NATIONAL SAFETY COUNCIL

Position/Policy Statement

Drowsy Driving

NSC Policy/Position:

Awake and attentive drivers keep everyone safer. Every driver has the responsibility to be attentive when operating a motor vehicle. The National Safety Council (NSC) supports the implementation of effective countermeasures and policies to reduce fatigue risks on the road for commercial and passenger vehicle drivers. NSC encourages improved data collection, the use of environmental countermeasures, the development of advanced driver safety technology, evidence-based graduated driver license (GDL) provisions, education for drivers, the incorporation of fatigue in corporate wellbeing programs and the collaboration of diverse institutions to reduce the risk of drowsy driving.

Specifically:

- Improved data collection, including, but not limited to: 1) crash data reporting to capture an accurate profile of drowsy driving in the United States, and 2) surveillance data on sleep health and drowsy driving
- Use of environmental countermeasures to reduce drowsy driving crashes, such as rumble strips, median cable barriers and rest areas
- Research, development and adoption of technology, including advanced driver assistance systems to monitor and alert the driver to drowsiness
- Research and education on the contribution of shift work, rotating shifts, and work and school timing on drowsy driving-related crashes
- Evidence-based GDL provisions to limit driving during high-risk hours
- Inclusion of drowsy driving educational materials in driving manuals, curricula and licensing exams
- Collaboration of diverse institutions and organizations to prevent drowsy driving
- Sleep health education and sleep disorder screenings in corporate wellbeing programs

Justification

Getting regular, quality sleep is a vital physiological need for humans, required for health and productivity. The American Academy of Sleep Medicine[1] and National Sleep Foundation (NSF)[2] both recommend that adults sleep seven or more hours on a regular basis "to promote optimal health." A variety of factors, including work demands, family and social obligations, personal electronics usage, sleep disorders and other health issues, interfere with the ability of most adults to meet this sleep need on a regular basis.
Sleep loss can affect people on both a short- and long-term basis. Performance the following day can be affected by losing two hours of sleep per night, and losing even less sleep over an extended period can lead to similar issues.[3]

A recent AAA Foundation for Traffic Safety report concluded that people who slept only five to six hours a day were twice as likely to be in a crash compared to those who slept seven hours or more.[4] Another study showed the odds of being in a crash or near crash were nearly three times higher when the driver was drowsy.[5]A study of National Transportation Safety Board investigations found drowsy driving was a probable cause in almost 40 percent of highway crashes investigated.[6]

Studies have also shown that certain work and lifestyle factors have an effect on susceptibility to drowsy driving. Drowsy driving is reported more often by men and by younger drivers.[7, 8] It is also known that individuals suffering from sleeping disorders, such as sleep apnea (a blockage of the airways during sleep), are at a high risk of traffic crashes.[9, 10]

Working nights, long and irregular hours, or having multiple jobs increases the risk of crashes due to fatigue.[11] As an example, medical workers are one group in which extended shifts have been found to increase the risk of crashes or near crashes, or of falling asleep while stopped in traffic post-shift.[12]

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[1] Watson NF, Badr MS, Belenky G, et al. Recommended amount of sleep for a healthy adult: a joint consensus statement of the American Academy of Sleep Medicine and Sleep Research Society. *Sleep*. 2015;38(6):843–844.
[2] Hirshkowitz M, Whiton K, Albert SM, Alessi C, Bruni O, et al. The National Sleep Foundation's sleep time duration recommendations: methodology and results summary. *Sleep Health*. 2015;1(1):40–43.
[3] Carskadon, M. A., & Roth, T. (1991). Sleep restriction. Sleep, Sleepiness and Performance, TH Monk (Ed). Chichester: Wiley, 155-167, 1991.
[4] Tefft, B. C. (2016). Acute Sleep Deprivation and Risk of Motor Vehicle Crash Involvement. AAA Foundation for Traffic Safety.
[5] Klauer, S. G., Klauer, S. G., Dingus, T. a., Dingus, T. a., Neale, V. L., Neale, V. L., … Ramsey, D. J. (2006). The Impact of Driver Inattention On Near Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data. Analysis, (April), 226.
[6] Marcus, J. H., & Rosekind, M. R. (2017). Fatigue in transportation: NTSB investigations and safety recommendations. Injury prevention, 23(4), 232-238.
[7] Wheaton, A. G., Shults, R. A., Chapman, D. P., Ford, E. S., & Croft, J. B. (2014). Drowsy driving and risk behaviors-10 States and Puerto Rico, 2011-2012. *Morbidity and Mortality Weekly Report*, *63*, 557-562.
[8] Smith, S., Carrington, M., & Trinder, J. (2005). Subjective and predicted sleepiness while driving in young adults. *Accident Analysis & Prevention*, *37*(6), 1066-1073.
[9] Young, T., Blustein, J., Finn, L., Palta, M. (1997). Sleep-disordered breathing and motor vehicle accidents in a population-based sample of employed adults. Sleep, 20: 608-613.
[10] George, C.F.P. & Smiley, A. (1999). Sleep apnea and automobile crashes. *Sleep.*, 22, 790-795.
[11] Stutts, J. C., Wilkins, J. W., Osberg, J. S., & Vaughn, B. V. (2003). Driver risk factors for sleep-related crashes. *Accident Analysis & Prevention*, *35*(3), 321-331.
[12] Barger, L. K., Cade, B. E., Ayas, N. T., Cronin, J. W., Rosner, B., Speizer, F. E., & Czeisler, C. A. (2005). Extended work shifts and the risk of motor vehicle crashes among interns. *New England Journal of Medicine*, *352*(2), 125-134.

Other factors, such as distraction or alcohol consumption[13], can further slow reaction times and impair decision-making, exacerbating driver performance decrements when drowsiness exists. These combinations likely are a contributing cause in further crashes. A vehicle traveling 60 mph will travel more than 20 feet further when a driver's reaction time is slowed by just a quarter of a second.

A 2002 Gallup study found that 37% of drivers reported having nodded off or fallen asleep at least once while driving, eight percent in the preceding six month period. Nearly half of those reporting nodding off did so between the hours of 9PM and 6AM.[14] More recently, 31% of respondents to a traffic safety culture survey reported driving while "so tired that [they] had a hard time keeping [their] eyes open" in the preceding thirty-day period.[15]

No matter the number of crashes caused by drowsy drivers, drowsy driving is recognized as a significant safety issue as fatigue is known to be in other facets of work and living. As there are numerous causes for driver fatigue, a variety of countermeasures should be used. Efforts to better quantify and understand the factors that contribute to such crashes and impact groups of individuals at high risk of fatigue and drowsy driving should be continued to improve safety on the nation's roads and benefit the public at large.

NSC supports the improved data collection including, but not limited to: 1) crash data reporting to capture an accurate profile of drowsy driving in the United States, and 2) surveillance data on sleep health and drowsy driving.

Drowsy driving crashes are recognized as a significant safety issue on the nation's roads, yet data on the precise number and factors related to such crashes remains elusive. No objective testing method exists that can definitively ascertain whether sleep loss or fatigue contributed to a crash.

In October 2017, National Highway Traffic Safety Administration (NHTSA) released updated data showing that from 2011 through 2015, drowsy driving was reportedly involved in 2.3 to 2.5 percent of all fatal crashes nationwide.[16] The data is based on crashes where police identified and reported drowsy driving as a contributing factor in the crash. The data includes the limitation, "Underreporting of the occurrence of drowsy driving is most likely due to lack of firm evidence of such involvement since investigation is done after the crash; drivers unaware of the role that drowsiness played in the crash; drivers reluctant to disclose that they fell asleep or were tired; and fatality of the involved driver."

While police reported up to 2.5 percent of all fatal crashes involved a drowsy driver, a recent study by the AAA Foundation for Traffic Safety estimates the number of fatal crashes involving a drowsy driver is around 21 percent.[17] This demonstrates the large gap between data currently collected and research-based estimated prevalence.

13 National Sleep Foundation. (2017). Who's at Risk? Accessed February 6th, 2018 at http://drowsydriving.org/about/whos-at-risk/
14 Royal, Dawn. National Survey of Distracted and Drowsy Driving Attitudes and Behavior: Findings. (2003)
15 AAA Foundation for Traffic Safety. 2017 Traffic Safety Culture Index.
16 National Highway Traffic Safety Administration (2017). Traffic Safety Facts. Drowsy Driving 2015. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812446
17 Tefft, B. C. (2014). Prevalence of motor vehicle crashes involving drowsy drivers, United States, 2009-2013. Washington, DC: AAA Foundation for Traffic Safety.

Accurate reporting of drowsy driving crashes and consistent surveillance of sleep health in the nation is necessary to assess and track these important issues. Better surveillance data on the prevalence of drowsy driving and its characteristics (e.g. – time of day, age distribution) is also necessary for identifying the scope of the problem, risk factors and at-risk groups.

NSC supports the use of infrastructure countermeasures to reduce drowsy driving crashes such as rumble strips, median cable barriers and rest areas

A number of preventive measures are available that can help limit the damages related to drowsy driving. Edge line or centerline rumble strips, raised or grooved patterns placed on the roadway that produce both noise and vibration when a vehicle's tires travel over them, have been found to reduce single-vehicle crashes by more than 20 percent.[18] Cable median barriers (three to four cables strung along posts on the roadside or in a highway median) are another roadway improvement that has been found to be effective in reducing fatal crashes and crash damage costs.[19]

As sleep is the most effective countermeasure to driver fatigue, roadside rest areas can provide a safe place for motorists to stop and take a short nap. A California study determined that fatigue-related crashes were reduced down the road within 30 miles of a rest stop.[20] Further study from the Minnesota Department of Transportation has determined that the distance between rest areas should not exceed 30 miles.[21] Such information ties in with other research that shows the optimal duration for safe highway driving is under 90 minutes before sleepiness and time-on-task-related decreases in performance occur.[22] NSC supports the continued study and application of infrastructure approaches, such as edge line or centerline rumble strips and rest areas, and larger level efforts to increase public awareness of this safety risk.

NSC supports the research, development and adoption of technology, including advanced driver assistance systems, to monitor and alert the driver to drowsy driving

The expanding area of vehicle technologies may offer another effective tool for reducing fatigue-related crashes. NHTSA-supported research has found that algorithms utilizing measures of driver performance can reasonably detect drowsiness and predict lane departures.[23] Technological features such as lane departure warning and other collision warning systems, may provide further protection against drowsy-related crashes. A recent Insurance Institute for Highway Safety (IIHS) study found that lane departure warning lowers rates of single-vehicle, sideswipe and head-on crashes of all severities by 11 percent and lowers the rates of injury crashes of the same types by 21 percent.[24] Organizations are also utilizing vehicle technologies, such as inward facing cameras, to monitor and detect fatigue in fleet vehicles. These

[18] Stutts, J. C., NCHRP Synthesis of Highway Practice 287: Sleep Deprivation Countermeasures for Motorists Safety, TRB, National Research Council, Washington, D.C., 2000.
[19] Governor's Highway Safety Association. (2016). Wake Up Call! Understand Drowsy Driving and What States Can Do.
[20] Banerjee, I., Lee, J.H., Jand, Kitae, J., Pande, S., Ragland, D. (2009). Rest Areas – Reducing Accidents Involving Driver Fatigue. State of California Department of Transportation Technical Report Documentation Page.
[21] Minnesota Department of Transportation. Office of Technical Support. (2007). Interstate Highway Safety Study. Analysis of vehicle crashes related to safety rest area spacing.
[22] Ting, P. H., Hwang, J. R., Doong, J. L., & Jeng, M. C. (2008). Driver fatigue and highway driving: A simulator study. Physiology and Behavior, 94(3), 448–453.
[23] Brown, T., Lee, J., Schwarz, C., Fiorentino, D., & McDonald, A. (2014). *Assessing the feasibility of vehicle-based sensors to detect drowsy driving* (No. DOT HS 811 886).
[24] Cicchino, Jessica. Effects of lane departure warning on police-reported crash rates. (2018)

technologies have the potential to reduce crashes, but they should not be used to allow fatigued drivers to continue driving.

NSC supports evidenced-based GDL provisions to reduce unsupervised driving by newly licensed teenagers during high-risk hours

Late-night driving increases teen risk for fatal crashes.[25] This may be attributable to a combination of the visibility challenges caused by dark conditions, slower response time brought about by fatigue and a lack of experience driving under such conditions.

Additionally, alcohol and drug impairment can be a contributing factor, though to a lesser degree than for older drivers.[26] Two studies reported maximum benefits to restrict driving beginning at 9 p.m., and a 2013 study supports 10 p.m. or earlier, with a 19 percent lower crash incidence for 16-year olds.[27] The largest proportion of nighttime motor vehicle fatalities for 16- to 17-year-olds takes place between 9 p.m. and midnight.[28]

NSC supports unsupervised nighttime driving restrictions beginning as early as 9 p.m. and ending no earlier than 5 a.m. for all intermediate drivers.[29]

NSC supports the inclusion of drowsy driving educational materials in driving manuals, curricula and licensing exams

Like previous efforts to address drunk driving, educating and changing behaviors related to drowsy driving will take time and effort. Recent efforts through GDL policies and new driver training suggest addressing drowsy driving concerns by highlighting these issues when drivers are first establishing their driving behavior could be effective.[30]

NSC believes that educational activities can better inform novice drivers of the risks associated with late night activity and sleep deficits, and licensing policies that restrict driving during late night hours can limit exposure to driving at a time when risks are greatest for impaired performance due to sleep deficits.

NSC supports the collaboration of diverse institutions and organizations to reduce drowsy driving

Public health campaigns and corporate wellness programs provide varied approaches that can raise awareness and promote positive driving behaviors. As work-related vehicular crashes are

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[25] Williams, A. F. (2004). Teenage drivers: patterns of risk. Journal of Safety Research, 34: 5-15.
[26] NHTSA. National 2007 Roadside Survey of Alcohol and Drug Use by Drivers.
[27] McCartt, A. T., Teoh, E. R., Fields, M., Braitman, K. A., and Hellinga, L. A. (2010b). Graduated licensing laws and fatal crashes of teenage drivers: a national study. Traffic Injury Prevention, 11: 240-248. Trempel, R. E. (2009). Graduated driver licensing laws and insurance collision claim frequencies of teenage drivers. Arlington VA: Highway Loss Data Institute. Masten, S. V., Foss, R. D., and Marshall, S. W. (2013). Graduated driver licensing program component calibrations and their association with fatal crash involvement, Accident Analysis & Prevention, 7: 105-113.
[28] Shults RA, Williams AF. Graduated Driver Licensing Night Driving Restrictions and Drivers Aged 16 or 17 Years Involved in Fatal Night Crashes – United States, 2009-2014. MMWR Morb Mortal Wkly Rep 2016, 65:725-730.
[29] National Safety Council. (2016). Policy/Position Statement. Graduated Driver Licensing. Available at: http://www.nsc.org/NSCDocuments_Corporate/Policy-Positions/Transportation/T-Graduated%20Driver%20Licensing%20-%20134.pdf
[30] Governor's Highway Safety Association. (2016). Wake Up Call! Understand Drowsy Driving and What States Can Do.

the leading cause of on-the-job fatalities, businesses should recognize this as an issue that merits addressing.

NSC encourages governmental oversight agencies and the research community at large to better understand the related human factors in how drivers respond to different types of in-vehicle warnings or alarms that can assist with alerting drivers. Lessons learned can be drawn and applied from other modes, such as aviation, where studies from NASA on the increased role of automation in operations (e.g., transitions between automated and manual operation, unexpected situations, whether automation provides a false sense of security) have identified particular issues that can be similarly studied and better understood in driving situations.

NSC supports sleep health education and sleep disorder screenings in corporate wellbeing programs

NSC believes that educating the public on healthy sleep practices and sleep disorders, including through corporate wellbeing[31] programs, is essential to reduce the national sleep debt and work toward eliminating preventable deaths. For more information, see the National Safety Council Policy Position/Statement: Educating the Public on Sleep Health through Worksite Wellbeing Programs.

This position statement reflects the opinions of the National Safety Council but not necessarily those of each member organization.

Adopted by the National Safety Council, 2018

[31] In this document, both “wellness” and “wellbeing” programs will be referred to as “wellbeing”