New report recommends research to improve understanding of relationship between fatigue and crash risk

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Insufficient sleep can decrease a commercial motor vehicle (CMV) driver's level of alertness, which may increase the risk of a crash, yet little is known about effective ways to minimize that risk, says a new report from the National Academies of Sciences, Engineering, and Medicine. Current research on the connection among hours of service, fatigue, and accident frequency for CMV operators is complicated by the difficulty of measuring driver fatigue objectively, invasive nature of capturing measures of the amount and quality of drivers' sleep, and many factors contributing to crashes that are unrelated to lack of sleep.

Approximately 4,000 fatalities due to truck and bus crashes occur each year, 10 percent to 20 percent of which are estimated to involve fatigued drivers. The stresses associated with work as a CMV driver—including irregular schedules and economic pressures—place these drivers at substantial risk for insufficient sleep and the development of several chronic health issues, including obstructive sleep apnea, hypertension, cardiovascular disease, adult-onset diabetes, and other conditions commonly associated with obesity.

Drinking coffee and other caffeinated products can provide temporary relief from drowsiness, and rumble strips can serve to alert sleepy drivers who are drifting out of their lanes, but these measures provide only temporary assistance, the report says. There is no biological substitute for sufficient sleep: The only way to alleviate driver fatigue is

to obtain an adequate quality and quantity of sleep.

The committee that conducted the study and wrote the report found that substantial data gaps limit understanding of the factors that affect the health and wellness of CMV drivers. Although considerable data are collected on drivers who work for large carriers, much less information is available on those who work for small carriers, especially independent owner-operators. The committee recommended several improvements in data and research methods by the Federal Motor Carrier Safety Administration (FMCSA) to support a more comprehensive understanding of the relationships between operator fatigue and highway safety and between fatigue and long-term health.

The U.S. Department of Health and Human Services and/or the U.S. Department of Transportation should fund, design, and conduct an ongoing survey that will allow longitudinal comparisons of CMV drivers to enable tracking of changes in their health status and the factors likely to be associated with those changes over time. It would be highly desirable to link the collected data with relevant electronic health records. To increase the availability of relevant data for researchers, FMCSA should also incentivize those who capture driver performance data—large fleets, independent trucking associations, and insurance companies. Such efforts should ensure that data confidentiality is maintained, through restricted access arrangements or use of statistical techniques for disclosure protection. The committee also recommended statistical design and analysis methods to account for factors that confound comparisons between control and treatment groups in crash studies.

FMCSA has several policies and programs to improve highway safety involving large trucks and buses that are based on the current scientific understanding of operator fatigue, its causes, and its consequences. For example, hours-of-service (HOS) regulations for truck and bus drivers

specify the maximum number of hours drivers can work in a day and in a work week, based on the assumption that drivers will have enough time to obtain adequate sleep between shifts, and therefore will be more alert while driving. However, HOS rules can only limit hours spent working; they cannot require drivers to get adequate sleep and rest while off duty.

FMCSA also oversees medical examinations every two years through the National Registry of Certified Medical Examiners. These examinations are required to certify that CMV drivers are fit to drive and to evaluate the risk of sudden incapacitation or chronic impairment due to medical conditions or treatments. The committee found that evidence is limited on the effectiveness of these medical exams in determining drivers who are prone to excessive fatigue due to sleep apnea or other medical reasons. Some evidence indicates that medical examiners have been inconsistent in the criteria they apply in evaluating the risk of medical conditions that may lead to driver fatigue.

In addition, FMCSA along with Transport Canada, trucking industry trade associations, and other agencies developed the North American Fatigue Management Program (NAFMP). This online program educates drivers and their employers about the causes of driver fatigue, the increased risk of crashes because of it, and the long-term health consequences of CMV driving, and suggests countermeasures to manage driver fatigue. However, insufficient information exists on whether drivers and employers make use of these programs and how well they promote driver behavior that results in better sleep and less fatigue. The report includes a list of research questions that, if answered satisfactorily, should assist FMCSA in understanding the costs and benefits of proposed changes to its policies for the HOS regulations, medical certification, and NAFMP.

The committee also studied the use of various on-board technologies and concluded that despite almost three decades of research on technological

innovations for detecting driver fatigue in near real time—such as lane deviation and eyelid tracking systems, collision alerting and warning systems, and varying levels of automation—operational strategies for their use are still in the early phases of understanding and application.

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