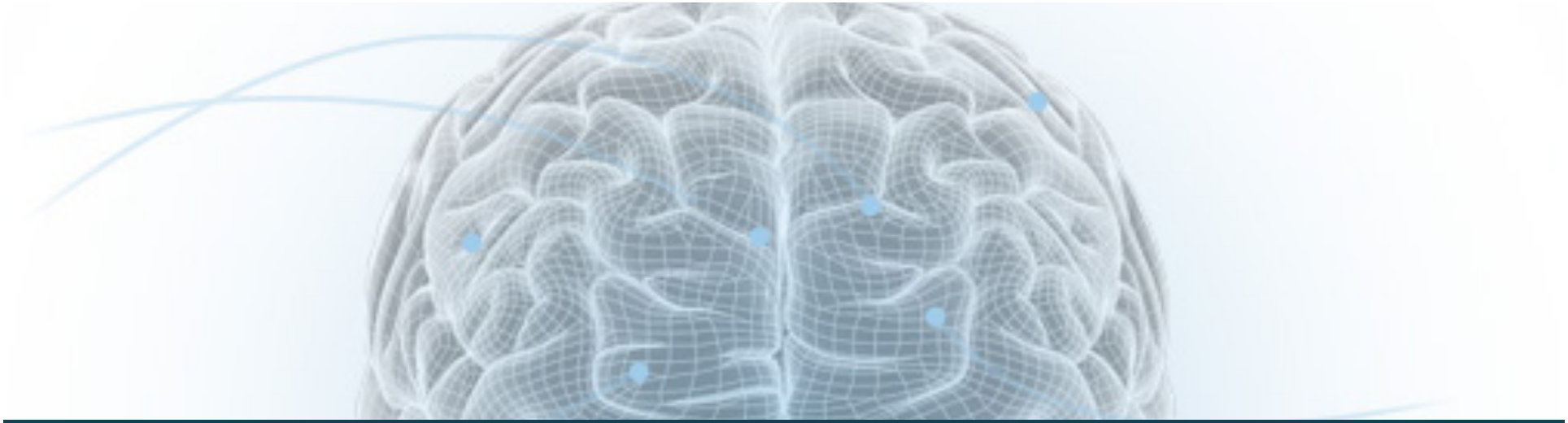
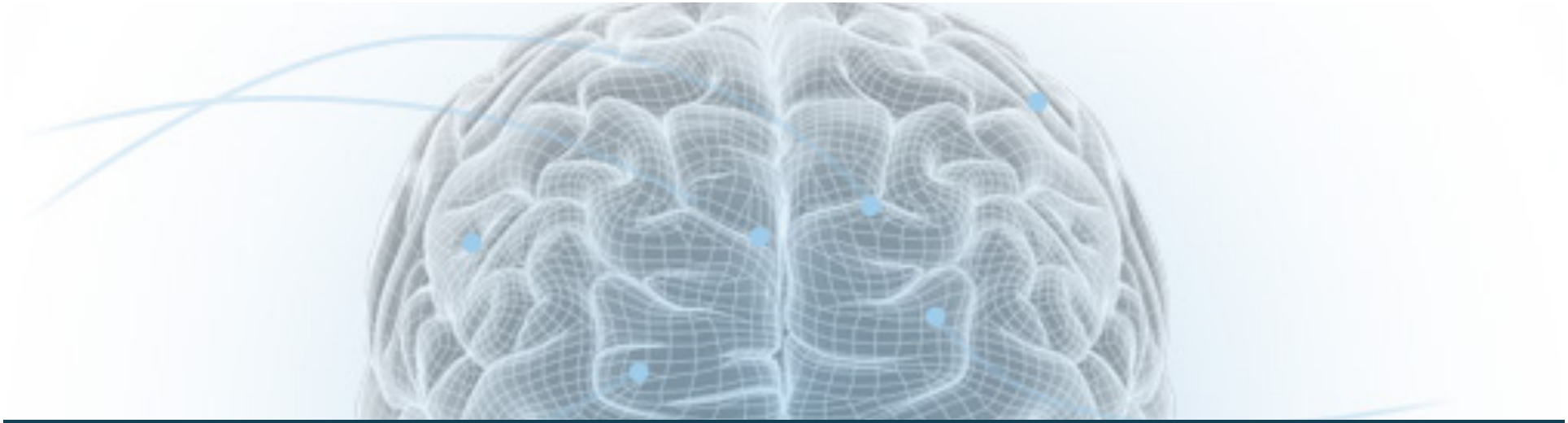


Different Strokes For Different Folks

Invasive Interventions and Triage Challenges for CVAs

Peter Antevy, MD, EMS Medical Director, Broward/Palm Beach FL



ELVO Has Entered the Building

Facilitating Cerebral Embolectomy for Large Vessel Occlusion

Peter Antevy, MD, EMS Medical Director, Broward/Palm Beach FL

Disclosures

- One important one

Questions

- What role does EMS play in OUTCOMES for stroke?
- Can we predict which patients need intervention from the Field?
- Can we leverage technology to improve outcomes?

Historical Perspective

Modified Rankin Scale

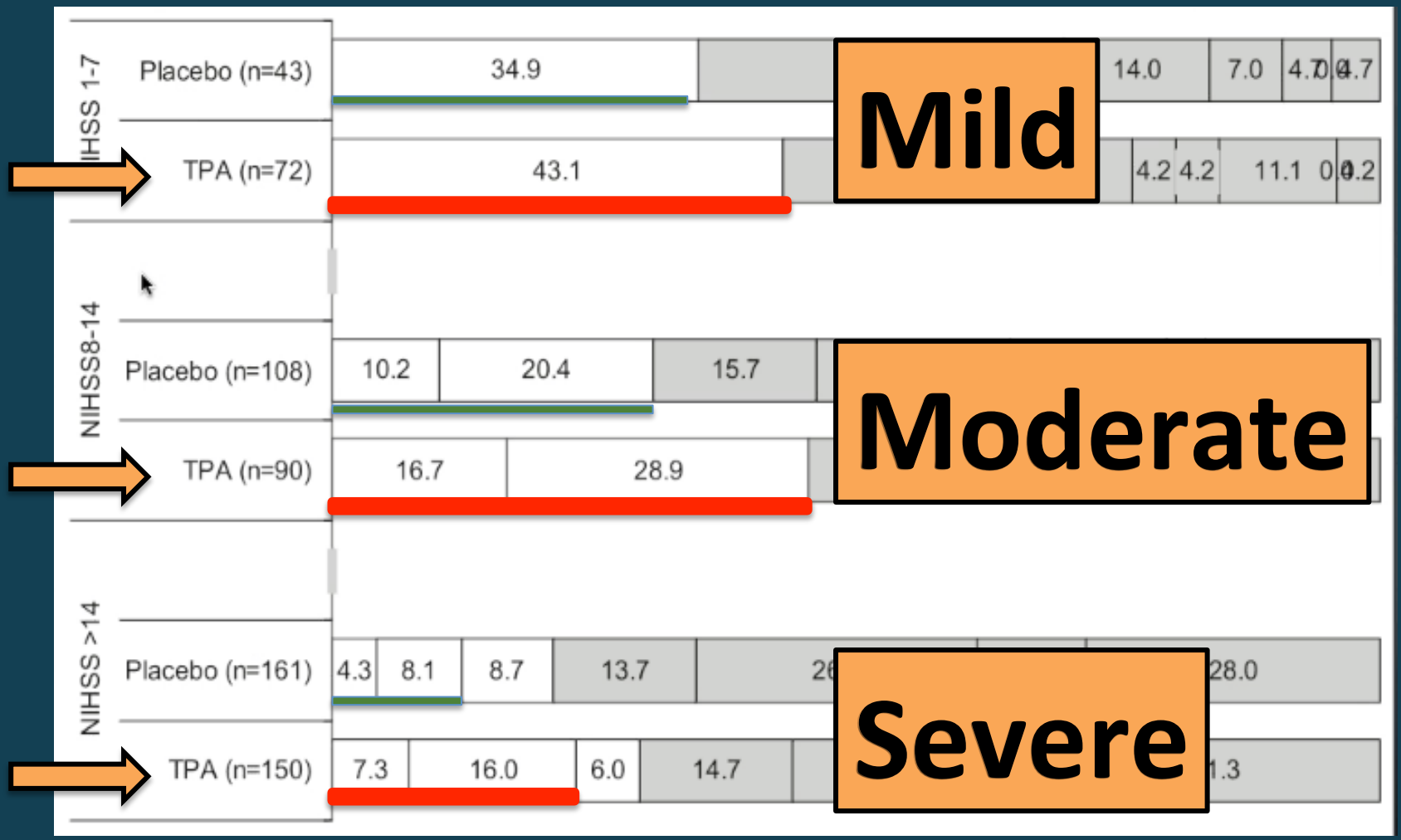
0	No symptoms – No Disability	FAV
1	Minor symptoms – Back to Work	
2	Independent – ADLs effected	GOOD
3	Requires Assistance	
4	Continued Nursing Care	
5	24 Hour Skilled Nursing	
6	Deceased	

First Stroke Revolution?

- 1995
- IV tPA trials
- Stoke as an acute neurologic illness
- “Tissue plasminogen activator for acute ischemic stroke” NEJM 1995

Stroke Evolves!

IV tPA Works For ALL!

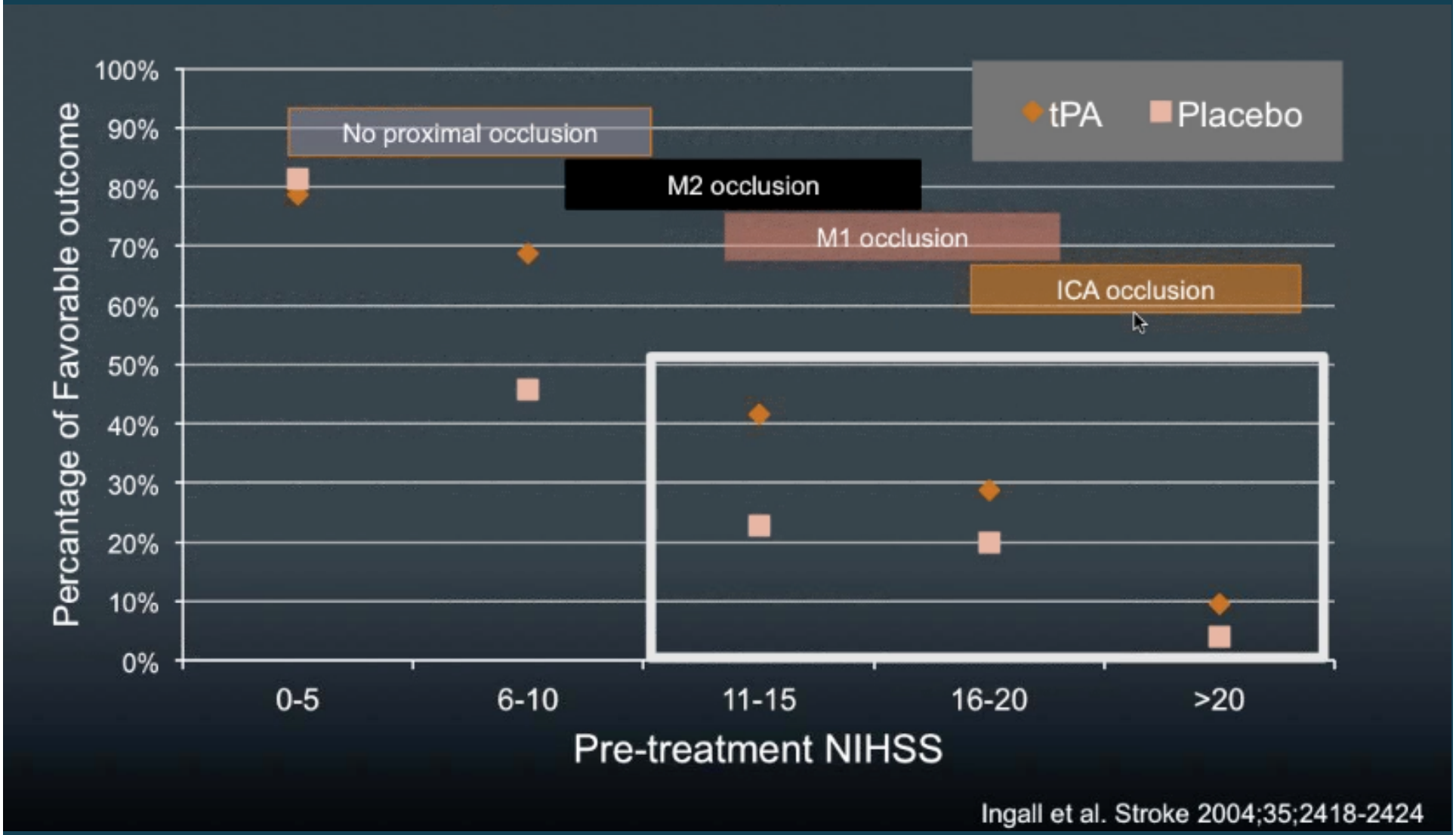


Saver et al, Stroke 2007

Vessel Anatomy

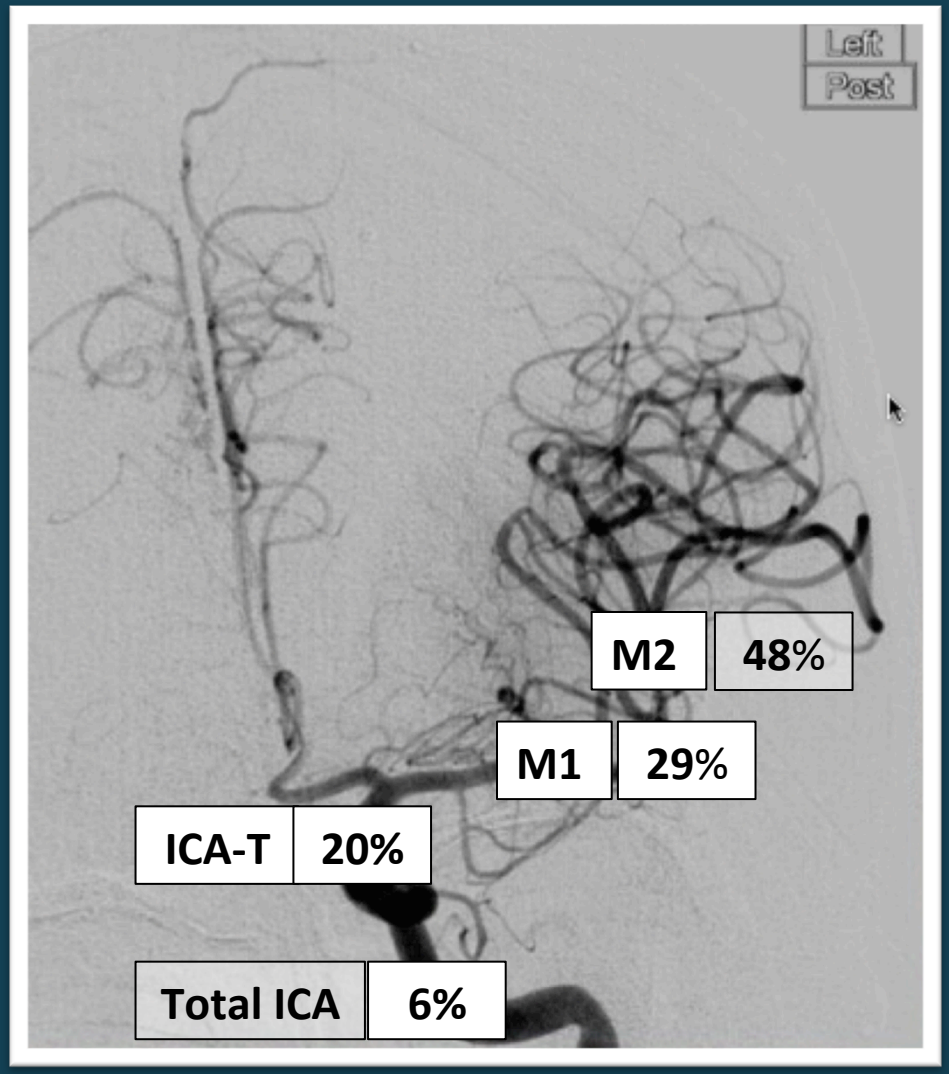
- Distal
- M2
- M1
- ICA

Maybe Not!



Ingall et al. Stroke 2004;35;2418-2424

IV tPA Success Rates



Saqqur et al, Neurology 2008

Next Stroke Revolution

- 1999
- IA tPA trials
- Documented MCA occlusion
- “Furlan AJ et al . JAMA 1999; 282: 2003-2011

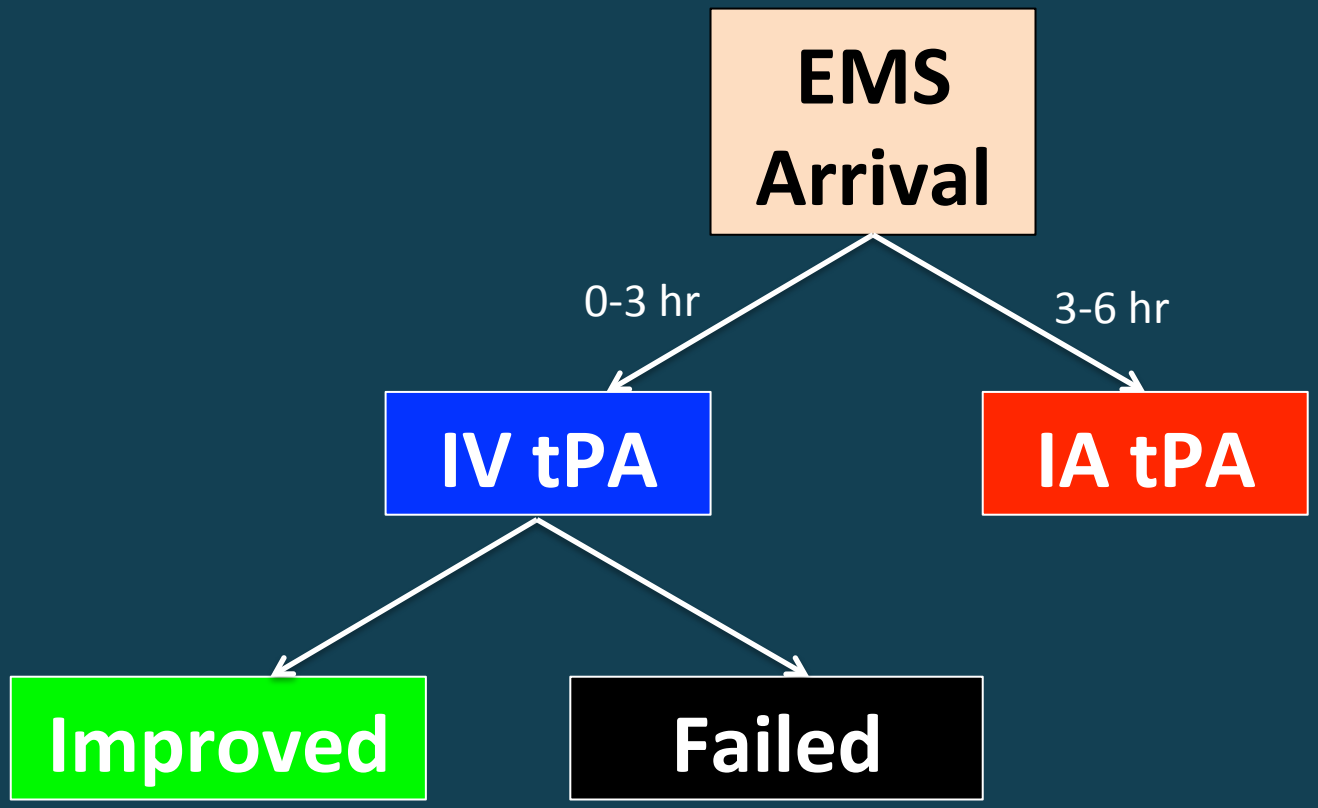
Outcomes?

IA Therapy : A New Hope

Treatment Group	Recanalization	Symptomatic Hemorrhage	MRS ≤ 2	Mortality
Pro-UK (n=121)	66%	10%	40%	25%
Placebo (n=59)	18%	2%	25%	27%
NINDS -1 (n=291)		6%	47%	21%

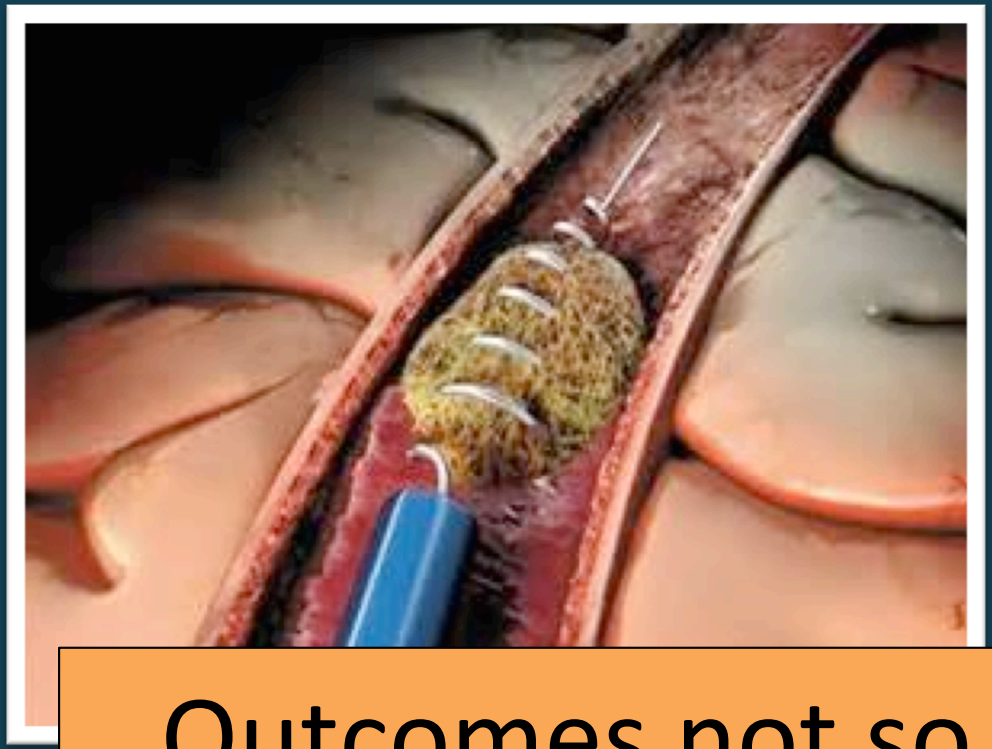
Twice as likely to have a positive outcome

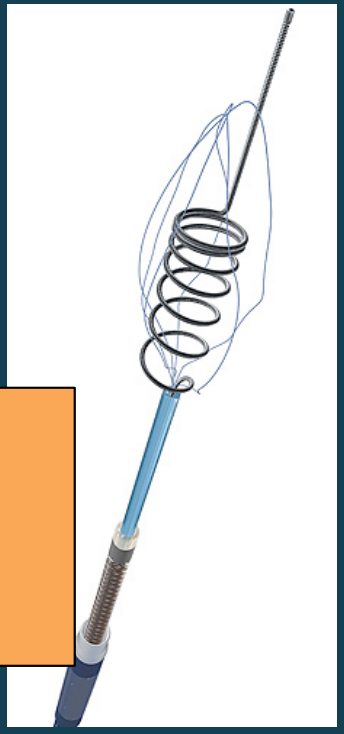
IA vs. IV : Late 1990's



Then in 2004

"The Lord Had Merci"

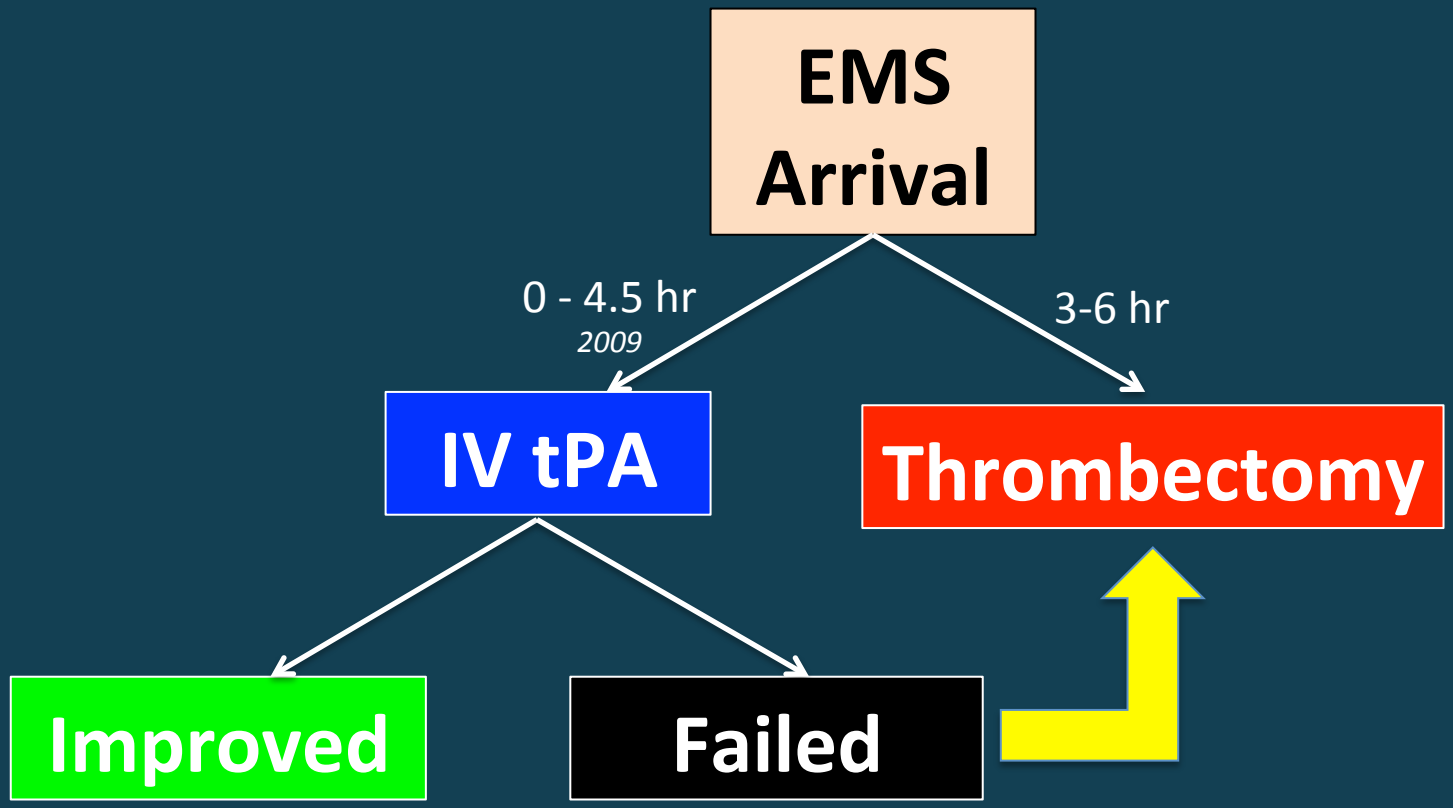




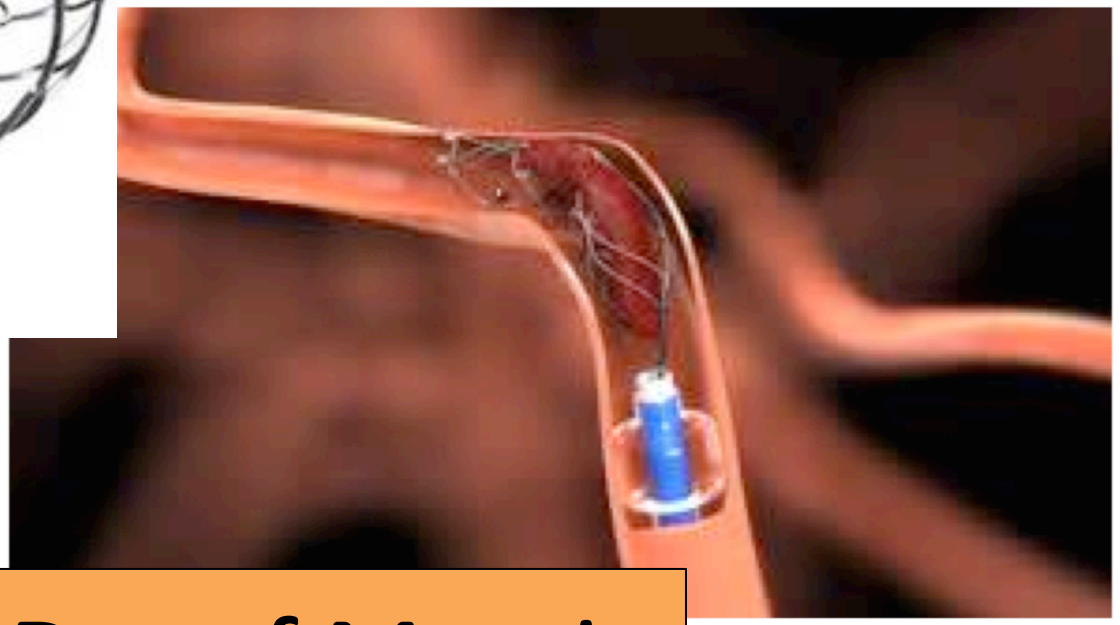
Outcomes not so good

mRs 0 – 2 in only 36%

IA vs. IV : “Bridging”



Then in 2012....



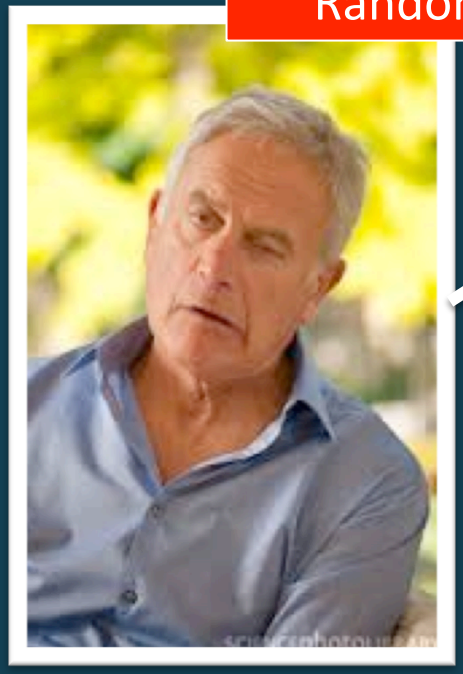
Outcomes Dwarf Merci

2013 – The $&IT Hit the Fan

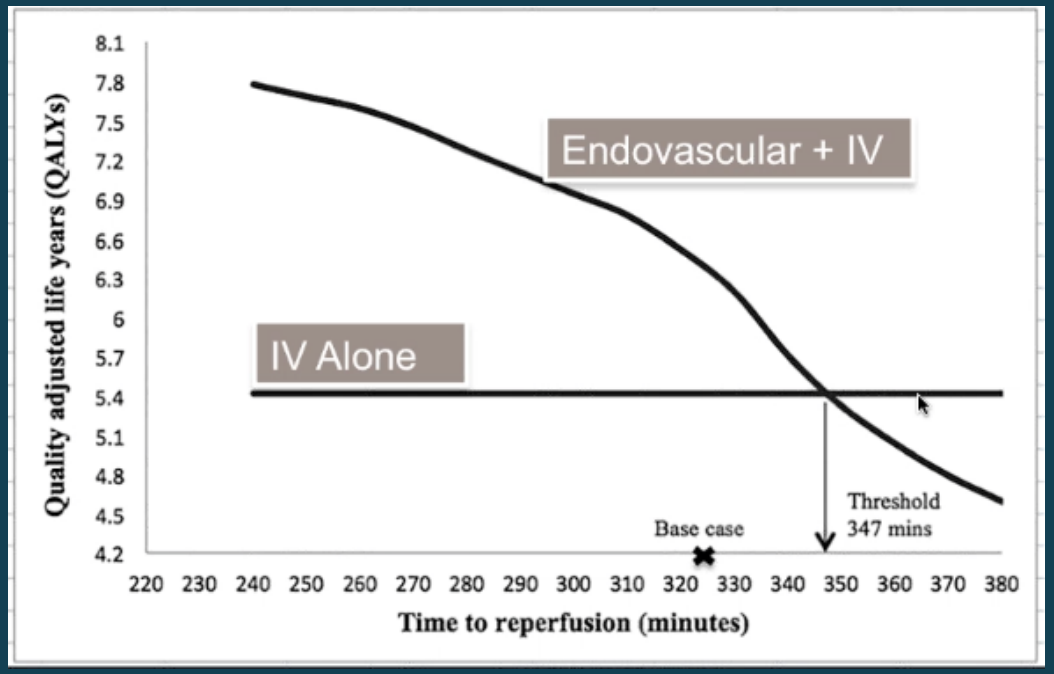
Major Issues Noted

1. Synthesis
2. IMS III
3. MR Rescue

Randomization by Symptoms



Cath Lab



What's the Real Story?

All 3 Showed Device Failure

1. ELVO not required for entry
2. 1st/2nd Generation devices used
3. Time to treatment not strict

Patients randomized by <u>symptom</u> not by disease

2015 Revolution

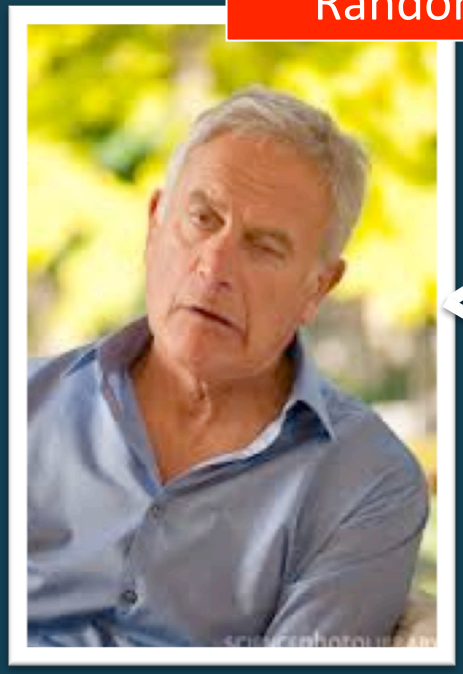
MR. CLEAN

- Netherlands
- Randomized
- 16 Sites
- 0 – 6 hrs
- Non contrast CT

Must Have ELVO

MR CLEAN Difference

1. Synthesis
2. IMS III
3. MR Rescue



Randomization by Symptoms

Cath Lab

+ELVO → **Cath Lab**

Randomization by Disease

33% vs 16%

mRS 0 - 2

The Show Down

EMS MD

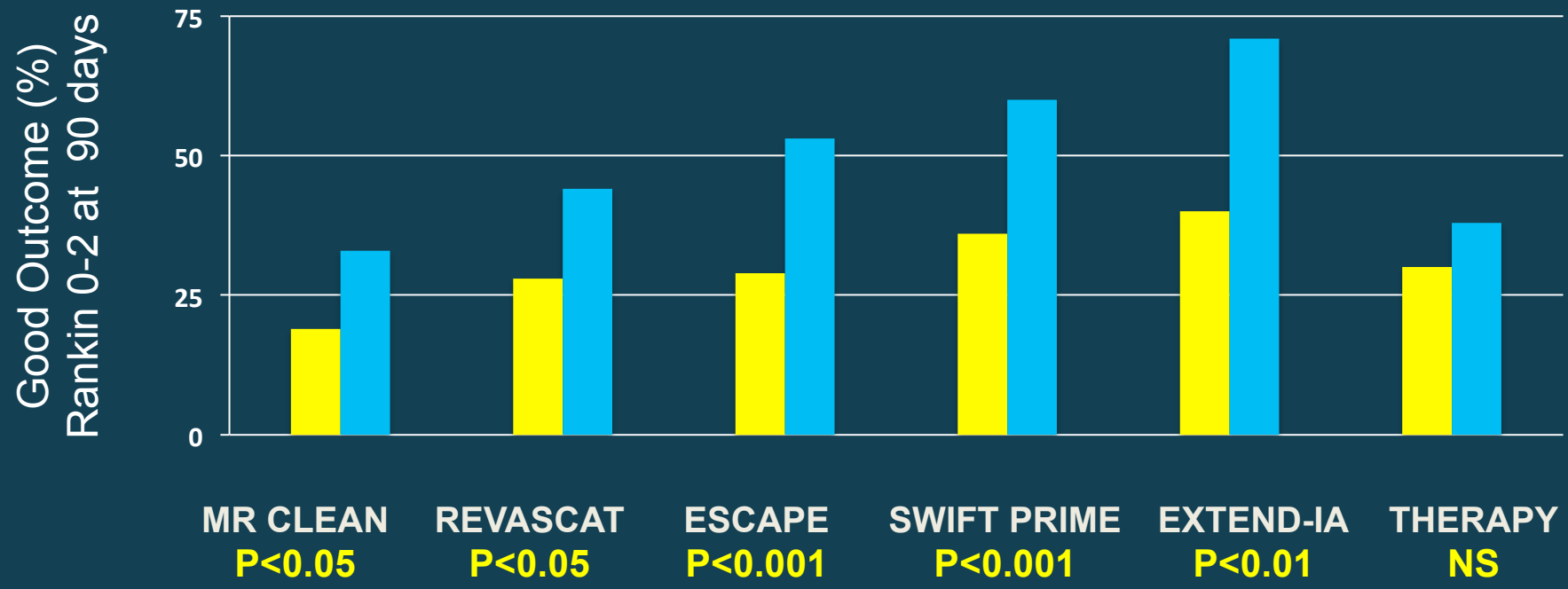
Hospital CEOs

The Flood Gates

Multiple Trials

MR CLEAN
SWIFT-PRIME
EXTEND IA
ESCAPE
REVASCAT
THERAPY

Positive Endovascular Stroke Trials 2015



	MR CLEAN P<0.05	REVASCAT P<0.05	ESCAPE P<0.001	SWIFT PRIME P<0.001	EXTEND-IA P<0.01	THERAPY NS
Endo-vascular	33%	44%	53%	60%	71%	38%
Control	19%	28%	29%	36%	40%	30%

The New Paradigm

CT Scan

↓

IV tPA

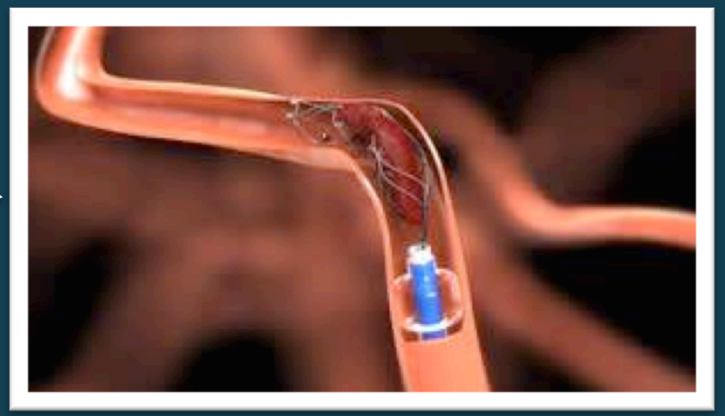
If eligible

↓

+ ELVO

0 – 6 hr

→



The Next Question

Is CT for Stroke = EKG for STEMI?

RACE Scale

Design and Validation of a Prehospital Stroke Scale to Predict Large Arterial Occlusion

The Rapid Arterial Occlusion Evaluation Scale

Natalia Pérez de la Ossa, MD, PhD; David Carrera, MD; Montse Gorchs, BD; Marisol Querol, BD; Mònica Millán, MD, PhD; Meritxell Gomis, MD, PhD; Laura Dorado, MD, PhD; Elena López-Cancio, MD, PhD; María Hernández-Pérez, MD; Vicente Chicharro, MD; Xavier Escalada, MD; Xavier Jiménez, MD, PhD; Antoni Dávalos, MD, PhD

Background and Purpose—We aimed to develop and validate a simple prehospital stroke scale to predict the presence of large vessel occlusion (LVO) in patients with acute stroke.

Methods—The Rapid Arterial oCclusion Evaluation (RACE) scale was designed based on the National Institutes of Health Stroke Scale (NIHSS) items with a higher predictive value of LVO on a retrospective cohort of 654 patients with acute ischemic stroke: facial palsy (scored 0–2), arm motor function (0–2), leg motor function (0–2), gaze (0–1), and aphasia or agnosia (0–2). Thereafter, the RACE scale was validated prospectively in the field by trained medical emergency technicians in 357 consecutive patients transferred by Emergency Medical Services to our Comprehensive Stroke Center. Neurologists evaluated stroke severity at admission and LVO was diagnosed by transcranial duplex, computed tomography, or MR angiography. Receiver operating curve, sensitivity, specificity, and global accuracy of the RACE scale were analyzed to evaluate its predictive value for LVO.

Results—In the prospective cohort, the RACE scale showed a strong correlation with NIHSS (r=0.76; P<0.001). LVO was detected in 76 of 357 patients (21%). Receiver operating curves showed a similar capacity to predict LVO of the RACE scale compared with the NIHSS (area under the curve 0.82 and 0.85, respectively). A RACE scale ≥5 had sensitivity 0.85, specificity 0.68, positive predictive value 0.42, and negative predictive value 0.94 for detecting LVO.

Conclusions—The RACE scale is a simple tool that can accurately assess stroke severity and identify patients with acute stroke with large artery occlusion at prehospital setting by medical emergency technicians. **(*Stroke*. 2014;45:87-91.)**

RACE Scale (0-9)

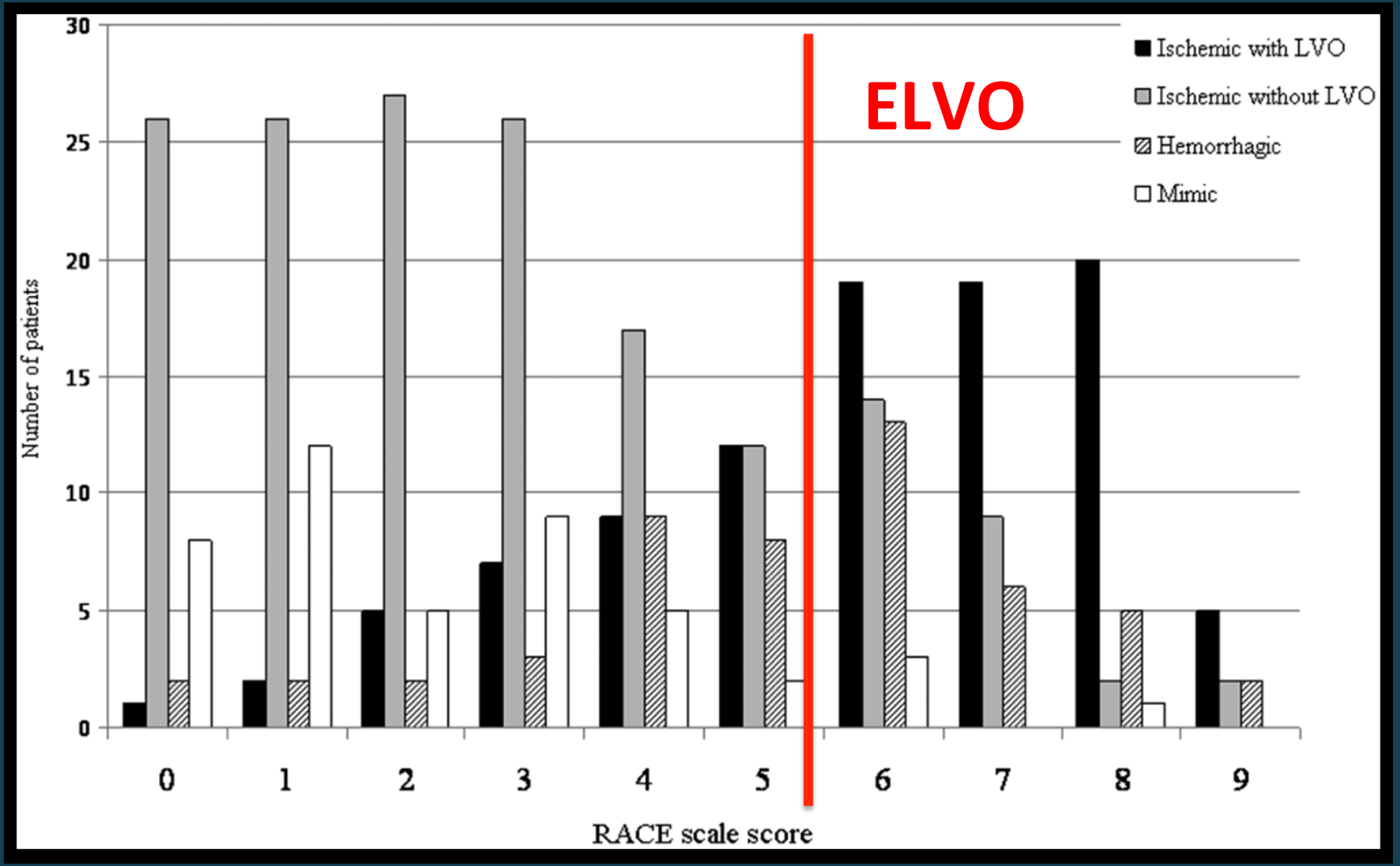
Cortical signs

Table 1. RACE Scale

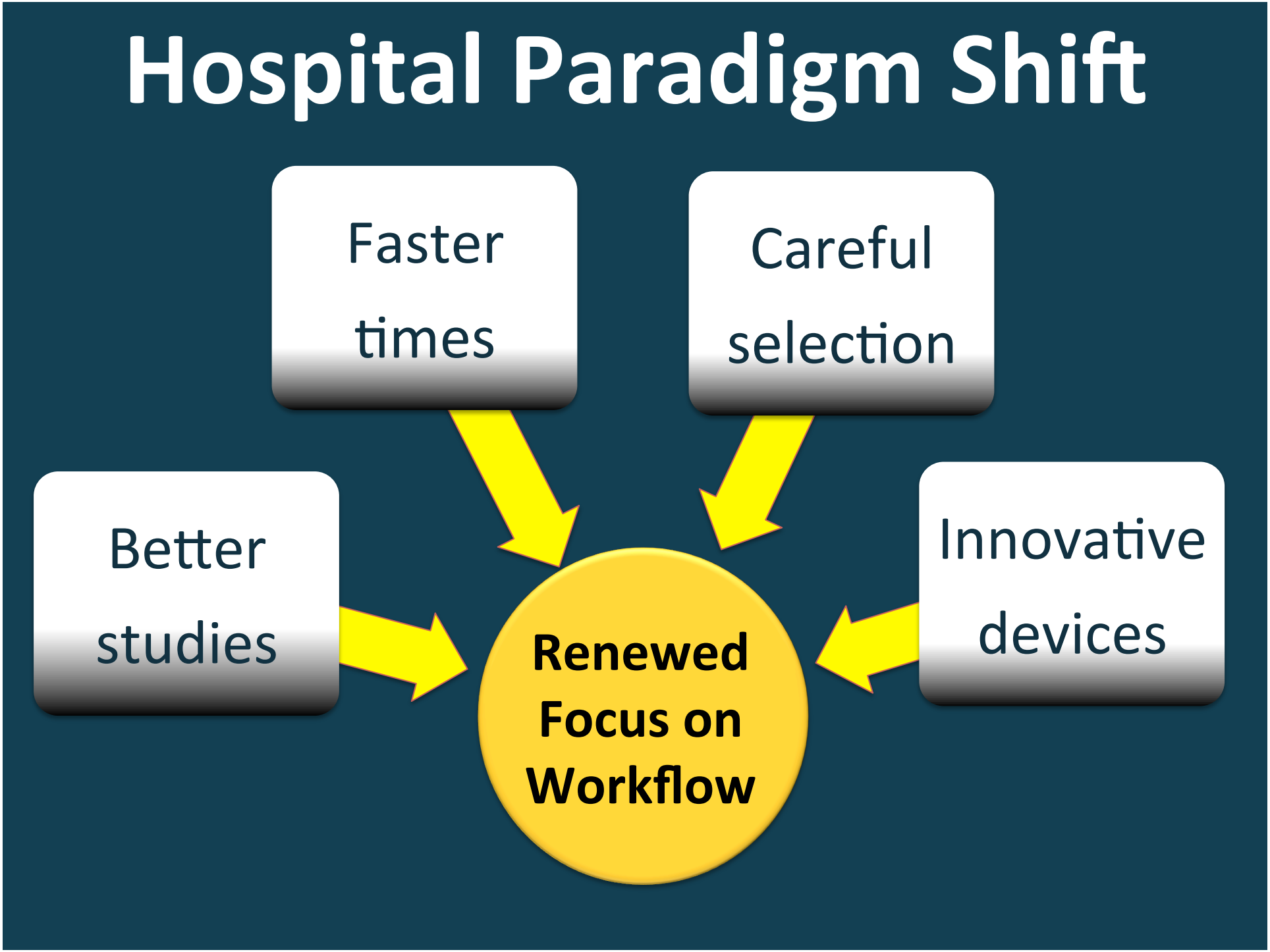
Item	RACE Score	NIHSS Score Equivalence
Facial palsy		
Absent	0	0
Mild	1	1
Moderate to severe	2	2–3
Arm motor function		
Normal to mild	0	0–1
Moderate	1	2
Severe	2	3–4
Leg motor function		
Normal to mild	0	0–1
Moderate	1	2
Severe	2	3–4
Head and gaze deviation		
Absent	0	0
Present	1	1–2
Aphasia* (if right hemiparesis)		
Performs both tasks correctly	0	0
Performs 1 task correctly	1	1
Performs neither tasks	2	2
Agnosia† (if left hemiparesis)		
Patient recognizes his/her arm and the impairment	0	0
Does not recognized his/her arm or the impairment	1	1
Does not recognize his/her arm nor the impairment	2	2
Score total	0–9	

Stroke 2014:45;87-91

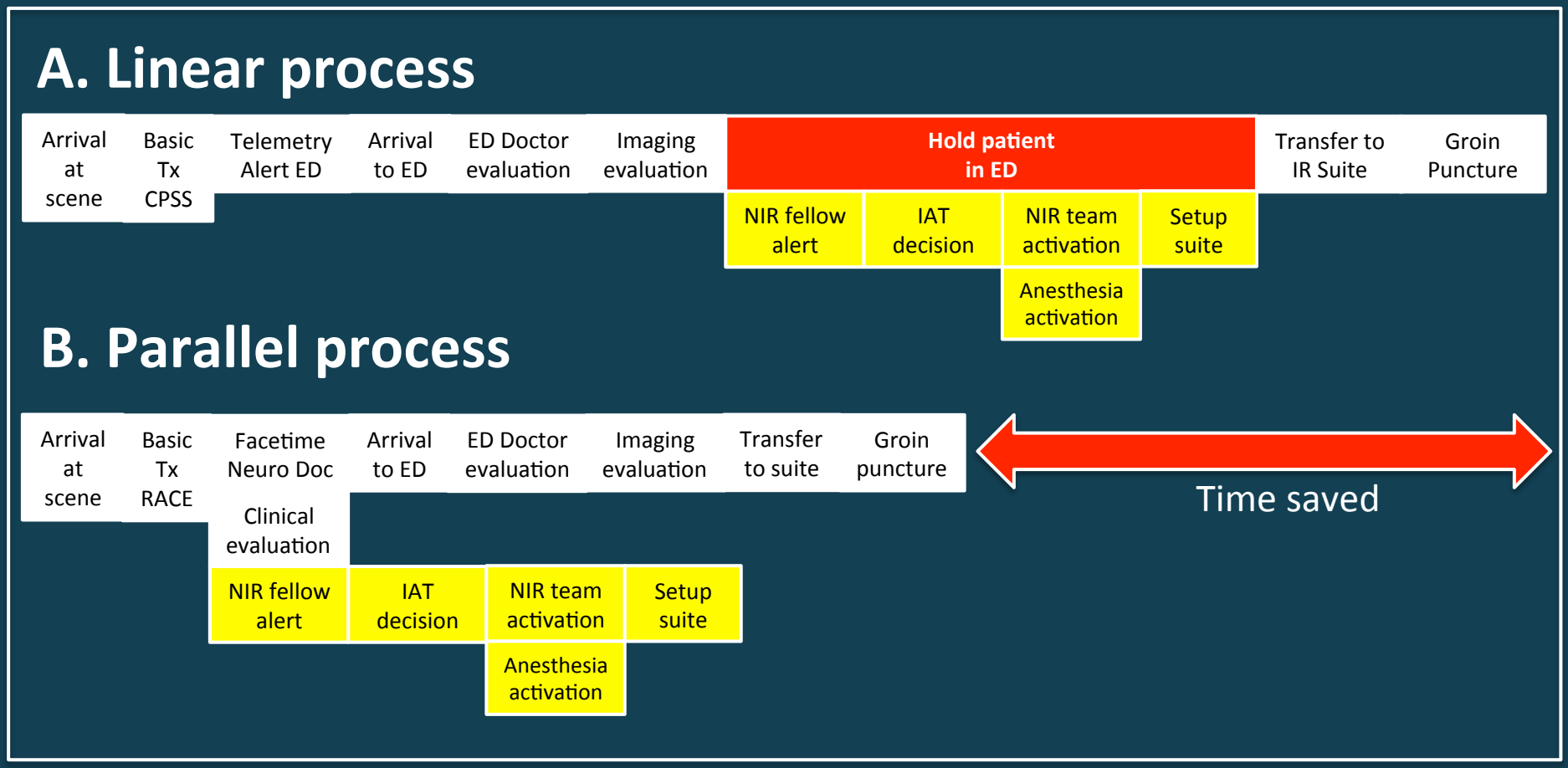
RACE - Validation



Hospital Paradigm Shift



Parallel Workflow



Field Activation by EMS

Memorial Healthcare System

EMS STROKE ALERT

Obtain the following from EMS:

RACE scale (0-9 score) _____

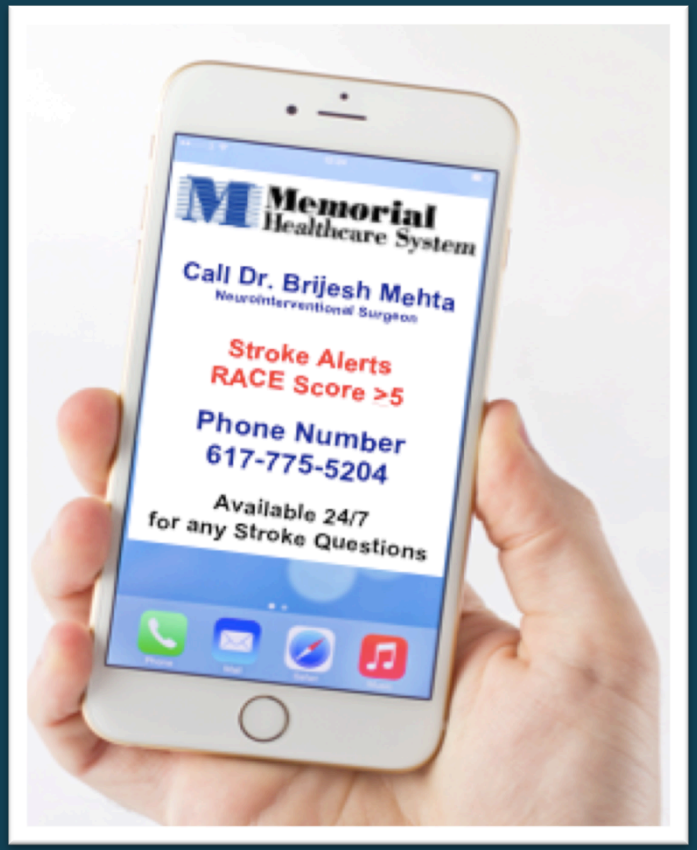
Last known well time _____

Anticoagulation (warfarin, pradaxa, xarelto, etc.) _____

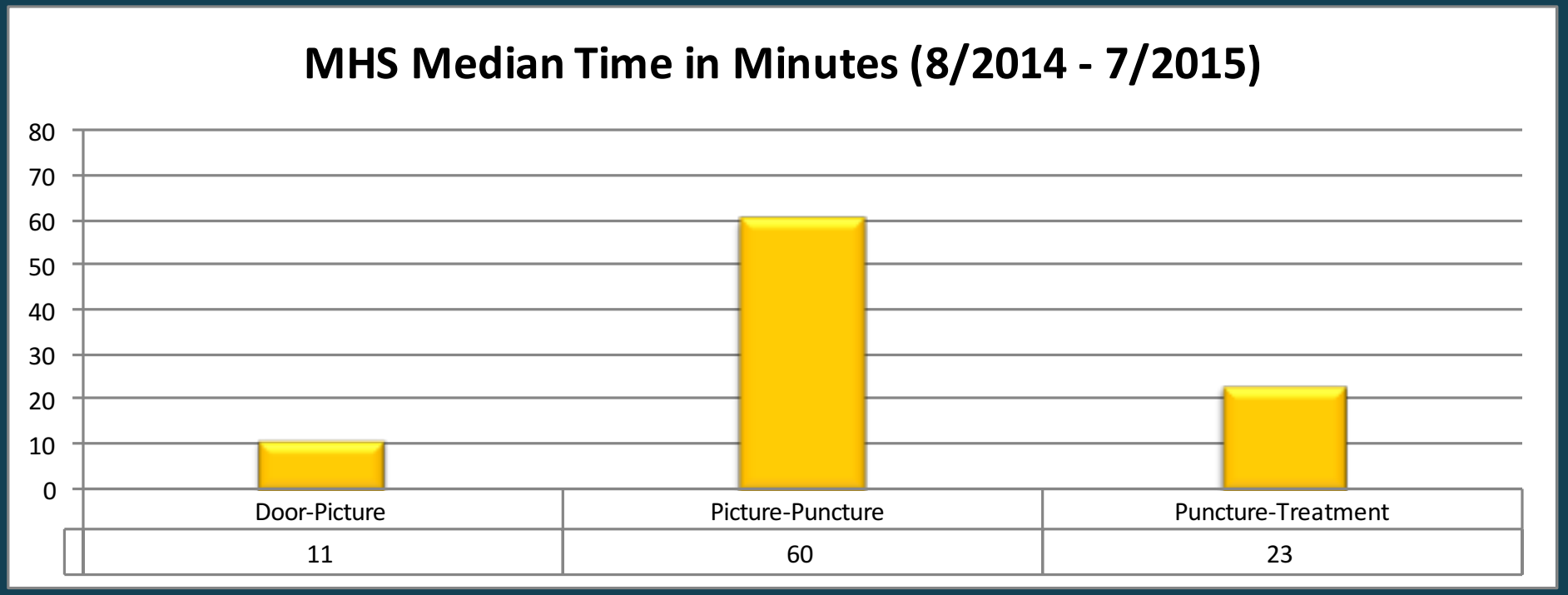
Estimated time of arrival _____

Actions to consider pre-hospital:

1. Alert neurologist on call for all stroke alerts
2. If RACE score >5 alert neurointerventionalist
3. Early cath lab activation = gaze preference + weakness



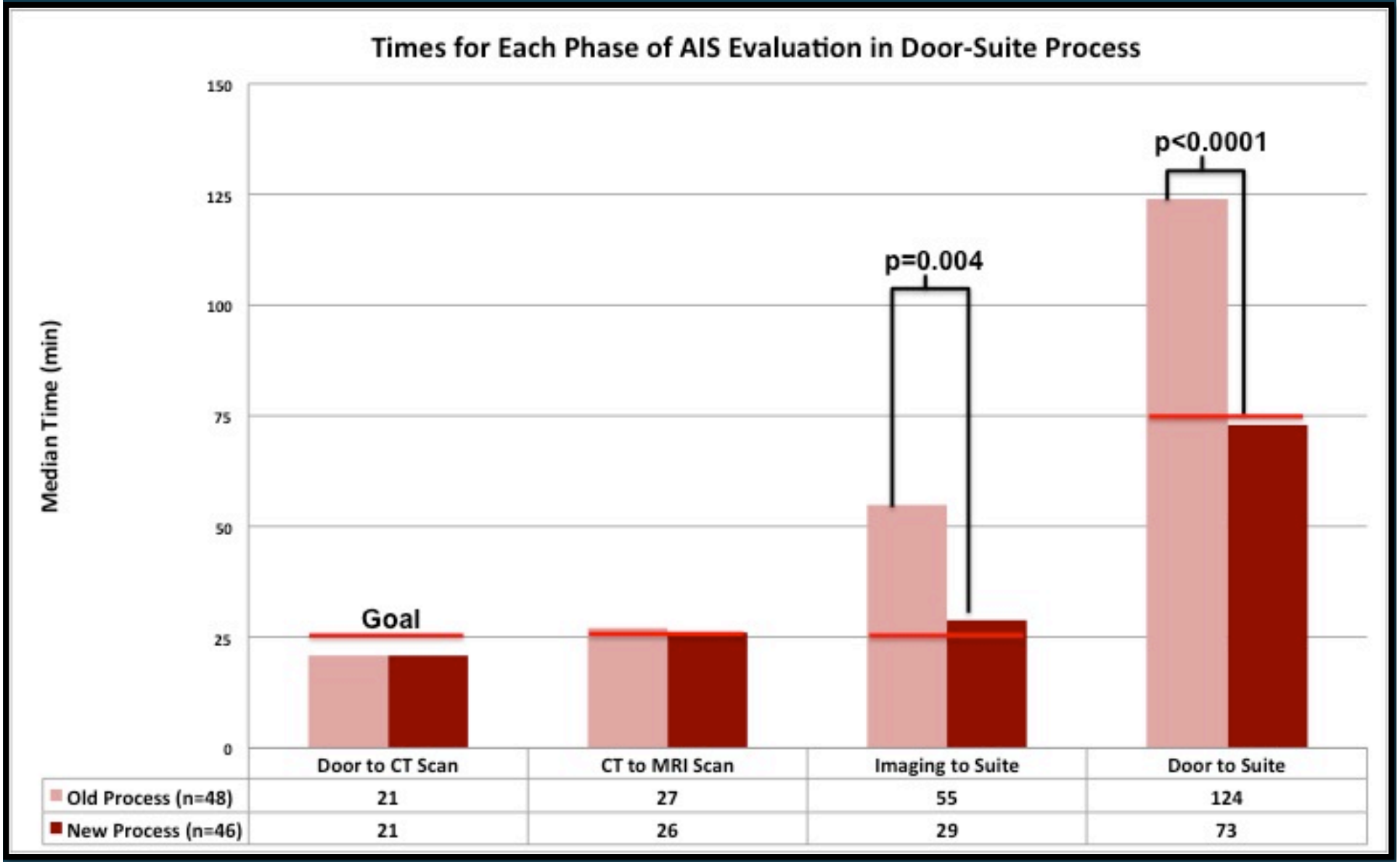
Stroke Process Metrics



115 Stroke Thrombectomy Cases

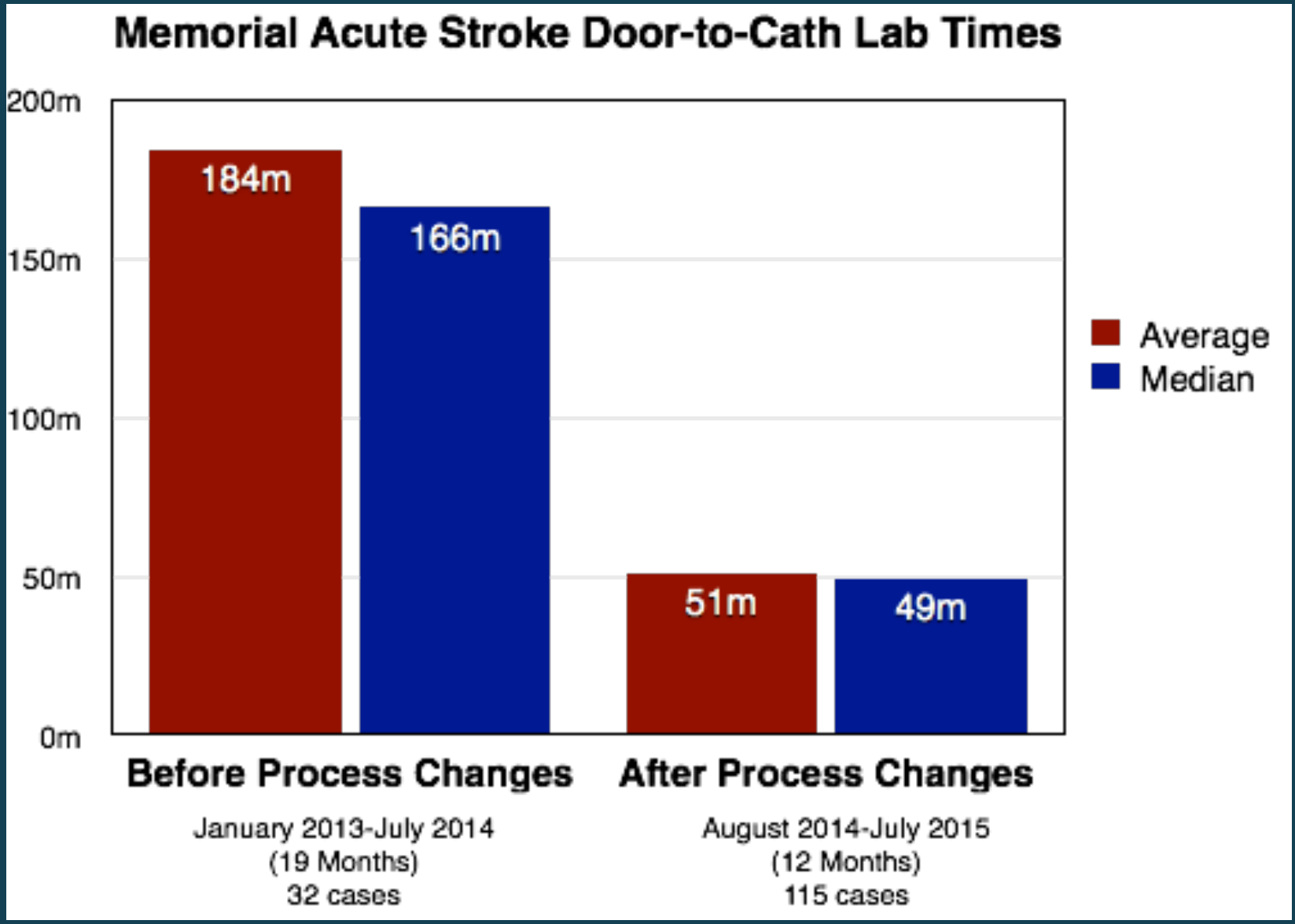
Goal P2P Time 60 minutes

Impact of Process Improvement

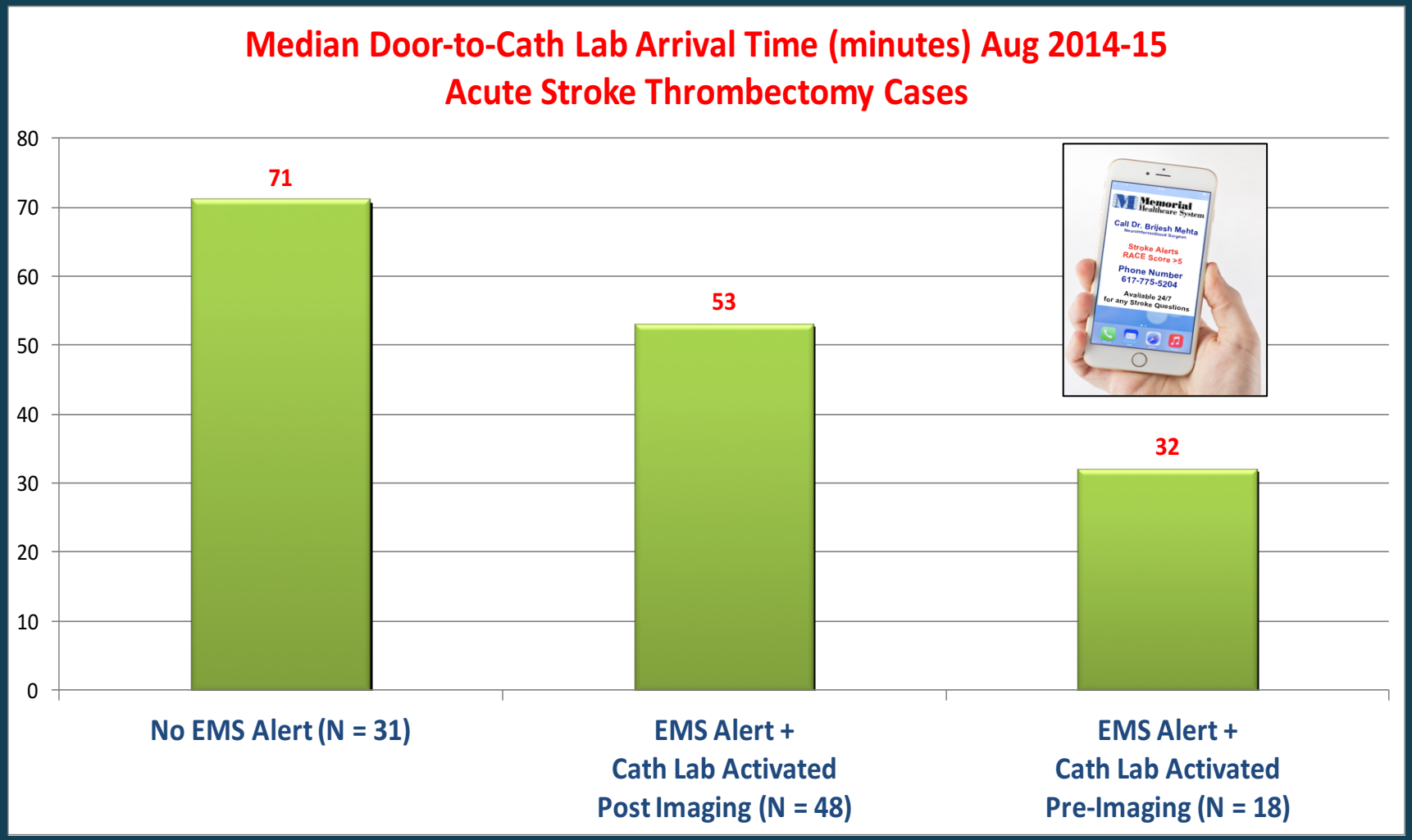


	Door to CT Scan	CT to MRI Scan	Imaging to Suite	Door to Suite
Old Process (n=48)	21	27	55	124
New Process (n=46)	21	26	29	73

Impact of Process Improvement

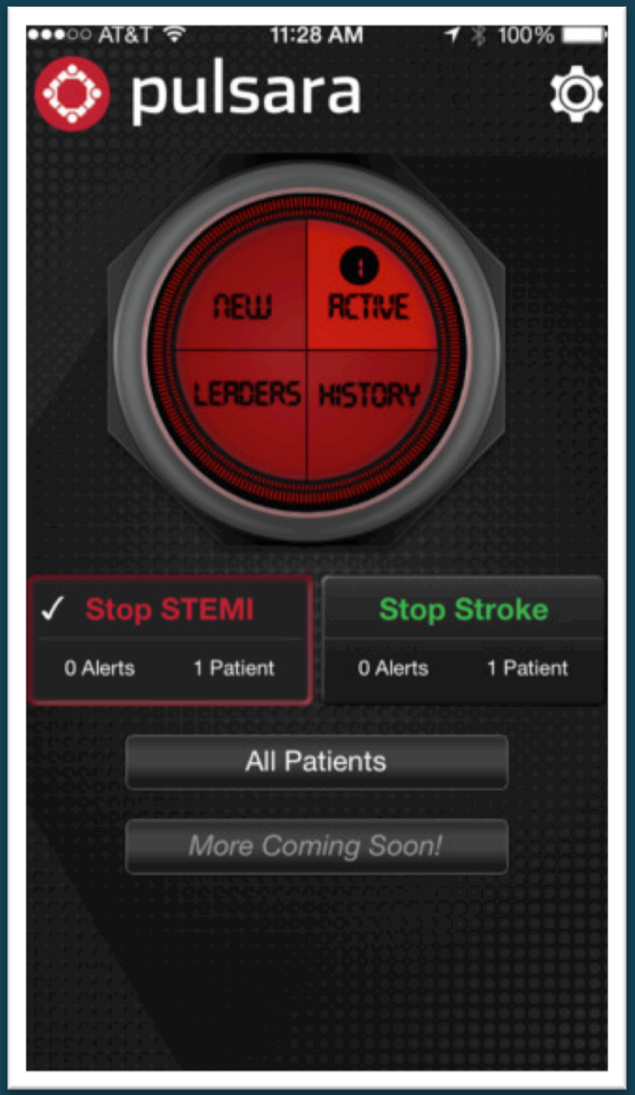


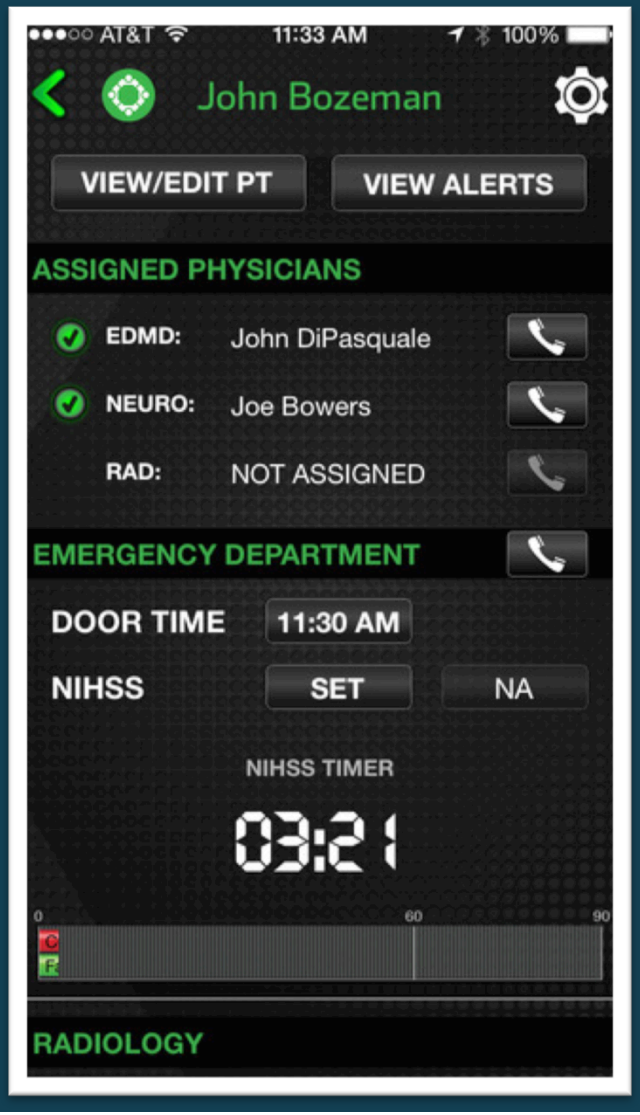
Door to Cath Lab Improvement



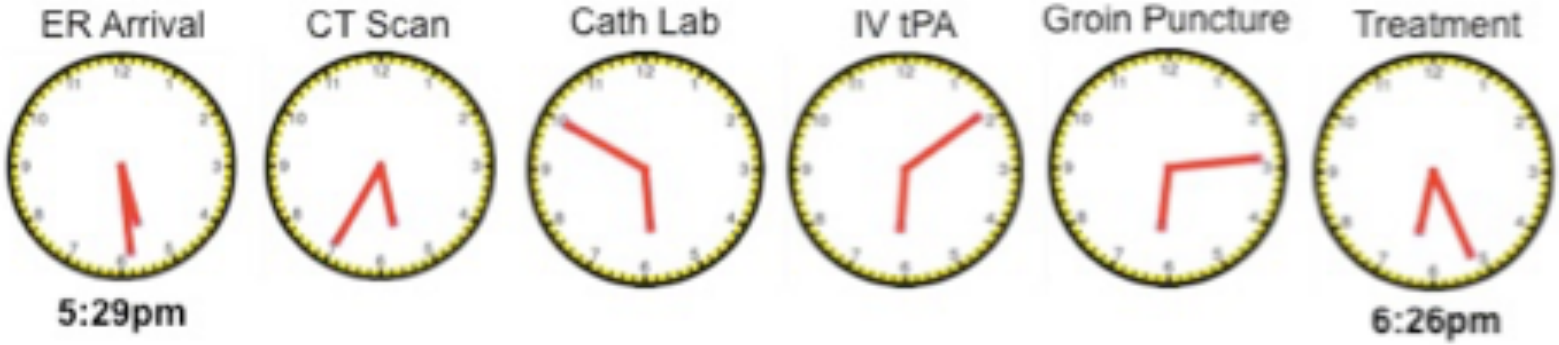
Recently Launched

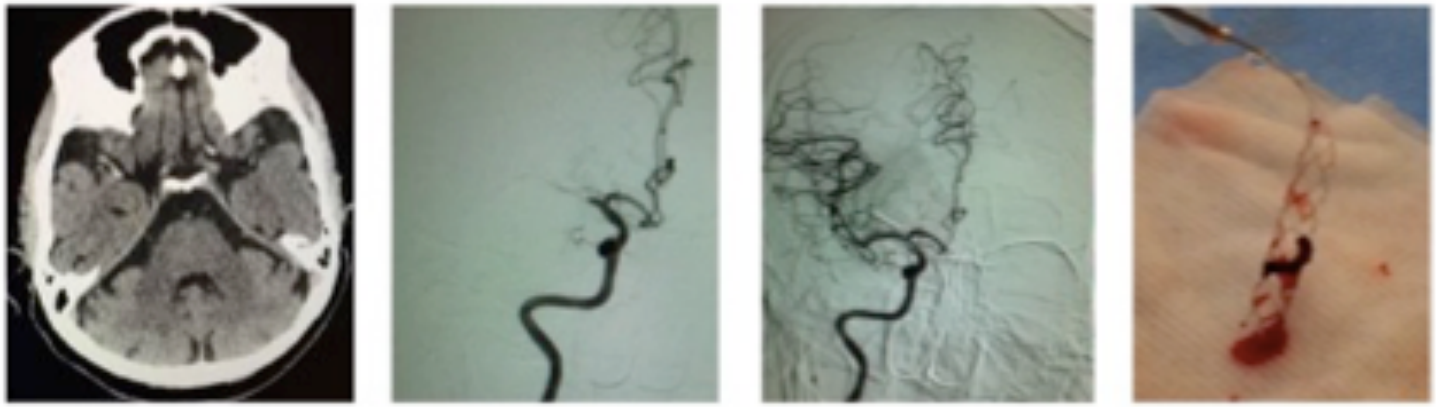
Entire Team Activation





Acute Thrombectomy - 2015





57 Min

74yoF left arm/leg weakness, NIHSS 16
Hallandale EMS (Station 90) → Memorial Regional
Full reperfusion with Solitaire device
Final NIHSS 1

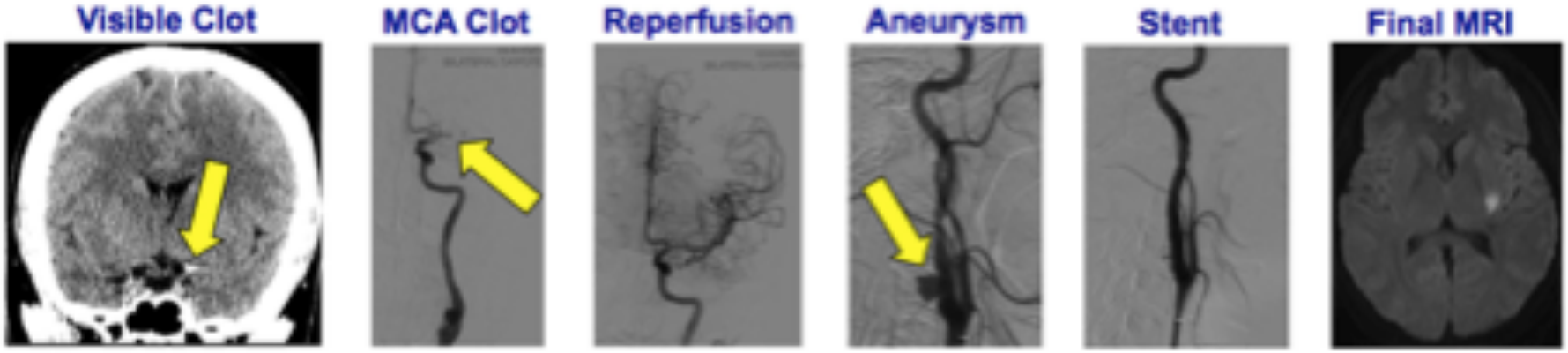
Performance Metrics	
Door-CT (Picture)	6 minutes
Picture-Puncture	39 minutes
Puncture-Treatment	12 minutes

ER Physician: Dr Donny Perez, **Rads**: Dr Vivek Patel
NeuroInterventionalist: Dr Brijesh Mehta, 617-775-5204

Memorial Healthcare System

Acute Thrombectomy - 2015

Symptom Onset	CT Scan	Cath Lab	Puncture	Treatment
11:40am	11:48am	12:17pm	12:40pm	12:55pm



PPines FR (Station 69) → Memorial West
26 year-old woman collapsed upon waking up
Full intracranial reperfusion with Solitaire device
Carotid pseudoaneurysm source of clot
Vessel reconstructed with covered stent
Very small stroke on MRI, discharge NIHSS 0

Performance Metrics

Onset-CT (Picture)	8 minutes
Picture-Puncture	52 minutes
Puncture-Treatment	15 minutes
Onset-Treatment	**75 minutes**

ICU Physician: Dr Ari Sareli, **Rads**: Dr Peter Sullivan
NeuroInterventionalist: Dr Brijesh P Mehta, 617-775-5204

Local10.com NEWS CUBA SPORTS ENTERTAINMENT MORE

NEWS Local News U.S./World Call Christina Health Dirty Dining Politics Money

HEALTH

App helps first responders support stroke patients

Posted: 11:09 AM, January 20, 2016
Updated: 11:21 AM, January 20, 2016

45 Twitter 45

39 Minutes

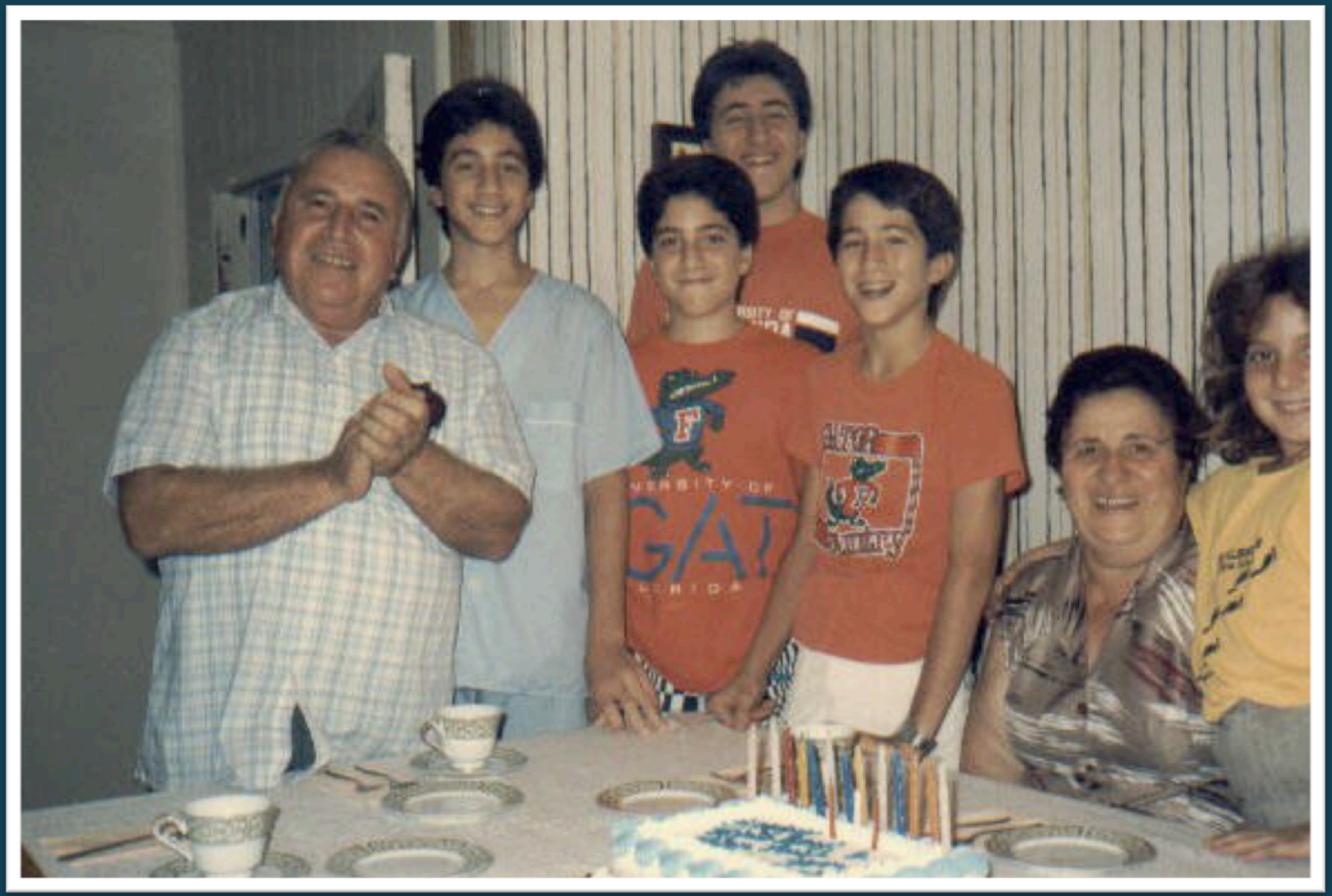
It Takes a Village

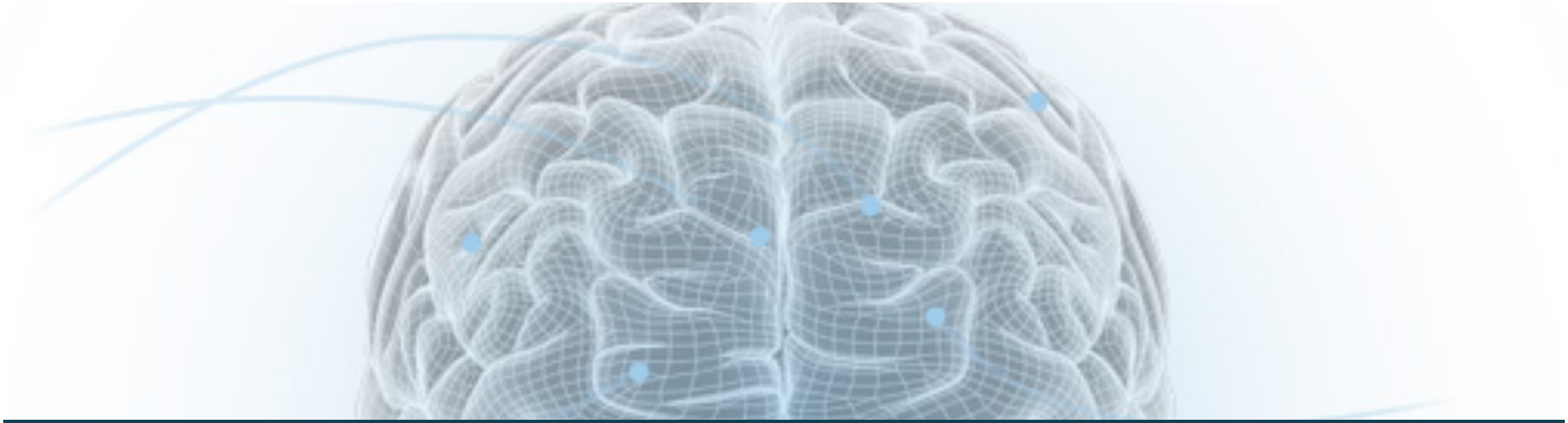
Dr. Charles Sand
EMS Medical Director
Tampa, FL

Dr. Paul Banerjee
EMS Medical Director
Polk County, FL

Dr. Randy Katz
EMS Medical Director
Hollywood, FL

Conclusion





ELVO Has Entered the Building

Facilitating Cerebral Embolectomy for Large Vessel Occlusion

Peter Antevy, MD, EMS Medical Director, Broward/Palm Beach FL