

Sleep Deprivation

**A Wake-up Call
for Business**

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Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem

- Nearly 40 million Americans suffer from sleep disorders
 - Greater in women
- National Sleep Foundation 2010 Sleep in America Poll
 - 25% reported that current work schedule does not permit sufficient sleep
 - 1/3 reported they obtain less sleep on workdays than they need to function at their best

Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem (cont.)

- Sleep-related productivity costs business up to \$54 million a year
- Sleep-related disorders cost employers \$60 billion in lost productivity, industrial accidents and medical expenses a year
- Affects all industries

Sleepiness vs. Fatigue

Sleepiness (Somnolence, Drowsiness)

- Difficulty in maintaining alert wakefulness so that the person falls asleep if not actively kept aroused

Fatigue

- Body's response to sleep loss, or physical or mental activity
- Progressive decline in alertness and performance
- Increasing difficulty in performing mental and physical activities

Optimal Sleep Duration

- Optimal amount for performance dependent on:
 - Task being performed
 - Time of day task is performed
 - Level of performance desired
- Optimal: 7- 9 hours per night
- Sleep duration of less than 6 hours increased from 24% to 30% of Americans in past 20 years



Causes of Excessive Sleepiness

- Extended work hours
- Multiple jobs/responsibilities
- Shift work (Circadian misalignment)
- International travel
- Sleep disorders
- Medications
- Medical conditions
- Drugs and alcohol
- Work/Life stress

Why Shift Work? - Employees

Shift usually worked on principal job by wage and salary workers, by reason for working shift, May 2004

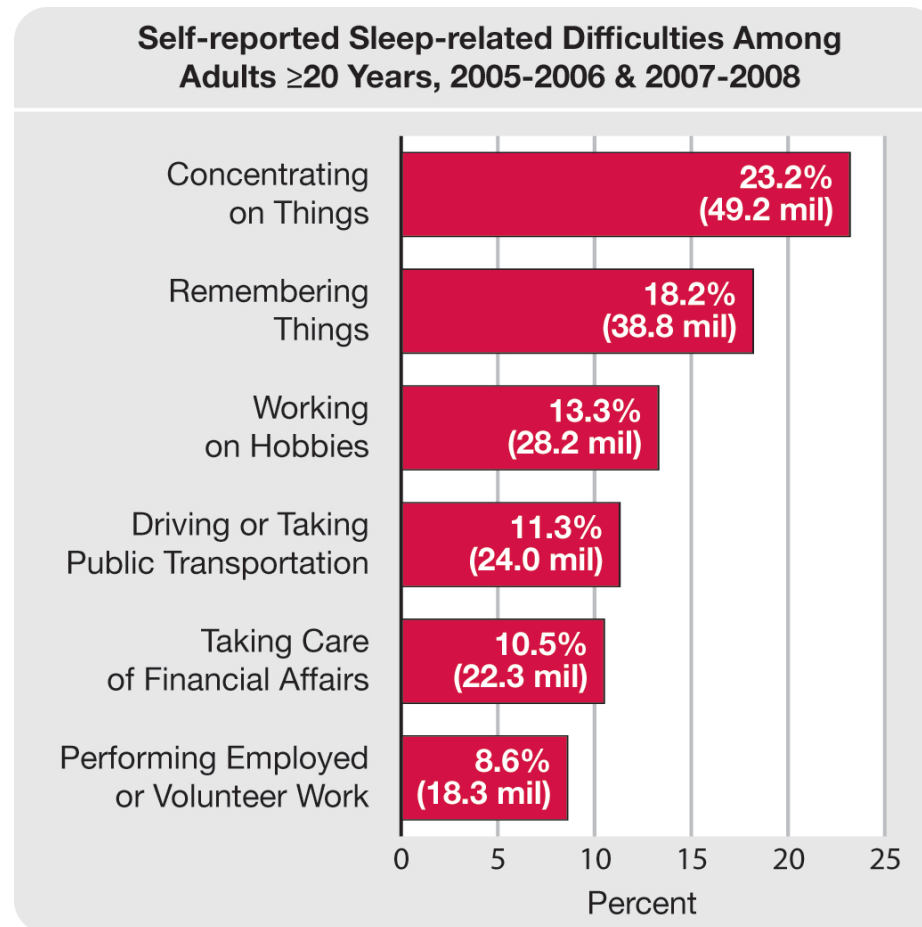
[Numbers in thousands]

Reason for working shift	Shift workers			Shift worked					
	Total	Usual full time	Usual part time	Evening shift	Night shift	Rotating shift	Split shift	Employer-arranged irregular schedule	Other shifts
Total shift workers	21,762	14,805	6,844	8,353	3,811	3,296	679	4,719	850
Better arrangements for family of childcare.....	1,827	1,211	613	888	626	74	44	162	34
Better Pay.....	1,125	1,007	104	397	365	166	32	119	45
Allows time for school	3,236	477	2,753	2,110	204	332	40	516	34
Could not get any other job.....	1,624	1,200	416	892	307	202	25	168	30
Local transportation or pollution control program	26	26	—	6	2	5	—	11	2
Nature of the job.....	10,445	8,089	2,294	2,586	1,247	2,242	470	3,346	553
Personal preference	2,122	1,700	409	976	732	110	40	191	74
Some other reason.....	1,029	802	220	388	251	124	25	177	65
Not reporting reasons.....	328	292	34	110	77	42	2	28	13

NOTE: Data relate to the sole or principal jobs of wage and salary workers and exclude all self-employed persons, regardless of whether or not their businesses were incorporated. Dash represents zero.

SOURCE: Current Population Survey, supplement, May 2004.

Consequences of Sleep-related Difficulties



SOURCE: Centers for Disease Control, <http://www.cdc.gov/Features/dsSleep/>

Consequences of Sleep Loss and Sleep Disorders

- Higher Health Care Costs
- Lost Productivity/Presenteeism
 - Tendency to stay at work beyond the time needed for effective performance on the job
 - Can represent 18-60% of a company's health care costs
- Safety Effects/Injuries

Sleep disorders cost employers \$60 billion in lost productivity, industrial accidents, and medical expenses per year

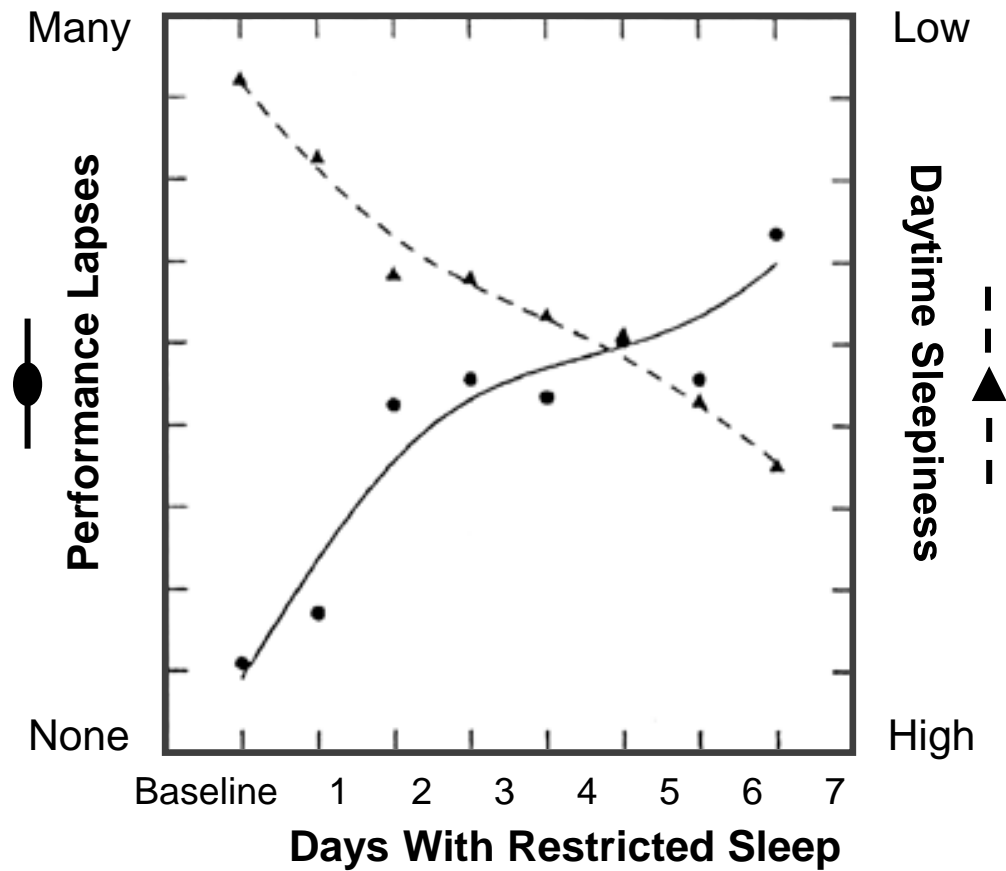
Health Effects of Sleep Deprivation

- Cardiovascular disease
- Hypertension
- Diabetes and Metabolic Syndrome
- Obesity
- Depression and Mood Disorders

Sleep-Related **Lost Productivity/Absenteeism**

- \$3,156 per employee with insomnia
- Sleep-related productivity reductions cost business up to \$54 million/year
- Workers on irregular schedules
 - Greater productivity loss

Relationship Between Performance and Sleepiness



SOURCE: Adapted from Dinges DF, et al. *Sleep*. 1997

Safety Consequences of Sleepiness/Fatigue

- Decreased alertness
- Slowed reaction time
- Reduced vigilance
- Reduced decision making ability
- Poor judgment
- Distraction during complex tasks
- Loss of awareness in critical situations

20 hours of sustained wakefulness equivalent to having blood alcohol level of 0.10

SOURCE: Dawson D., Reid K. "Alcohol, Fatigue and Performance Impairment". *Nature* 1997;388:235-6

Safety/Injury Effects of Sleepiness

- Driving
 - Driven drowsy — 50% of Americans
 - Fallen asleep at wheel in previous year — 20%
 - Admit to crash or near crash — 11 million drivers
- NHSTA estimates at least 100,000 police-reported crashes annually due to driver fatigue
- Annual cost of drowsy driving crashes
 - 1,550 deaths
 - 71,000 injuries
 - \$12.5 billion in monetary losses

Sample Key **Sleep-Related Industrial Incidents**



The Washington Post

A Case That Shook Medicine

How One Man's Rage Over His Daughter's Death Sped Reform of Doctor Training

Fatigue Risk Trajectory

Sleep Opportunity

- HOS, Labor agreements, corporate policies, use of fatigue models

Sleep Obtained

- Commute time, personal lifestyle

Behavioral Symptom

Fatigue-related errors

Fatigue-related incidents

SOURCE: Adapted from Dawson D., McCulloch K. "Managing Fatigue: It's About Sleep". *Sleep Medicine Review* 2005; Oct; 9(5); 365-80.

Addressing Sleep Issues in the Workplace

- Federal/State Regulations
- Industry Standards/Best Practices
- Medical Standards

Strategies to Address the Issue

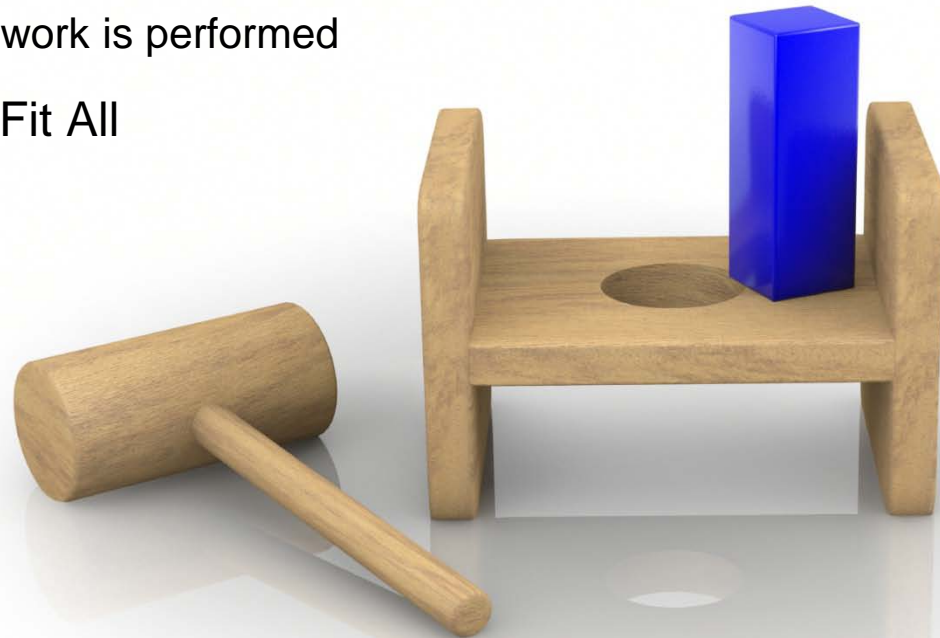
- **Employee Education** on Importance of Adequate Sleep
- **Supportive Culture** that Promotes Adequate Sleep

Other Strategies to Address the Issue

- Fatigue Risk Management Programs
- Appropriate work schedule policies and practices
 - Overtime, flex time, shift work, take home work
 - Time zone, daylight savings, start times
- Staffing
- Strategic napping
- Wellness programs
 - Screening for sleep disorders

Ideal Work Schedule

- “No one best way to arrange work given that the value of work varies in response to economic, physiological and social factors”
 - Type of work being performed
 - Consequences of an error
 - Time of day at which work is performed
- One Size Does NOT Fit All



Screening for Sleepiness and Sleep Disorders

- Sleep Questionnaires
 - Epworth Sleepiness Scale, Berlin Survey
- Physical Assessments
 - BMI, Neck Circumference
- Sleep Diary
- Sleep Studies
 - Polysomnogram, MSLT, MWT
- Actigraphy

Signs of Excessive Sleepiness

Mental

- Difficulty concentrating on tasks
- Lapses in attention
- Difficulty remembering tasks being performed
- Failing to communicate important information
- Failing to anticipate events or actions
- Accidentally doing the wrong thing
- Accidentally not doing the right thing

Signs of Excessive Sleepiness (cont.)

Physical

- Yawning
- Heavy eyelids
- Eye rubbing
- Head dropping
- Microsleeps

Emotional

- More quiet or withdrawn than usual
- Lacking in energy
- Lacking in motivation to perform the task well
- Irritable or grumpy

Fatigue Management

Managed by Employer

- Hours of work
- Shifts
- Time between shifts
- Time of day of shift start
- Timing of critical tasks
- Overtime policies

Managed by Employee

- Second job
- Commuting time
- Family and social obligations
- General health
- Sleep environment
- Medications
- Adequate sleep

Questions?

Resources

- National Sleep Foundation www.sleepfoundation.org
- National Sleep Awareness Roundtable www.nsart.org
- Drowsy Driving www.drowsydriving.org
- National Center on Sleep Disorders Research -
National Institutes of Health www.nhlbi.nih.gov/about/ncsdr/index.htm
- American Academy of Sleep Medicine www.aasmnet.org

Thank You

For more information:

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