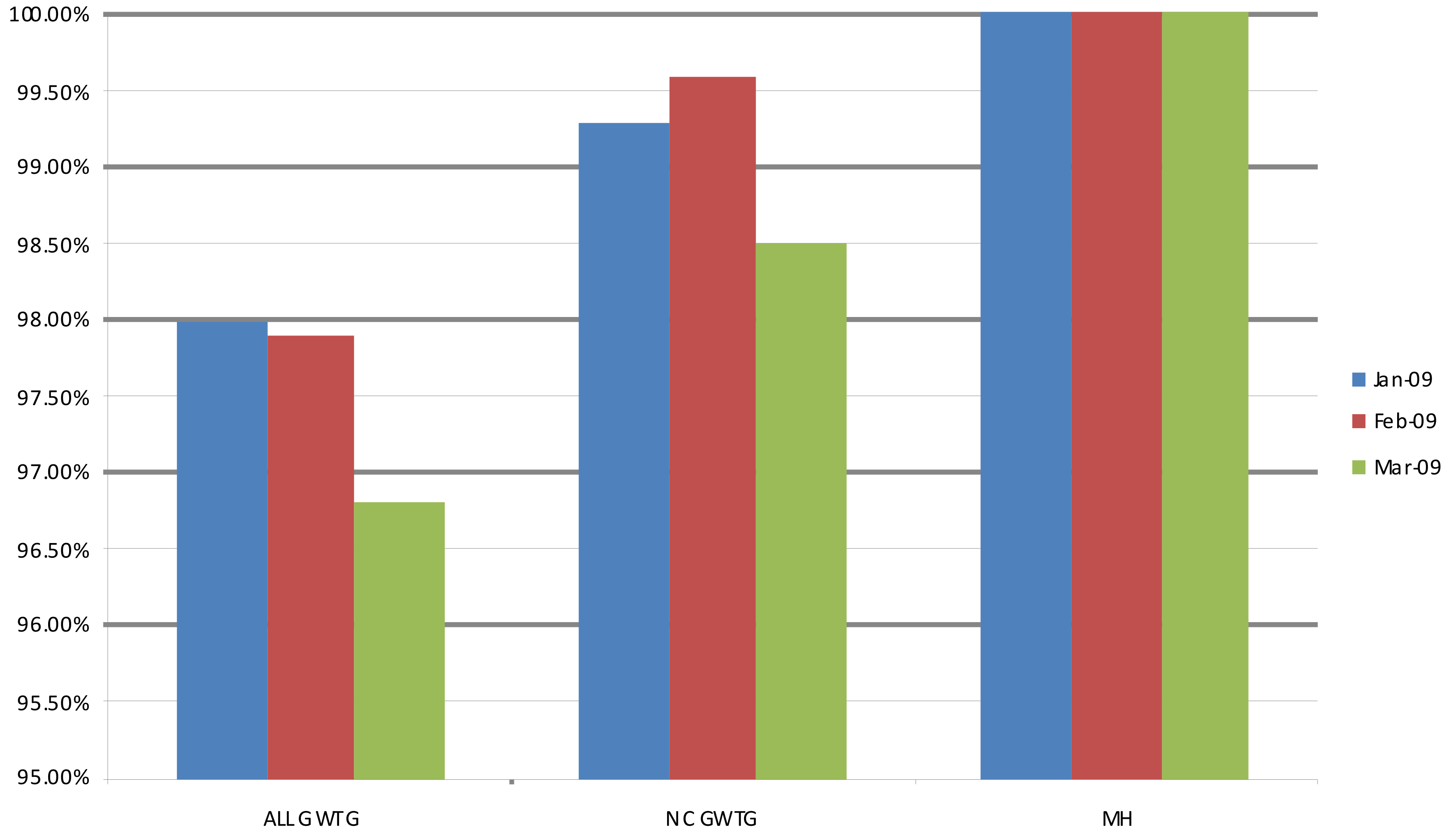
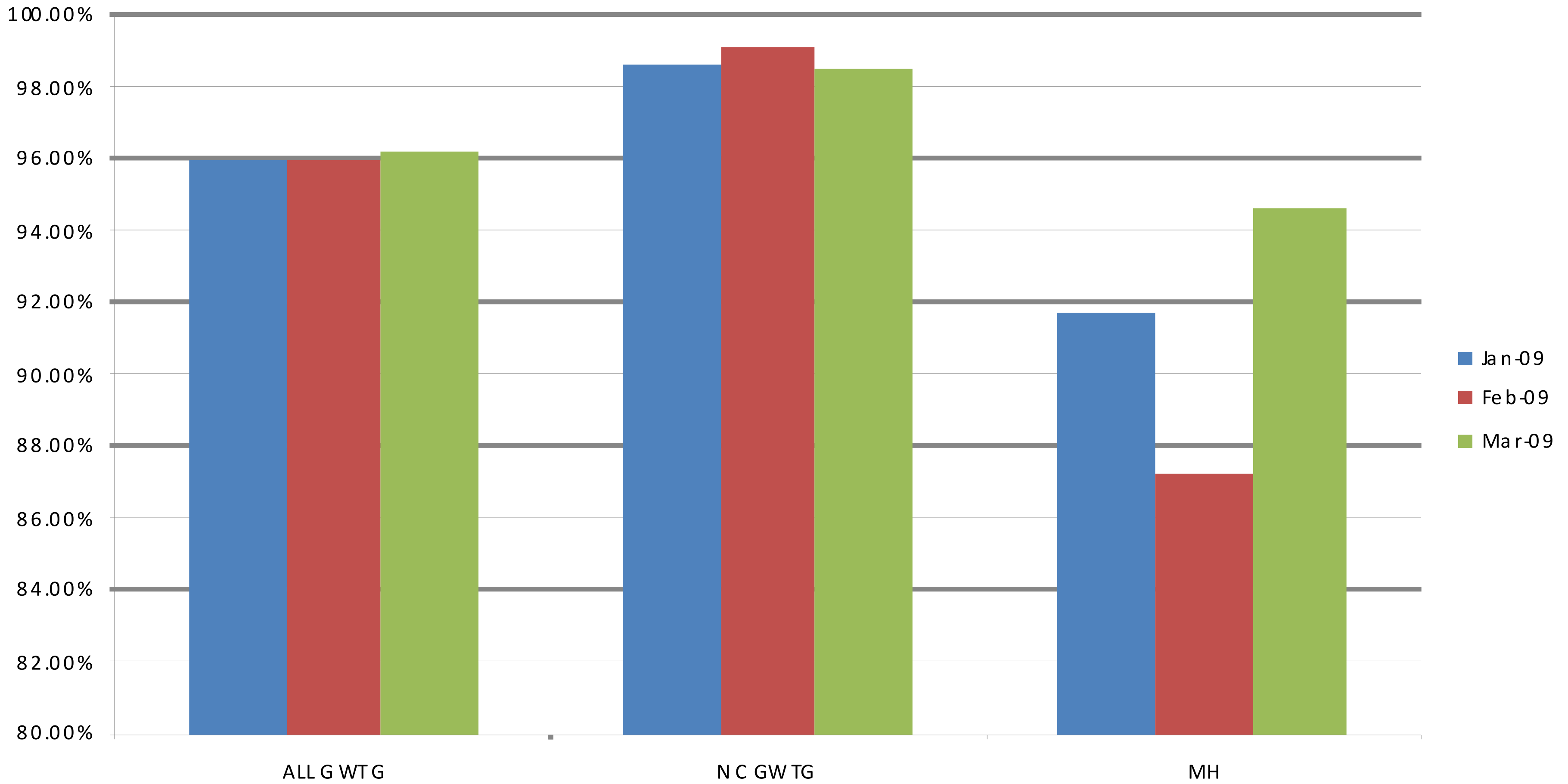
Stroke 2 Discharged on Antithrombotics



Stroke 5 Antithrombotic by end of hospital day 2



Stroke Databases

- North Carolina has its own registry as part of the CDC Coverdale Stroke Registry Grant
- In 2008 CDC, GWTG, and TJC harmonized the core quality measures, but there are still some differences
- Home grown: essential because it tracks the things that you want to track

TJC/GWTG PSC Indicators

- DVT prophylaxis
- Discharged on Antithrombotics
- Thrombolytics Administered
- Antithrombotics by end of hospital day 2
- Anticoagulation in A fib/flutter
- Statins administered
- Dysphagia screen
- Stroke education
- Smoking cessation
- Rehabilitation considered

Stroke Care Continuum

1^0 Prevention

Pre-hospital — Hyper-acute

ED — Acute

Hospital — Sub-acute

Rehabilitation — Chronic

---> 2° prevention

2° prevention -------->

EDUCATION -- Professional and public

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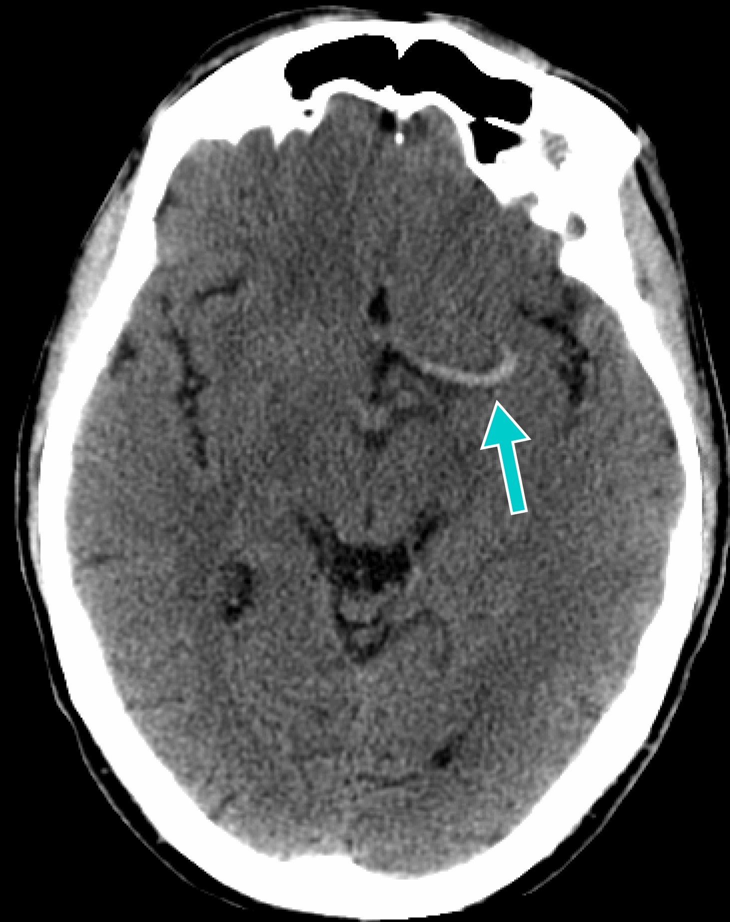
Case Study: Code Stroke

- 66 year old male who is typically active and independent
- Wife hears noise in the bathroom, finds the patient weak on the right side and unable to speak
- EMS takes patient to Margaret Pardee Hospital
- Contacted the vascular neurologist on call at Mission Hospitals

Emergency Computerized Tomography (CT) Scan



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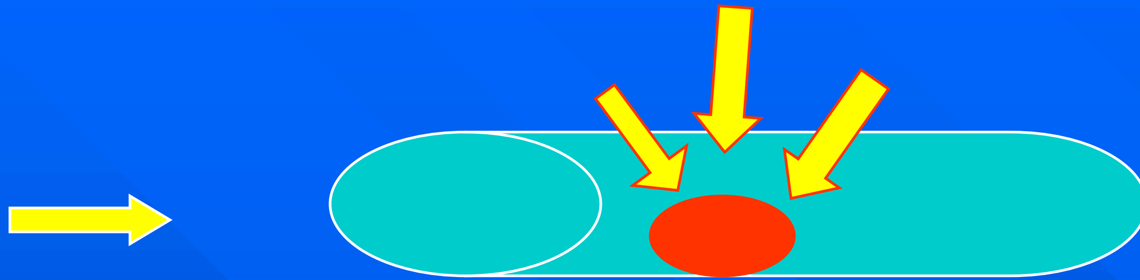
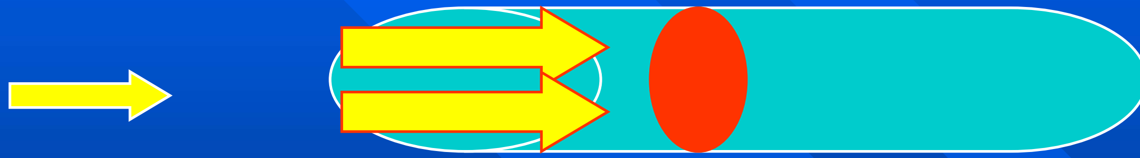
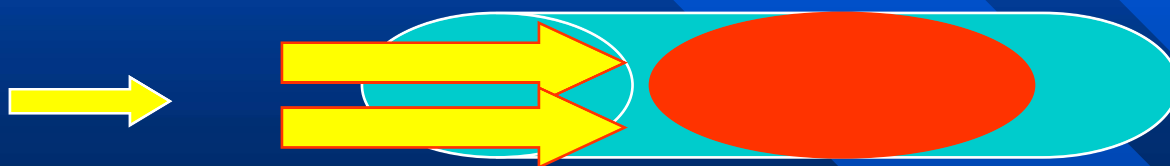


Partially Occluded



Small Occlusion



Large Occlusion

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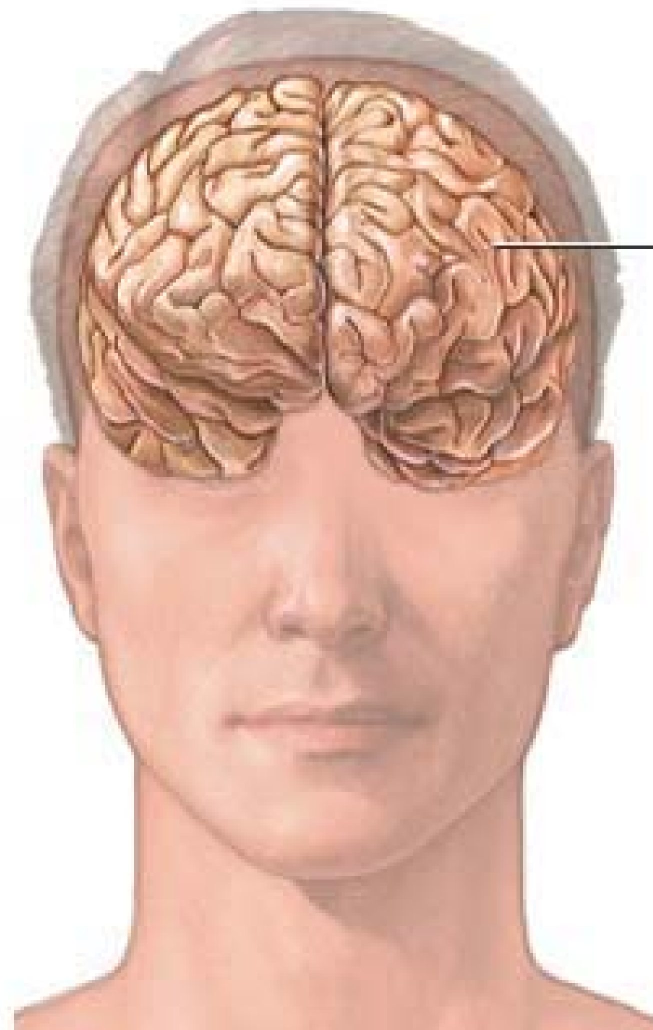
Case Study: Code stroke- continued

- The patient has an NIH Stroke scale score of 23.
- CT scan of the brain shows no bleeding and the brain itself looks normal.
- There is a question of possible blood clot in the left middle cerebral artery.
- A partial dose of tPA is started at the outside hospital and patient transported



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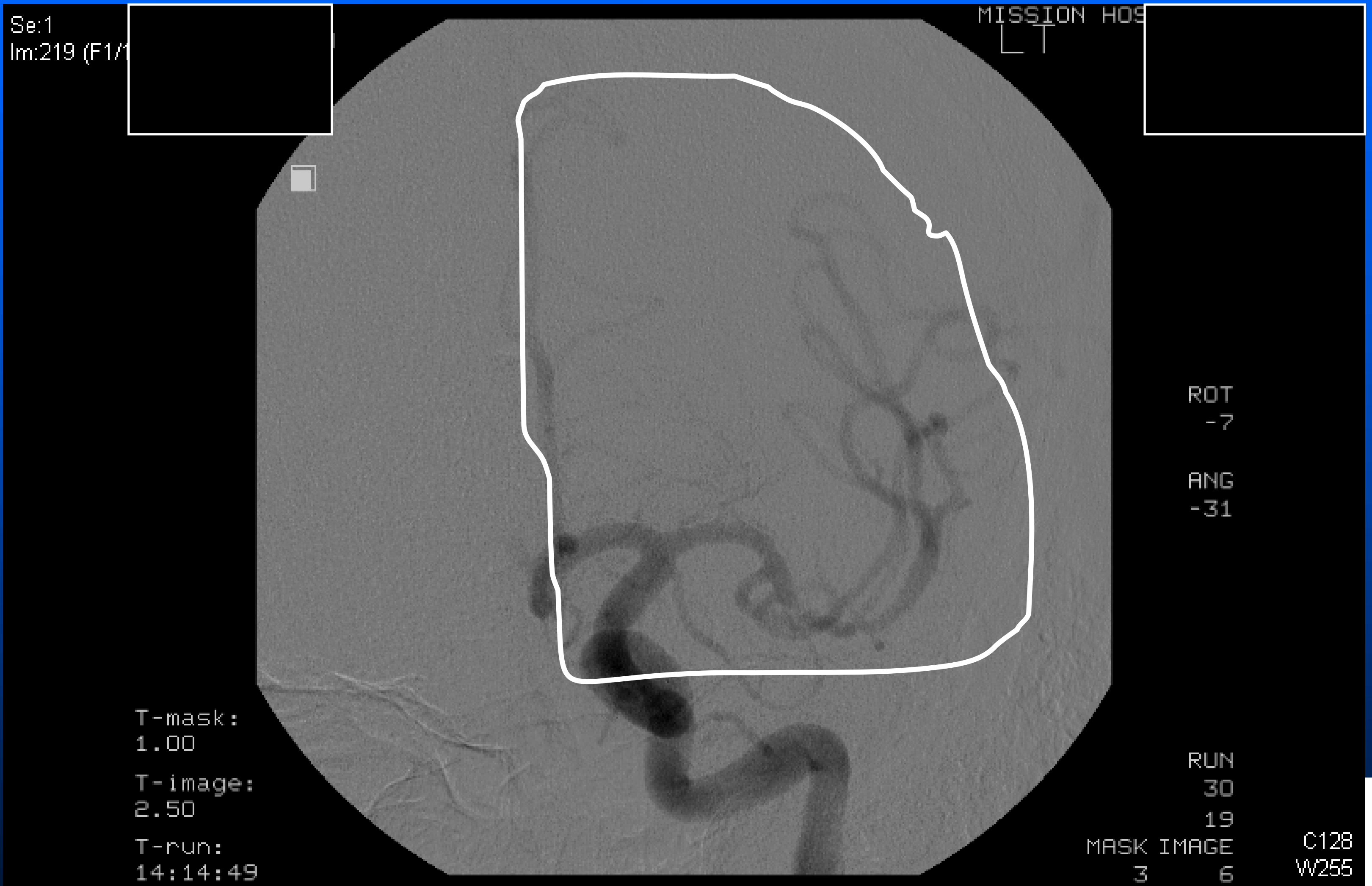
Normal Angiography



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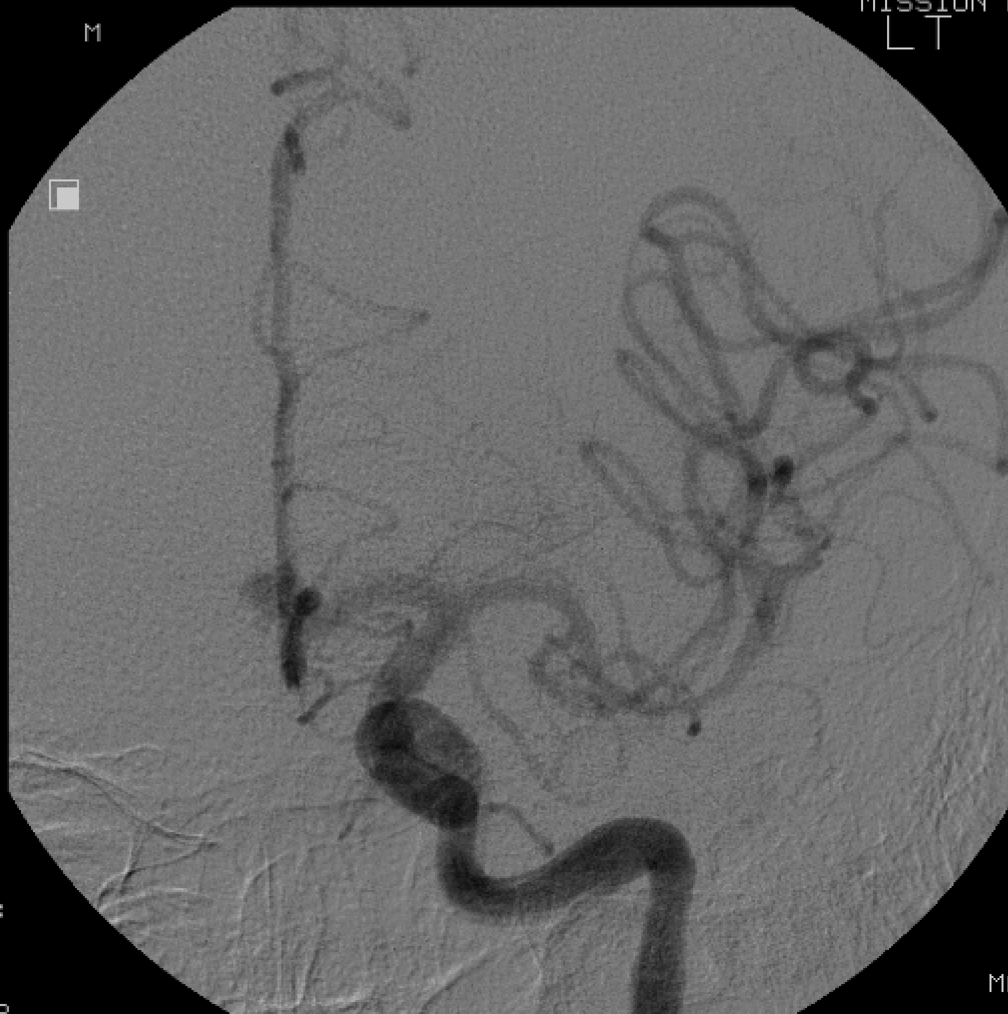
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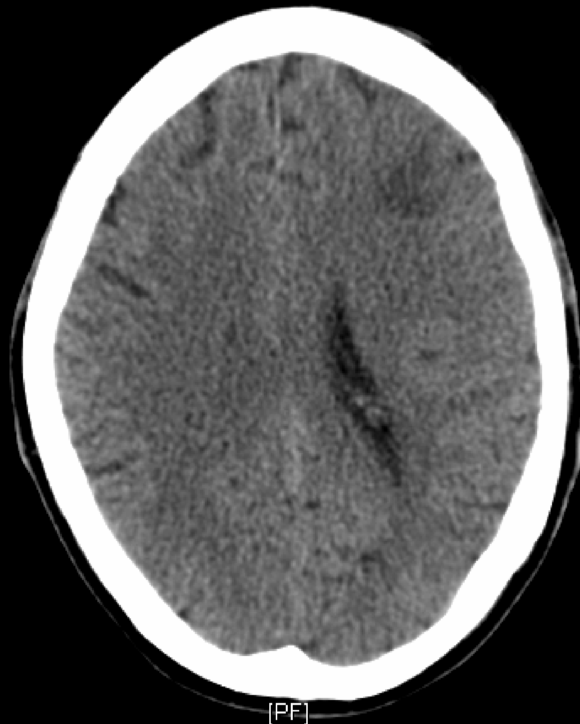
Stroke Case Study: Outcomes

- This man's NIH Stroke Scale decreased from 23 to 2.
- He was treated with our standard stroke pathway/order set.
- He was discharged home.
- Repeat CT scan of the brain did show an area of stroke.

Stroke Case Study: Follow Up Scan



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Stroke Case Study

- A patient who was taken to an ED as soon as possible
- An emergency department that recognized the possibility of acute intervention
- Rapid transport to an active stroke center
- An interventional radiology program that responded to the situation

2008 numbers

- 43,081 inpatients, 2,760 are Nervous System (6.4%)
- Mission Neurology saw 1,800 total patients as attending (851), admitting (25), consulting (924)
- 394 code stroke calls, treated 105 patients
- Principle dx of stroke: about 65/month or 800/year. Carotid procedures and secondary dx are about 400 more cases/year

Asheville, NC Stroke 2009

- In 2007, Mission Hospitals was certified by the Joint Commission as a Primary Stroke Center
- We have a code stroke team that responds to emergency strokes
- Three vascular certified neurologists during the week, 6 total neurologists sharing call- ALL PART OF THE SAME GROUP
- Interventional radiology and neurosurgery

Mission Hospitals: Acute Stroke Intervention

- A code stroke team developed through collaboration of multiple disciplines can increase % of treated patients.
- The code stroke nurse makes a big difference.
- With rapid treatment, people with severe deficits can make good improvements
- GWTG helps to follow internal and external benchmarks

Inertia
Ignorance
Deceit
Truth
Costs
Isolation
"Priorities"
Regret
Slander
Strokes: ain't nothing new

HOSPITALS