



Prevalence of motor vehicle crashes involving drowsy drivers, United States, 1999–2008

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ABSTRACT

The proportion of motor vehicle crashes that involve a drowsy driver likely is greater than existing crash databases reflect, due to the possibility that some drivers whose pre-crash state of attention was unknown may have been drowsy. This study estimated the proportion of crashes that involved a drowsy driver in a representative sample of 47,597 crashes in the United States from 1999 through 2008 that involved a passenger vehicle that was towed from the scene. Multiple imputation was used to address missing data on driver drowsiness. In the original (non-imputed) data, 3.9% of all crashes, 7.7% of non-fatal crashes that resulted in hospital admission, and 3.6% of fatal crashes involved a driver coded as drowsy; however, the drowsiness status of 45% of drivers was unknown. In the imputed data, an estimated 7.0% of all crashes (95% confidence interval: 4.6%, 9.3%), 13.1% of non-fatal crashes that resulted in hospital admission (95% confidence interval: 8.8%, 17.3%), and 16.5% of fatal crashes (95% confidence interval: 12.5%, 20.6%) involved a drowsy driver. Results suggest that the prevalence of fatal crashes that involve a drowsy driver is over 350% greater than has been reported previously.

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1. Introduction

Operator drowsiness, sleepiness, or fatigue (hereafter referred to as drowsiness) has been documented as a causal or contributing factor in aviation, maritime, and trucking accidents (National Transportation Safety Board, 1990, 1991, 1994). However, estimates of the proportion of motor vehicle crashes that involve drowsy drivers vary widely depending upon sources of data and analytical methods used.

Knipling and Wang (1994) analyzed data from years 1989 through 1993 and reported that 0.9% of all police-reported crashes and 3.6% of fatal crashes in the United States involved a driver coded as drowsy. The authors cited several other studies of large crash databases that reported results in this range, but also noted that studies of crash databases were likely to underestimate the prevalence of crashes that involved drowsy drivers due to data limitations. Wang et al. (1996) analyzed a national sample of crashes that occurred in 1995 in which a passenger vehicle was towed and estimated that 2.6% of these crashes involved a drowsy driver. The authors noted that the role of drowsiness was unknown in 46% of

crashes and that their estimate of the proportion of crashes involving drowsy drivers was likely conservative.

An Australian study classified crashes as drowsiness-related if drowsiness was cited by the police or if the crash involved departure from the roadway in the absence of other causes or contributing factors suggestive of attentive driving, and estimated that 6% of all reported crashes and 15% of fatal crashes in 1992 in New South Wales involved a drowsy driver (Fell, 1994). Knipling and Wang (1995) used a similar method to refine their earlier estimates (1994), and estimated that 1.2%–1.6% of all reported crashes involved a drowsy driver. Masten et al. (2006) used data from a sample of crashes in North Carolina to develop a statistical model to classify crash-involved drivers as drowsy or not drowsy, applied this model to national data on fatal crashes, and estimated that 15–33% of drivers involved in fatal crashes nationwide from 2001 through 2003 were drowsy.

In a study in which 109 vehicles were equipped with cameras and other data collection equipment for a period of 12–13 months, Klauer et al. (2006) reviewed pre-event video and estimated that 22% of crashes and near crashes in the study population involved moderate to severe drowsiness. However, the majority of outcomes in the study population were near crashes and unreported minor crashes (Dingus et al., 2006); the extent to which these results may be generalized to more severe crashes is unknown.

The aim of the current study was to improve upon past estimates of the proportion of crashes that involve a drowsy driver, overall and relation to crash severity, using multiple imputation to address missing data on driver drowsiness.

Abbreviations: CDS, Crashworthiness Data System; CI, Confidence interval; GES, General Estimates System; FARS, Fatality Analysis Reporting System; NASS, National Automotive Sampling System; NHTSA, National Highway Traffic Safety Administration.

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