

Table 2. Characteristics and Outcomes of 586 Critically Injured ED Trauma Transfer Patients by Blunt vs Penetrating Mechanism of Injury

Characteristic and Outcome	Mechanism of Injury	
	Blunt	Penetrating
No. (%)	301 (51.4)	285 (48.6)
ISS, median (IQR) ^a	17 (10-26)	9 (2-16)
Time at a nontrauma hospital, median (IQR), min	160 (114-234)	64 (36-125)
Time in transit, median (IQR), min	38 (22-56)	32 (20-48)
Trauma center LOS, median (IQR), d	6 (3-14)	4 (1-7)
Transfer to operating suite from ED, No. (%)	57 (18.9)	47 (16.5)
Outcome of hospital death, No./total No. (%) ^b	66/281 (23.5)	26/272 (9.6)
Missing discharge disposition, No. (%)	20 (6.6)	13 (4.6)

Abbreviations: ED, emergency department; IQR, interquartile range; ISS, Injury Severity Score; LOS, length of stay.

^a The ISS is a commonly used, *International Classification of Diseases, Ninth Revision*-derived indicator of injury severity with values from 1 to 75, with 75 being an unsurvivable injury.

^b Calculated from patients with known discharge disposition; thus, the total number for this category is 553.

trauma hospital (160 [114-234] minutes vs 64 [36-125] minutes; $P < .001$) (Table 2).

Discussion | Through this quality improvement process, we found that the rapid triage protocol identified critically injured patients at higher risk for poor outcomes who could benefit from the use of rapid triage. For critically injured ED trauma transfer patients who died, especially those with blunt trauma rather than penetrating trauma, increased time at a nontrauma hospital prior to transfer could have contributed to the higher mortality rate. In California's exclusive trauma system, data for patients cared for in nontrauma hospitals are not systematically available, even for patients transferred to a trauma center. In this study, we identified important clinical data elements that are not routinely obtained from referring nontrauma hospitals. A regional trauma center committee is using this information to create a consensus-based trauma transfer performance improvement page within each site's current trauma registry. This would enable the recording of data necessary to understand the emergency transfer process to improve the care for this vulnerable critically injured population.

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Emergency Medical Services Response Times in Rural, Suburban, and Urban Areas

Emergency medical service (EMS) personnel in the United States respond to an estimated 37 million 911 calls annually, providing care to the sick and injured, but the initial link in the chain of survival includes family, friends, and bystanders.¹ A collaborative effort between emergency care and emergency management experts within the US government recently led to the development of a public education campaign titled Until Help Arrives (<https://community.fema.gov/until-help-arrives>). Spearheaded by the US Departments of Homeland Security, Defense, and Health & Human Services, this initiative seeks to empower laypersons to provide care to the ill and injured until EMS personnel arrive. While there is an unavoidable delay between a 911 call and EMS arrival, to our knowledge, no current published data exist to quantify these time frames. This study seeks to describe the interval between receipt of a 911 call and the arrival of the first EMS unit on the scene of a reported emergency in the United States.

Methods | We reviewed deidentified EMS records from calendar year 2015 from 485 EMS agencies distributed throughout the United States (ESO Solutions). Encounters were distributed geographically throughout the country and were classified, based on the 2014 US Census Bureau categorization of the originating zip code, as rural (population <2500), urban (urbanized centers, population >50 000), or suburban (urban clusters, population 2500-50 000).²

Only emergency (911) prehospital encounters were included. We excluded patient transfers, encounters coded as aborted encounter, and all encounters with arrival times 120 minutes or longer or transport times 180 minutes or longer (as these outliers were not representative of the general EMS experience). One author (B.H.) examined the data for obvious errors and outliers, and corrected data errors resulting from the use of a 12-hour AM/PM clock. All other data entry errors

Table 1. Distribution of Emergency Medical Services Encounters by Category

Category	No. (%)
Aborted encounter	6116 (0.34)
Dead on arrival	20 771 (1.2)
No patient found on scene	39 397 (2.2)
Patient encounter without transport by primary unit	455 174 (25.3)
Patient encounter with transport by primary unit	1 275 529 (71)
Total	1 796 987 (100)

Table 2. Response Time Data for Emergency Medical Services Encounters by Zip Code Classification

Category	No.	Median (IQR), min	Arrival Time, min	
			90th Percentile	Mean (SD)
Suburban	1 538 203	6 (4-10)	14	7.7 (5.4)
Urban	146 682	6 (4-9)	12	7.0 (4.4)
Rural	68 283	13 (8-19)	26	14.5 (9.5)
Overall	1 753 168	7 (4-10)	14	7.9 (5.7)

Abbreviation: IQR, interquartile range.

resulted in the calculated time interval being set to missing. Given the lack of other covariates available for incorporation, multiple imputation was not valid for dealing with missing data. Therefore, complete case analysis was used to generate descriptive statistics. The study was determined to be exempt from review by the institutional review board at the Wake Forest Baptist Medical Center.

Results | Data were provided for 1 796 987 EMS encounters. There were 625 encounters identified as outliers and excluded as described here. **Table 1** provides the distribution of encounter types in the database. A total of 71% of encounters (n = 1 275 529) resulted in transport of a patient by the primary EMS unit. There were 70 189 encounters (3.9%) from rural zip codes, 1 576 019 (87.7%) from suburban zip codes, and 150 779 (8.4%) from urban zip codes. **Table 2** provides time data for the various encounter types by population category.

Discussion | Emergency medical service units average 7 minutes from the time of a 911 call to arrival on scene. That median time increases to more than 14 minutes in rural settings, with nearly 1 of 10 encounters waiting almost a half hour for the arrival of EMS personnel. Longer EMS response times have been associated with worse outcomes in trauma patients.³ In some, albeit rare, emergent conditions (eg, cardiopulmonary arrest, severe bleeding, and airway occlusion), even modest delays can be life threatening.⁴ Our data are limited in that most encounters derive from urban cluster zip codes and are derived from a convenience sample as opposed to a selected series of representative census tracts. However, the large sample size provides external validity to our findings.

Research suggests that bystanders trained in first aid can and will effectively assist the ill and injured in their time of need.^{5,6} Our data suggest that there is an interval for bystander intervention between 911 system engagement and

EMS arrival. Recognizing that “you are the help until help arrives” may be lifesaving.

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COMMENT & RESPONSE

Incentive Spirometry After Bariatric Surgery: The Importance of Patient Compliance

To the Editor We read with great interest the article by Pantel et al¹ on the effect of routine incentive spirometry (IS) orders after bariatric surgery on patients with postoperative hypox-