



Relative risk of injury and death in ambulances and other emergency vehicles.

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This study addresses the impacts of emergency vehicle (ambulances, police cars and fire trucks) occupant seating position, restraint use and vehicle response status on injuries and fatalities. Multi-way frequency and ordinal logistic regression analyses were performed on two large national databases, the National Highway Traffic Safety Administration's Fatality Analysis Reporting System (FARS) and the General Estimates System (GES). One model estimated the relative risk ratios for different levels of injury severity to occupants traveling in ambulances. Restrained ambulance occupants involved in a crash were significantly less likely to be killed or seriously injured than unrestrained occupants. Ambulance rear occupants were significantly more likely to be killed than front-seat occupants. Ambulance occupants traveling non-emergency were more likely than occupants traveling emergency to be killed or severely injured. Unrestrained ambulance occupants, occupants riding in the patient compartment and especially unrestrained occupants riding in the patient compartment were at substantially increased risk of injury and death when involved in a crash. A second model incorporated police cars and fire trucks. In the combined ambulance-fire truck-police car model, the likelihood of an occupant fatality for those involved in a crash was higher for routine responses. Relative to police cars and fire trucks, ambulances experienced the highest percentage of fatal crashes where occupants are killed and the highest percentage of crashes where occupants are injured. Lack of restraint use and/or responding with 'lights and siren' characterized the vast majority of fatalities among fire truck occupants. A third model incorporated non-special use van and passenger car occupants, which otherwise replicated the second model. Our findings suggest that ambulance crewmembers riding in the back and firefighters in any seating position, should be restrained whenever feasible. Family members accompanying ambulance patients should ride in the front-seat of the ambulance.

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Comment in:

- [Ann Emerg Med. 2002 Dec;40\(6\):633-5.](#)
- [Ann Emerg Med. 2003 Jul;42\(1\):159; author reply 159.](#)
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Occupational fatalities in emergency medical services: a hidden crisis.

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STUDY OBJECTIVE: We estimate the occupational fatality rate among emergency medical services (EMS) personnel in the United States. **METHODS:** We undertook descriptive epidemiology of occupational fatalities among EMS providers. Analysis was conducted by using data from 3 independent fatality databases: the Census of Fatal Occupational Injuries (1992 to 1997), the National EMS Memorial Service (1992 to 1997), and the National Highway Traffic Safety Administration's Fatality Analysis Reporting System (1994 to 1997). These rates were compared with the occupational fatality rates of police and firefighters and with the rate of all employed persons in the United States. **RESULTS:** The Census of Fatal Occupational Injuries database documented 91 EMS provider occupational fatalities. The National EMS Memorial Service database contained 70 fatalities, and the Fatality Analysis Reporting System identified 8 ground-transportation EMS occupational fatalities. There was also wide variation in fatality counts by cause of injury. Using the highest cause-specific count from each of the databases, we estimate that there were at least 67 ground transportation-related fatalities, 19 air ambulance crash fatalities, 13 deaths resulting from cardiovascular incidents, 10 homicides, and 5 other causes, resulting in 114 EMS worker fatalities during these 6 years. We estimated a rate of 12.7 fatalities per 100,000 EMS workers annually, which compares with 14.2 for police, 16.5 for firefighters, and a national average of 5.0 during the same time period. **CONCLUSION:** This study identifies an occupational fatality rate for EMS workers that exceeds that of the general population and is comparable with that of other emergency public service workers.

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[Correlation between survival time and severity of injuries in fatal injuries in traffic accidents]

[Article in Serbian]

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INTRODUCTION: In forensic pathology, only trauma systems based on disintegration of anatomic structure of organs and tissues, could be used for objectivization, comparison and establishing of severity of injuries. Trauma systems based on pathophysiological values are useless. The Abbreviated Injury Scale (AIS) and its derivate Injury Severity Score (ISS) are the most common. AIS coded injuries are divided into six body regions and injuries are assigned a six-digit score in relation to their severity. ISS results the sum of the squares of the highest AIS values from the three most severely injured body regions. In this way, the ISS values are discontinued and vary from 0 (absence of injuries) to 75 (incompatible-with-life injury). **PURPOSE:** The purpose of this paper is to establish the correlation degree between outliving period and trauma severity in persons fatally injured in traffic accidents, and according to this finding to point out the ISS value of critical injury. **MATERIAL AND METHOD:** A retrospective autopsy study was performed; it included the material of the Institute of Forensic Medicine in Belgrade of 1998. The autopsy reports and accessible clinical medical data were analyzed for persons over the age of 18, fatally injured in traffic accidents who survived trauma less than 15 days. The sample was statistically prepared (chi 2-test, t-test, correlation coefficient, regression line). **RESULTS AND DISCUSSION:** The sample included 272 persons: 193 males and 79 females. The proportion of men was more significant ($\chi^2 = 4.76$; $0.01 < p < 0.05$). Average age was 51.08 years (SD = 18.08): males 49.84 +/- 17.41 and females 54.09 +/- 19.38. The most frequently injured persons in our sample were pedestrians (134). The authors combined the autopsy and accessible clinical data in order to obtain the ISS value for each case. They considered that all persons found dead on the spot or died ante portam did not outlive trauma. The sample distribution by ISS values showed three peaks: for ISS--75, 41-50 and 26-35. Peaks indicated the number of the injured body regions and trauma severity in these persons. In 87 persons who did not survive, the ISS value was 75. There were 73 persons without outliving period with ISS values less than 75: their mean ISS value was 31.87 (SD = 11.30). In 112 cases the mean outliving period was 4.79 days (SD = 3.77) and their mean ISS value was 18.05 (SD = 15.33), which was a statistically significant lower ISS value than in previous group ($t = 7.015$; $p < 0.001$). A weak negative correlation between outliving period and ISS values in our sample was noted (coefficient of linear correlation $r = -0.452$). Our sample is representative ($t = 8.37$). Coefficient of a determination ($r^2 = 0.20$), pointed to the fact that direct correlation outliving period-trauma severity was only about 20% and the rest of correlation i.e. 80% depended on other factors (e.g. effective emergency medical system and triage, prompt and correct diagnosis, adequate medical treatment and care, etc.). The calculated linear regression was as follows: outliving period approximately 52-3 ISS. This regression pointed out that critical

and potentially fatal injury, in our sample, was injury with ISS of 17. There were 22 persons with ISS ≤ 7 . Six of them died on the spot as car passengers; they died due to mechanical asphyxia (thoracoabdominal pressure) or respiratory and/or circulation failure due to critical chest injury (flail chest, contusions and rupture of the lungs with consequent haemopneumothorax). The rest of 16 persons survived trauma in an average of 8.56 days (SD = 3.88), and the causes of death were pneumonia, thrombus and fat embolism, sepsis, etc. CONCLUSION: By analyzing our sample of fatally injured persons in traffic accidents (unpenetrated blunt trauma), there was a negative weak correlation between the outliving period and severity of injury based on ISS. This correlation was partly direct but mostly depended on other factors (e.g. effective emergency medical system and triage, prompt and correct diagnosis, adequate medical treatment and care, etc.). Establishment of these factors could be possible through state medical projects in big medical trauma centres. Prospect registration, evaluation and scoring of all injuries in hospitals and dissecting rooms, and comparison of the obtained results, can give valid data on mortality of injured people, bad diagnosis, and appropriate medical treatment. The autopsy of injured persons dead on the spot can point out what kind of injuries are incompatible with life, as well as with their severity. The autopsy of injured persons who survived trauma can point to the most frequent injury complications, clinical diagnosis and preventable deaths. According to this paper, the critical injury by ISS is 17. In such cases, the forensic pathologist must answer the following questions: whether the death was due to trauma; whether the precipitated cause of death was the consequence or complication of injury; what were the mechanism and mode of dying; whether the death was preventable; if there were possible malpractice and negligence, etc.

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