

Title: An Investigation of Prehospital Scene Times in West Virginia

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Introduction

Trauma is the leading cause of death for persons under the age of 44 years old. Although there is not broad consensus on a specific standard for scene times which Emergency Medical Services (EMS) must meet for patients suffering from trauma, the majority of experts agree that minimizing scene time is better. This is especially true for patients who have suffered significant or life threatening trauma. It is important for the State Office of EMS and other trauma stakeholders to continuously analyze trauma scene times to establish a framework for support, inform education and training objectives, and address resource management to reduce trauma scene times and potentially decrease mortality.

Objective

To describe trauma scene times for general and significant life threatening trauma in West Virginia (WV).

Methods

This retrospective observational study examined the scene times for all 911 Emergency Medical Service (EMS) patients who experienced trauma in West Virginia in 2016. Data for this study was obtained from the WV EMS Data System located within the EMS Performance Improvement Center at the University of North Carolina – Chapel Hill. All EMS events in WV are documented with patient care reports which include elements recording scene times and descriptors of trauma. The study definition of significant trauma utilized available NEMSIS 2.2.1 elements that were consistent with the Centers for Disease Control and Prevention (CDC) Field Triage Guidelines for transport to a trauma center. Patients were categorized as significant trauma patients if they presented with any of the following: a Glasgow Coma Scale of less than 13, systolic blood pressure of less than 90 mmHg, adult respiratory rate of less than 10 or greater than 29 breaths per minute, flail chest segment, pregnancy greater than 20 weeks, burn as mechanism of injury, fall of greater than 10 feet for a patient under 16 years old, fall of greater than 20 feet for anyone over 16 years old, and vehicle injury indicator of death in same vehicle, ejection of patient, or at least 1 foot of intrusion into the drivers compartment. Trauma that was not identified as significant was classified as general. Descriptive statistics were calculated regarding the scene times for patients suffering from general and significant trauma, as well as for community size (rural and urban). Scene times involving the high acuity events requiring transport by air medical ambulance as well as where extrication was required were also examined. Because scene times are not normally distributed, Mann–Whitney U tests were performed to evaluate statistically significant differences between comparison groups.

Results

There were 86,835 EMS events documented as trauma in WV in 2016. Overall, scene times ranged from 0 minutes to 117.96 minutes. The median scene time for all trauma events in WV was 15.29 minutes (Interquartile Range 10.92 to 21.85) with an average of 17.16 minutes (standard deviation 11.04). The 90% fractile time was 30.58 minutes. There was a statistically significant difference when comparing scene times based on the community size where the call took place ($p < 0.01$). Both rural and urban trauma calls had a median scene time of 15.29 minutes (Interquartile Range 10.92 to 21.84). Trauma call in urban areas average had an average of 17.08 minutes (standard deviation 10.49) and a 90% fractile time of 28.40 minutes. Trauma call in rural areas average 17.38 minutes (standard deviation 11.99) with a 90% fractile time of 30.58 minutes.

There were 9,933 calls identified as significant trauma. The median scene time for significant trauma calls was 20.16 minutes (Interquartile Range 10.92 to 24.03) with an average of 17.48 minutes (standard deviation 13.34). The 90% fractile time was 34.95 minutes. General trauma calls had an average of 16.75 minutes (standard deviation 10.64), a median of 15.29 minutes (Interquartile Range 10.92 to 21.85), and a 90% fractile of 28.40 minutes. There was a statistically significant difference found when comparing scene times for general trauma calls to significant trauma calls ($p < 0.001$). There were 161 documented cases of trauma calls that required air medical transport. Trauma scene times for events requiring air medical transport had an average scene time of 25.44 minutes (standard deviation 12.72), median of 21.85 minutes (Interquartile Range 17.45 to 30.58), and a 90% fractile of 41.51 minutes. Trauma scene times for events that did not require air medical transport had an average of 17.14 minutes (standard deviation 11.03), a median of 15.29 minutes (Interquartile Range 10.92 to 21.85), and a 90% fractile of 30.58 minutes. There was a statistically significant difference noted when comparing scene times for trauma calls that utilized air medical ambulance when compared to trauma calls that were transported by ground ambulance ($p < 0.001$). Finally, there were 72 calls where extrication was documented. Scene times when extrication was required had an average of 30.30 minutes (standard deviation 17.97), a median of 26.21 minutes (Interquartile Range 19.66 to 34.95), and a 90% fractile of 52.43 minutes. Scene times for trauma calls that did not require extrication had an average of 17.14 minutes (standard deviation 11.03), a median of 15.29 minutes (Interquartile Range 10.92 to 21.85), and a 90% fractile of 30.58 minutes. There was a statistically significant difference found when comparing calls that required extrication to those that did not require extrication ($p < 0.01$).

Conclusion

Overall trauma scene times has a median scene time of 15 minutes and 17 seconds. Scene times for significant trauma calls were significantly longer than general trauma. Additionally, there was a statistically significant difference noted when comparing scene times when air medical transport was required to ground transport with air medical transport calls having longer scene times. Scene times for calls that required extrication were significantly longer than scene times when no extrication was required. Finally, although there was a statistically significant difference noted when comparing scene times in rural and urban areas, this difference does not appear to be clinically important. This study provides benchmarks for the WV Office of EMS and trauma stakeholders as it relates to trauma scene times. Future study should seek to evaluate interventions to reduce scene time and identify barriers to reducing scene time.

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