

Reversing the Risks of Fatigue & Sleeplessness

-an Employer's Sleep Apnea Intervention-

HealthyQuest



aetna®

Presenters

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Today's Agenda

- Sleep Insufficiency & Workplace Health
- Sleep Apnea Overview
- Quest Wellness Strategy (Blueprint for Wellness)
- Sleep Survey Data & the Sleep Project Team
- Post-assessment Intervention & Outcomes
- Project Summary & Presenting Data to Leadership

HealthyQuest



Blueprint for Wellness Strategy

Quest Diagnostics

We are the world's leading provider of diagnostic testing, information and services that patients and doctors need to make better healthcare decisions.

- **Diagnostic Testing Services**
 - We are the world's leading provider of diagnostic testing, information and services that patients and doctors need to make better healthcare decisions. Our services range from routine blood tests — such as total cholesterol, Pap testing and white blood cell count — to complex, gene-based and molecular testing.
- **Diagnostic Products**
 - We develop and manufacture devices, test kits and reagents used by physicians, hospitals, blood collection centers and other clinical laboratories to help detect, characterize, monitor and select treatment for disease.
- **Clinical Trials Testing**
 - We're one of the largest providers of global central laboratory services performed in connection with clinical research trials.
- **Healthcare IT**
 - Over 200,000 physicians use our Care360® suite of connectivity solutions to order lab tests, receive timely test results, share clinical information quickly and securely, and prescribe drugs.
- **Wellness and Risk Management**
 - We help employers and insurers improve the health of their workers and reduce illegal drug use in the workplace. In fact, we're a leading provider of programs to promote wellness and the prevention of disease. By conducting lab testing-based health assessments for common conditions such as diabetes and heart disease, we enable people to better manage their health. We are the leading provider of risk assessment services to the life insurance industry.

Quest Diagnostics

- 45,000 employee
- A medical and scientific staff of more than 700 M.D.s and Ph.D.s.
- Strong logistics capabilities, including approximately 3,000 courier vehicles and 20 aircraft that collectively make tens of thousands of stops daily
- Offers physicians a test menu that is industry leading in breadth and [innovation](#). Our test menu ranges from routine biological tests to complex and specialized molecular and gene-based testing as well as anatomic pathology
- In addition to the U.S., Quest Diagnostics operates clinical laboratories in laboratory facilities in Gurgaon, India; Heston, England; Mexico City, Mexico; and San Juan, Puerto Rico

Quest Diagnostics- Snap shot of employees

Home states and Job Families

Top 10 States of employees

State	# of employees
California	6,810
Florida	3,835
Pennsylvania	3,162
Texas	3,082
New Jersey	2,571
Virginia	2,080
Missouri	1,654
North Carolina	1,558
Kansas	1,553
Georgia	1,515

Top Job Families

Job Family	# of employees
Patient Services	13,520
Technical Lab Services	6,885
Logistics/Couriers	4,066
Specimen Processors	3,367
Billing	2,380
Client Services	2,190
Laboratory Support	1,839
Sales	1,715
Information Tech.	1,498
Laboratory Mgt	1,047

HealthyQuest:

- Introduced in May 2005 to create a workplace culture that encourages employees and dependents to optimize their wellbeing
- Hundreds of health promotion volunteers lead and bring life to the varied HealthyQuest initiatives including preventive screenings, lifestyle modifications and stress management
- Features our commercial Blueprint for Wellness product: including comprehensive blood panel analysis, bio-metrics and questionnaire
 - Biometrics: Height, weight, blood pressure and waist circumference
 - Panel of 40+ lab tests including glucose, cholesterol, triglycerides, CBC, A1C, Vitamin D, etc.
 - <http://www.questforhealth.com/>

Annual Blueprint for Wellness

- Offered Blueprint for Wellness screening program since 2001
 - All employees and spouses/domestic partners eligible
 - Includes questionnaire, biometrics, and full blood draw
 - Medical Premium credit associated with participation
 - Average 70% employee participation (81% of insured population)
 - Approximately 40% of spouses / domestic partners
- Evolution of Program
 - 2005- 2009: Premium credit for participation
 - 2010+: Majority of credit achieved for achieving weight goals, in range for Metabolic Syndrome
- Introduced Berlin questionnaire in 2014 program to address sleep risk

Sleep Solutions: Obstructive Sleep Apnea (OSA)

Objectives/Background

- A significant portion of the Quest's Blueprint for Wellness participants, were identified as "at-risk" for obstructive sleep apnea (OSA)
- Quest benefits team committed to partner with the wellness business to conduct a pilot/study of the at-risk Quest population that could be potentially leveraged for commercial purposes
- Leverage the pilot to engage Quest population in managing their health (broader than pilot)
- Quest will measure the success of the pilot and measure the impact which hopefully will include:
 - Adequate diagnosis of OSA and other sleep issues
 - Increased treatment compliance for OSA which should reduce health care costs, decrease in other related health risks, increase productivity, and reduce accidents of Quest workforce.

Sleep Insufficiency & Workplace Health

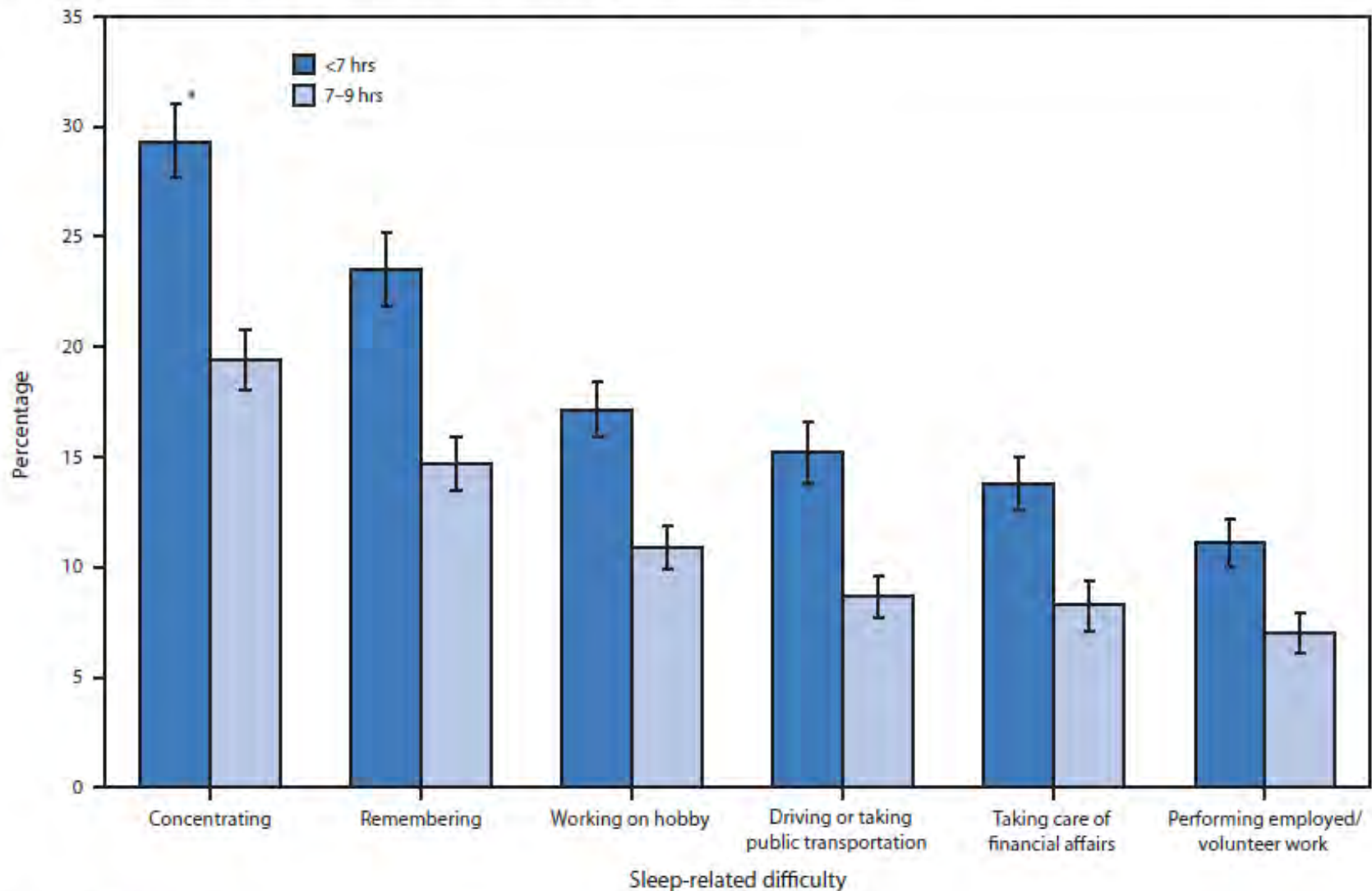


An estimated 50-70 million US adults have sleep or wakefulness disorder



Institute of Medicine. *Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem*. Washington, DC: The National Academies Press; 2006

Sleep Duration & Performance



*95% confidence interval.

Behaviors; Morbidity & Mortality Weekly Report; March 4th, 2011

National Sleep Foundation

Many large studies have found a relationship between sleepiness and work-related injuries.

Highly sleepy workers are 70 percent more likely to be involved in accidents than non-sleepy workers,

and workers with chronic insomnia (difficulty getting to or staying asleep) are far more likely than well-rested individuals to report industrial accidents or injuries.

<https://sleepfoundation.org/excessivesleepiness/content/the-relationship-between-sleep-and-industrial-accidents>

Injury Rates & Sleep Volume

TABLE 2. Estimated Annualized Injury Rates/Hours of Sleep*

	Estimated Annualized Injury Rates/100 Workers					
Hours of sleep	<5	5–5.9	6–6.9	7–7.9	8–8.9	9–9.9
Injury rates	7.89	5.21	3.62	2.27	2.50	2.22

*Adapted from Lombardi et al.²⁰



Slightly over 2 hours of additional sleep
can cut the injury rate 3-fold*

*ACOEM Presidential Task Force. *ACOEM Guidance Statement: Fatigue Risk Management in the Workplace*; *Journal of Occupational & Environmental Medicine*; February, 2012

Duty-Rest Regs & Fatigue Risk Management Systems

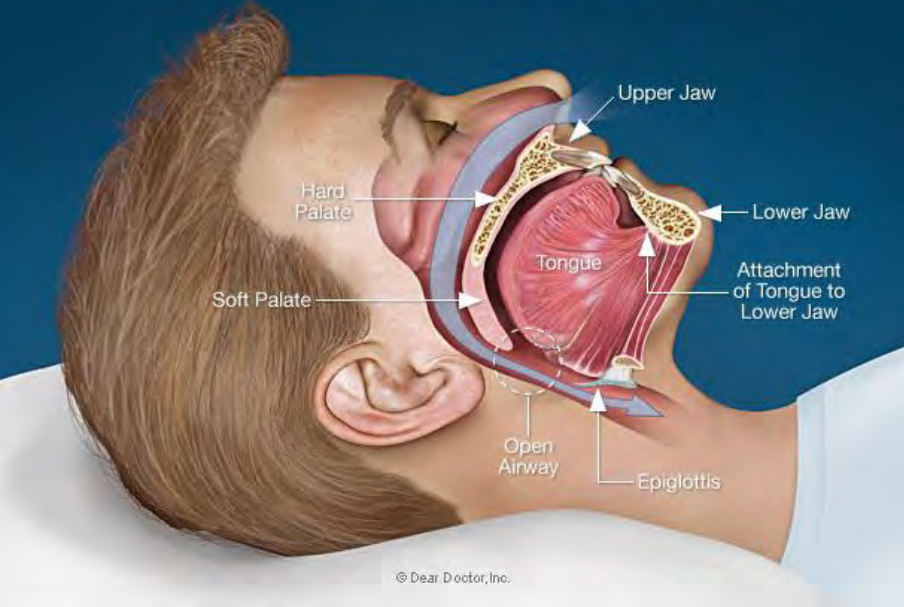
In 1996, a survey of pediatric residents ($n = 62$) at one institution showed that on average, residents managed to sleep 2.7 hours when on call and 7.2 hours when not on call

TABLE S-1 Comparison of IOM Committee Adjustments to Current ACGME Duty Hour Limits

	2003 ACGME Duty Hour Limits	IOM Recommendation
Maximum hours of work per week	80 hours, averaged over 4 weeks	No change
Maximum shift length	30 hours (admitting patients up to 24 hours then 6 additional hours for transitional and educational activities)	<ul style="list-style-type: none">• 30 hours (admitting patients for up to 16 hours, plus 5-hour protected sleep period between 10 p.m. and 8 a.m. with the remaining hours for transition and educational activities)• 16 hours with no protected sleep period
Maximum in-hospital on-call frequency	Every third night, on average	Every third night, no averaging

Normal Anatomy & Function

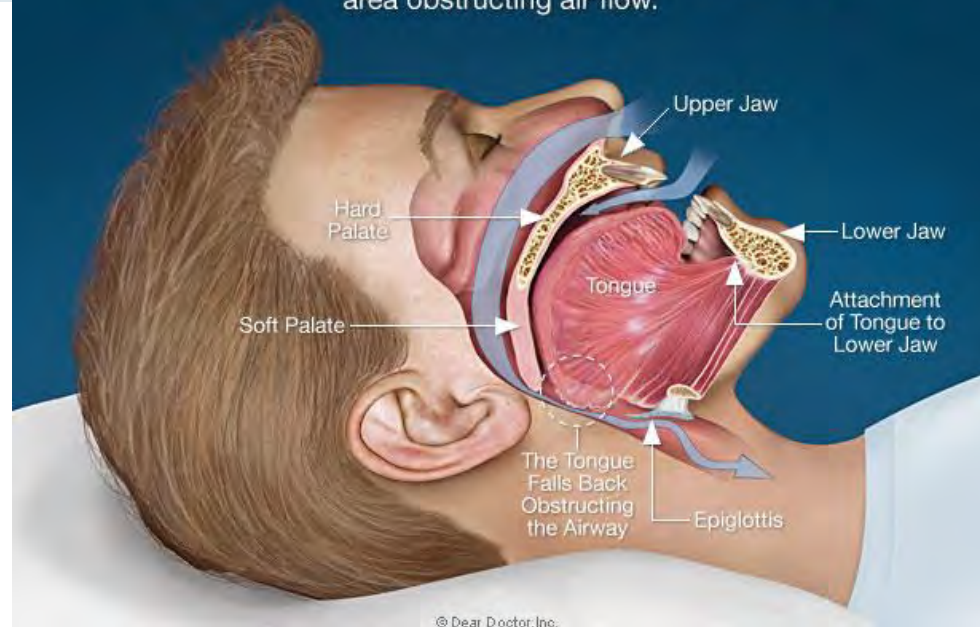
Your upper airway is open and unobstructed allowing air to flow from your nose, through your throat and into your lungs.



Obstructive Sleep Apnea (OSA) Overview

Obstructive Sleep Apnea

During sleep, gravity and muscle relaxation allows the tongue and surrounding soft tissues to fall back into the throat area obstructing air flow.



Increased Physician-Reported Sleep Apnea*: The National Ambulatory Medical Care Survey

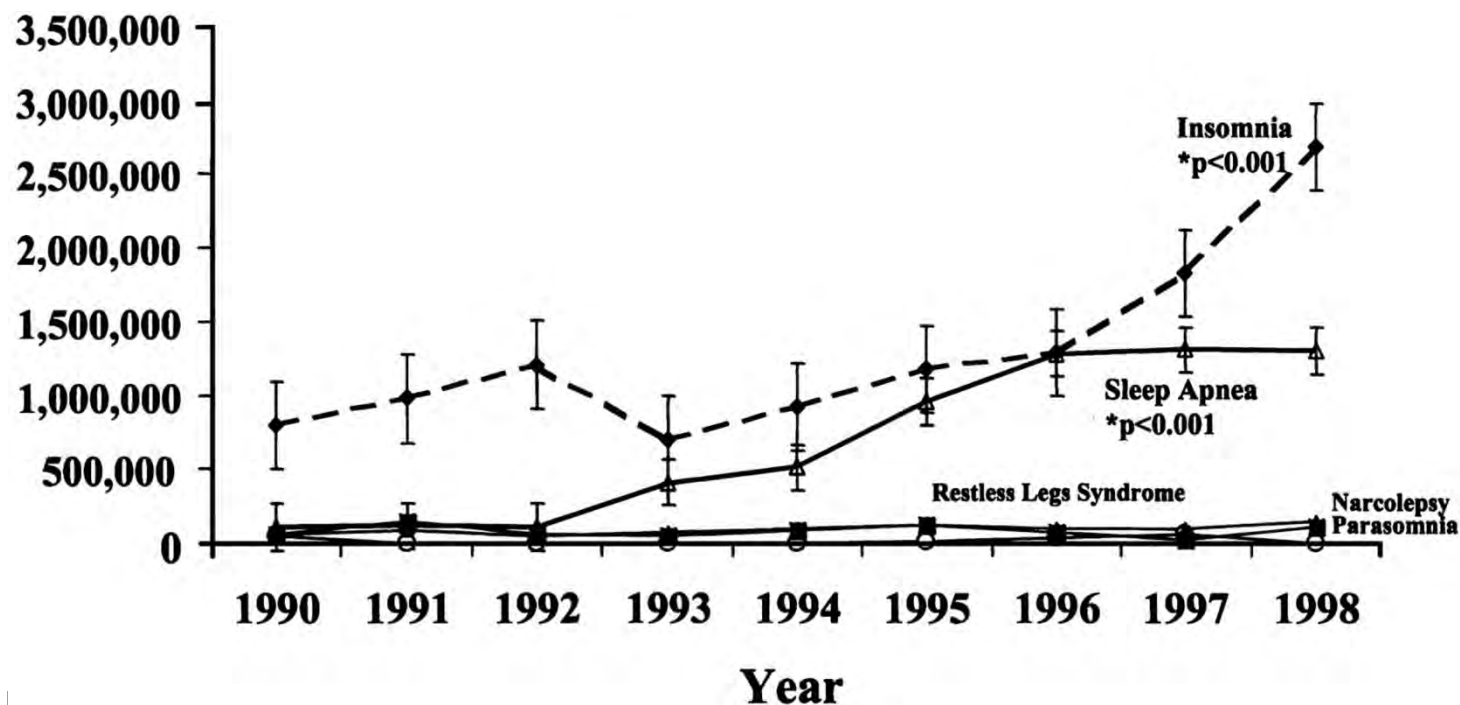


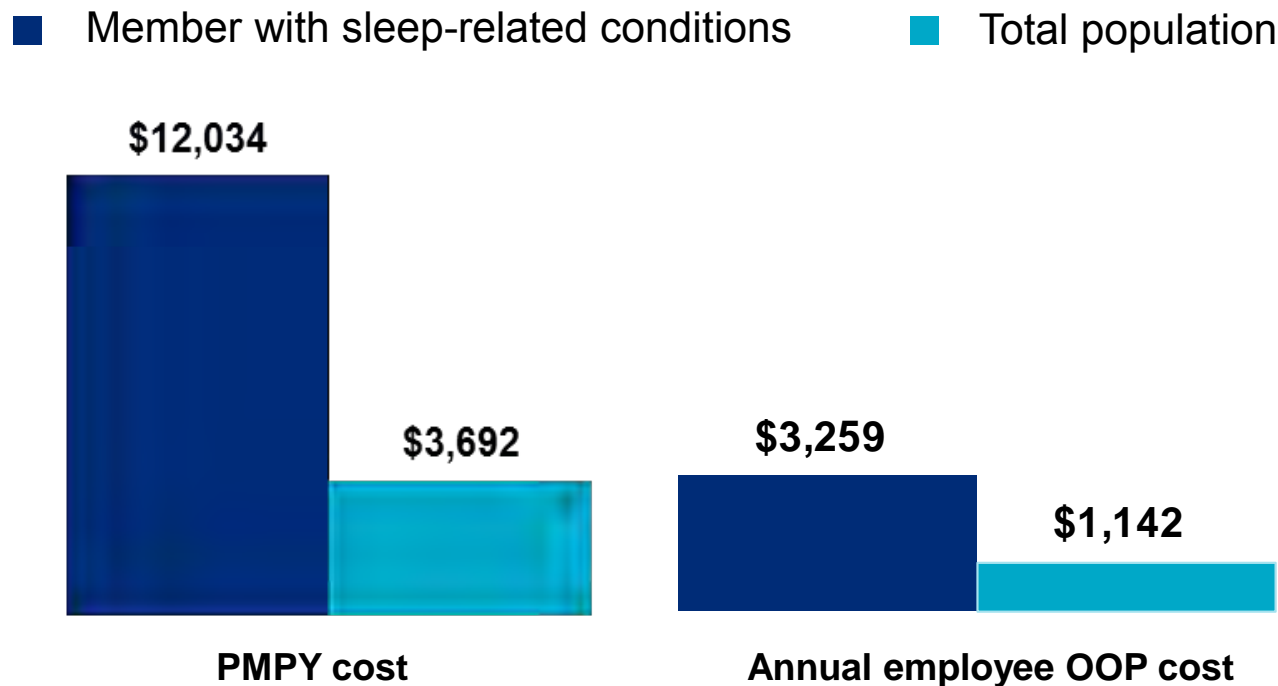
Figure Legend.

NAMCS reports of sleep disorders (from 1990 to 1998). Over a 9-year period, there was a fourfold increase ($p < 0.0001$) in physician-reported insomnia, while a 12-fold increase was observed among reports of sleep apnea. No significant increase was shown in reported narcolepsy, restless legs syndrome, and parasomnias.

Sleep Management: Why We Care About OSA?

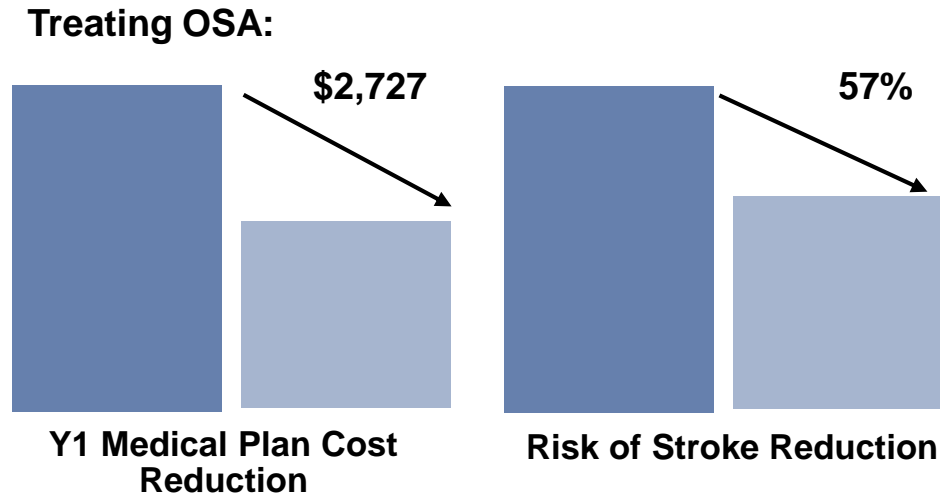
Sleep disorders are associated with higher medical costs

Individuals with sleep-related conditions have approximately 3 times the annual medical costs of the overall population



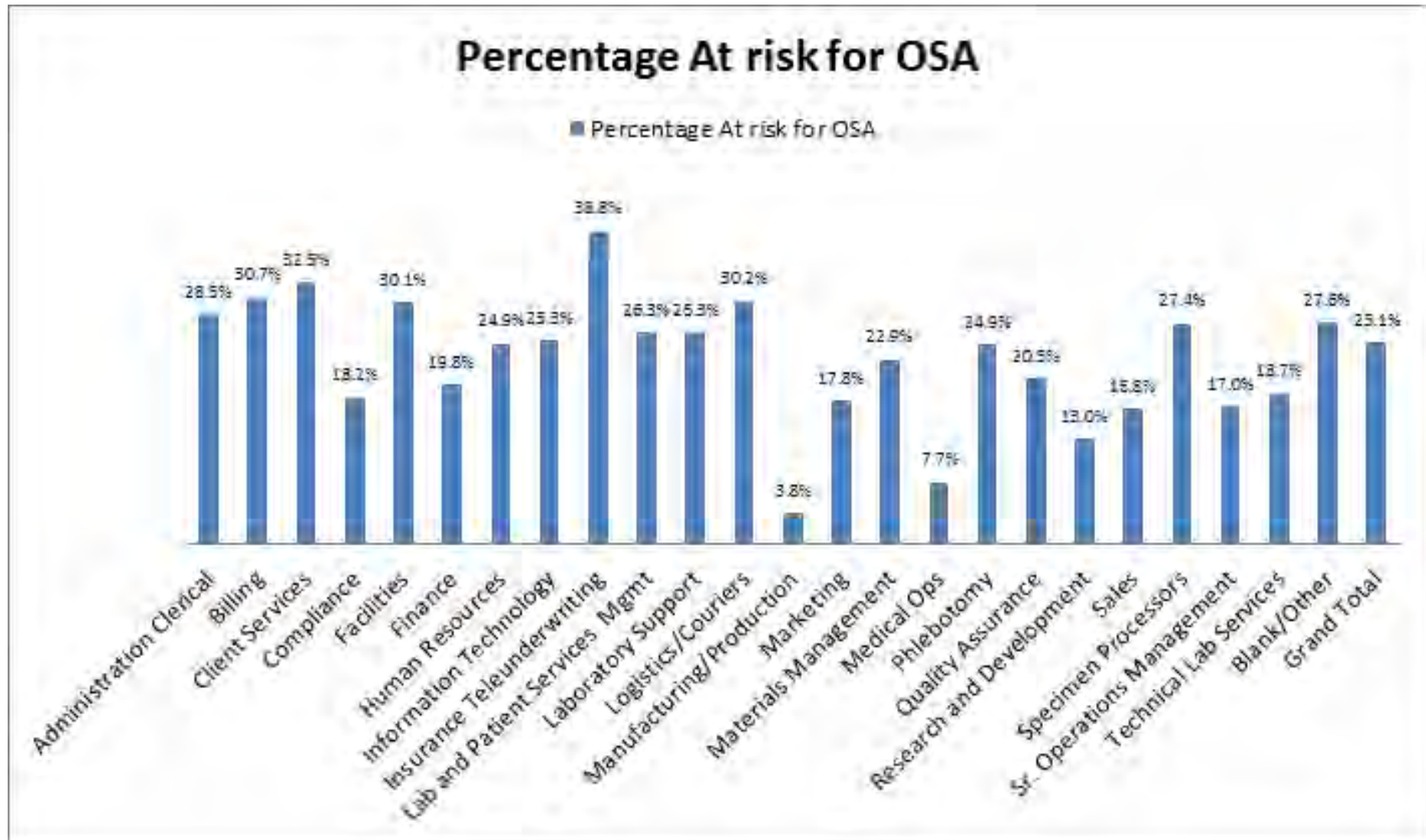
Source: Mercer Focus/Mercer Health Online data 11/2010 – 10/2011

Sleep Management: Why We Care About OSA?

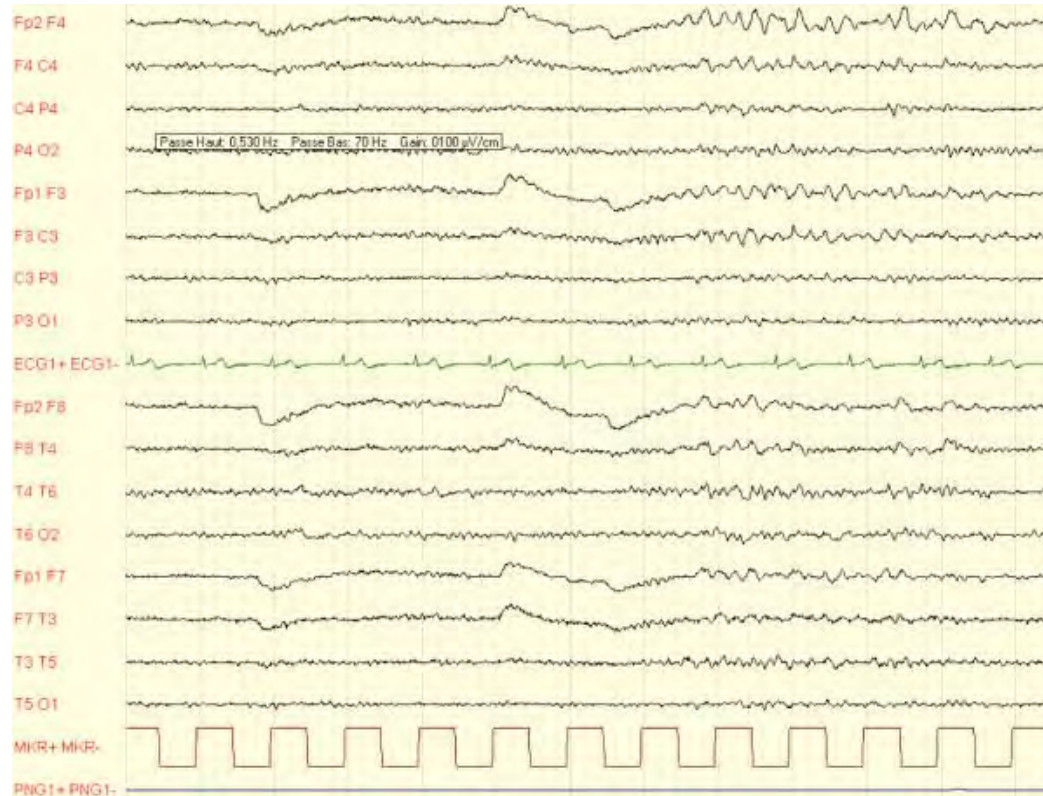


- 20 million Americans have Obstructive Sleep Apnea (OSA) and 85% remain undiagnosed
- Employers spend **\$3,200-\$4,000** in incremental annual healthcare dollars on employees with unmanaged OSA
- Sleep and fatigue are two of the top three cost drivers for both presenteeism and absenteeism

Quest Workforce & OSA Risk



Sleep Survey Data



Sleep Survey Data

Berlin Questionnaire administered as part of the HRA for EEs and spouses in 2014

- 8,350 unique respondents were identified as meeting the Berlin Questionnaire criteria for risk for sleep apnea
- 5,223** identified as Aetna members at the time (**Target Population**)
- 2,035 identified as non-Aetna members
- 1,092 unidentified (no SSN or no longer eligible)

The **Target Population** was stratified into two Groups

Group A – Berlin at Risk w/ Comorbid Conditions (as per Aetna's CPB)

483 members

Letter mailed 7/1

Group B – Berlin at Risk-remaining members

4,740 members

Letter mailed 8/29

Quest Diagnostics OSA-Comparative Prevalence

Prevalence of OSA – All Members	OSA Claimants	Adult Prevalence
All Members Plan Year 2014	390	0.9%
All Members Plan Year 2015	467	1.0%
Period Prevalence '13-'15 (unique members)	547	2.3%
Prevalence of OSA—Berlin@Risk Members		
January 2014 through July 2015	530	10%
OSA claims Group A (Berlin@Risk+ Comorbid)	109	23%
OSA claims Group B Berlin@Risk	421	9%



With a nearly 5-fold difference in prevalence of OSA, the Berlin survey enhancement to the HRA appears to be identifying the right members for intervention

Post-Assessment Intervention & Outcomes



Analysis of Quest OSA Program Impact

OSA Metrics	Total Population	Berlin@Risk Population
Pre-Letter Measurements	Aug - Nov 2014	Jan 2014 - July 2015
Unique OSA Claimants Per 1,000	15.6	72.5
Sleep related Office Visits Per 1,000	34.5	402.5
OSA Metrics	Total Population	Berlin@Risk Population
Post Letter Measurements	Aug - Nov 2015	Aug - Nov 2015
Unique OSA Claimants Per 1,000	16.8	181.6
Sleep related Office Visits Per 1,000	41.5	448.5
Change in Metrics	Total Population	Berlin@Risk Population
Unique Claimants Per 1,000	7% increase	150% increase
Sleep related Visits Per 1,000	20% increase	11% increase

--New cases of OSA and engagement with the healthcare system increased in both the intervention group and the overall population after the communication letters were mailed to 5,223 at-risk members

Early Impact of the Mailing Intervention on the Group A (n=483)

Berlin@Risk + Major Co-morbidity (i.e., CHF, COPD)

Pre-Intervention Analysis—Claims from 8/1/2014 - 7/31/2015

- 92 members had claims related to sleep
 - 46 members received CPAP machines
 - 24 members had sleep studies
 - 59 received supplies
 - 34 members had office visits
 - 1 member had claims for a wakefulness drug

Post-Intervention Analysis—Claims from 8/1/2015 to 11/30/2015

- 53 of the members had claims related to sleep apnea (11%)
 - 8 of the 53 members have no evidence of claims in the prior 12 months for sleep apnea (1.6%)—Sleep studies, CPAP, etc.

Early Impact of the Mailing Intervention on the Group B (n=4,740)

Berlin@Risk-

Pre-Intervention Analysis—Claims from 10/1/2014 - 9/30/2015

- 375 members had claims related to sleep apnea in the 12 months prior to the mailing
 - 123 members had sleep studies
 - 174 members received CPAP machines
 - 335 members received supplies
 - 160 members had office visits
 - 8 member had claims for a wakefulness drug

Pot Intervention Analysis—Claims from 10/1/2015 to 11/30/2015

- 168 of the members had claims related to sleep apnea (3.5%)
 - 40 of the 168 members have no evidence of claims in the prior 12 months for sleep apnea (0.8%)—Sleep studies, CPAP, etc.

Early Conclusion—Letter Impact

*When the impact time period (August-November 2015)
of the July 2015 OSA intervention
is compared with the same time period in 2014
through incidence rate (new cases of OSA in Berlin@Riskers),
there is a 34% increase in new cases of OSA*

Aug., 2014-Nov., 2014 Incidence Rate of OSA	Aug, 2015-Nov., 2015 Incidence Rate of OSA
38.9 Number of new cases (no evidence in prior 12 month period) / MM * 12000	52.2 Number of new cases (no evidence in prior 12 month period) / MM * 12000

Work Related Injuries & Illnesses

Quest Employee Population

	Sleep Survey Population	# Work Comp Claims	WC Incidence Rate
No Risk Berlin	24,914	299	1.2%
At Risk Berlin	8,361	127	1.5%

Work-related injuries & illnesses were 25% higher in Quest employees who demonstrated high risk for Obstructive Sleep Apnea on the Berlin Questionnaire when compared with employees that demonstrated no risk