

How to Set up a Pre-hospital Stroke Severity-Based Triage System - The Toledo, Ohio Experience

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Disclosures

- None

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- Fifteen Counties
- Catchment area: 1.2 Million
- Tele-stroke Sites: 14
- Two Hubs: CSC and PSC-IC
- Admissions: 1300/Yr
- MTs: 150/ year



Lucas County Stroke Centers

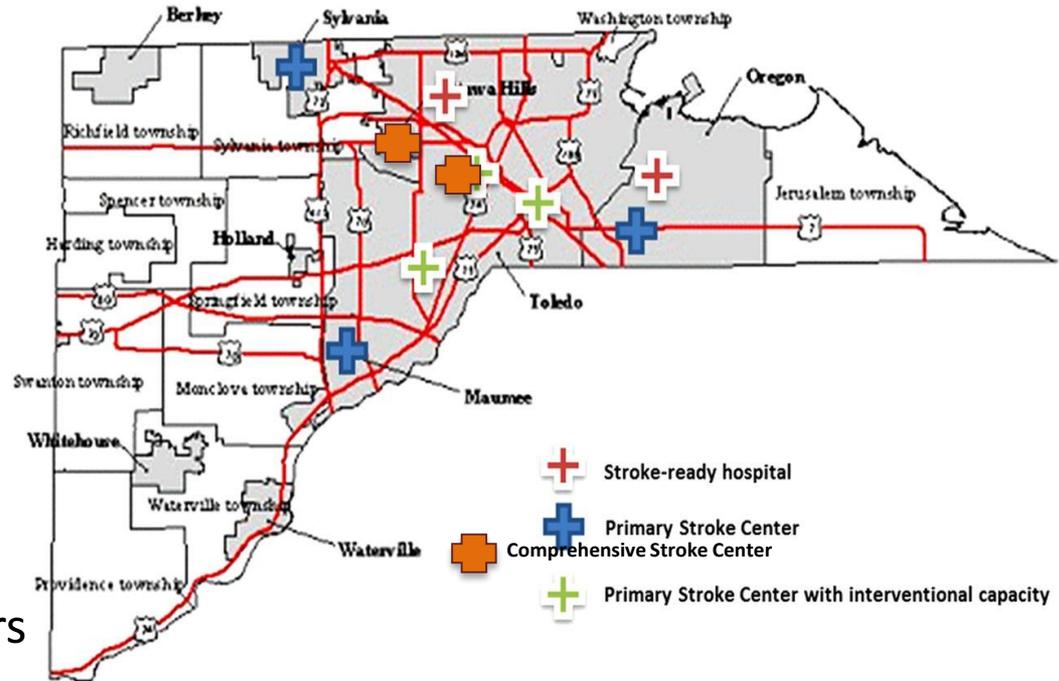
Population: 436,393

Size: 596 mi²

Hospitals: 8+2 Free standing ERs

Two Comprehensive Stroke Centers

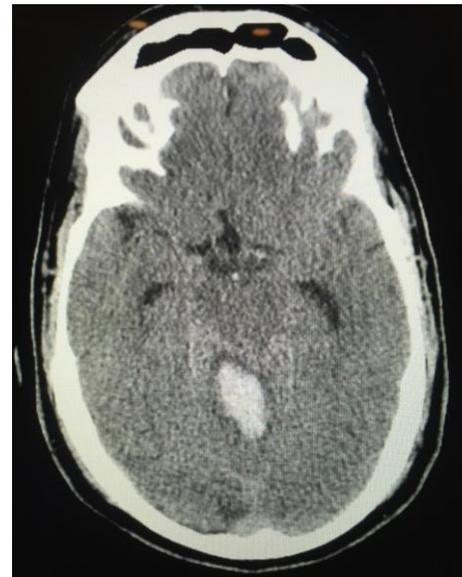
One PSC with Neurointerventional capacity



Syed F Zaidi et al. J NeuroIntervent Surg doi:10.1136/neurintsurg-2016-012476

Case 1: Patient with ICH

- 52 YOM with PMHx of HTN
- Acute onset of Left>Right weakness and somnolence.
- He became unresponsive in route and had to be intubated.
- Exam on arrival: Coma and diminished brainstem reflexes.



Case 2: Patient with Ischemic Stroke

- 81 YOF with No significant PMHx
- Patient is independent at baseline
- Acute onset of Left sided paralysis and Dysarthria at 1040 HR
- She arrived to the ER at 1105 HR
- NIHSS on Arrival to the ER was 24
- ASPECT Score 10

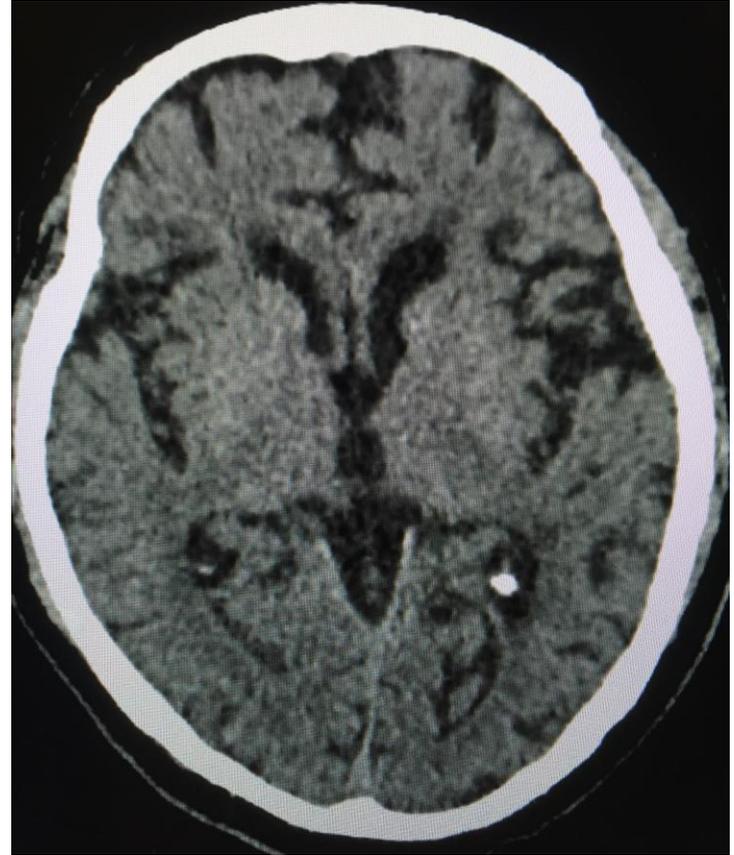
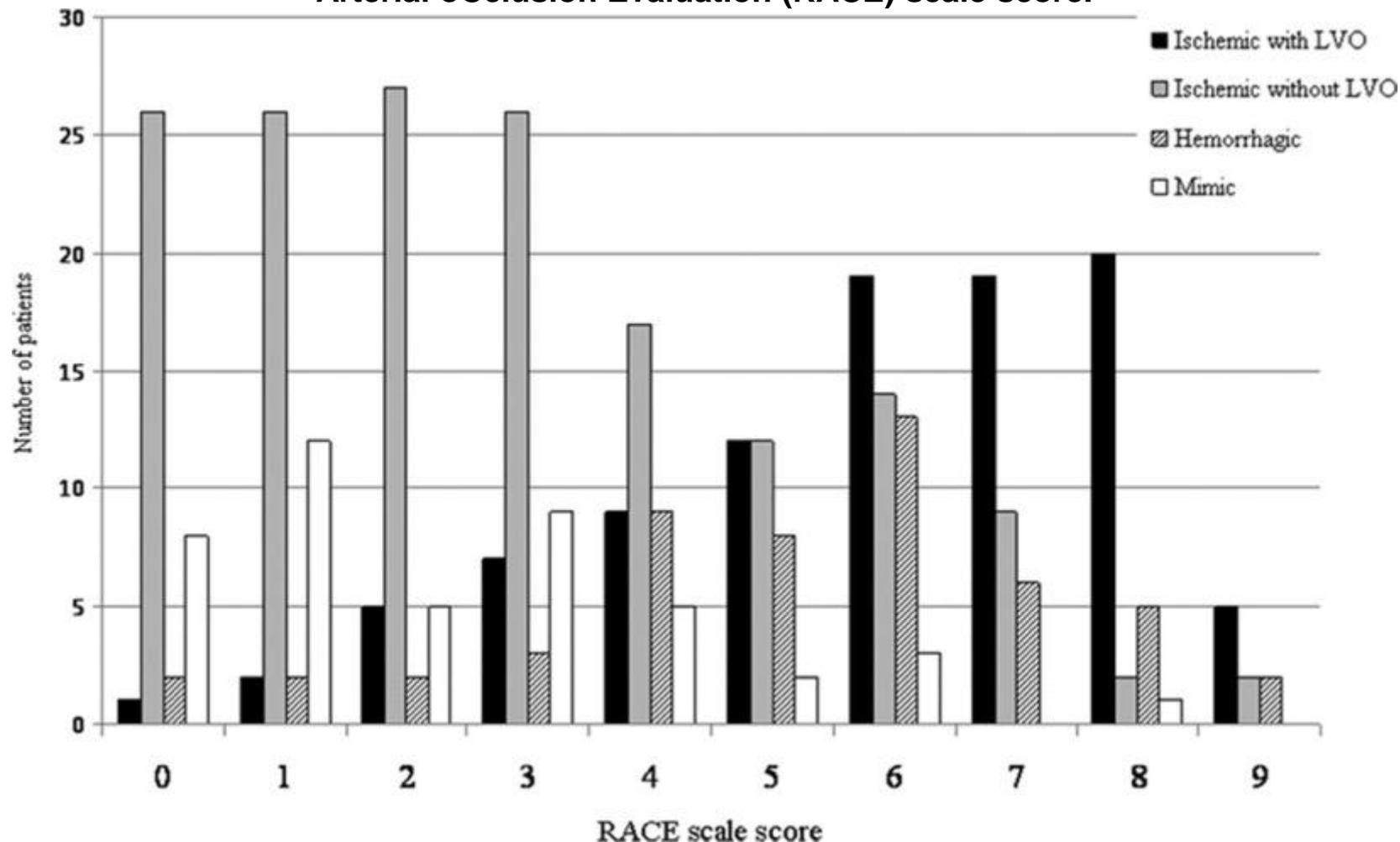


Table 1. RACE Scale

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	

Proportion of patients with ischemic stroke with large vessel occlusion (LVO; black), ischemic stroke without LVO (gray), hemorrhagic stroke (dashed), or stroke mimic (white) for every Rapid Arterial Occlusion Evaluation (RACE) scale score.

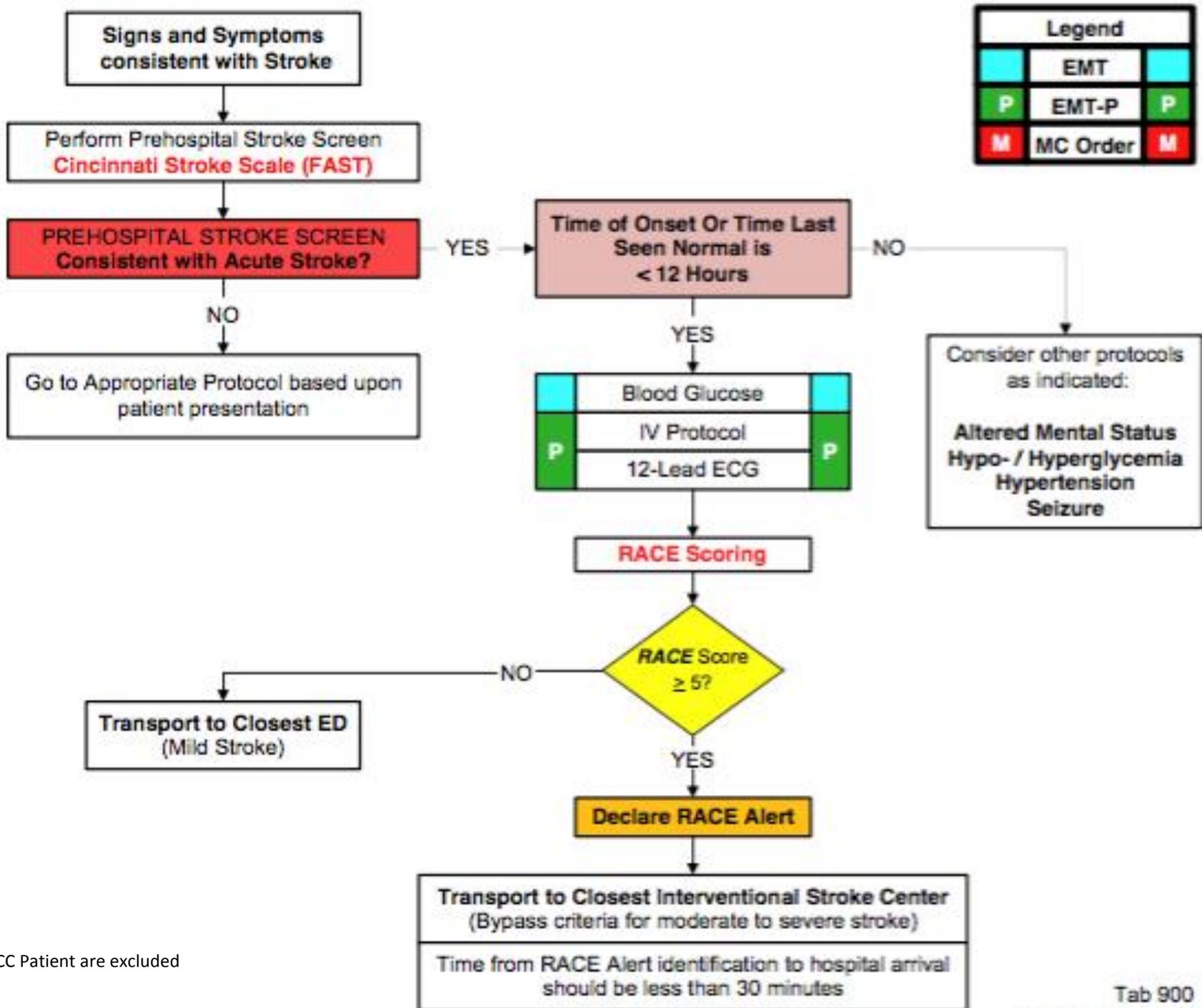


Natalia Pérez de la Ossa et al. Stroke. 2014;45:87-91

Training Course: June 2015

- EMS personnel: 464
- Sessions: 10
- Lecture- 60 minutes: Stroke syndromes and stroke mimics
- Cases- 60 minutes- videos of consented patients & Dr. Brijesh Mehta's youtube video
- Practice exams/ competency: 90 min.

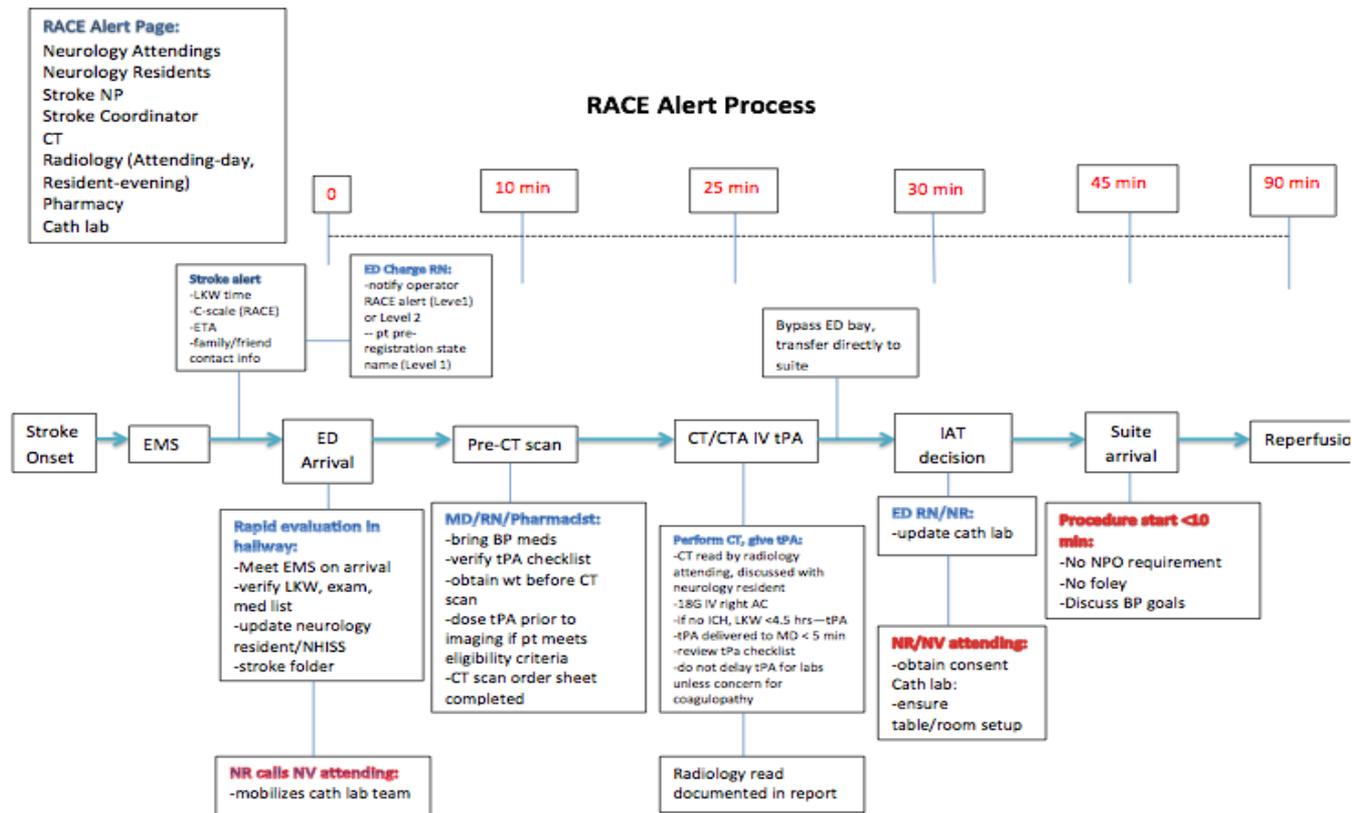




DNR- CC Patient are excluded

RACE Alert Process map

- Pre- arrival notification to Stroke and Neurointerventional teams
- Quick hallway assessment by ED doctor → CT/CTA





ORIGINAL RESEARCH

Stroke care: initial data from a county-based bypass protocol for patients with acute stroke

Syed F Zaidi,¹ Julie Shawver,² Aixa Espinosa Morales,¹ Hisham Salahuddin,¹ Gretchen Tietjen,¹ David Andrea Korsnack,¹ Mout

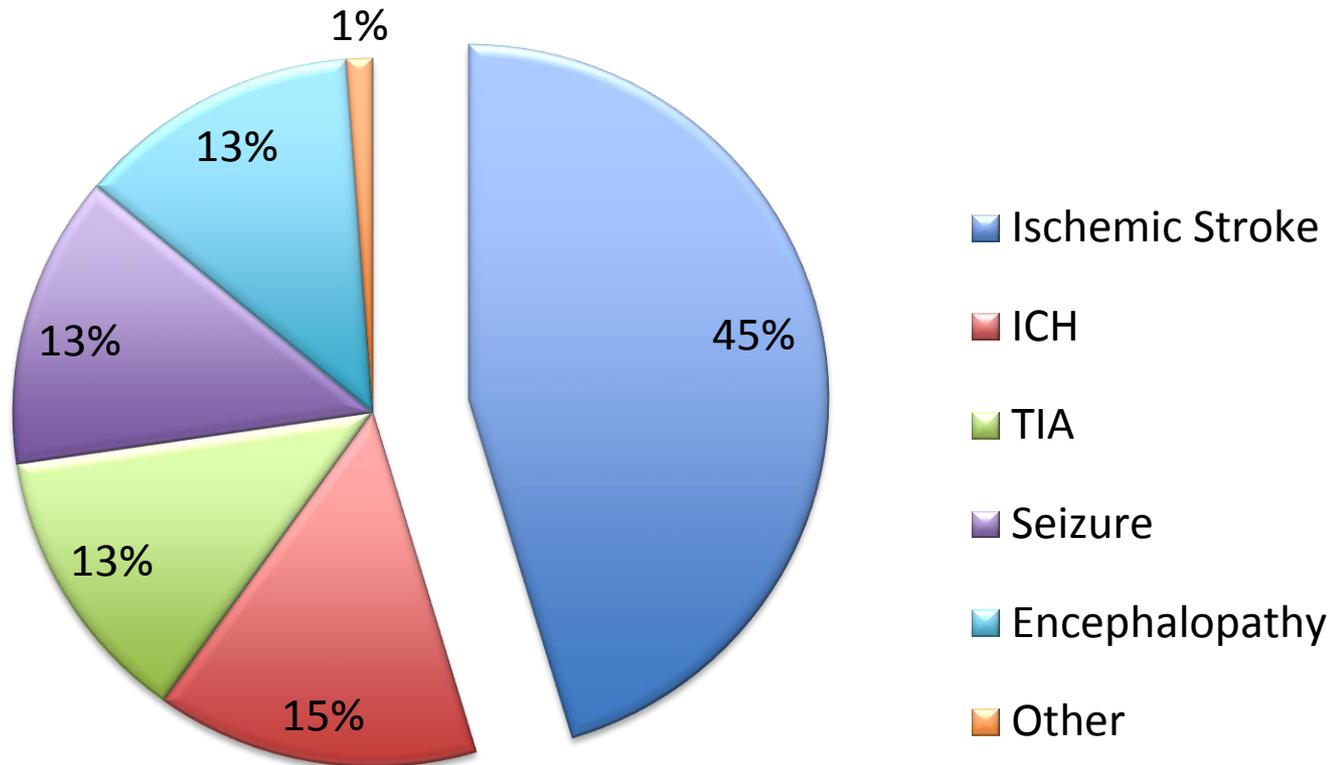
Table 1 Baseline demographics, diagnosis, and treatment times

	RACE alerts (N=109)	Stroke alerts (N=142)	p Value
Median age (IQR)	72.5 (61–81)	65 (55–79)	0.02
Gender (female (%))	61 (56.0)	71 (50)	0.3
Median NIHSS (IQR)	12 (7–18)	5 (2–10)	<0.05
Median RACE score (IQR)	6 (5–8)	NA	
Diagnosis, N (%)			<0.05
Ischemic stroke	57 (52.3)	44 (30.1)	
ICH	12 (11)	8 (5.6)	
Seizures	19 (17.4)	14 (9.9)	
TIA	7 (6.4)	23 (16.2)	
Encephalopathy	6 (5.5)	12 (8.3)	
Others	8 (7.3)	41 (28.9)	
Disposition from ER (N (%))			
ICU	68 (62.4)	56 (39.4)	<0.05
Step-down unit	37 (33.9)	86 (60.6)	<0.05
Hospice	4 (3.7)	0	
IV tPA (N (%))	28 (25.7)	18 (12.7)	<0.05
Times (min), median (IQR)			
911 Dispatch to ER	31 (22–38)	32 (20–51)	0.06
Door to CT completion	10 (5–16)	28 (20–41)	<0.05
Door to tPA	46 (28–55)	75 (60–95)	<0.05
Mechanical thrombectomy, N (%)	22 (20.2)	11 (7.7)	0.03
Times (min), median (IQR)			
Onset to arrival	71 (37–560)	128 (91–207)	0.3
Arrival to CT	8.5 (6–15)	15 (7–17)	0.3
Arrival to puncture	68 (60–93)	128 (101–142)	0.04
Arrival to recanalization	101 (88–118)	205 (131–218)	0.001
IV tPA+MT, N (%)	13 (59.1)	7 (63.6)	0.3
Occlusion site, N (%)			
ICA terminus	6 (26.1)	3 (27.3)	0.7
MCA	13 (56.5)	6 (54.5)	0.9
Only MCA M2	2 (8.7)	2 (18.2)	0.6
Tandem	2 (8.7)	0	
90-Day MT outcome, N (%)			
mRS 0–2	11 (50)	4 (36.4)	0.3
Mortality	3 (14.3)	3 (27.2)	0.1

ER, emergency room; ICA, internal carotid artery; ICH, intracerebral hemorrhage; ICU, intensive care unit; MCA, middle cerebral artery; mRS, modified Rankin Scale score; MT, mechanical thrombectomy; NIHSS, National Institutes of Health Stroke Scale; RACE, Rapid Arterial occlusion Evaluation; TIA, transient ischemic attack; tPA, tissue plasminogen activator.

RACE One Year Data July 15-June16

RACE alerts: 172: Ischemic Stroke n=78, TIA:22, ICH 25 patients



Acute Ischemic Stroke/ RACE alerts

Ischemic Stroke Acute Treatment	N (% of all 172 RACE alerts)	N (% of 78 Ischemic Strokes)
IV t-PA	23 (13%)	23 (29%)
IV- tPA + MT	21 (12%)	21 (27%)
MT only	16 (9%)	16 (21%)
Total MT (w or w/o tPA)	37 (22%)	37 (47%)
Any Acute Tx	60 (35%)	60 (77%)

RACE Thrombectomy comparison

- Prospective RACE registry (**July 2015- December 2016**) was compared to retrospective STROKE ALERT (SA) from Lucas county between July of **2013 and June of 2015**:
- RACE Alerts: 57 Thrombectomies
- Stroke Alerts: 56 Thrombectomies
 - 33/56 Direct to CSC or PSC-IC,
 - 23/56 To Outside Lucas County ER First

RACE Thrombectomy Baseline Characteristics

	RACE ALERT (RA) 2015-2016 N=57	STROKE ALERT (SA) 2013-2015 N=56 33/56 Direct to CSC 23/56 To Outside ER First	P value
Mean Age (SD)	71.8+13.6	68.1 +16.1	0.194
Gender – Female (%)	26 (%)	27(%)	0.85
Median NIHSS (IQR)	16 (13-21)	18 (13-21)	0.46
Median ASPECT (IQR)	9 (8-9)	9 (8-9)	0.1
IV tPA - N (%)	30 (52.6)	22 (39)	0.188
Site of intracranial occlusion N (%)			
M1 MCA	24(42.1%)	31 (55..3%)	0.19
ICA- T	18 (31.5%)	14 (25%)	0.532
M2 MCA	14 (24.6%)	7 (12.5%)	0.146
Basilar Occlusion	1 (1.8%)	4 (7.1%)	0.206
Proximal ICA occlusion (Tandem lesion)	9(15.8)	10 (17.9)	0.806

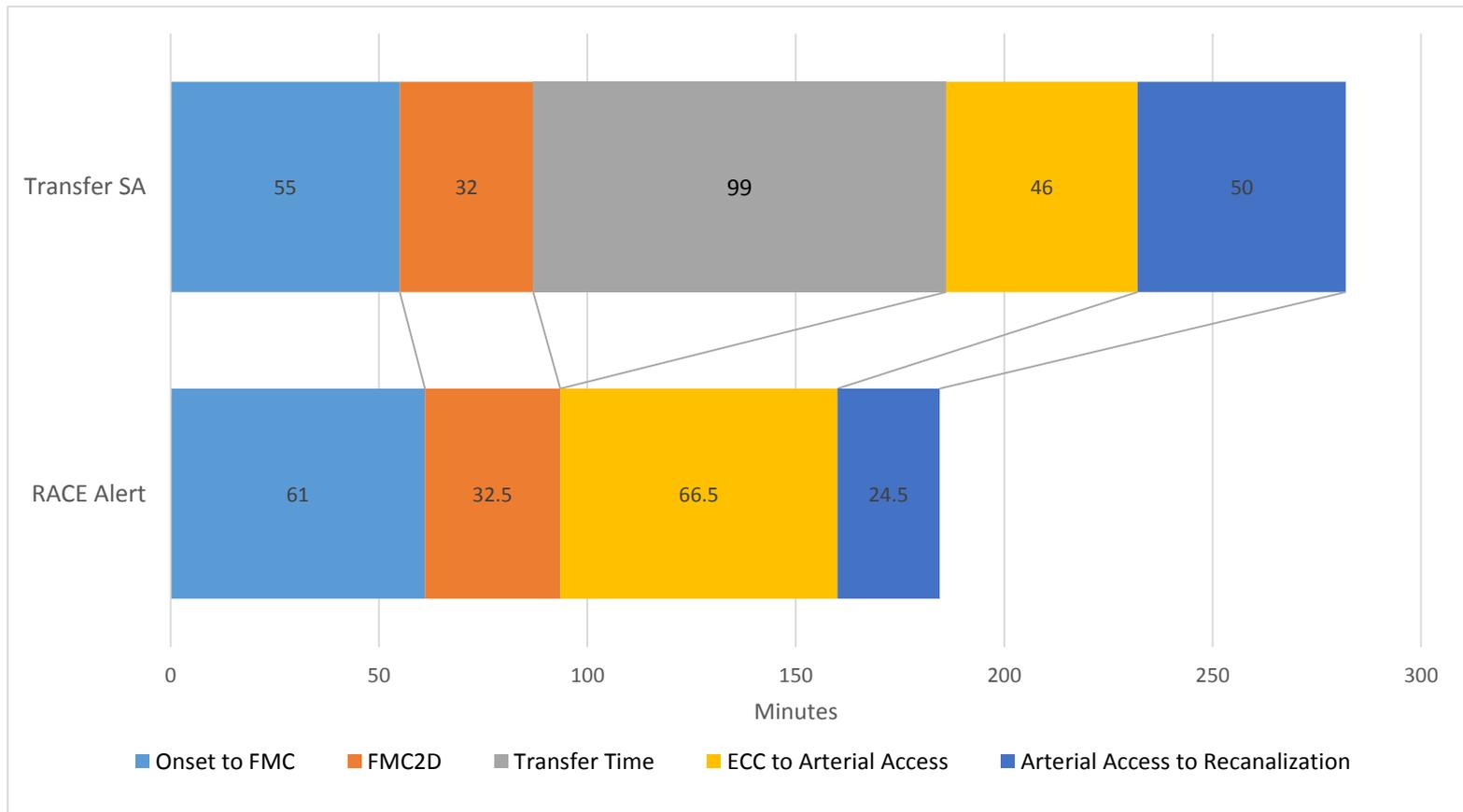
RACE Thrombectomy Time Efficiencies

	RACE ALERT (RA) 2015-2016 N=57	STROKE ALERT (SA) 2013-2015 N=56 33/56 Direct to CSC 23/56 To Outside ER First	P Value
Median Minutes – First Medical Contact to 1 st ER - FMC2D (IQR)	32.5 (26-38.8)	34 (30-38)	0.75
Median Minutes – First Medical Contact to IV- tPA – FMC2T (IQR)	58 (51-70)	88 (78-97)	<0.001
Median Minutes –First Medical Contact to Arterial access- FMC2P (IQR)	100.5 (82.3-124.1)	173 (128-204)	<0.001
Median Minutes- First Medical Contact to Recanalization- FMC2R (IQR)	130 (109- 158)	220.5 (190.5-282)	<0.001

RACE Thrombectomy Outcomes

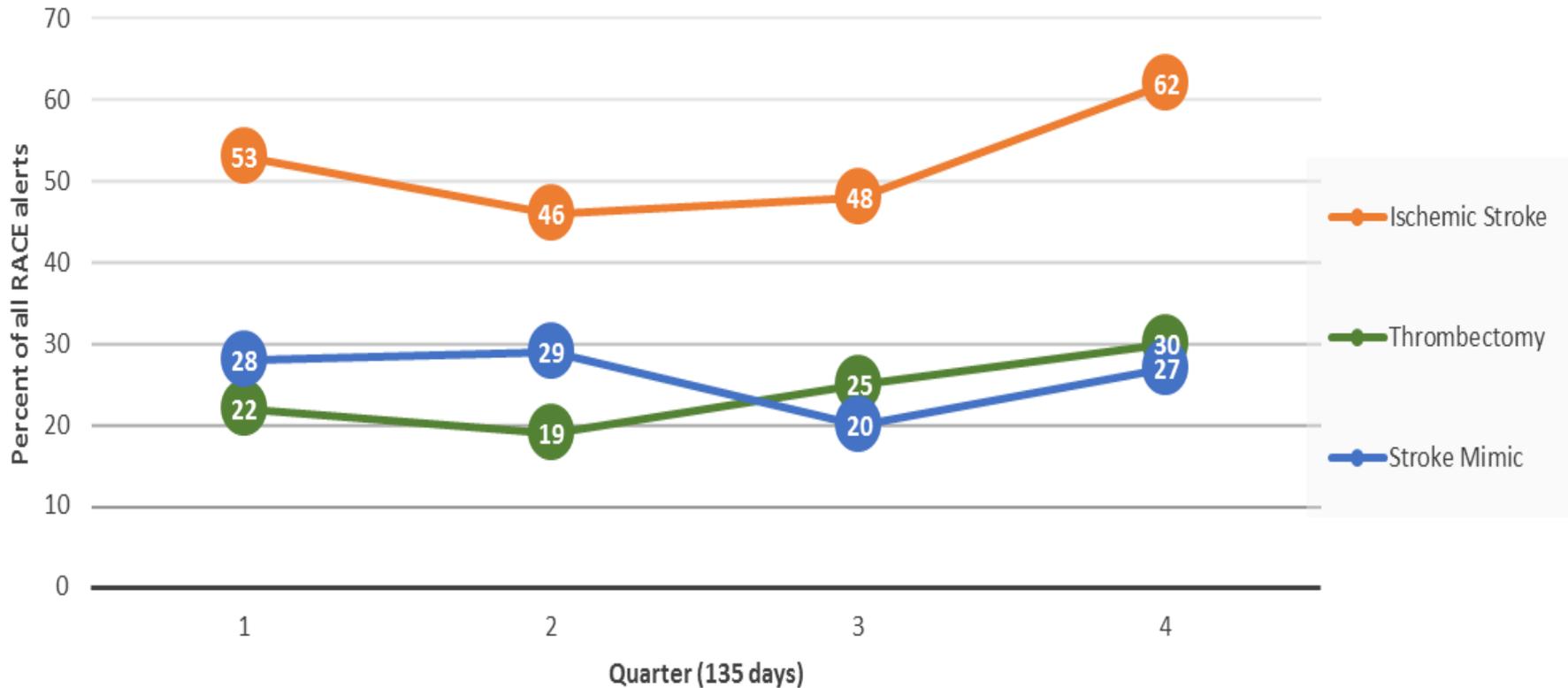
	RACE ALERT (RA) 2015-2016 N=57	STROKE ALERT (SA) 2013- 2015 N=56 33/56 Direct to CSC 23/56 To Other ER First	P Value
TICI 2b, 3 Recanalization, N (%)	50 (87.7%)	42 (75%)	0.095
Good Outcome at 90 days, mRS \leq 2. N (%)	31 (54.4%)	21 (37.5)	0.09
Excellent Outcome at 90 days, mRS \leq 1. N (%)	25 (43.9)	12 (21.4)	0.015
Mortality at 90 days	11 (19.3%)	12 (21.4%)	0.81

Comparison of median time Intervals for Transferred SA vs. RA patients



Sensitivity Analysis for RACE score

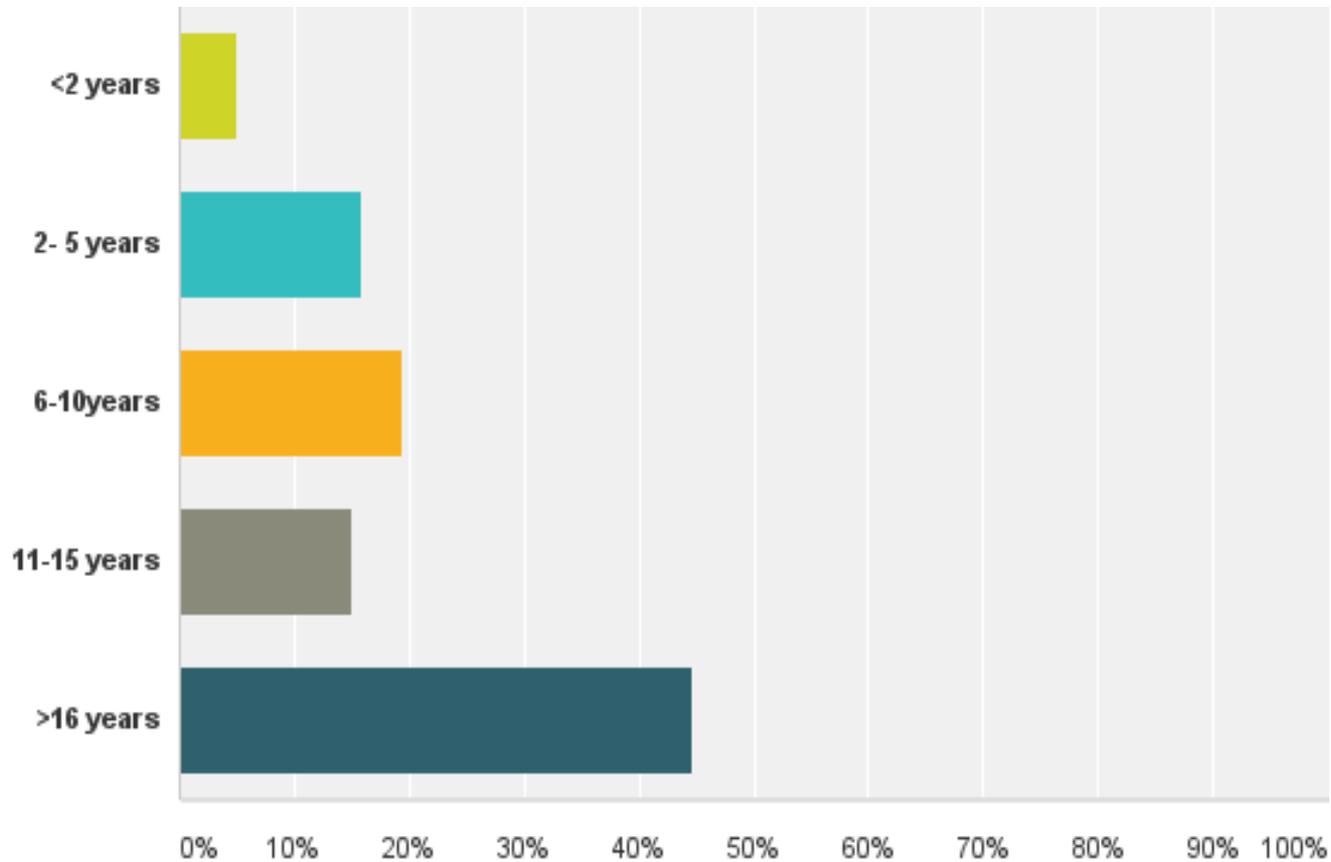
RACE Alerts by Final Diagnosis



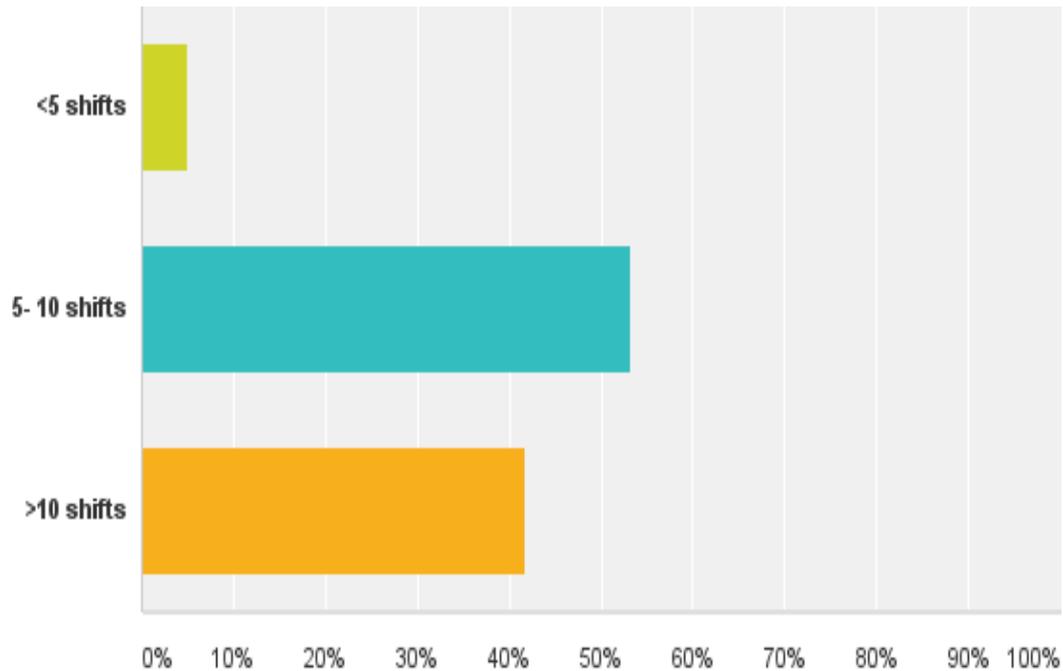
EMS RACE Survey

- Date Created: Friday, September 09, 2016
- **Complete Responses: 139**

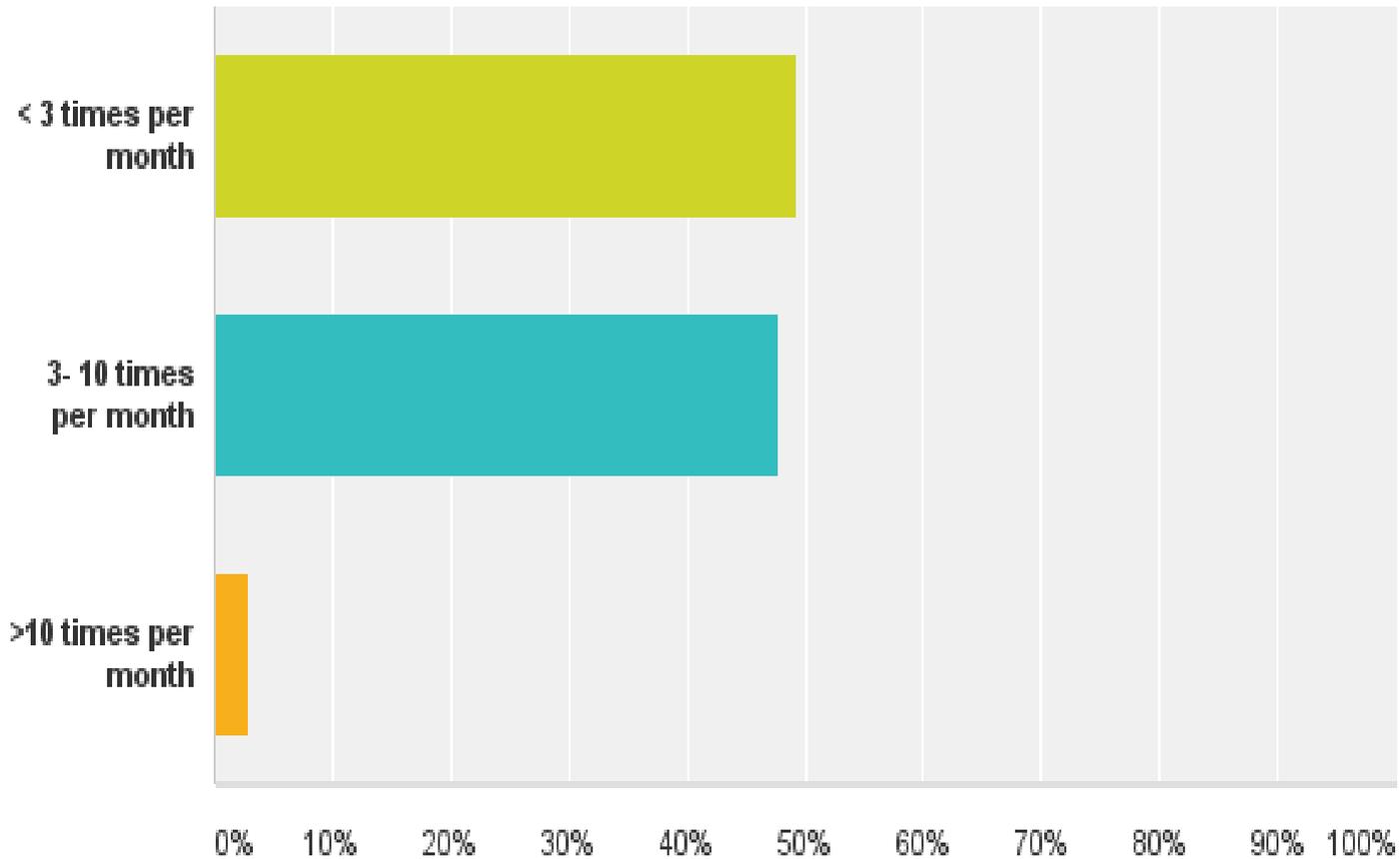
Q1: How long have you been a paramedic?



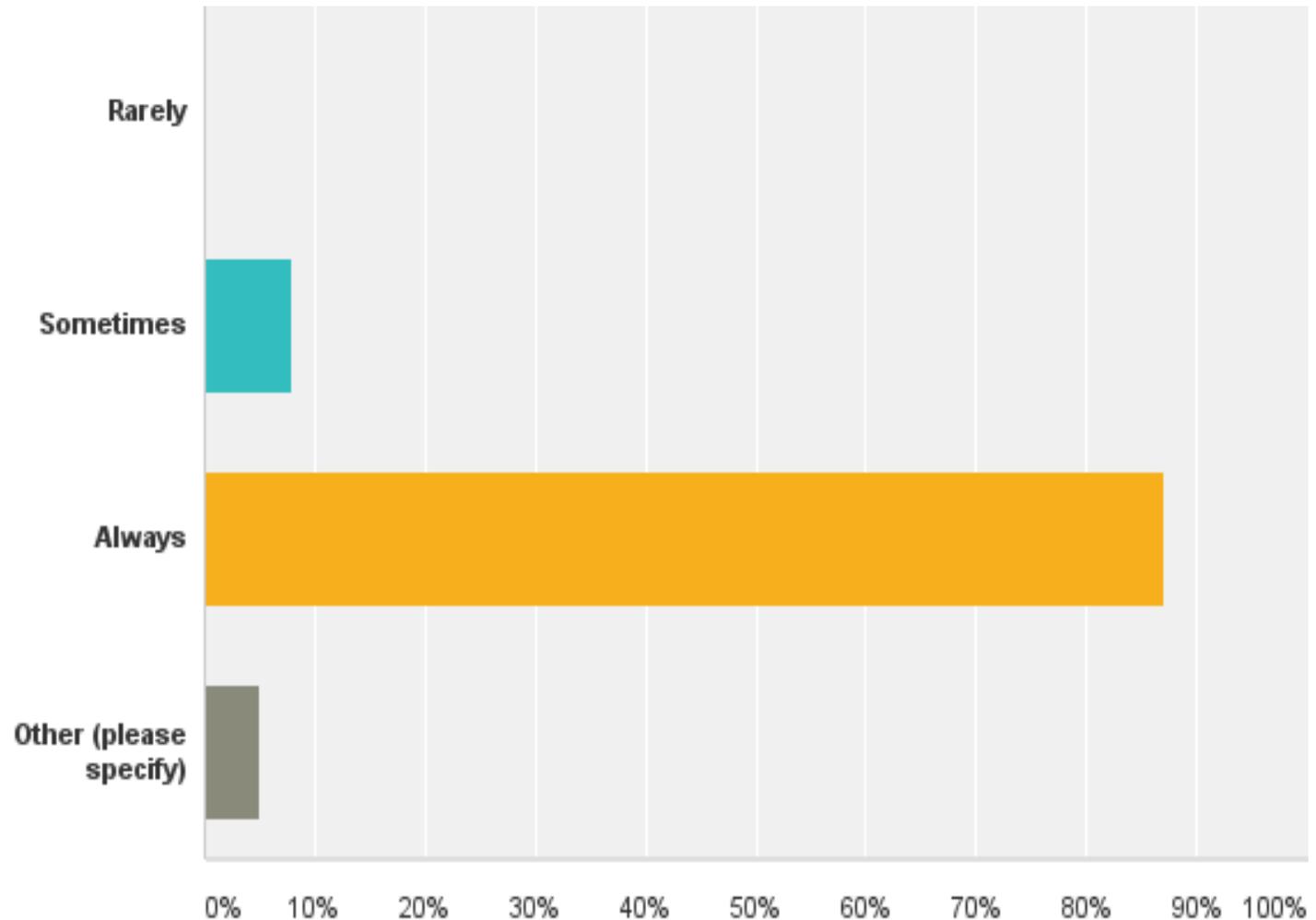
Q2: How many shifts do you do per month?



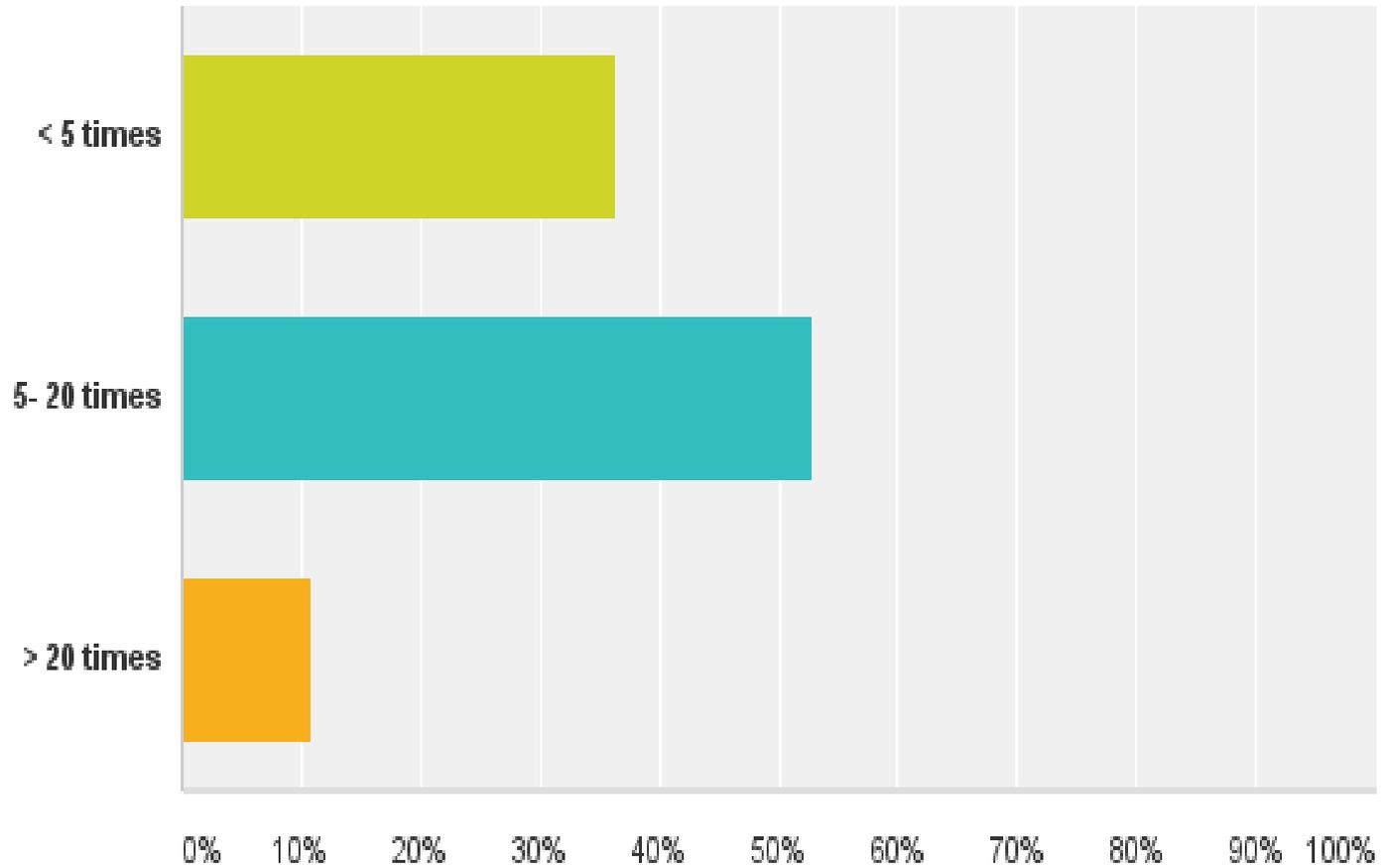
Q3: How frequently do you encounter stroke patients?



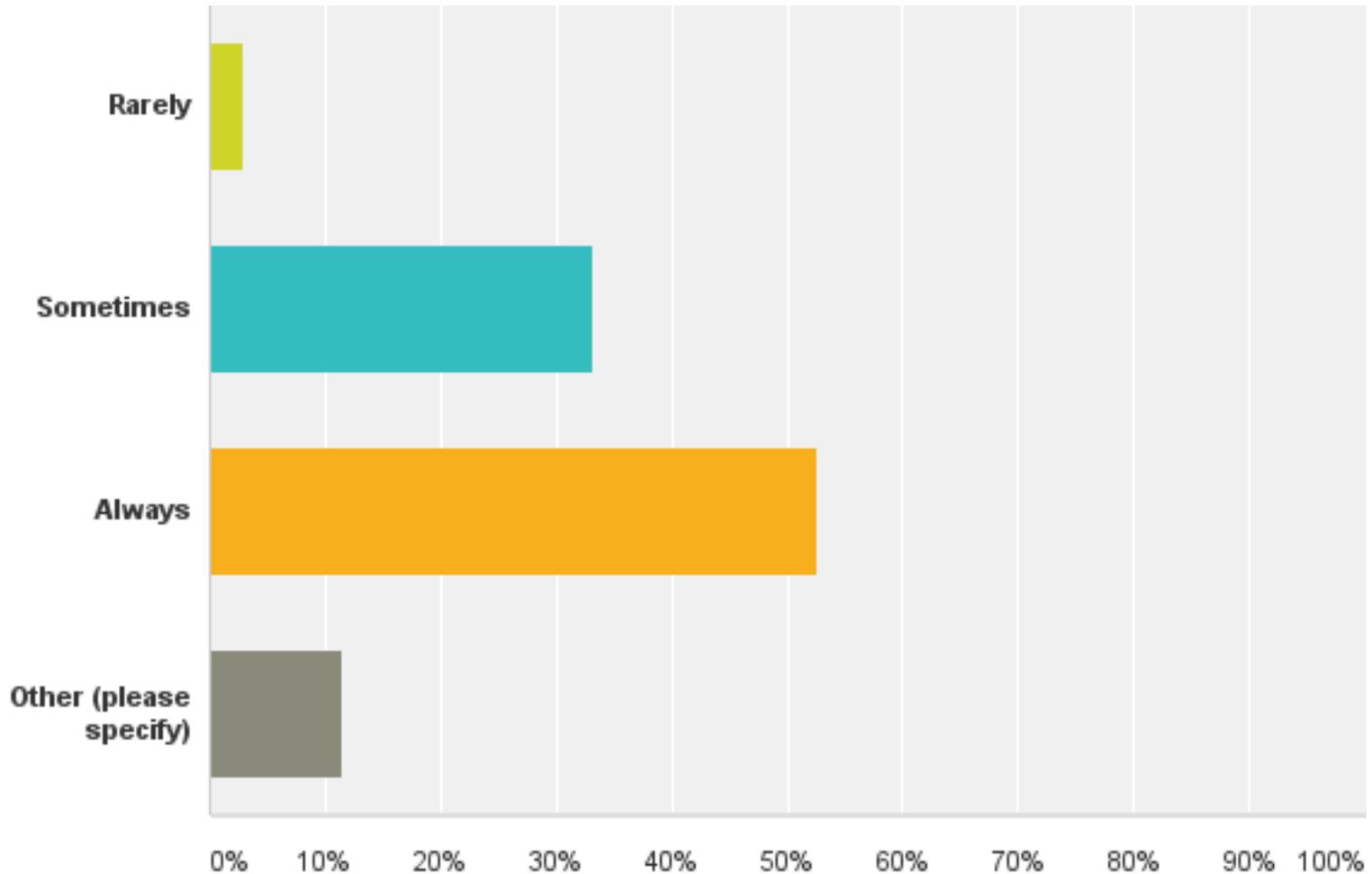
Q4: How often do you feel confident managing patients with acute stroke symptoms?



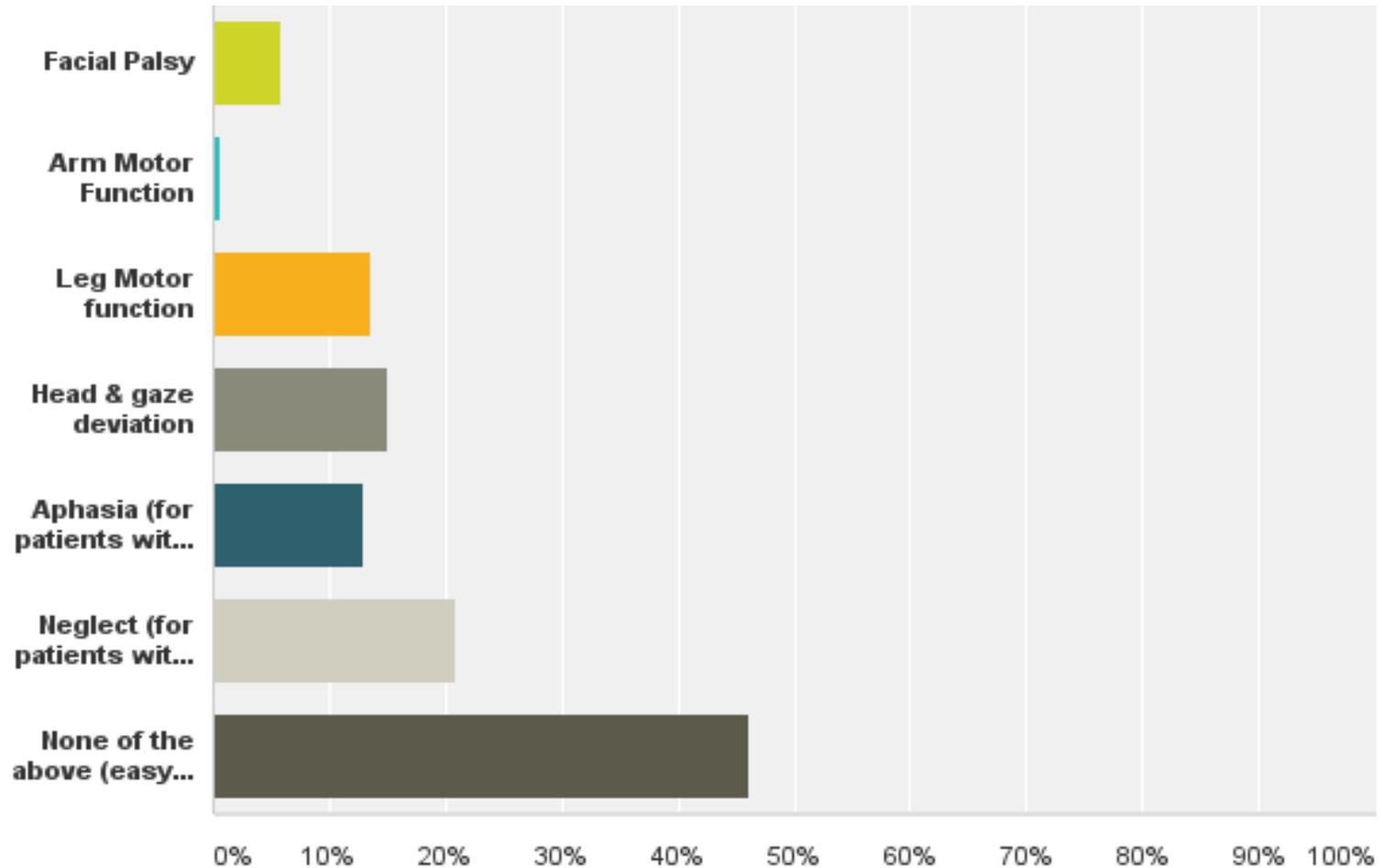
Q6: How many times have you determined the R.A.C.E score on patients with suspected stroke?



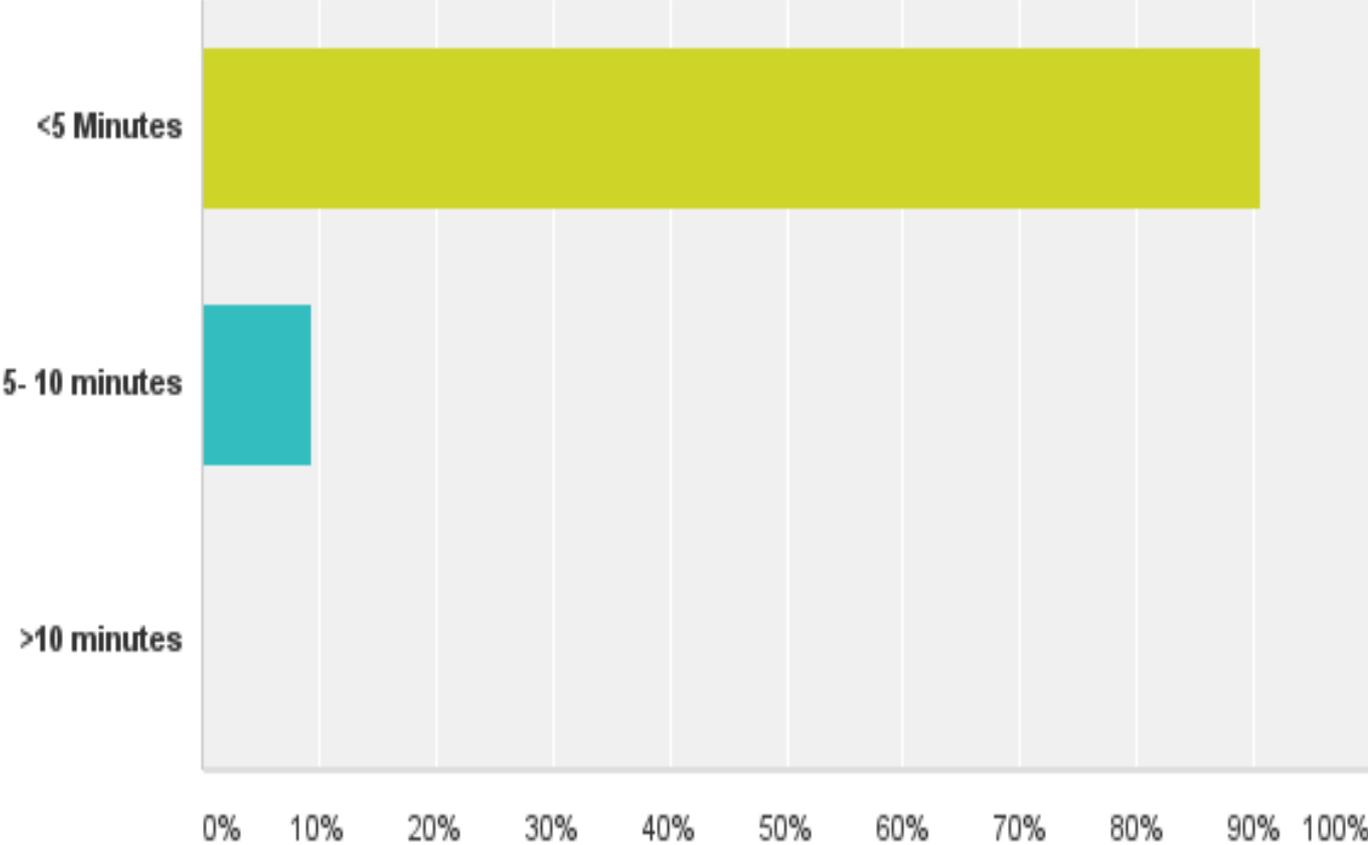
Q7: How often do you feel confident determining the R.A.C.E score on patients with suspected stroke?



Q8: Which component of the R.A.C.E scale is most challenging to perform?

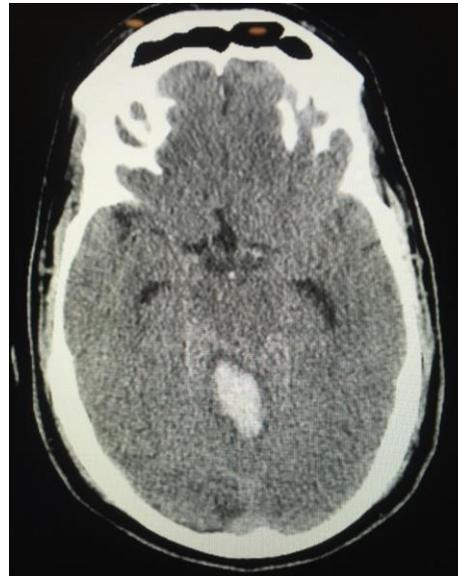
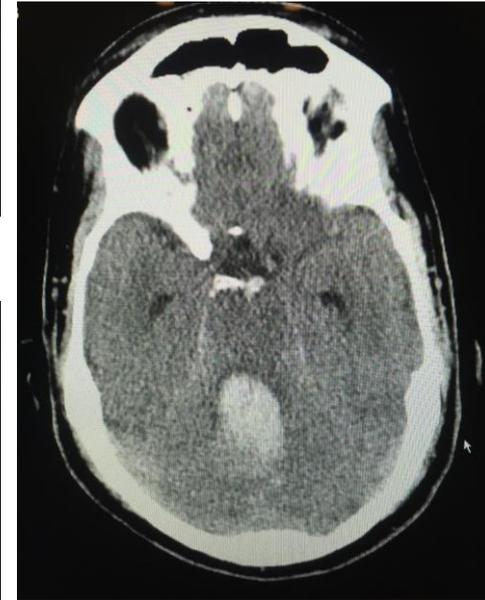


Q9: How long does it take you to determine the R.A.C.E score on a patient with suspected stroke?



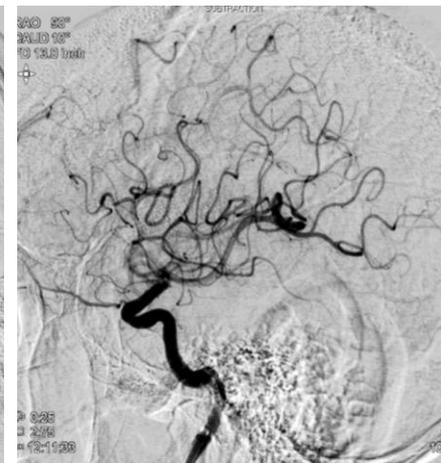
Case 1: Patient with ICH/ *RACE=7*

- 52 YOM with PMHx of HTN
- Acute onset of Left > Right weakness and somnolence.
- He became unresponsive in route and had to be intubated.
- Exam on arrival: Coma and diminished brainstem reflexes.
- Patient was in the OR 30 minutes after arrival to the ER.
- Clot Evacuation + EVD
- AVM embolization 2 weeks later
- Recovering in Rehab



Case 2: Patient with Ischemic Stroke- **RACE =7**

- 81 YOF with No significant PMHx
- Patient is independent at baseline
- Acute onset of Left side paralysis and Dysarthria at 1040 HR
- She arrived to the ER at 1105 HR
- NIHSS on Arrival to the ER was 24.
- ASPECT Score 10
- **IV tPA bolus at 1135 HR**
- **Groin Puncture at 1145 HR: Distal MCA occlusion. TICI 3 at 12.10 HR, IV- tPA was stopped**
- **NIHSS on Discharge was 1**



Onset to Recanalization: 90 minutes

