

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



Prevalence of Self-Reported Drowsy Driving, United States: 2015

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Title

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About the Sponsor

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Introduction

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.

Estimates of the prevalence of self-reported drowsy driving have been remarkably consistent. A national survey of drivers ages 16 and older conducted by the National Highway Traffic Safety Administration (NHTSA) in 2002 found that 37% of drivers reported having ever “nodded off for at least a moment or fallen asleep while driving,” including 4% who had done so in the past month (Royal, 2003). A survey of residents of 19 states and the District of Columbia conducted by the Centers for Disease Control and Prevention (CDC) in 2009-2010 found that 4 percent of drivers aged 18+ reported having fallen asleep while driving in the past 30 days (CDC, 2013). Another national survey conducted by the AAA Foundation for Traffic Safety in 2010 found that 41% of drivers reported having ever fallen asleep or nodded off while driving, including 4% who had done so in the past month (Tefft, 2010).

Most previous studies of the prevalence of crashes that involved driver drowsiness analyzed data derived from police reports found that drowsiness was only cited as a contributing factor in 1-4% of crashes (Knipling & Wang, 1994; Knipling & Wang, 1995; Wang, Knipling, & Goodman, 1996). However, more recent studies have estimated that the actual prevalence is likely much higher. The AAA Foundation analyzed data from a representative sample of crashes that were subject to in-depth investigations, found that the drowsiness status of nearly half of all drivers was reported as unknown, developed a statistical model to estimate the proportion of those drivers who were drowsy, and estimated that 7% of all crashes in which a vehicle was towed, 13% of crashes that resulted in a person being admitted to a hospital, and 17% of fatal crashes in years 1999-2008 involved a drowsy driver (Tefft, 2010). An update of that study, based on data from 2009-2013, estimated that 6% of all crashes in which a passenger vehicle was towed, 13% of crashes that resulted in a person being admitted to a hospital, and 21% of fatal crashes involved a drowsy driver (Tefft, 2014).

The purpose of the present study was to provide updated estimates of the prevalence of self-reported drowsy driving using data from a nationally-representative survey of drivers conducted in 2015.

Methods

The data reported here were collected as part of the AAA Foundation's 2015 *Traffic Safety Culture Index*, a survey of U.S. residents 16 years of age and older, conducted in English and in Spanish from July 28, 2015 through August 12, 2015 by GfK for the AAA Foundation. The questionnaire was administered online to a sample of members of KnowledgePanel®, an online research panel which consists of members of households recruited by the research firm GfK using standard probability-based random digit dial and address-based sampling methods. The data were weighted to account for differences in respondents' probability of being invited to join the panel, differences in probability of being asked to complete this specific questionnaire, and non-response at both stages (GfK, 2013).

The AAA Foundation's annual *Traffic Safety Culture Index* includes a variety of questions pertaining to the respondent's attitudes about traffic safety, perceptions of social norms, and driving behavior. The 2015 survey also contained a special series of questions regarding experience with drowsy driving. Specifically, 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 at least once were asked when the most recent time they fell asleep or nodded off while driving occurred. At another point in the survey, within a battery of questions about the respondent's driving behavior in the past 30 days, 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*. Respondents were also asked about the number of days in a week they "get less than six hours of sleep (including naps)," in reference to a typical week as well as the past week, with response options of 0 through 7 days.

The current study is based on data from 2,545 respondents who reported that they were licensed drivers and had driven at least once in the 30 days before they completed the questionnaire.

Results

Nearly a third of all drivers (31.5%) reported driving when they were so sleepy that they had a hard time keeping their eyes open in the last 30 days, including 3.5% who did so fairly often or regularly (Table 1). Drivers ages 19-24 were the most likely to report having driven while struggling to keep their eyes open at least once in the last 30 days (39.6%), while drivers ages 25-39 were the most likely to report having done so fairly often or regularly (5.3%). Drivers ages 16-18 were the least likely to report having driven while struggling to keep their eyes open at least once in the last 30 days (16.3%), while drivers ages 75 and older were the least likely to report having done so fairly often or regularly. Men were slightly more likely than women to have reported engaging in this behavior (34.0% vs. 29.2%, $p=0.027$).

More than two in five drivers (43.2%) admitted having fallen asleep or nodded off while driving at least once in their life (Table 2). More than one in seven drivers (14.5%) reported having fallen asleep while driving only once, 11.3% twice, and 17.4% reported having done so three or more times; 2.5% reported having fallen asleep while driving within the past month, 6.6% within the past six months, and 10.0% within the past 12 months.

Drivers ages 19-24 were more likely than drivers of any other age group to report having fallen asleep while driving within the past month, within the past 6 months, and within the past year, all of which decreased with increasing age across all older age groups. Lifetime prevalence of having ever fallen asleep while driving increased with age.

Table 1: Self-reported frequency of driving while “so tired you had a hard time keeping your eyes open” in the past 30 days, representative sample of licensed drivers who reported driving in the past 30 days, United States, 2015.

		Just once	Rarely	Fairly often or Regularly	At least once
		<i>Row %, weighted</i>			
Driver age	All drivers (n=2,540)	9.2	18.8	3.5	31.5
	16-18 (n=439)	6.5	7.8	2.0	16.3
	19-24 (n=153)	17.2	19.3	3.1	39.6
	25-39 (n=484)	11.7	17.7	5.3	34.7
	40-59 (n=801)	8.4	18.8	3.1	30.2
	60-74 (n=534)	5.8	20.9	3.1	29.8
	75+ (n=129)	7.6	21.8	0.9	30.3
Driver sex	Male (n=1,277)	9.2	20.9	3.9	34.0
	Female (n=1,263)	9.3	16.9	3.0	29.2
Number of days sleep < 6 hrs in typical week					
	0 (n=1,364)	8.0	15.0	2.1	25.0
	1-2 (n=575)	10.9	24.0	2.5	37.4
	3-5 (n=384)	10.8	21.1	8.9	40.8
	6-7 (n=190)	10.4	23.4	4.6	38.4

Men were much more likely than women to report having ever fallen asleep while driving (51.1% vs. 35.5%, $p < 0.001$) and to report having done so within the past year (11.9% vs. 8.2%, $p = 0.008$).

Drivers who reported sleeping less than 6 hours per day at least once a week in a typical week were more likely to report having fallen asleep while driving in the past year than were those who reported sleeping at least 6 hours every day: 11.5% of drivers who reported sleeping less than 6 hours a day 1-2 days a week ($p = 0.003$), 18.5% of those who reported sleeping less than 6 hours 3-5 days a week, and 11.7% of those who reported sleeping less than 6 hours a day 6-7 days a week ($p = 0.04$) reported having fallen asleep while driving at least once in the past year, compared with 6.5% of those who reported sleeping at least 6 hours a day every day. Similar patterns were observed in the prevalence of having fallen asleep while driving in the past month and past 6 months.

Drivers who reported driving while struggling to keep their eyes open in the past 30 days were much more likely to report having fallen asleep while driving by all measures examined. Of drivers who reported that they did not drive while so sleepy that they had a hard time keeping their eyes open at all in the past month, 0.3%, 1.5%, and 3.0% reported having fallen asleep while driving in the past month, 6 months, and 12 months, respectively. In contrast, among drivers who reported that they drove while sleepy in the past 30 days “just once,” 5.3% reported having fallen asleep while driving in the past month ($p = 0.003$), 15.1% in the past 6 months ($p < 0.001$), and 19.9% in the past 12 months ($p < 0.001$). Falling asleep while driving was very prevalent among the small subgroup of drivers who admitted driving while struggling to keep their eyes open “fairly often” or “regularly” – 21.4% reported having fallen asleep while driving in the past month, 41.1% reported having done so in the past 6 months, and fully half (50.0%) reported having fallen asleep while driving in the past year ($p < 0.001$ for all compared with those who reported never driving while having hard time keeping their eyes open).

Table 2. Self-reported falling asleep or nodding off while driving, representative sample of licensed drivers who reported driving in past 30 days, United States, 2015.

		Most recent time			Total number of times			
		Ever (Lifetime)	Within past month	Within past 6 months	Within past 12 months	1	2	3+
		<i>Row %, weighted</i>						
Driver age	All drivers (n=2,540)	43.2	2.5	6.6	10.0	14.5	11.3	17.4
	16-18 (n=439)	14.5	1.1	8.9	10.6	8.0	3.0	3.5
	19-24 (n=153)	41.8	4.0	12.0	20.4	14.7	11.7	15.4
	25-39 (n=484)	42.3	3.5	9.6	12.6	13.5	13.0	15.9
	40-59 (n=801)	44.9	2.7	5.7	8.7	13.2	11.6	20.1
	60-74 (n=534)	46.5	1.1	4.0	7.4	17.6	11.1	17.8
	75+ (n=129)	39.1	0.0	0.2	2.4	18.0	6.5	14.6
Driver sex	Male (n=1,277)	51.1	2.9	7.8	11.9	14.8	13.8	22.5
	Female (n=1,263)	35.5	2.0	5.4	8.2	14.2	8.9	12.4
Number of days sleep < 6 hrs in typical week								
	0 (n=1,364)	39.2	1.8	4.6	6.5	14.3	10.6	14.2
	1-2 (n=575)	48.0	2.4	7.2	11.5	14.6	13.2	20.1
	3-5 (n=384)	48.8	4.8	10.7	18.5	15.7	9.1	24.0
	6-7 (n=190)	41.8	3.4	9.2	11.7	10.5	12.9	18.5
Frequency of driving while having hard time keeping eyes open (past 30 days)								
	Never (n=1,809)	32.9	0.3	1.5	3.0	11.9	9.0	11.9
	Just once (n=222)	66.4	5.3	15.1	19.9	32.6	16.5	17.3
	Rarely (n=428)	63.5	5.7	14.2	23.0	14.6	17.5	31.4
	Fairly often/regularly (n=72)	72.3	21.4	41.1	50.0	13.8	9.1	49.3

Discussion

Drivers in the United States report having fallen asleep or nodded off while driving at alarming rates: more than two in five (43.2%) have fallen asleep or nodded off while driving at some point in their lives, including 2.5% who did so within the past month, 6.6% within the past six months, and 10.0% within the past year. These results are highly consistent with past surveys conducted by the AAA Foundation, NHTSA, and the CDC: estimates of lifetime prevalence of falling asleep at the wheel ranged from 37% to 41%, while estimates of past month drowsy driving converged at 4% (CDC, 2013; Royal, 2003; Tefft, 2010).

The prevalence of falling asleep at the wheel is particularly remarkable given that, in the same survey, 97.0% of drivers said they feel it is unacceptable to drive when one is so sleepy one has trouble keeping his or her eyes open. The substantial prevalence of falling asleep while driving despite near universal social disapproval for the same behavior is not unique to drowsy driving: similar patterns have also been documented for other driving behaviors such as texting while driving and red light running (AAA Foundation, 2014).

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. Considering the social disapproval for drowsy driving, social desirability bias may lead drivers to underreport related behaviors. Thus, the true prevalence of falling asleep while driving may be even higher than the estimates reported here.

Given that previous research has found that as many as 6,400 fatal crashes annually are likely to involve driver drowsiness (Tefft, 2014), and a substantial proportion of the motoring public admits to driving while struggling to stay awake at least occasionally, interventions are necessary to decrease the prevalence of drowsy driving and to prevent drowsy driving crashes. Ongoing effort is needed to educate the public about the dangers of drowsy driving, warning signs, and ways to reduce risk. AAA provides recommendations for motorists, including getting at least six hours of sleep before a long drive, traveling during normal waking hours, scheduling breaks every two hours or 100 miles, and stopping driving if they become sleepy (AAA, n.d.).

Interventions should also target those in a position to intervene directly and/or indirectly, such as employers and the medical community. In addition, some vehicles on the market today offer technologies designed to detect driver drowsiness and alert the driver or intervene in another way to reduce the risk of a crash; however, no independent evaluations of their effectiveness have been published to date. More research is needed to determine whether such vehicle-based systems actually reduce risk or whether they may have unintended consequences.

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