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SPECIAL ARTICLES

Obstructive sleep apnea screening, diagnosis, and treatment in the transportation industry

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Obstructive sleep apnea (OSA) is a common, identifiable, and treatable disorder with serious health, safety, and financial implications—including sleepiness-related crashes and incidents—in workers who perform safety-sensitive functions in the transportation industry. Up to one-third of crashes of large trucks are attributable to sleepiness, and large truck crashes result in more than 4,000 deaths annually. For each occupant of a truck who is killed, 6 to 7 occupants of other vehicles are killed. Treatment of OSA is cost-effective, lowers crash rates, and improves health and well-being. A large body of scientific evidence and expert consensus supports the identification and treatment of OSA in transportation operators. An Advanced Notice of Proposed Rulemaking regarding the diagnosis and treatment of OSA in commercial truck and rail operators was issued by the Federal Motor Carrier Safety Administration and Federal Railroad Administration, but it was later withdrawn. This reversal of the agencies' position has caused confusion among some, who have questioned whether efforts to identify and treat the disorder are warranted. In response, we urge key stakeholders, including employers, operators, legislators, payers, clinicians, and patients, to engage in a collaborative, patient-centered approach to address the disorder. At a minimum, stakeholders should follow the guidelines issued by a medical review board commissioned by the Federal Motor Carrier Safety Administration in 2016 alone, or in combination with the 2006 criteria, "Sleep Apnea and Commercial Motor Vehicle Operators," a Statement from the Joint Task Force of the American College of Chest Physicians, the American College of Occupational and Environmental Medicine, and the National Sleep Foundation developed by a joint task force. As research in this area continues to evolve, waiting is no longer an option, and the current standard of care demands action to mitigate the burden of serious health and safety risks due to this common, treatable disorder.

Keywords: transportation, OSA, sleep apnea, public health, safety, accidents, drowsy driving

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INTRODUCTION

Obstructive sleep apnea (OSA) is a sleep-related breathing disorder that is characterized by repetitive episodes of complete or partial upper airway obstruction during sleep.[1] OSA is common among adults,[2,3] and it is particularly common in commercial operators.[4–8] Untreated OSA leads to increased morbidity and mortality, as well as high costs related to crashes, health care use, absenteeism, and lost productivity.[9–11] A systematic review and meta-analysis commissioned by the Federal Motor Carrier Safety Administration (FMCSA) shows that drivers with OSA have a crash risk that is between 21% and 489% higher than comparable drivers without OSA.[12] A 2013 meta-analysis of more than 25,000 individuals who were enrolled in 12 studies shows that OSA was associated with an increased risk for cardiovascular disease (relative risk: 1.79), fatal and nonfatal stroke (relative risk: 2.15), and death from all causes (relative risk: 1.92).[13]

The advent of portable sleep apnea testing devices that can be utilized at home, or even in the berths of commercial vehicles, has improved access to diagnostic testing.[14,15] The primary therapy for OSA is positive airway pressure (PAP).[16] Newer generations of PAP devices adjust automatically in response to airflow limitation, often eliminating the need for laboratory-based adjustment to determine optimal levels of pressure required to reduce sleep-disordered breathing events.[17] Ongoing management and support to ensure adherence are required, and modem-based, remote-access monitoring of adherence to PAP therapy can be helpful in keeping the driver on the road by reducing some of the need for in-person visits to assess the efficacy of treatment.[18] Therefore, technological advances have made the establishment of a diagnosis and ongoing management more convenient, accessible, and affordable for individuals with OSA.[19,20]

A large body of data shows that PAP is an effective treatment for OSA, restoring oxygen levels and sleep quality.[21,22] Patients experience numerous subsequent benefits.[17] These include improved daytime alertness,[23] improved blood pressure control[24–26] (particularly in those with resistant hypertension[24]), possibly reduced insulin resistance and improved glycemic control in patients with diabetes,[27,28] improved quality of life,[23,29] reduced rates of drowsiness-related crashes,[12,30–32] and lower risk of both cognitive deficits and cardiovascular disease.[23,33,34]

In the workplace, lower health care costs[35–37] and rates of disability,[38] reduced absenteeism and occupational incidents, and improved productivity have been associated with PAP use.[39] PAP therapy also has been shown to improve all-cause mortality.[40]

Regulatory perspective

There are several key regulatory statements that address OSA specifically for commercial motor vehicle (CMV) operators. With the Final Rule published in 2012, and compliance required by May 21, 2014, the FMCSA National Registry of Certified Medical Examiners[41] required that all commercial driver medical examiners be trained and certified, consistent with FMCSA criteria; only those examiners meeting specific criteria listed by the National Registry of Certified Medical Examiners can medically certify CMV operators. FMCSA has provided an interpretation to the regulation indicating that the medical examiner is responsible for making the medical certification determination. OSA is not named specifically in the FMCSA medical standards, 49 CFR 391.41, but it is included in the Respiratory Standard as explained in the Medical Advisory Criteria,[42] which describe OSA as one of the "conditions that interfere with oxygen exchange and may result in sudden or gradual impairment or incapacitation":

> Respiratory: §391.41(b)(5) A person is physically qualified to drive a commercial motor vehicle if that person: has no established medical history or clinical diagnosis of a respiratory dysfunction likely to interfere with ability to control and drive a commercial motor vehicle safely.

FMCSA has no official guidance for OSA screening, diagnosis, or treatment beyond that which is included in the January 2015 "Bulletin to Medical Examiners and Training Organizations Regarding Obstructive Sleep Apnea"[43] and the updated August 2016 Medical Review Board (MRB) report on OSA.[44]

Two questions on the Commercial Driver Medical Examination (CDME) form address OSA: whether the operator has/ever had "sleep disorders, pauses in breathing while asleep, daytime sleepiness, loud snoring" or "a sleep test (eg, sleep apnea)."[45] Examiners are instructed to use both the medical history and objective physical findings to identify drivers who are at risk of moderate-to-severe OSA, referring them for further diagnostic testing.

Public Law 113–45 was signed on October 15, 2013, mandating that any new requirement regarding the screening, testing, or treatment of commercial motor vehicle operators for sleep disorders, including OSA, must first go through a formal rulemaking procedure.[46] Formal rulemaking would require a more extensive process, including an analysis of the benefits and costs of the new regulation. This law resulted in the FMCSA removing guidance from the medical examiner website and handbook,[41] which led many benefits plan administrators, employers, and labor groups to incorrectly inform examiners that they were prohibited from requiring diagnostic evaluation of OSA for high-risk operators, even when the decision was based on the medical examiner's clinical assessment.

The following guidance documents have been available for several years. FMCSA commissioned 2 evidence-based reviews on crash risk in drivers with OSA,[12,31] and it heard from 1 Medical Expert Panel[47] and 3 MRBs, one commissioned jointly with the Motor Carrier Safety Advisory Committee,[48–50] regarding the management of OSA in commercial drivers.[51] A request for comments was published in the Federal Register in 2012[52] seeking opinions on proposed guidance on OSA in commercial drivers based on the 2012 MRB recommendations, but it was withdrawn hours later.[53] In March 2016, FMCSA and the Federal Railroad Administration issued an Advanced Notice of Proposed Rulemaking addressing OSA in commercial drivers and rail operators,[54] but they withdrew the notice in 2017.[55] While these efforts did not result in rulemaking, the Medical Expert Panel, the MRB, recommendations from the MRB/Motor Carrier Safety Advisory Committee, and published documents from several other groups serve as resources for medical examiners.[51,56,57]

U.S. Department of Transportation modal agencies have acknowledged the importance and relevance of OSA in transportation operations through several actions. FMCSA recommends that drivers and employers utilize the North American Fatigue Management Program,[58] which focuses on diverse factors that contribute to fatigue, including medical issues (eg, OSA), and provides education and tools to address factors contributing to fatigue and its impact on performance. The Federal Railroad Administration has indicated that rulemaking addressing fatigue risk management would be an appropriate way to address OSA in railroad workers.[55] The Federal Aviation Administration has a specific protocol used by aviation medical examiners to evaluate those pilots who have been diagnosed with OSA and those with multiple risk factors for OSA.[59]

Financial perspective

Most third-party payers use predefined criteria to determine whether to cover payment for diagnostic testing and PAP treatment for OSA. Some payers require prior authorization for diagnostic testing. Such authorization often requires affirmative reporting of sleepiness, a symptom that is underreported or denied by many CMV drivers and other transportation operators. Therefore, denial of coverage based on symptom-reporting reduces access to diagnostic testing for CMV drivers and other transportation operators. Additionally, most payers who provide coverage for PAP therapy require a demonstration of ongoing adherence and effectiveness.[60] If use falls below a predefined threshold, coverage for PAP is denied, and requests for extensions based on medical necessity, often laborious and time-consuming for health care providers, are not guaranteed. These barriers to obtaining coverage may result in delays in effective treatment for workers who perform safety-sensitive functions in the transportation industry, contributing to the continued burden of untreated disease, including the associated health and safety risks.

The cost savings of PAP therapy can be substantial, with 2 recent analyses estimating the annual cost of undiagnosed OSA. One placed this cost at $150 billion annually,[9,11] and an earlier study by Harvard in 2010 estimated the annual economic burden of moderate-to-severe OSA to be up to $165 billion.[61] These costs are greater than those for asthma, heart failure, stroke, and hypertensive disease. In contrast, it is estimated that it would cost the health care system only an additional $49.5 billion each year to diagnose and treat every American adult

who has OSA,[9,11] which would produce a significant cost savings. Crashes related to large trucks are expensive, according to U.S. Department of Transportation data.[62] Adjusted for inflation using the Consumer Price Index Inflation Calculator,[63] these amounts are approximately $120,000 per crash, $257,238 per crash associated with a nonfatal injury, and $4.75 million per fatal crash. It is estimated that individuals with untreated moderate-to-severe OSA spend up to an additional $4,000 annually in health care costs.[61] These values are far greater than the average costs to diagnose ($6,000) and treat an individual ($1,500/year).

These economic benefits would be obtained directly by patients as well as by many stakeholders, including employers, self-insured carriers, third-party payers, and public health payers such as Medicare and Medicaid. Individual drivers who bear out- of-pocket costs for diagnosis and treatment may reap numerous benefits, including a lower risk of fatigue-related crashes, improved daytime symptoms, less time lost from work, greater efficiency and productivity, improved overall health and wellbeing, lower health care costs, and improved quality of life.

STAKEHOLDER ROLES

Effectively and efficiently implementing programs for OSA screening, diagnosis, and treatment in safety-sensitive transportation workers requires collaboration, partnership, and shared responsibility among multiple stakeholders.

Health care providers

To address OSA in safety-sensitive transportation personnel, the role of health care providers—including primary care providers and other referring clinicians, sleep medicine clinicians, and health examiners—is as follows:

- Engage in practices to screen, diagnose, and treat OSA that are supported by scientific evidence and available guidance documents from experts, which are based on this evidence:
  - Consider, at a minimum, the 2016 letter provided by the MRB as a resource, alone or with earlier 2006 guidance.[44,64]
  - Consider other recommendations that are available.[56,65]
- Use objective criteria when assessing crash risk. Primary care providers should be particularly aware that the self-reported denial of the presence of snoring or daytime sleepiness does not rule out OSA in this group.

Payers

The role of third-party payers is to recognize the serious public health risks posed by OSA in safety-sensitive transportation personnel, and accordingly, to:

- Recognize that symptoms used to authorize testing may be unreported, and clinical judgment based on objective criteria is required to assess risk. To avoid missing potentially serious cases, payers must remove barriers—such as preauthorization for diagnostic testing and ongoing coverage for PAP therapy—that hinder these individuals from accessing OSA testing and treatment.
- Broaden coverage for the clinical support needed to achieve treatment efficacy.

Researchers

The role of the research community is to continue to advance our state of knowledge to:

- Refine risk-stratification algorithms.
- Incorporate assessment technologies including chain-of-custody solutions.
- Identify diagnostic and treatment pathways that provide accessible, ongoing, convenient, effective, and cost-effective care management that leverages telemedicine-based care when possible.

Other stakeholders

The role of employees, employers, labor representatives, law enforcement, and legislators is to work collaboratively to provide an environment that is patient-centered, so that:

- Education and awareness programs are developed and fostered to improve understanding of the risks of unrecognized and untreated OSA, and of the medical, safety, and financial benefits of identification and treatment.
- Screening and risk stratification can be done in a nonpunitive environment: for example, through the use of self-assessment tools[7,66] or by modeling uniform, systematic risk-management programs based on existing paradigms.[4–8]
- Diagnostic testing is accessible, affordable, and convenient.
- Ongoing support for the operator is available to ensure adherence to effective treatment.
- Financial and logistical barriers to the operator seeking care are kept at a minimum. Some options to consider include:
  - Allowing the employee to remain in service as much as possible.
  - Limiting out-of-pocket costs of treatment and the impact of time lost from work.

DISCUSSION

Important factors must be considered by each stakeholder to prioritize and maximize strategies for OSA screening, diagnosis, and treatment in safety-sensitive transportation workers.

Considerations for employers

Enacting effective safety and health programs can bring significant and meaningful value to transportation companies without waiting for federal regulatory action or requirements. However, among transportation modes, the trucking industry faces some unique logistical issues. An existing challenge to retaining skilled drivers in the setting of time-sensitive operations is straining an industry that aims to hire qualified drivers quickly. High turnover rates—with drivers leaving and re-entering the workforce, or switching employers—are common.[67] While a

minority of companies are large carriers, most are either small operations or independent owner-operators. Drivers may be underinsured or uninsured. Some employers accept a current, valid medical certificate, while others require a new medical certification examination, conducted by an examiner chosen by the employer or the driver.

Employers should ensure that their examiners are utilizing current best practices and guidance in determining the medical qualification of their drivers, as has been repeatedly directed by FMCSA. At a minimum, examiners should be expected to utilize the 2016 MRB recommendations as a starting point for identifying those drivers who should be referred for diagnostic testing for OSA,[44] while also referring to additional guidance that is available.[56,65] Permitting, endorsing, or facilitating those examiners who ignore undiagnosed OSA as a risk factor for a crash places the employer at legal risk and jeopardizes the potential health and economic benefits that can be reaped by the company and its employees. Some employers may choose to go beyond relying on the examiner's choice of criteria and dictate specific criteria for referral, potentially choosing to cover the cost of testing, treatment, and adherence monitoring.

Education on the importance of addressing OSA and other fatigue-related issues that can affect safety and performance can aid in improving the health and safety of the drivers. There are many resources available, including the North American Fatigue Management Program.[4–8] Organizations can implement OSA management programs even in the absence of a regulatory requirement. Several transportation companies have undertaken these efforts by implementing and documenting the effectiveness and benefits of their OSA diagnosis and treatment programs.[4–8,68]

Beyond the health, safety, and economic benefits of diagnosing and effectively treating OSA, employers are faced with several legal questions. These questions were answered in several court cases, and the following decisions resulted[69–74]:

1. Although guidance documents are available to the medical examiner to address OSA, no specific requirements are mandated for OSA screening, diagnosis, or treatment.
2. An effort to sue an employer who requires prehire OSA testing was overthrown.
3. Some decisions have gone against employers whose drivers were at significant risk of having OSA but were not referred for a sleep study.
4. Employers are not required to cover the costs of testing and treatment.
5. Adherence with treatment recommendations in a driver diagnosed with OSA may serve as an effective defense against claims of negligence, should a crash occur.

Considerations for law enforcement

National organizations such as the National Transportation Safety Board, the U.S. military, the Federal Aviation Administration, and others have the mandate, investigational protocols, education, and resources to examine the role of fatigue and sleep disorders in major transportation incidents.[75] However, at the state and local levels, law enforcement investigators have fewer resources and less time to examine the potential role of fatigue and sleep disorders such as OSA in their crash investigations. There is no simple, accepted method to evaluate fatigue or sleep disorders that parallels a breathalyzer's measurement of blood alcohol content. Without sufficient education, training, and resources, local investigators will significantly underestimate the role of fatigue and sleep disorders in crashes that do not involve an investigation by a national organization. Therefore, local post-crash investigations will be less informative regarding the contributions of fatigue and sleep disorders. Clearly, there is a need for a national effort to educate, train, and provide investigational resources for local and state law enforcement regarding the role of fatigue and sleep disorders in transportation crashes.

Considerations for legislators and regulators

Many regulations exist to address medical fitness for duty in safety-sensitive transportation workers,[59,76–78] and guidance exists to assist the medical professional who makes the qualification determination to protect operators and the public from medical conditions that can impair performance or reduce acceptable safety margins. As evidenced by the data summarized in this article, there are insufficient requirements, procedures, and clarity in current regulations to address the well-established individual and public health and safety risks associated with OSA. Establishing regulations for the diagnosis and effective treatment of OSA in safety-sensitive transportation workers would provide significant benefits. Implemented at a federal level, these regulatory protections would provide national benefits; however, initiatives at the state level to address the risks of OSA also would enhance individual, organizational, and public health and safety.

Consideration for payers

To minimize individual and public safety risks, prompt coverage of diagnostic testing and PAP therapy, without prior- authorization processes, is imperative. Payers must shift the focus from discontinuing PAP therapy coverage for nonadherent patients to covering interventions and visits that have been shown to be efficacious in employees who work in safety- sensitive positions. This may include education and cognitive-behavioral therapy to improve adherence to PAP therapy.[79]

Considerations for health care providers

All clinicians who provide care for transportation personnel must work in close cooperation with the operator to ensure effective treatment, while also recognizing the obligation to report at-risk workers who do not adhere to treatment recommendations. Cultivating a culture of partnership, with the shared goal of improving an individual's health and safety, will benefit all parties.

All clinicians should be aware that when evaluating a transportation operator, the absence of symptoms does not ensure the absence of risk. In 1 study of commercial drivers whose prevalence of OSA was 77.7%, results showed that 47.1% were objectively sleepy based on multiple sleep latency testing,[80] but none reported sleepiness when asked. Therefore, self-reported

assessments of sleepiness may not correlate with laboratory-based assessments.

Above all, OSA is treatable, and effective treatment restores crash risk to levels that are comparable to those in populations without OSA.[31] Education, ongoing monitoring of treatment effectiveness, and interventions to support treatment adherence should be included in the ongoing management of OSA in safety-sensitive transportation workers.

General health care clinicians

Health care clinicians who identify and treat OSA constitute a primary resource to address this problem in transportation personnel. These health care professionals may include medical examiners and those who specialize in sleep medicine. A key first step is for the clinician to initiate a discussion about OSA with all safety-sensitive transportation workers. This includes discussing OSA risk factors, identification strategies, and potential adverse consequences if left untreated, particularly drowsy driving and possible vehicle crashes. Recommendations for when to refer a commercial driver to a sleep specialist, published by the MRB of the FMCSA and the American Academy of Sleep Medicine (AASM) Sleep and Transportation Safety Awareness Task Force,[44,56] can inform these efforts.

Medical examiners

Whenever possible, the medical examiner should make efforts to keep transportation workers in service during an evaluation when deemed safe to do so, and if service is paused, to return them to service as soon as safely possible. Guidance is available to aid medical examiners in determining whether the designation of fitness for duty should be unrestricted, conditional, or denied,[43–45,56] and these documents advocate for the use of objective criteria such as body mass index, hypertension, and diabetes, rather than symptoms. Studies suggest that only a minority of commercial drivers at risk for a potential crash are being referred and ultimately treated for OSA,[81,82] with 1 study indicating that 62% of those referred for testing were lost to follow-up; 100% of those who had sleep studies were confirmed to have OSA (indicating that screening criteria are only capturing the "tip of the iceberg"), and only 1 patient confirmed to have OSA demonstrated adherence to PAP.[81] Also in 2009, before the institution of the National Registry of Certified Medical Examiners, another survey found that 92% of examiners recognized the importance of screening commercial drivers for OSA, and yet only 42% were using available guidance, citing barriers including lack of awareness (36%), client retention (10%), driver inconvenience (10%), and lack of simplicity (12%).[82]

One study of 1,668 tractor-trailer drivers used any mention of a sleep-related issue in the medical examination record as a positive screen. Despite using this relaxed standard, this study nonetheless reported that the sensitivity of the medical examination was 19.4%, 20.7%, and 23%, respectively, when the thresholds of an apnea-hypopnea index of ≥ 5 events/h, ≥15 events/h, or a conservative standard of ≥30 events/h were used to define OSA. Additionally, even when their employer was already aware of their polysomnography-confirmed diagnosis of OSA prior to the screening examination, 25 of 85 (29.4%) did not disclose this information to the examiner.[32]

Given these undesirable outcomes, since 2009, several guidance documents have emerged, as well as the requirement in 2014 that examiners must undergo training and certification and be listed in a national registry in order to evaluate commercial drivers for fitness for duty.[41] Follow-up data to evaluate whether these measures have increased risk identification and treatment rates are unavailable at this time. Medical examiners should consult, at a minimum, the recommendations provided by the MRB of the FMCSA.[44]

Sleep medicine clinicians

Sleep medicine clinicians who provide care for CMV operators and other transportation workers should make every effort to customize their practice procedures to meet the needs of this unique population. Clinicians who tailor care to this group and address their unique barriers can provide an expedited clinical pathway with short time to diagnosis and establishment of effective treatment. These efforts can minimize income loss and will be more likely to be accepted by this group. Sleep medicine clinicians also should be aware that a lack of symptoms can be unreliable when assessing risk.[7,80–83]

The use of an unattended home sleep apnea test in the home or a commercial truck berth, to avoid reliance on overnight polysomnography in a sleep center (and potential time lost from work), also may be more accepted by this group. Transportation workers should be informed that a negative home sleep apnea test does not rule out OSA, and it may require additional testing either at home or in a sleep center. Sleep study reports should offer clear recommendations regarding next steps in management. Individuals with OSA who receive PAP therapy may benefit from the use of remote monitoring, and perhaps telemedicine/telehealth strategies for ongoing care management, to reduce the amount of lost work time.

Considerations for transportation personnel

Transportation workers who operate in safety-sensitive positions face unique challenges to diagnosis and treatment access. First, lack of awareness, or more importantly, concerns about employment, may lead them to underreport symptoms,[7,80–83] leading to underreferral and underdiagnosis. In fact, ensuring anonymity has been shown to improve reporting of symptoms.[7,66] Second, these individuals often lack health insurance. Because employers are not mandated to cover the costs of evaluation, treatment, or time spent undergoing evaluation and treatment, the costs of testing and treatment may be borne by the individual workers. Some who are deemed to be at high risk for a crash may be advised to forego driving or operating, often without pay, until they receive effective treatment.

Safety-sensitive personnel bear the responsibility for understanding their risk for drowsiness-related crashes and incidents due to a higher prevalence of moderate-to-severe OSA. Other factors, including extended or nontraditional work hours and insufficient sleep,[84] may compound impairment.

While fewer young individuals are entering the trucking profession,[85] many of these younger commercial drivers may not

seek routine medical examinations. Therefore, their certification examinations often may be their only routine encounter with the health care system.[73]

Commercial drivers and all transportation workers are encouraged to obtain routine medical exams through their health care providers. In addition, all transportation workers should be encouraged to take advantage of the educational resources that exist. There are readily available materials that address many of the common misconceptions and concerns that transportation workers may have regarding OSA. They should discuss any concerns about OSA with their primary care provider or the certifying medical examiner.

Accurate symptom-reporting by all transportation operators is imperative, as clinical decision-making relies heavily on the data provided to health care personnel. Additionally, insufficient sleep, irregular schedules, and circadian misalignment can compound safety risks, and these risks cannot be assessed in real time by health care providers. Therefore, the ultimate responsibility to become educated, recognize risks, and avoid operating if concerned about impairment rests with the individuals employed in safety-sensitive positions, who must work in collaboration with their health care team.

CONCLUSIONS

While it is a challenge to identify which operators are most likely to be at an increased risk of both having OSA and being involved in an OSA-related crash, particularly without reliable symptom-reporting, the use of guidance documents and existing science can help promote uniformity in risk-reduction practices. The U.S. Preventive Services Task Force has acknowledged that individuals who work in safety-sensitive transportation occupations have unique testing needs, and it urged clinicians evaluating such employees to consult guidelines issued by the relevant agency.[86] Despite the withdrawal of the Advanced Notice of Proposed Rulemaking, FMCSA has stated that OSA is an important medical issue that requires evaluation and management to mitigate crash risk, and it encourages examiners to use available guidance, which includes a letter by the MRB of the FMCSA,[44] recommendations by the AASM,[56] and the North American Fatigue Risk Management Program.[58]

Future models to predict crash risk may incorporate novel measures to improve sensitivity and accuracy. In the interim, the use of existing paradigms to identify and treat OSA results in clear benefits, including a reduction in crashes, economic gains, symptom relief, and general health benefits for the individual operator.

Despite the long-standing availability of guidance, and in the absence of specific regulations, high-profile crashes have continued to occur, and most employers have not mandated specific OSA screening and treatment programs beyond the federal requirement. However, some companies have implemented targeted programs, such as Schneider International, JB Hunt,[68,87] and—following a prominent crash in which 6 individuals died[88]—Metro-North Railroad.[89] Their programs may serve as potential models for other companies considering similar undertakings, and they show that systematic, mandated programs have the potential to identify at-risk operators efficiently. The success of these programs demonstrates the value of collaboration and partnership between all entities: operator, employer, examiner, and sleep medicine clinician.

ABBREVIATIONS

CMV, commercial motor vehicle
FMCSA, Federal Motor Carrier Safety Administration
MRB, Medical Review Board
OSA, obstructive sleep apnea
PAP, positive airway pressure

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