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]

<table>
<thead>
<tr>
<th>Reason for working shift</th>
<th>Shift workers</th>
<th>Shift worked</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Usual full time</td>
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<tr>
<td>Total shift workers</td>
<td>21,762</td>
<td>14,805</td>
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<tr>
<td>Better arrangements for family of childcare</td>
<td>1,827</td>
<td>1,211</td>
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<tr>
<td>Better Pay</td>
<td>1,125</td>
<td>1,007</td>
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<td>Allows time for school</td>
<td>3,236</td>
<td>477</td>
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<tr>
<td>Could not get any other job</td>
<td>1,624</td>
<td>1,200</td>
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<tr>
<td>Local transportation or pollution control program</td>
<td>26</td>
<td>26</td>
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<tr>
<td>Nature of the job</td>
<td>10,445</td>
<td>8,089</td>
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<td>Personal preference</td>
<td>2,122</td>
<td>1,700</td>
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<tr>
<td>Some other reason</td>
<td>1,029</td>
<td>802</td>
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<tr>
<td>Not reporting reasons</td>
<td>328</td>
<td>292</td>
</tr>
</tbody>
</table>

**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.

Consequences of Sleep-related Difficulties

Self-reported Sleep-related Difficulties Among Adults ≥20 Years, 2005-2006 & 2007-2008

- Concentrating on Things: 23.2% (49.2 mil)
- Remembering Things: 18.2% (38.8 mil)
- Working on Hobbies: 13.3% (28.2 mil)
- Driving or Taking Public Transportation: 11.3% (24.0 mil)
- Taking Care of Financial Affairs: 10.5% (22.3 mil)
- Performing Employed or Volunteer Work: 8.6% (18.3 mil)

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

Performance Lapses vs. Days With Restricted Sleep

Baseline 1 2 3 4 5 6 7

Days With Restricted Sleep

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

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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