REPORT UPDATE

WAKE UP CALL!

Understanding Drowsy Driving and What States Can Do

GHSA℠
Governors Highway Safety Association
The States' Voice on Highway Safety

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Contents

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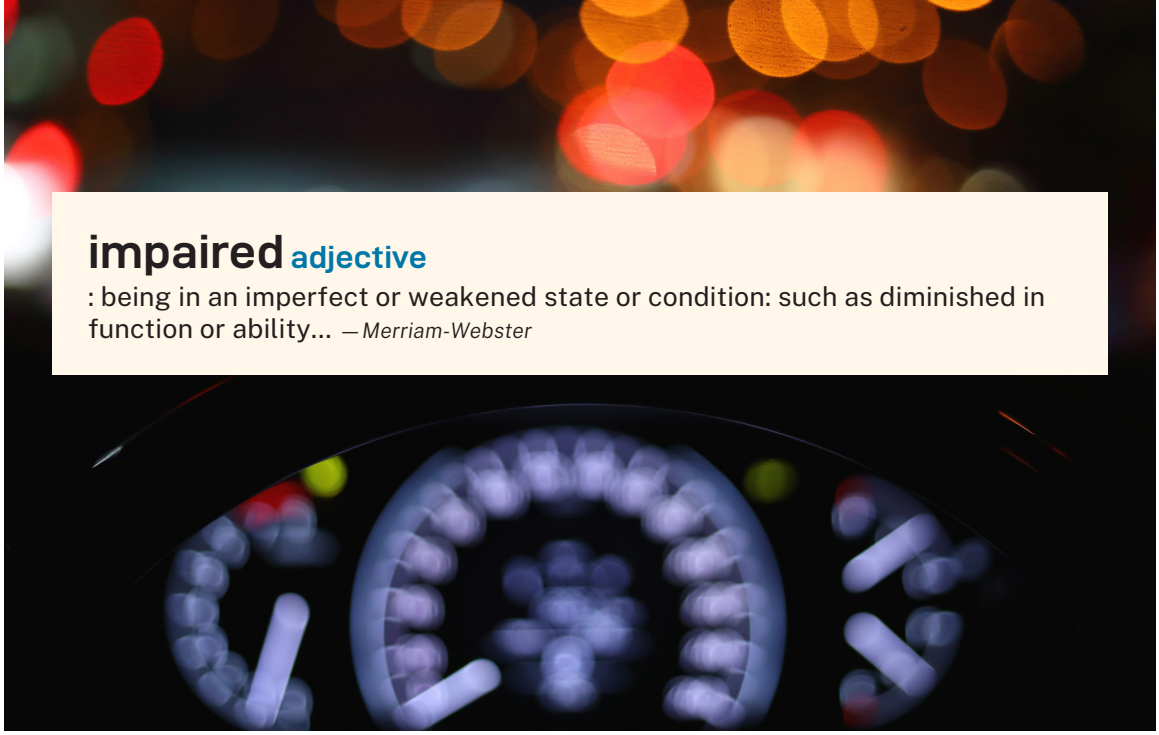


impaired adjective

: being in an imperfect or weakened state or condition: such as diminished in function or ability... —*Merriam-Webster*

Introduction

Driving "impaired" is most often associated with driving after consuming alcohol and/or drugs. However, driving while tired can be similarly impairing. In one study, 17 to 19 hours without sleep led to performance impairments equivalent or worse than the effects of a Blood Alcohol Content (BAC) of 0.05.[1]

Despite the danger, drowsy driving rarely gets the same level of attention as drunk or drug-impaired driving. Nor is it discussed as much as another dangerous driving behavior: distraction. Like distracted driving, drowsy driving is a behavior that many people know is risky but admit to engaging in anyway.

This update to the Governors Highway Safety Association's 2016 drowsy driving report, Wake Up Call, Understanding Drowsy Driving and What States Can Do, delves into what the most currently available crash, injury, fatality and self-reported survey data tell us about this problem. It also discusses the most promising strategies to reduce the prevalence of drowsy driving on America's roadways.

Defining the Problem

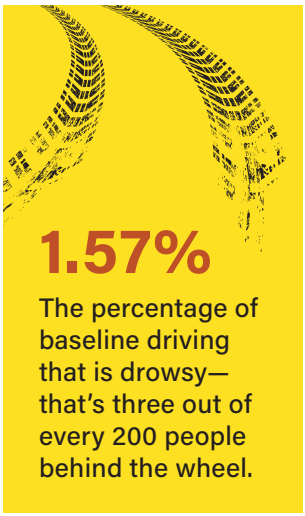
Overall Estimates

It's difficult to describe the current state of drowsy driving since its prevalence is likely to be underreported in crash and fatality statistics. An alcohol-or drug-impaired driver can be tested in the immediate aftermath of a crash, but the same is not true for a drowsy driver. In fact, a drowsy driver who survives a crash is likely to be fully awakened by the impact of the crash.

1 Williamson, A. M., & Feyer, A. M. (2000). Moderate sleep deprivation produces impairments in cognitive and motor performance equivalent to legally prescribed levels of alcohol intoxication. *Occupational and environmental medicine*, 57(10), 649–655. https://doi.org/10.1136/oem.57.10.649

Despite this challenge, there are sources that provide good clues about the extent of drowsy driving. A particularly useful one is the Strategic Highway Research Program, or SHRP2 (thus named because it's the second iteration of the initiative). The data from this naturalistic driving study used instrumented vehicles driven by more than 3,500 volunteer drivers in six areas of the U.S. between October 2010 and December 2013. It provides the only direct observation data of pre-crash drowsiness.

Using the SHRP2 file, a 2016 AAA Foundation for Traffic Safety (AAAFTS) study[2] observed video of the drivers' eyes for one to three minutes before 701 crashes ranging from minor to severe. The researchers found that about 9% of all crashes and about 10.8% of all police reportable crashes involved a drowsy driver. While the number of crashes was limited and the data are more than 10 years old, it is safe to estimate that **approximately 9-11% of relatively minor crashes involve a drowsy driver**.



Using the same SHRP2 data and method of examining a driver's eyes, researchers have also estimated that about **1.57% of baseline driving is drowsy**.[3] This means that at any given moment on the road, three out of every 200 people behind the wheel are driving drowsy.

The Fatality Analysis Reporting System (FARS) is a census of all fatal crashes in the U.S. The FARS data come directly from aggregated police reports. In 2023 (the most recent year for which data are available), FARS indicated that 1.5% of fatal crashes involved a drowsy driver and 1.8% of drivers in fatal crashes were either "drowsy, asleep, fatigued, ill or black[ed] out."[4] Using these data, NHTSA reported that 633 people were killed in drowsy driving crashes in 2023.

Police reports, from which the FARS data are derived, substantially underestimate drowsy driving because officers have no direct observation of drivers before they crash and states and localities have different policies on how to report suspected drowsy driving. As a result, the **national raw FARS numbers are a substantial undercount** of the total prevalence of drowsy driving among all traffic fatalities.

A 2024 AAAFTS research report[5] applied a model developed from NHTSA's Crash Investigation Sampling System (CISS) to FARS data and concluded that "**an estimated 17.6% of all fatal crashes in the years 2017-2021 involved a drowsy driver**." This is probably the best available estimate of drowsiness in fatal crashes in the U.S.

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2 Owens et al. (2016). Prevalence of drowsy-driving crashes: Estimates from a large-scale naturalistic driving study (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety. https://aaafoundation.org/prevalence-drowsy-driving-crashes-estimates-large-scale-naturalistic-driving-study/

3 Dingus et al. (2016). Driver crash risk factors and prevalence evaluation using naturalistic driving data. *Proc. Natl. Acad. Sci. U.S.A.* 113 No. 10, 2636-2641. https://doi.org/10.1073/pnas.1513271113

4 NHTSA (2025). Traffic safety facts – 2023 data. DOT HS 813 743 (and previous years similarly) https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813743

5 Tefft, B.C. (2024). Drowsy driving in fatal crashes, United States, 2017–2021 (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety. https://aaafoundation.org/wp-content/uploads/2024/03/202304-AAAFTS-Drowsy-Driving-Countermeasures.pdf

Applying this estimate to the FARS fatality totals for 2017-2021 yields an annual drowsy driving fatality average of 5,967. That's more than the average number of motorcyclist fatalities for the same five years (5,414) and slightly less than the average annual number of pedestrians killed in motor vehicle crashes (6,551). Assuming the same proportion of fatalities in 2023 involved drowsy driving, **there would have been 6,326 roadway deaths in 2023 caused by drowsy driving. This is ten times more than the raw FARS data reported by NHTSA.**

6,326
The number of roadway deaths in 2023 caused by drowsy driving, according to the AAAFTS model.

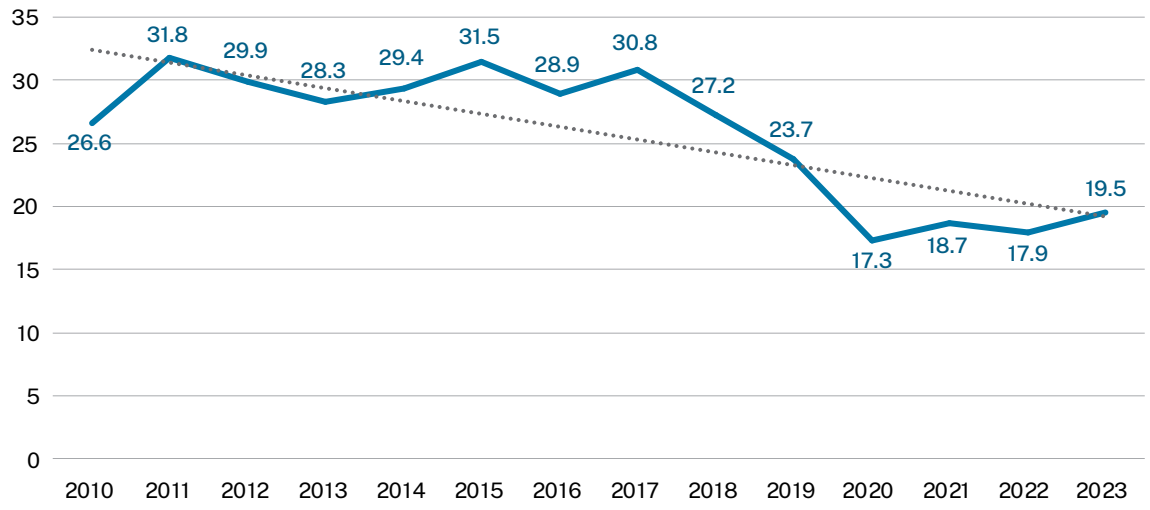
Self-reported surveys also are useful, although they have their own limitations. The two best sources are:

» The AAAFTS Traffic Safety Culture Indices,[6] published every year beginning in 2008; and

» The National Sleep Foundation (NSF) Sleep in America® poll, which began in 1991 and has been conducted close to annually since.

The AAAFTS survey, which queries approximately 2,000 to 3,500 adults and contains the same question each year, asks respondents if they have "driven in the last 30 days when they were so tired they had a hard time keeping their eyes open." They can select regularly, fairly often, a few times, once or not at all. Between 2010 and 2023, the percentage of adults who admitted to any drowsy driving ranged from 31.8% in 2011 to 17.3% in 2020. Most recently, the proportion is 19.5% in 2023. Figure 1 illustrates this trend over time.

FIGURE 1: Percentage of Adult Drivers Reporting Driving Drowsy at Least Once in the Past 30 Days, 2010–2023



Source: AAAFTS Traffic Safety Culture Indices

6 AAAFTS 2023 Traffic safety culture index (and previous years similarly). Washington, D.C.: AAA Foundation for Traffic Safety. https://aaafoundation.org/2023-traffic-safety-culture-index

The results of the latest NSF survey were published in November 2025[7] and found that 60% of adults admitted to having driven drowsy at some point in their lifetime. One would expect a higher proportion of self-reported behavior in a driver's lifetime rather than in the past 30 days, as the AAAFTS survey asks.

60%

of adults admitted to having driven drowsy at some point in their lifetimes.

Who's Most Likely to Drive Drowsy?

When it comes to who is likely to drive drowsy, research shows:

- Males drive drowsy somewhat more frequently than females.[2,5,8]
- Younger drivers 16 to 24 years old drive drowsy more frequently than older drivers.[2,5,8]
- A survey of 718 college students at a sizable university in the Southwestern U.S. found that nearly half reported drowsy driving in the past month.[9] Two other recent studies found 20% of 1,039 college students reported having fallen asleep while driving[10] and 31% of 450 university students reported driving while drowsy at least once in the past month.[11]
- While 60% of adults admitted to drowsy driving, according to the most recent NSF survey findings, that figure rises to 70% for parents of children through age 17, with 21% of them reporting they drove drowsy at least once in the last month.

In general, individuals from historically underserved groups reported driving drowsy more frequently than other drowsy drivers.[9] Specifically, Black and Hispanic individuals and those with a high school education or less self-reported driving drowsy significantly more often than their counterparts.

Individuals working certain jobs are also more susceptible to driving drowsy. Two groups stand out — truck drivers and nurses. In 2010, the National Institute of Occupational Safety and Health conducted a nationally representative survey of 1,265 long-haul truck drivers at 32 truck stops across the contiguous U.S. They found that 24% of the responding drivers admitted they often continued driving despite fatigue, bad weather or heavy traffic.[12]

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7 National Sleep Foundation (2025). National Sleep Foundation's 2025 Drowsy Driving Survey (and previous years similarly). https://www.thensf.org/wp-content/uploads/2025/10/Drowsy-Driving-Survey_2025.pdf

8 Dzierzewski, J.M. and Nielson, S.A. (2025). Demographic differences in drowsy driving frequency and beliefs among a nationally representative US sample: A brief report from the National Sleep Foundation. National Sleep Foundation. *Sleep Health* 11.2: 230-233. https://doi.org/10.1016/j.sleh.2025.01.003

9 Akhter, M. S. et al. (2024). Theory-based determinants of stopping drowsy driving behavior in college students: A cross-sectional study. *International Journal of Environmental Research and Public Health*, 21(9), 1157. https://doi.org/10.3390/ijerph21091157

10 Robbins, R. et al. (2021). Examining the relationship between poor sleep health and risky driving behaviors among college students. *Traffic Injury Prevention*, 22(8), 599–604. https://doi.org/10.1080/15389588.2021.1984440

11 Lee, C.J., et al. (2016). Intentions and willingness to drive while drowsy among university students: An application of an extended theory of planned behavior model. *Accident Analysis & Prevention*, 93, 113-123. https://doi.org/10.1016/j.aap.2016.05.002

12 Chen, G.X., et al. (2015). NIOSH national survey of long-haul truck drivers: Injury and safety. *Accident Analysis & Prevention*, 85, 66–72. https://doi.org/10.1016/j.aap.2015.09.001

As for nurses, drowsy driving impacts at least three-quarters of night shift nurses.[13] In a survey of 2,205 nurses, 30% reported having dozed off while driving during their commute to work, while 45% felt unsafe or uncomfortable.[14]

Strategies to Reduce Drowsy Driving

While it is difficult to measure the full extent of the prevalence of drowsy driving, it's crystal clear that it is dangerous and on par with other forms of impaired driving. It's also well established that driving while fatigued affects certain populations more than others.

So, what can be done to address the problem? As with other risky driving behaviors, there is no one-size-fits-all solution. Reducing the incidence of drowsy driving and the resulting crashes, injuries and fatalities requires a multi-disciplinary approach that includes education, partnerships, policy, infrastructure improvements and promising technological advancements.

Education

Because every driver is at risk of being drowsy behind the wheel, the entire driving population could benefit from increased awareness. The NSF has a myriad of resources centered on helping people practice good sleep hygiene. Their tips include maximizing exposure to natural light; getting enough exercise; eating regular meals; avoiding heavy meals, caffeine and alcohol before bed; establishing a wind-down routine; and sleeping in a quiet, cool, dark and device-free environment.

Source: NSF

Drinking caffeine and taking breaks also can help wake up a drowsy driver, but only temporarily. A 2025 study found that drivers who took breaks—with and without caffeine—had a limited-time enhancement in driving performance. The improvement lasted longer for

13 Smith A. et al. (2020). Night-shift nurses and drowsy driving: A qualitative study. *International Journal of Nursing Studies*, December 2020, 103600. https://doi.org/10.1016/j.ijnurstu.2020.103600

14 Westley J.A. et al (2022). Drowsy driving among nurses: Potential impetus to support napping. *Workplace Health and Safety*, 70(12), 551-555. https://doi.org/10.1177/21650799221111300

those who consumed caffeine than those who didn't.[15] This led researchers to suggest that improved public safety messaging could help drivers better understand what to do when they feel tired.

Novice drivers are particularly suitable for this message, as they're developing habits they'll use throughout their lifetime. This presents a great opportunity to teach them the importance of being alert behind the wheel, which starts with a good night's sleep. Parents are encouraged to help their teens get enough sleep. GHSA's *Wake Up Call* report provides concrete suggestions for parents (see below), and driver education and training providers can explain the dangers of drowsy driving as part of their programming. The Children's Hospital of Philadelphia also provides tips aimed at preventing teen drowsy driving, including several directed to parents.[16]

Partnerships and Policies

Beyond public education and awareness, it's useful for safety professionals to partner with specific groups that have the power to make a difference. GHSA policy "urges states and communities to … train law enforcement to identify drowsy drivers and the role of fatigue in crashes, consider later school start times, and collaborate with industry, especially with night and shift workers, to encourage appropriate rest policies and practices."[17]

Law enforcement officers can be trained to understand how to detect drowsy drivers. While only two states (Arkansas and New Jersey) have traffic laws that specifically cite drowsy driving, all police should be alert for lane drifting, tailgating or other erratic behaviors that are indicative of a driver who may be impaired by alcohol, drugs or lack of sleep. The bright flashing lights and sirens of a police vehicle pulling them over would be enough to temporarily rouse a tired driver, regardless of whether a citation is issued.

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15 Gaspar, J., et al. (2025). The impact of self-initiated breaks during drowsy driving. *Sleep*, 48(9), zsaf150. https://doi.org/10.1093/sleep/zsaf150

16 Children's Hospital of Philadelphia Research Institute. (n.d.). *Teen drowsy driving*. Teen Driver Source. https://teendriversource.research.chop.edu/teen-crash-risks-prevention/rules-of-the-road/impaired-driving/drowsy-driving

17 Governors Highway Safety Association. GHSA Policy on Driver Safety Issues. GHSA. https://www.ghsa.org/resource-hub/ghsa-policy-driver-safety-issues

School districts can consider shifting high school start times to later in the day to help teens get more sleep. One study comparing 16- to 18-year-old teen drivers in Fairfax County, Virginia (before and after their high school start time was pushed back) with their peers across the state (who did not have a change in school start times) showed the former had significantly higher crash rates before the later school start time took effect.[18] Other studies have found similar results.

Employers, particularly those who oversee drivers of fleet vehicles and employees who fly through multiple time zones, can develop and implement policies to help promote sleep hygiene and safety. This is especially important because employers share the responsibility for preventing drowsy driving crashes and may be legally liable in the event of a crash. A 2019 study examined several steps employers can take to help reduce the risk, including making responsible scheduling and travel policies, creating a culture where safety is valued and even screening employees for sleep disorders such as obstructive sleep apnea.[19]

Source: SHRM

Infrastructure Changes

Unfortunately, education and policies alone will not convince every driver to be alert 100% of the time. Modifications to the physical infrastructure also can help prevent drowsy driving.

For example, rumble strips – raised or grooved patterns in the pavement at the outside of a traffic lane – can jolt weary drivers awake as they start to drift out of their lane of traffic. A 2022 AAAFTS literature review of drowsy driver countermeasures discussed the benefits and limitations of rumble strips. While the practice is known to wake up drowsy drivers temporarily, it does not prevent them from continuing to drive and potentially succumbing to sleepiness again.[20]

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18 Bin-Hasan, S., et al. (2020). School start time change and motor vehicle crashes in adolescent drivers. *Journal of Clinical Sleep Medicine: JCSM: Official Publication of the American Academy of Sleep Medicine*, 16(3), 371–376. https://doi.org/10.5664/jcsm.8208

19 Rainey, D., Parenteau, M. A., & Kales, S. N. (2019). Sleep and transportation safety: Role of the employer. *Sleep Medicine Clinics*, 14(4), 499–508. https://doi.org/10.1016/j.jsmc.2019.08.007

20 Bayne A. et al. (2022). Countermeasures to reduce drowsy driving: Results of a literature review and discussions with experts. Washington, D.C.: AAA Foundation for Traffic Safety. https://aaafoundation.org/wp-content/uploads/2022/09/Drowsy-Driving-Countermeasures-Review-Technical-Report.pdf

Cable median barriers are another solution to prevent and/or reduce the severity of crashes that may be caused by a drowsy driver. While there is no link to preventing drowsy driving, these strong steel cables attached to weak posts (and placed in the median between traffic traveling in different directions), have been effective in improving safety outcomes in numerous studies. One 2016 study from Florida found that "cable median barriers are successful in preventing median crossover crashes; 97.4% of the [vehicles in] cable median barrier crashes were prevented from crossing over the median."[21]

Of course, it's difficult for drivers to stop and rest if there aren't safe and convenient locations to do so, particularly in rural areas. This is why rest areas are so important. Traditional rest areas are vital for long haul freight drivers; research validates their effectiveness.[22] A study of supplemental rest areas — small resting facilities located between larger rest areas — installed on South Korea's freeway system concluded they reduced freeway crashes caused by drowsy driving by 14%.[23]

In-Vehicle Technology

Vehicle safety technology has been evolving rapidly in recent years. Advanced Driver Assistance Systems (ADAS) often include features that can help mitigate drowsy driving, among other risky behaviors.

Features like lane keeping assist and automatic emergency braking have been standard on many newer vehicles for some time. They help the driver when a vehicle is in danger of veering out of its lane or crashing into an obstacle in front of it. Newer ADAS systems include cameras that monitor a driver's body language to alert them to take a break.

These driver monitoring systems go by many names, but they all alert drivers when sensors detect telltale signs of drowsiness, such as yawning, long blinks or repeated blinking, or irregular driving patterns. The alerts can be visual (a message or icon on the dashboard), auditory (a warning sound) or haptic (steering wheel vibrations). Some systems have tiered alerts that gradually escalate if a behavior is detected multiple times.

Features like lane keeping assist can help prevent a drowsy driver from veering out of their lane.

General Motors (GM) introduced its driver attention monitoring technology in 2017 as part of its Super Cruise hands-free driving system on the Cadillac CT6. Within the last few years, GM evolved this monitoring system into a standalone feature called Driver Attention Assist. It issues alerts (chimes or seat vibrations) for general distracted driving or drowsiness, even if Super Cruise is not engaged. It is now available on many newer GM makes and models.

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21 Alluri, P. et al. (2016). Safety performance evaluation of cable median barriers on freeways in Florida. *Traffic Injury Prevention*, 17(5), 544–551. https://doi.org/10.1080/15389588.2015.1101079

22 Alkhatni, F., et al. (2021). Characteristics and potential impacts of rest areas proximate to roadways: A review. *The Open Transportation Journal*, Volume 15, 2021, Pages 260-271, ISSN 1874-4478, https://doi.org/10.2174/1874447802115010260

23 Jung, S. et al. (2017). Evaluating the effects of supplemental rest areas on freeway crashes caused by drowsy driving. *Accident Analysis and Prevention*, 99(Pt A), 356–363. https://doi.org/10.1016/j.aap.2016.12.021

Subaru's DriverFocus system, which monitors eye closure and blinking for signs of drowsy driving, has been well-received by drivers. An Insurance Institute for Highway Safety study found that nine out of ten Subaru drivers with DriverFocus in their vehicle use it all or most of the time, and most said it makes them feel safer.[24]

Other common in-vehicle technologies include Ford's Driver Alert System, Toyota's Driver Attention Monitor, Mazda's Driver Attention Alert, Nissan's Intelligent Driver Alertness, Jaguar's Driver Condition Monitor and Mercedes-Benz's Attention Assist.

New developments in driver drowsiness detection systems are ongoing. A 2022 analysis provides a deep dive into systems that have undergone experimental studies in the prior decade (some of which are not yet commercially available). The paper organizes systems into four categories:

- Image-based, using a camera.
- Biological-based, using sensors on the driver's body.
- Vehicle-based, using the movement of the vehicle.
- Hybrid-based, combining two or more of these systems

It compares the pros and cons of each system. Researchers also hypothesize that mobile phones using 5G networks will factor into future drowsy driver detection systems.[25]

Unfortunately, none of the currently available systems prevent a driver from ignoring them and continuing to drive — or from turning them off entirely. Like rumble strips, they may cause a driver to pay attention temporarily, but they won't eliminate the problem. The driver needs to make the safe decision — pull off the road and rest.

Conclusion

Drowsy driving is dangerous, just like driving while impaired by alcohol, drugs or electronic devices. It's also prevalent, with about 20% of Americans admitting to driving while drowsy at least once in the past month.

But drowsy driving is preventable. Raising awareness about the dangers of driving while drowsy, including training law enforcement to detect this problem, instituting workplace policies, and making engineering changes to both roadways and motor vehicles, can help reduce the incidence of drivers engaging in this dangerous behavior. The result will be fewer injuries and fatalities on U.S. roadways.

Drowsy driving is dangerous, but preventable. Raising awareness, instituting workplace policies, and making engineering changes can result in fewer fatalities on U.S. roadways.

24 Cox, A., et al. (2025). Subaru drivers' experiences with the DriverFocus driver monitoring system. Insurance Institute for Highway Safety. https://www.iihs.org/api/datastoredocument/bibliography/2344

25 Albadawi, Y., et al. (2022). A Review of recent developments in driver drowsiness detection systems. *Sensors (Basel, Switzerland), 22*(5), 2069. https://doi.org/10.3390/s22052069

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