

# Sleep Apnea: What Employers Should Know

Prepared for The American Sleep Apnea Association  
by Annelise Thornton, Population Sleep

## Introduction

Many employers, especially those that subscribe to wellness and disease management programs, are familiar with the concept that chronic conditions such as obesity, heart disease and diabetes can greatly affect the company's bottom line. Few, if any however, recognize that another chronic condition – obstructive sleep apnea – may be an equally significant cost driver when it comes to population health and wellness.

## What Is Sleep Apnea?

Apnea literally means “without breath.” Obstructive sleep apnea (OSA) represents the more severe end of a continuum of night time breathing disorders that begins with snoring.<sup>1</sup> Although snoring can certainly be a nuisance, it is not considered to be a medical problem with physiological consequences. It is however, an important warning sign of OSA, which is caused by a mechanical malfunction of the muscles that surround the airway.

As the throat muscles relax during sleep, they fail to hold up to the negative pressure created by inhaling air into the lungs. As a result, the airway partially or completely collapses and restricts airflow to the lungs. Breathing thus becomes significantly restricted or stops altogether. When this happens, blood oxygen levels drop. The brain responds to the lack of oxygen, and causes the apneic patient to wake up enough to start breathing again. A cyclic pattern of falling asleep – airway collapse – breathing cessation – drop in oxygen levels – waking up – and breathing beginning again occurs over and over throughout the night. In cases of severe obstructive sleep apnea, a person can stop breathing as many as 80 times in one hour!

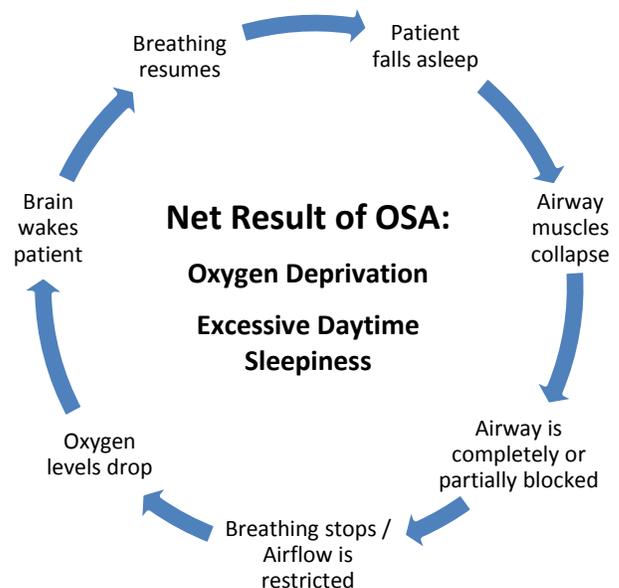
Untreated OSA results in cumulative oxygen deprivation which puts enormous stress on an individual's cardiovascular and metabolic systems.<sup>2-4</sup> Furthermore, the repeated arousals necessary to reignite the breathing cycle prevent the apneic patient from getting the restorative sleep necessary for optimal health and daily function.

Consequently, chronic daytime sleepiness and fatigue are often hallmarks of untreated sleep apnea.<sup>5,6</sup>

## A Compounding Problem: OSA and the Cost of Comorbidities

Sleep apnea goes hand-in-hand with many of the conditions that are already on employers' radars. For instance, studies have shown that obstructive sleep apnea is an independent risk factor for high blood pressure and cardiovascular disease and is strongly associated with insulin resistance, diabetes, obesity and mood disorders, such as depression.<sup>7-9</sup>

Due in large part to its associated comorbidities, OSA patients tend to be heavy users of health-care resources. In fact, studies have shown that these patients have higher utilization rates and incur greater costs than non-OSA patients for up to 10 years prior to diagnosis.<sup>10-18</sup> In one recent study, patients with OSA incurred medication and hospital costs that were two to three times higher than controls and total health care costs that were more than



**Obstructive Sleep Apnea (OSA):** A cyclical pattern of breathing cessation that leads to oxygen deprivation and excessive daytime sleepiness.

twice as high.<sup>19</sup>

Studies suggest that earlier disease detection and treatment could have a dramatic impact on healthcare costs by preventing the comorbidities associated with obstructive sleep apnea.<sup>9,13,20</sup>

## OSA's Impact on Work

Untreated OSA can cost employers much more than dollars spent on healthcare claims. The chronic sleepiness, loss of energy and decreased cognitive function associated with OSA can limit workers' ability to perform.<sup>21</sup> Studies have also shown that employees with OSA have a significantly increased number of lost workdays (absenteeism) and rates of work disability.<sup>22,23</sup>

Specific industries, such as transportation, have begun to consider the ramifications of untreated OSA in their employee populations since the associated sleepiness and diminished reflexes among apneic patients increase their risk for accidents. Studies have shown that untreated OSA increases the risk of motor vehicle crashes by 2 to 7 times.<sup>24,25</sup> In response to the growing concern of untreated sleep apnea, an expert panel of physicians presented new guidelines to the Federal Motor Carrier Safety Administration in 2008 stating that "drivers should be disqualified until the diagnosis of sleep apnea has been ruled out or has been treated successfully."<sup>26</sup>

## Who Is at Risk?

Differences in study design and definitions of disease over the years have led to large variations of the reported prevalence of sleep apnea in the general population.<sup>7</sup> However, based on three similar population-based studies conducted in the US, researchers estimate that approximately 1 of every 5 adults has at least mild OSA and 1 of every 15 has at least moderate OSA.<sup>6</sup> Another important study of working-aged adults between the ages of 30 and 60 found that approximately 1 in 10 women (9%) and 1 in 4 men (24%) suffer from some degree of sleep disordered breathing and fall somewhere on the snoring and sleep apnea continuum.<sup>27</sup>

A common misconception is that obstructive sleep apnea, often accompanied by loud snoring, is only an "old, fat man's disease." Nothing could be further from the truth.

### Conditions Related to Untreated OSA

- High blood pressure
- Drug-resistant high blood pressure
- Heart disease (including endothelial dysfunction, cardiac arrhythmia, congestive heart failure, etc.)
- Heart attack
- Stroke
- Diabetes, insulin resistance
- Dyslipidemia
- Obesity
- Depression, anxiety
- Morning headaches
- Chronic pain, fibromyalgia
- Insomnia
- Reflux (GERD)
- Urinary incontinence
- Impotence / erectile dysfunction
- Impaired motor functions
- Decreased cognitive ability
- Inability to concentrate
- Falling asleep at inappropriate times

Although the risk for developing sleep apnea does increase with both age and weight, there are many other factors that influence its development such as an individual's craniofacial structure, airway anatomy and muscle tone. Roughly, 60 percent of moderate to severe sleep apnea cases can be attributed to excess weight.<sup>28</sup> A small lower jaw and narrow palate are also important contributing risk factors for developing apnea, particularly in non-obese cases.<sup>29,30</sup>

## A Problem of Epidemic (and Expensive) Proportions

Estimated by the National Sleep Foundation at 18-20 million, the number of people with sleep apnea has reached epidemic proportions, on par with the number of people who suffer from diabetes (25.8 million).<sup>31</sup> Unfortunately, as compared to blood pressure and glucose levels which are routinely assessed by physicians, obstructive sleep apnea symptoms are rarely discussed, in part, because most medical professionals have not been trained to identify OSA.<sup>7</sup> Those who suffer from sleep apnea often do not recognize that they have a sleep disorder and do not report their symptoms to their physician.<sup>32</sup> Consequently, a very

small percentage of those who suffer from apnea have been screened for or diagnosed with the disorder. Current research indicates that the vast majority of those affected have not been diagnosed with sleep apnea.<sup>7,33,34</sup>

Unidentified, undiagnosed and untreated apnea creates an excess financial burden on healthcare payers as well as a large burden on society in general.<sup>35</sup> Because even people with mild sleep apnea experience adverse health outcomes, the vast numbers of undiagnosed and untreated apnea cases contribute to an annual cost of \$3.4 billion in additional medical costs.<sup>6,20</sup> Symptoms such as sleepiness contribute to poor quality of life and safety-related concerns both for apneic individuals and those around them. In the year 2000, 810,000 US drivers were involved in a motor vehicle accident related to OSA of which 1,400 involved fatalities. Researchers estimated that the total cost of OSA-related accidents in 2000 was approximately \$15.9 billion.<sup>36</sup>

## Diagnosis and Treatment for OSA

The good news is that there are simple questionnaires and screening tools available that can be used to identify potential patients in a given population. Whereas the standard of care has typically required patients to have a polysomnogram (a relatively expensive overnight test in a sleep laboratory), technological advances in diagnostics have led to the recent approval of home sleep testing by the Centers for Medicare and Medicaid (CMS) and subsequent changes in the policies of many private payers. Now sleep physicians, like radiologists and pathologists, are beginning to work with primary care physicians as consultants, thereby expanding patient access to diagnosis and treatment.

A number of treatment options for OSA exist. Today the preferred method of treatment for sleep apnea is non-invasive, although surgery may be appropriate for certain individuals. Both the American Academy of Sleep Medicine (AASM) and the Centers for Medicare and Medicaid (CMS) recommend two non-invasive, non-surgical treatments as a first line of therapy for obstructive sleep apnea: continuous positive airway pressure (CPAP) and oral appliance therapy with a mandibular advancement device (MAD). Both methods mechanically open the airway to allow air to reach the lungs.

Continuous positive airway pressure (CPAP) therapy requires the patient to wear a mask attached to a small machine via a hose. The machine blows air into the patient's

airway to keep it open and prevent it from collapsing. CPAP therapy is used to treat all levels of OSA severity and has typically been physicians' treatment of choice.

The second treatment, oral appliance therapy (OAT) with a mandibular advancement device (MAD) requires the patient to wear a small, custom device like an orthodontic retainer or mouth guard. The device, fitted by a dentist, is based on the same principle of airway management taught in CPR classes. The device repositions the patient's jaw in a slightly forward position which keeps his or her airway open and prevents it from collapsing. This therapy was approved by Medicare in January 2011 (an indicator of acceptance by the medical community and third party payers) and is indicated for mild to moderate OSA as a first line of therapy and in cases of severe apnea when the patient can't tolerate the CPAP machine.

## A New Horizon in Population Health

Given the prevalence and widespread acceptance of disease prevention and management programs in recent years, employers have no doubt witnessed how such interventions can contain healthcare costs when implemented in corporate populations. Although there have been very few studies on the financial impact of sleep apnea interventions as compared to hypertension, diabetes and other highly prevalent chronic diseases, one study of commercial truck drivers found that the employer could save over \$6000 in healthcare costs over two years for every patient that was diagnosed and treated.<sup>37</sup>

The evidence is clear that employees with untreated sleep apnea affect their employer's bottom line because they:

- Are heavy users of healthcare services;
- Incur higher healthcare costs than those without apnea, in part due to the costs of the comorbidities associated with apnea;
- Have an increased risk for occupational and motor vehicle accidents, and therefore represent a greater liability to an employer than the average employee;
- Tend to experience extreme daytime sleepiness and decreased cognitive function, which can affect their presenteeism, performance and productivity;
- Have increased number of lost workdays (absenteeism); and,
- Have increased rates of work disability.

As employers look for new ways to contain healthcare costs and even augment the benefits of disease management programs that are already in place, it makes sense to seriously consider programs that target obstructive sleep apnea. By addressing OSA on a population level, employers

can expect more than healthcare savings. Employers that invest in a focused obstructive sleep apnea disease management program can expect healthier, happier, safer and more productive employees.

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