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Ten-year trends in traumatic injury mechanisms and outcomes: A trauma registry analysis

Zhamak Khorgami^a, William J. Fleischer^a, Yuen-Jing A. Chen^b, Nasir Mushtaq^c,
Michael S. Charles^a, C. Anthony Howard^{a,*}

^a Department of Surgery, The University of Oklahoma, College of Medicine, Tulsa, OK, USA

^b Department of Surgery, University of Hawaii, Honolulu, HI, USA

^c Department of Biostatistics and Epidemiology, University of Oklahoma Health Sciences Center, Tulsa, OK, USA

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ABSTRACT

Background: The Oklahoma Trauma Registry (OTR) collects data from all state-licensed acute care hospitals. This study investigates trends and outcomes of trauma in Oklahoma using OTR.

Methods: 107,549 patients (2005–2014) with major severity and one of the following criteria were included: length of hospital stay ≥ 48 h, dead on arrival or death in the hospital, hospital transfer, ICU admission, or surgery on the head, chest, abdomen, or vascular system. Patient characteristics, mechanisms of injury, and outcomes of trauma were analyzed.

Results: Hospital admissions due to falls increased with an annual percent change of 4.0% (95%CI: 3.1%–4.9%) while hospital admissions due to motor vehicle crashes decreased. The number of overall deaths per year remained stable except for the fall-related deaths, which increased proportionate to the increase in the incidence of fall. Fall-related mortality was 4.2% and intracranial bleeding was present in 60% in these patients.

Conclusion: Falls are significantly increasing as a mechanism of trauma admissions and trauma-related deaths in Oklahoma. Analysis of state-based trauma registries can identify trends in etiologies of injuries and may indicate a reference point to prioritize preventive plans.

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* Corresponding author. Department of Surgery, The University of Oklahoma, College of Medicine Tulsa, 1919 S. Wheeling Avenue, Suite 600, Tulsa, OK, 74104-5638, USA.

E-mail addresses: zhamak-khorgami@ouhsc.edu (Z. Khorgami), william-fleischer@ouhsc.edu (W.J. Fleischer), ychen8@hawaii.edu (Y.-J.A. Chen), nasir-mushtaq@ouhsc.edu (N. Mushtaq), michael.charles@ascension.org (M.S. Charles), tony-howard@ouhsc.edu (C.A. Howard).

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1. Introduction

Trauma is the leading cause of death among persons aged 1–44 in the United States, accounting for 59% of deaths in this age group. It is the third cause of death among persons in all age groups, accounting for 208,557 deaths in the United States in 2015. Trauma accounts for 20% of all life years lost in the United States, in comparison to cancer which accounts for 23.5% and heart disease which accounts for 17.1%. There are about 37 million emergency room visits every year in the United States that are attributable to injuries. The health care and lost productivity costs to the United States are estimated at \$671 billion per year.^{1–3}

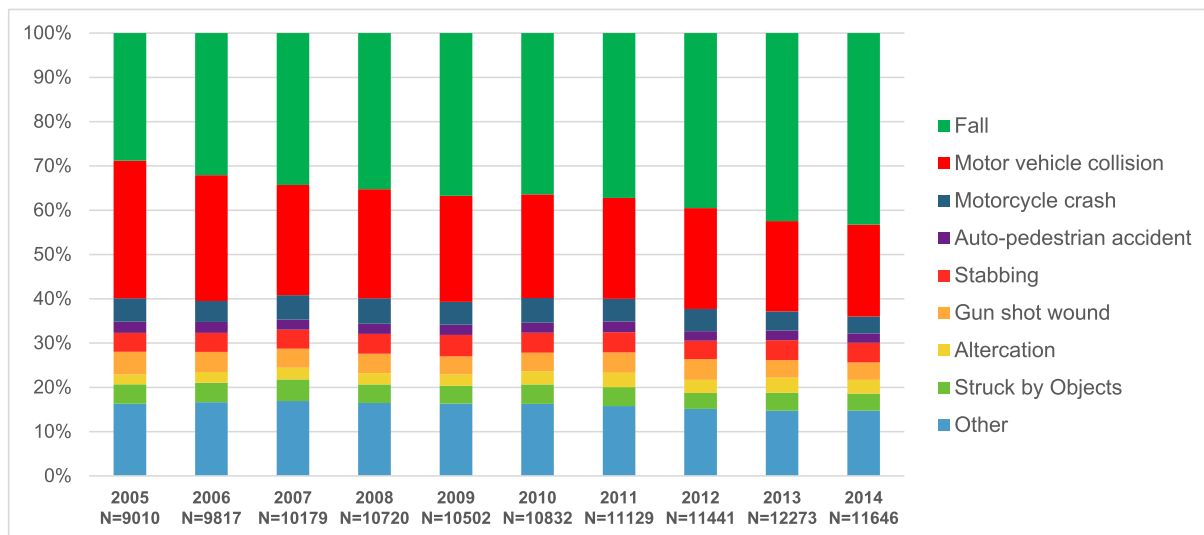
Injury prevention has become a pillar of modern trauma systems to reduce the impact of unintentional injury to injured patients and the population. Injury has been traditionally classified into three distinct phases: pre-injury, the injury itself, and post-injury. These phases help distinguish areas to which interventions can be made in order to reduce both morbidity and mortality in trauma patients.⁴ In a retrospective study at a level I trauma center, it was shown that about 7% of traumatic deaths were potentially preventable or preventable with therapeutic changes in the post-injury phase.^{5,6} In contrast, several other studies have shown that 30% to more than 90% of deaths are preventable in the pre-injury phase of trauma.^{7–9} The potential for decreasing the burden of trauma is much greater in the pre-injury phase than after the injury has already taken place. In 2014, the CDC listed unintentional injury among the five leading cause of potentially preventable death,

estimating 43% of unintentional-injury deaths are preventable.¹⁰

Many strategies have been implemented to address the trauma burden. Education for both medical providers and the public has been at the forefront of injury prevention. Several authors have advocated increasing early exposure to the topic of trauma prevention in medical school as well as increasing its teaching in surgery.^{11–14} Resources for health care providers are available to help educate patients on the importance of prevention. *Healthy People* is an initiative set up by the Office of Disease Prevention and Health Promotion (ODPHP) at the U.S. Department of Health and Human Services (HHS) which has as its objective creation of a healthier America. In its Injury and Violence Prevention section, this program provides evidence-based resources to guide injury prevention.¹⁵

Trauma databases have also become an important tool in injury prevention. By retrospectively analyzing trauma trends and injury patterns in specific regions, efforts can be made to improve not only the quality of the care provided after an injury occurs, but also to direct preventative strategies based on their injury profile. In 1989, the Regents of the American College of Surgeons established the National Trauma Data Bank. This has provided vast amounts of data from trauma centers all over the United States. Registries and datasets were set up to collect data from hospitals in specific states.

Some authors have noted the benefits of geographic information systems to help decrease the number of unintentional injuries in specific high-risk locations.^{14,16} Although national databases are able to indicate wide-level trends, state databases have the



*Average Annual Percent Change; MVC: Motor Vehicle Crashes, MCC: Motorcycle Crash, GSW: Gunshot Wound

Fig. 1. Trends in mechanisms of injury in Oklahoma from 2005 to 2014.

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