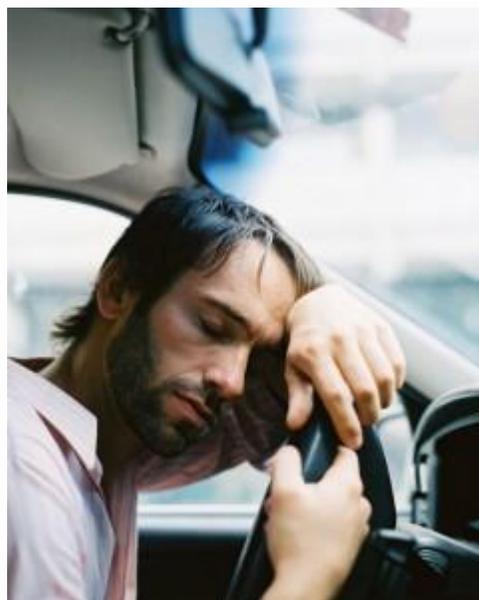


# ★ ★ ★ ★ Safety Culture

## *2012 Traffic Safety Culture Index: Motorists Admit to Driving Drowsy*



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Car crashes rank among the leading causes of death in the United States.

## **Author**

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Lindsay S. Arnold, Research Analyst  
Brian C. Tefft, Senior Research Associate  
AAA Foundation for Traffic Safety

## **About the Sponsor**

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AAA Foundation for Traffic Safety  
607 14th Street, NW, Suite 201  
Washington, DC 20005  
202-638-5944  
[www.aaafoundation.org](http://www.aaafoundation.org)

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## Introduction

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Fatigue, or drowsiness, is known to degrade driving performance by slowing reaction time, impairing judgment and situational awareness, and increasing attentional lapses as well as the occurrence of microsleeps (Rosekind, 2012). Operator drowsiness, sleepiness, or fatigue (hereafter referred to as *drowsiness*) has been documented as a contributing factor in aviation, maritime, and traffic crashes. However, in comparison to some other highway safety problems such as drunk and distracted driving, drowsy driving has received much less attention.

The proportion of crashes that involve a drowsy driver has proven difficult to pinpoint, in large part because there ordinarily is not any physical evidence that a crash was drowsiness-related. Drivers may be unable or unwilling to report to investigators that drowsiness contributed to the crash, and may not even have been aware of the role that drowsiness may have played in the crash. The studies most often cited as the source of estimates of the proportion of crashes that involve a drowsy driver (Knipling & Wang, 1994; Knipling & Wang, 1995; Wang, Knipling, & Goodman, 1996) are now more than 15 years old. In these studies, which estimated that only 1% – 4% of crashes involved a drowsy driver, the researchers assumed that drivers not reported to have been drowsy were not drowsy, even if investigators explicitly noted that the driver's level of drowsiness or attention was unknown.

Studies that have used more sophisticated methods have estimated that the proportion of crashes that involve a drowsy driver is actually much higher. For example, Masten *et al.* used data from a sample of crashes in North Carolina to develop a statistical model to classify crashes as drowsiness-related versus not drowsiness-related, applied this model to a national database of all fatal crashes in the United States, and estimated that 15% – 33% of drivers involved in fatal crashes nationwide from 2001 through 2003 were drowsy (Masten, Stutts, & Martell, 2006). A study using cameras to monitor the driving of 109 drivers for 12-13 months each estimated that 22% of crashes and near crashes involved drowsiness (Klauer, Dingus, Neale, Sudweeks, & Ramsey, 2006).. In 2010, the AAA Foundation for Traffic Safety analyzed a representative sample of crashes that involved at least one passenger vehicle that was towed from the scene, used the method of multiple imputation to estimate the proportion of drivers who were actually drowsy among those whose pre-crash level of attention or drowsiness was unknown, and estimated that 7.0% of all of these crashes, 13.1% of crashes that resulted in a person being admitted to a hospital, and 16.5% of fatal crashes involved a drowsy driver (Tefft, 2010).

This study provides estimates of the prevalence of self-reported drowsy driving using data from a nationally-representative survey of drivers.

## Methods

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The data reported here were collected as part of the AAA Foundation's 2012 *Traffic Safety Culture Index*, a web-enabled nationally-representative probability-based survey of 3,896 U.S. residents 16 years of age and older, conducted in English and in Spanish from September 7, 2012 through September 24, 2012 by GfK for the AAA Foundation. The annual survey assesses indicators of the degree to which traffic safety is valued and is being pursued. A sample of respondents ages 16 and older was recruited from GfK's KnowledgePanel® (GfK Knowledge Networks, n.d.) to complete an online questionnaire. KnowledgePanel® consists of members of households recruited by GfK using standard probability-based random digit dial (RDD) and address-based survey methods. The sampling frame includes all U.S. households reachable by telephone or by regular mail, irrespective of Internet access or use. If a sampled household lacks Internet access or an Internet-capable computer, GfK provides Internet access and a netbook computer at no cost to the household. Individuals not sampled by GfK cannot volunteer to join the panel. Because each individual respondent's probability of selection into the panel and probability of selection for a particular survey are known, statistics can be weighted to reflect the entire population of the United States. The questionnaire was made available in English and Spanish, and respondents were able to complete it in the language of their choice. GfK invited 8,173 KnowledgePanel® members to complete the questionnaire.

In the 2012 *Index*, licensed drivers who reported having driven in the past 30 days were asked how many times they had "fallen asleep or nodded off (even for just a few seconds)" in all of the time they have been driving. Respondents who reported having done this one or more times were asked when the most recent time they fell asleep or nodded off while driving occurred. All respondents were also asked how often they had "driven when they were so sleepy that they had a hard time keeping [their] eyes open," with response options of *regularly, fairly often, rarely, just once, or never*, within a battery of items addressing the frequency with which respondents had performed various other driving behaviors over the past 30 days.

Respondents were asked several questions about their attitudes and beliefs regarding drowsy driving. Within a list of driving behaviors and issues, respondents were asked how much of a threat to their safety sleepy drivers are, with response options of *very serious threat, somewhat serious threat, minor threat, or not a threat*. They were also asked how acceptable it is for "a driver to drive when they're so sleepy that they have trouble keeping their eyes open," both from their personal perspective as well as that of others where they live. The response options for these items were *completely acceptable, somewhat acceptable, somewhat unacceptable, or completely unacceptable*.

GfK weighted the data to account for probability of selection for recruitment into KnowledgePanel®, probability of selection for this survey, non-response at both stages, and to align the characteristics of the respondents to those of the population of U.S. residents ages 16+ nationwide with respect to gender, age, race/hispanic ethnicity, education, census region, metropolitan area, number of 16+ year olds in the household, and household income using data from the Current Population Survey (U.S. Census Bureau, 2012). All analyses were based on weighted data. P-values, were reported, were based on two-tailed Z-tests of proportions.

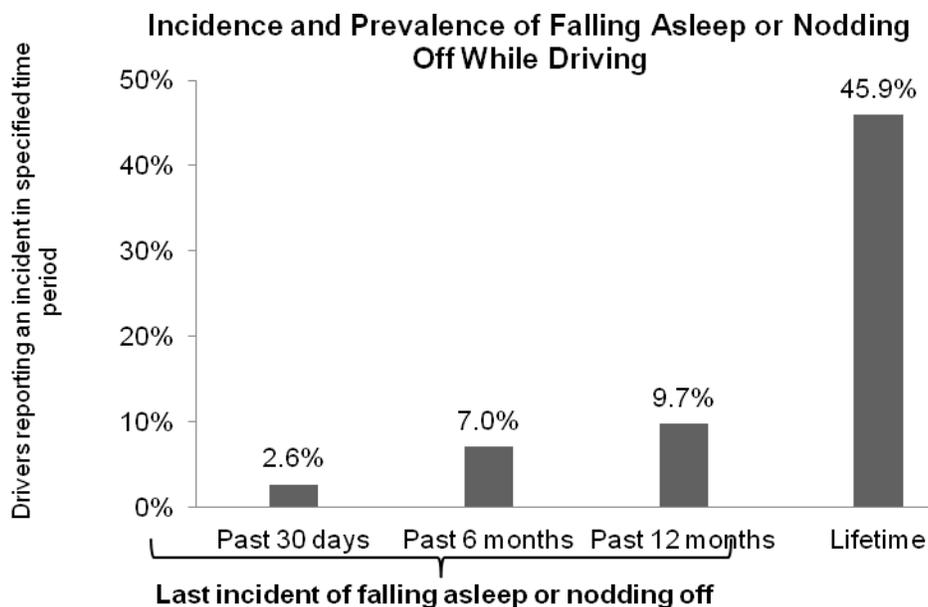
## Results

Three thousand eight hundred ninety-six (3,896) completed responses were obtained. Results reported here are based only the 3,303 respondents who reported that they had a valid driver's license and had driven in the past 30 days. **Table 1** summarizes the basic demographics of the respondents.

	N (unweighted)	% (weighted)
<b>Age group (yrs)</b>		
16-24	523	11.1%
25-39	619	25.3%
40-59	1,112	37.3%
60-74	730	18.7%
75+	319	7.6%
<b>Sex</b>		
Male	1,707	49.3%
Female	1,596	50.7%
<b>Survey language</b>		
English	3,190	95.6%
Spanish	113	4.4%

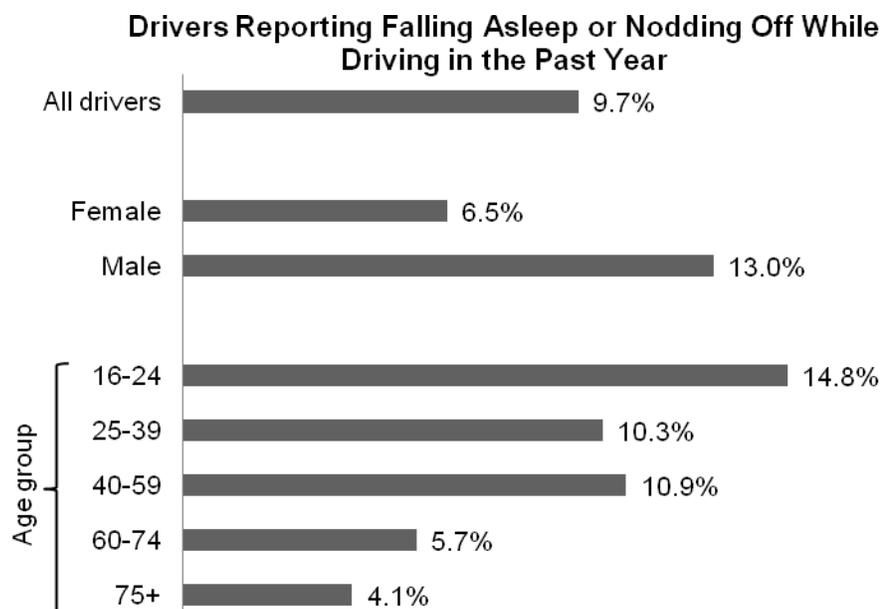
**Table 1.** Characteristics of licensed drivers who reported having driven in the past 30 days. (unweighted N, column percent weighted to reflect U.S. resident population ages 16+)

Nearly half of all drivers (45.9%) reported having ever (in their lifetime) fallen asleep or nodded off while driving; 2.6 percent of all drivers reported having fallen asleep or nodded off while driving in the past month, 7.0 percent within the past 6 months, and 9.7 percent within the past 12 months (**Figure 1**). Nearly a third of all drivers (29.9%) reported driving when they were so sleepy that they had a hard time keeping their eyes open in the last 30 days, including 19.6 percent who did so more than once. Men were more likely than women to have reported engaging in this behavior (33.7% vs. 26.3%,  $p < 0.001$ ).



**Figure 1. Self-reported incidence of falling asleep or nodding off while driving.** Drivers were asked, “Thinking about all the time you have been driving, how many times have you fallen asleep or nodded off (even just for a few seconds) while you were driving?” The proportion of drivers whose response was one or greater is indicated by the “Lifetime” column. Those drivers were asked when their most recent incident of falling asleep or nodding off while driving occurred, and their responses are indicated above.

Licensed drivers ages 16-24 were the most likely to report having fallen asleep while driving within the past year. There was a general trend of decreasing likelihood of having fallen asleep while driving within the past year across the entire age spectrum; 14.8 percent of drivers ages 16-24 reported having fallen asleep while driving in the last year, compared to 8.5 percent of drivers over 40 and only 5.2 percent of drivers over 60. Men were much more likely than women to report having ever fallen asleep while driving (55.3% vs. 36.7%,  $p < 0.001$ ), and to report having done so within the past year (13.0% vs. 6.5%,  $p < 0.001$ ). (**Figure 2**)



**Figure 2. Self-reported prevalence of falling asleep or nodding off while driving by sex and age group.**

The majority of drivers (96.3%) expressed disapproval of those who drive when they have trouble keeping their eyes open. More than one-in-four (26.3%) drivers who believe it is completely unacceptable to drive in this compromised state, however, admitted doing so in the last month. When asked how they thought others living in their community felt about motorists driving despite having difficulty keeping their eyes open, they tended to underestimate the disapproval that others express about this risky behavior.

## Discussion

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Despite the almost universal disapproval among the motoring public of those who drive when they have trouble keeping their eyes open, the practice is alarmingly common, epitomizing the “do as I say, not as a do” attitude that characterizes the current traffic safety culture in the U.S. A nationally representative survey conducted in 2002 for the NHTSA found similar rates of falling asleep or nodding off while driving as the current analysis: 37 percent of drivers reported having ever “fallen asleep or nodded off, even for a moment, while driving,” including 4 percent within the past month, 8 percent within the past 6 months, and 11 percent within the past year (Royal, 2003). The AAA Foundation is currently initiating an analysis of data from the 2008-2012 *Indices* to determine whether attitudes and behaviors regarding drowsy driving, and traffic safety in general, have changed since the *Index* was initiated. Self-reports of driving while drowsy and falling asleep at the wheel may be underreported due to drivers’ tendency to underestimate drowsiness and/or lack of awareness of having fallen asleep while driving if no negative consequences occurred. Given our 2010 estimate of the involvement of drowsy drivers in crashes and the frequency of self-reported drowsy driving, interventions are necessary to decrease drowsy driving crashes. These interventions should raise awareness about the signs and effects of drowsiness while driving, and ways to avoid driving drowsy. Interventions should target the motoring public as well as those in a position to intervene directly and/or indirectly, such as employers and medical doctors. In-vehicle crash avoidance technology currently on the market and in development may help reduce some types of drowsy driving crashes, but does not address the underlying problem.

## References

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- Current Population Survey: August 2012. [Data files]. Washington, DC: Bureau of Census.  
<http://www.bls.gov/cps/>
- GfK Knowledge Networks (n.d.). *Knowledge Panel® Design Summary*. Retrieved November 26, 2012, from <http://www.knowledgenetworks.com/knpanel/docs/KnowledgePanel%28R%29-Design-Summary-Description.pdf>
- Klauer, S. G., Dingus, T. A., Neale, V. L., V. L., Sudweeks, J.D., and Ramsey, D.J. . (2006). *The impact of driver inattention on nearcrash/ crash risk: An analysis using the 100-Car Naturalistic Driving Study data*. Report No. DOT HS 810 594. Washington, DC: National Highway Traffic Safety Administration.
- Knipling, R. R. & Wang, J.-S. (1994). *Crashes and fatalities related to driver drowsiness/fatigue*. Washington, DC: National Highway Traffic Safety Administration.
- Knipling, R. R. & Wang, J.-S. (1995). Revised estimates of the U.S. drowsy driver crash problem size based on General Estimates System case reviews. *39th Annual Proceedings, Association for the Advancement of Automotive Medicine*, October, Chicago, IL.
- Rosekind, Mark. (2012) *Fatigue: A Motor Vehicle Crash Risk*. *56th Annual Association for the Advancement of Automotive Medicine Conference*, October, Seattle, WA.
- Royal, D. (2003). *National survey of distracted and drowsy driving attitudes and behaviors: 2002, Vol 1: Findings*. Report No. DOT HS 809 566. Washington, DC: National Highway Traffic Safety Administration.
- Masten, S. V., Stutts, J. C., & Martell, C. A. (2006). Predicting daytime and nighttime drowsy driving crashes based on crash characteristic models. *50th Annual Proceedings, Association for the Advancement of Automotive Medicine*, October, Chicago, IL.
- Tefft, Brian C. (2010). *Asleep at the Wheel: The Prevalence and Impact of Drowsy Driving*. Washington, DC: AAA Foundation for Traffic Safety.
- Wang, J.-S., Knipling, R. R., & Goodman, M. J. (1996). The role of driver inattention in crashes; new statistics from the 1995 Crashworthiness Data System. *40th Annual Proceedings, Association for the Advancement of Automotive Medicine*, October, Vancouver, BC.