

# South Carolina Emergency Medical Service (EMS) Prehospital Stroke Patient Timeline and Transport Cost



S.C. Department of Health and Environmental Control

Jason Walchok NRP, FPC <sup>1</sup>, Antonio R. Fernandez, PhD, NRP, FAHA <sup>2</sup>

<sup>1</sup> Bureau of EMS, South Carolina Department of Health and Environmental Control, <sup>2</sup> EMS Performance Improvement Center, Department of Emergency Medicine, School of Medicine, University of North Carolina – Chapel Hill, Chapel Hill, North Carolina, USA

**Background**

- Acute stroke is a time sensitive emergency that requires IV clot busting medications which should be administered within 3.5 hours after onset of symptoms.
- The Bureau of EMS recommends that EMS providers limit scene time to 10 minutes or less when treating a suspected stroke
- By decreasing the time in the field, EMS providers can have an impact on the patient timeline from dispatch to definitive treatment in the ED.

**Research Question**

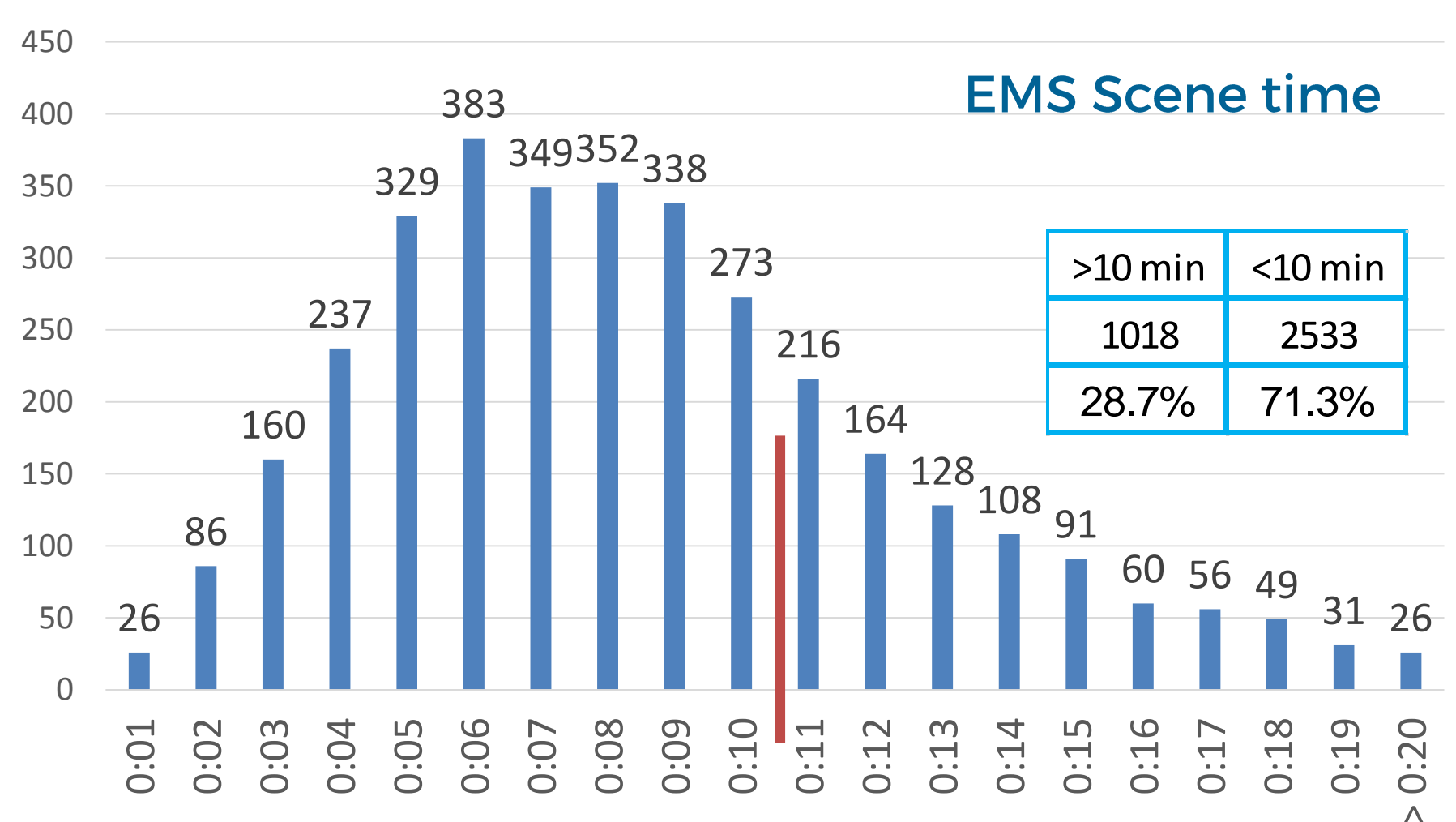
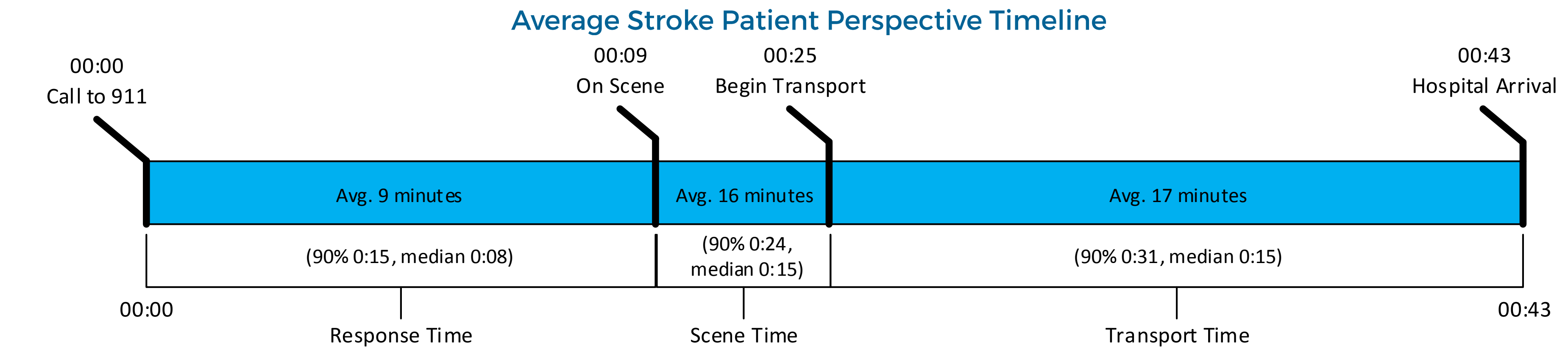
- The study objectives were to quantify the patient timeline of 2016 emergency 911 acute stroke patients in South Carolina (SC).
- Secondarily, this study sought to describe these patients based on patient demographics, transport distance, and EMS transport cost.

**Methods**

- Retrospective case series from Emergency Medical Service (EMS) patients in SC from 2016 in which:
  - Had a primary EMS impression of acute stroke/CVA,
  - Were transported emergently to an ED, and
  - Had times documented.
- Total miles traveled during transport was collected if available, with cost determined by use of the 2017 Medicare/Medicaid rates of \$409.99 per EMS ALS transport, plus \$17 per mile.
- Additionally, reason for choosing the destination hospital, primary payment type, and patient demographics were collected for descriptive statistic analysis.

**Results**

- The mean total stroke call timeline was 43 minutes (90% 1:01, median 0:39) from dispatch to arrival at the ED.
- The average miles transported was 13.4 miles (0.7-105) which cost \$637.40 (95% CI: \$616.43-\$658.37) on average.
- Primary payer was Medicare (50.8%) with the hospital destination determined by patient choice in the majority of cases (44.8%).



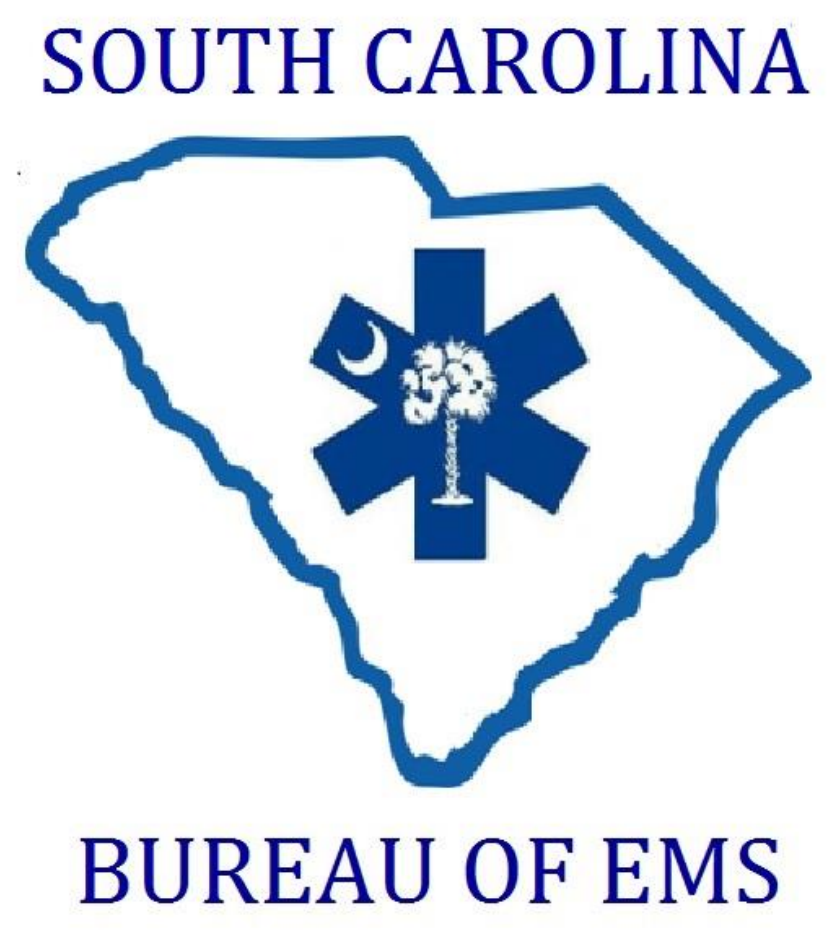
**Transport Cost**

Cost = (\$17 x Miles transported) + \$409.99

Metric	Value
Transport Miles (Average)	13.4
Transport Miles (Range)	0.7-166.7
Cost (Average)	\$637.40
Cost (95% CI)	\$616.43-\$658.37

**Discussion**

- This study demonstrates that the majority EMS agencies in SC are limiting their scene time at or below 10 minutes for suspected acute stroke patients as recommended by the Bureau of EMS.
- However, it also demonstrates that just over 1 hour of the 3.5-hour treatment window is spent outside of the hospital with EMS in most cases. This should be considered when developing stroke patient destination guidelines.



**Patient Demographics**

Demographics:	3551 total	Hospital determined by:	n=	%	Payment Method:	n=	%
Age: Range 20-105	mean 65	Patient choice	1590	44.8%	Medicare	1137	32.0%
Sex:	n %	Family choice	561	15.8%	Insurance	554	15.6%
Male	1654 46.6%	Protocol	498	14.0%	Selfpay	380	10.7%
Female	1883 53.0%	Closest Facility	485	13.7%	Medicaid	143	4.0%
not recorded	14 0.4%	Specialty resource center	239	6.7%	Not billed	1	0.0%
Race:		Patient physician choice	104	2.9%	Other gov	24	0.7%
White	2463 69.4%	Other	30	0.8%	Not recorded	1312	36.9%
Black	969 27.3%	Not recorded	23	0.6%	Miles Transported:		
Other	49 1.4%	Diversion	16	0.5%	Average	13.4	
Not recorded	70 2.0%	OLMC	5	0.1%	Range	0.7-166.7	

**Possible Public Health Implications**

- EMS agencies appear to adhere to recommendations give to them by the Bureau of EMS.
- Scene time is only one variable in the timeline. Increase destinations for stroke patients within the state could lead to more of a decrease in the EMS stroke patient timeline.