Research Letter

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

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Editorial

Converting Bystanders to Immediate Responders

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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 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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Study concept and design: Mell, Carr, Stopyra.

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