



Crash and burn? Vehicle, collision, and driver factors that influence motor vehicle collision fires

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ABSTRACT

A retrospective population-based case–control study was performed to determine the association between vehicle fires, and vehicle, collision, and driver factors on highways with a posted speed limit of at least 55 mph. Data were obtained from the Kentucky Collision Report Analysis for Safer Highways (CRASH) electronic files for 2000–2009 from the Kentucky State Police Records Sections. The results from the final multiple logistic regression show that large trucks were at a higher risk for a collision involving a fire than passenger vehicles and pickup trucks. When controlling for all other variables in the model, vehicles 6 years old and older, driving straight down the highway, and single vehicle collisions were also identified as factors that increase the risk of motor vehicle collision fires on roadways with a posted speed limit of ≥ 55 mph. Of the 2096 vehicles that caught fire, there were 632 (30%) non-fatally injured drivers and 224 (11%) fatally injured drivers. The results of this study have the potential to inform public health messages directed to the transportation industry, particularly semi truck drivers, in regard to fire risk.

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1. Introduction

Approximately 31 highway fires are responded to every hour, and one person is killed every day due to vehicle fires in the US (National Fire Protection Association, 2010). Between the years 2003 and 2007, it was estimated that there were approximately 287,000 vehicle fires, 1525 injuries, and 480 deaths annually associated with vehicle fires. Of the vehicle fires responded to by emergency personnel, approximately three-quarters were due to mechanical or electrical failures or malfunctions. Collisions accounted for only 3% of all vehicle fires but for over half of the deaths (58%). Intentional vehicle fires were a factor in about 8% of all vehicle fires and vehicle fire deaths.

Vehicle crashes that result in fire have been associated with severe injuries (Zhu and Srinivasan, 2011; Majdzadeh et al., 2008; Singleton and Qin, 2004; Khattak et al., 2002). Injury severity has also been associated with the manner of collision such as head-on collisions (Singleton and Qin, 2004), and vehicle stiffness and frontal geometry (Blum et al., 2008). The Kentucky Fatality Assessment and Control Evaluation (FACE) program was established in 1994 to conduct surveillance of fatal work injuries and perform on-site investigations of worker deaths. Since the year 2005, the Kentucky – specific priority for worker fatality investigations has

been the investigation of transportation industry fatalities. From 2005 to 2010, 60 fatal occupational large truck collisions were recorded in the FACE surveillance database and 14 FACE fatality reports were produced; of the 60 fatalities, 37% ($n = 22$) involved a vehicle fire.

Due to the high percentage of large truck collision fire fatalities investigated by the KY FACE program, the objective of this study was to determine if large trucks are more likely to catch fire than light trucks and passenger cars in collisions on Kentucky highways.

2. Study data

Data for the study were obtained from the Kentucky Collision Report Analysis for Safer Highways (CRASH) electronic files for 2000–2009 from the Kentucky State Police Records Sections which contained all reported crashes on public roadways in Kentucky. The electronic file received contained all motor vehicle collision information but excluded some personal identifiers. This study is part of the broad spectrum of the Kentucky Occupational Safety and Health Surveillance program which is approved by the University of Kentucky Institutional Review Board.

3. Methods

A retrospective population-based case–control study was conducted to evaluate if large trucks were more likely to catch on fire in a motor vehicle traffic collision on highways with a posted speed limit of at least 55 mph. For purposes of this study, “large

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