WHY SLEEP MATTERS:
SLEEP HEALTH AND HYGIENE

KYRA P CLARK, MD, FACP
Medical Director, Sleep Diagnostics
Morehouse School of Medicine
October 15, 2016
OBJECTIVES

- Discuss the prevalence sleep deprivation in the United States
- Review the association between sleep, health and inflammation
- Define sleep hygiene
- Understand and adapt good sleep hygiene measures
“INSUFFICIENT SLEEP IS A PUBLIC HEALTH PROBLEM”

Insufficient Sleep Is a Public Health Problem

Continued public health surveillance of sleep quality, duration, behaviors, and disorders is needed to monitor sleep difficulties and their health impact.

Sleep is increasingly recognized as important to public health, with sleep insufficiency linked to motor vehicle crashes, industrial disasters, and medical and other occupational errors. Unintentionally falling asleep, nodding off while driving, and having difficulty performing daily tasks because of sleepiness all may contribute to these hazardous outcomes. Persons experiencing sleep insufficiency are also more likely to suffer from chronic diseases such as hypertension, diabetes, depression, and obesity, as well as from cancer, increased mortality, and reduced quality of life and productivity. Sleep insufficiency may be caused by broad-scale societal factors such as round-the-clock access to technology and work schedules, but sleep disorders such as insomnia or obstructive sleep apnea also play an...
SLEEP DEPRIVATION PREVALENCE

- Effects 50-70 million Americans\(^1\)
  - Sleep Apnea
  - Insomnia
  - Restless Leg Syndrome
  - Narcolepsy
- Chronic Sleep Deficiency
  - 1 and 3 adult Americans <7hrs/night\(^2\)
  - Behaviorally Induced: poor sleep hygiene

# Average Sleep Timeline

<table>
<thead>
<tr>
<th>Year</th>
<th>Study</th>
<th>Average Sleep Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1959-1960</td>
<td>American Cancer Society&lt;sup&gt;3&lt;/sup&gt;</td>
<td>8-8.9 hours per night</td>
</tr>
<tr>
<td>Late 1960’s</td>
<td>Tune, 1968/1969&lt;sup&gt;4,5&lt;/sup&gt; Hammond, 1964&lt;sup&gt;6&lt;/sup&gt;</td>
<td>7-8 hours per night</td>
</tr>
<tr>
<td>2008</td>
<td>National Sleep Foundation&lt;sup&gt;7&lt;/sup&gt;</td>
<td>6hrs and 40min (weeknights)</td>
</tr>
<tr>
<td>2004-2008</td>
<td>Lombardi, 2010 (National Health Interview Survey)&lt;sup&gt;8&lt;/sup&gt;</td>
<td>≤6 hours per night (40.6 million workers)</td>
</tr>
<tr>
<td>2010</td>
<td>National Sleep Foundation&lt;sup&gt;9&lt;/sup&gt;</td>
<td>&lt;7hrs on weeknights across all racial groups</td>
</tr>
</tbody>
</table>
AVERAGE SLEEP TIME BY ETHNICITY

Data from the National Sleep Foundation, Sleep in American Poll 2010 (National Sleep Foundation, Washington, D.C)
Percentage of adults reporting an average ≤ 6 h of sleep in 1985 and in 2004. Data from the National Health Interview Survey, 2004 \(^{10}\), and Schoenborn \(^{11}\).

SLEEP DEPRIVATION: PERFORMANCE AND HEALTH CONSEQUENCES
Tracy Morgan Wal-Mart Accident: Driver made deliveries to Wal-Mart stores in New Jersey, Delaware and Pennsylvania before the accident 13 hours, 32 minutes later.

Federal rules limit interstate commercial drivers to 14-hour shifts before they must rest.
The Exxon Valdez oil spill occurred in Prince William Sound, Alaska, on March 24, 1989, when the Exxon Valdez, struck Prince William Sound’s Bligh Reef and spilled 260,000 to 750,000 barrels of crude oil.

The Three Mile Island accident in 1979. It was the most significant accident in the history of the USA commercial nuclear power generating industry. Between the hours of 4 and 6 a.m., Leak of core coolant water resulting in the release of approximately 2.5 million curies of radioactive gases, and approximately 15 curies of iodine-131.
• **Cardiovascular**
  - Increased risk of hypertension
  - Increased risk heart disease
  - Increased risk of stroke

• **Endocrine**
  - Increase in ghrelin (appetite regulating hormone)
  - Diabetes and impaired glucose tolerance
  - Increased risk of obesity
  - Increase in stress hormones (cortisol)
  - Impaired immune system response

• **Nervous system**
  - Memory and learning
  - Increased risk of seizures
  - Increase in pain (migraines)

• **Mental Health**
  - Decreased neurotransmitters affecting mood
    - irritability, depression, alcohol use, suicide
  - Decreased quality of life
Disrupted sleep increases fatigue

Fatigue diminishes ability to cope with stressors in a healthy way

Inability to cope with stressors disrupts sleep
FIG. 1. Plasma levels of proinflammatory and anti-inflammatory cytokines immediately after REM sleep deprivation (Day 0). Effects of REM sleep deprivation on plasma levels of IL-1α, IL-1β, IL-6, IL-10, IL-17A, and TNF-α immediately after treatment. Results are expressed as ng/mL. Results represent mean ± SD from three independent experiments.
FIG. 2. Plasma levels of proinflammatory and anti-inflammatory cytokines 1 week after REM sleep deprivation (Day 7). Effects of REM sleep deprivation on plasma levels of IL-1α, IL-1β, IL-6, IL-10, IL-17A, and TNF-α after 7 days of recovery. Results are expressed as ng/mL. Results represent mean ± SD from three independent experiments.
SLEEP AND LUPUS
SLEEP SYMPTOMS AND LUPUS

- 90 SLE women, cross sectional study with questionnaires
  - Perceived stress scale (PSS), Brief COPE, Pittsburgh Sleep Quality Index (PSQI), Insomnia Severity Index (ISI), Beck Depression Inventory (BDI) and Self-rating Anxiety Scale (SAS)
  - Insomnia symptoms, n=57, 66%
    - Higher perceived stress scale (p<.001)
    - Higher emotional-focused coping (p=0.001)

SLEEP SYMPTOMS AND LUPUS

- 129 patients SLE, cross sectional study ¹
  - 72% poor sleep quality
  - 20-32% severe anxiety and depression
  - 26% pain
  - 37% fatigue

- 14 SLE, 11 control underwent polysomnography on 3 nights ²
  - MSLT, questionnaire, Beck Depression
  - More interrupted sleep and arousals
  - More daytime sleepiness
  - Disease activity association with decrease in sleep insufficiency, delta sleep and fragmentation

SLEEP DISORDERS AND AUTOIMMUNE DISEASE

- 1411 patients with obstructive sleep apnea (OSA) higher risk of developing autoimmune diseases
  - Link between OSA and systemic inflammation
  - Possible that OSA may initiate autoimmune responses in susceptible individuals

<table>
<thead>
<tr>
<th></th>
<th>Number of Events</th>
<th>Person-Years</th>
<th>Incidence Rate</th>
<th>Crude HR (95% CI)</th>
<th>P Value</th>
<th>Adjusted HR (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD</td>
<td>7,731</td>
<td>656,868</td>
<td>117.70</td>
<td>1.64 (1.59–1.70)</td>
<td>&lt; 0.001</td>
<td>1.47 (1.41–1.53)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Control</td>
<td>4,753</td>
<td>664,413</td>
<td>71.54</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>SLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD</td>
<td>341</td>
<td>689,939</td>
<td>4.94</td>
<td>1.82 (1.52–2.18)</td>
<td>&lt; 0.001</td>
<td>1.81 (1.50–2.18)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Control</td>
<td>186</td>
<td>683,772</td>
<td>2.72</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>RA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD</td>
<td>3,134</td>
<td>676,090</td>
<td>46.36</td>
<td>1.62 (1.53–1.71)</td>
<td>&lt; 0.001</td>
<td>1.45 (1.36–1.54)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Control</td>
<td>1,936</td>
<td>675,858</td>
<td>28.65</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>AS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD</td>
<td>992</td>
<td>686,761</td>
<td>14.45</td>
<td>1.65 (1.49–1.83)</td>
<td>&lt; 0.001</td>
<td>1.53 (1.38–1.70)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Control</td>
<td>596</td>
<td>681,786</td>
<td>8.74</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Sjögren syndrome</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD</td>
<td>3,970</td>
<td>676,295</td>
<td>56.70</td>
<td>1.70 (1.61–1.79)</td>
<td>&lt; 0.001</td>
<td>1.51 (1.43–1.60)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Control</td>
<td>2,329</td>
<td>675,996</td>
<td>34.45</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Systemic sclerosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSD</td>
<td>40</td>
<td>691,434</td>
<td>0.579</td>
<td>1.42 (0.87–2.30)</td>
<td>0.158</td>
<td>1.36 (0.82–2.25)</td>
<td>0.234</td>
</tr>
<tr>
<td>Control</td>
<td>28</td>
<td>684,560</td>
<td>0.409</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

*Per 10^4 person-years. **Adjusted for Charlson comorbidity index score, coronary artery disease, cerebrovascular disease, hypertension, diabetes mellitus, chronic kidney disease, dyslipidemia, and medication for non-apnea sleep disorders. HR, hazard ratio; CI, confidence interval; NSD, non-apnea sleep disorders; SLE, systemic lupus erythematosus; RA, rheumatoid arthritis; AS, ankylosing spondylitis; SS, Sjögren syndrome; SSc, systemic sclerosis.

SLEEP AND HEALTH: HOW AND WHY DO WE SLEEP?
ABOUT SLEEP

- We spend 1/3 of our lives asleep
- Sleep is an active process
  - No organ or regulatory system “shuts down”
- Some brain activity increases during sleep
  - Many parts of the brain are as active as awake periods
- Specific hormones increase during sleep
  - Growth hormone
  - Melatonin
CIRCADIAN RHYTHM

Suprachiasmatic Nucleus

- SCN in the hypothalamus
Sleep Homeostatic drive (Sleep Load)

Circadian alerting signal

Alertness level

Wake

Sleep

Time

9 AM  3 PM  9 PM  3 AM  9 AM

© American Academy of Sleep Medicine
HOW MUCH SLEEP DO WE NEED?

- No “magic number”
- Most adults need 7.5-8 hours to function well
  - 10% require more or less sleep

* Basal Sleep Need – the amount of sleep our body needs on a regular basis for optimal performance

* Sleep Debt – accumulated sleep that is lost due to poor sleep habits, sickness, awakenings due to environmental factors or other causes

“…sleep is a rich and still poorly understood phenomenon.”

-National Sleep Foundation
No other activity delivers so many benefits with so little effort!

- Improves Memory
- Lengthens Life
- Curbs Inflammation
- Helps Control Weight
- Lowers Stress
- Helps Decrease Risk of Depression
WHAT IS SLEEP HYGIENE?

• Good habits to optimize sleep
1. You can “cheat” on the amount of sleep that you get. 1 hour less sleep won’t affect me at all!

2. Health problems have no relation to the amount of sleep one obtains.

3. Watching TV in my bedroom and working on my laptop helps me wind down and fall asleep.

4. Alcohol or wine helps me fall asleep faster.
MAINTAIN A REGULAR BEDTIME AND WAKE TIME
ESTABLISH A REGULAR BEDTIME ROUTINE
RELAX AND DE-STRESS!
LIMIT NAPS DURING THE DAY
CREATE A SLEEP FRIENDLY ENVIRONMENT

- No television, reading or radio in bedroom
- No pets in the bed
- Decrease cell phone use
- Consider heavier drapery to darken room
NO CLOCK WATCHING
LIMIT STIMULANTS BEFORE BEDTIME

- Things to limit too close to bedtime
  - Caffeine
    - Metabolized in 4-7hrs
  - Alcohol
  - Nicotine
  - Large or spicy meals
EXERCISE REGULARLY

- 123 adults with SLE
- Fatigue and physical activity
- Greater daily and moderate/vigorous physical activity (10 minutes)
  - lower mean fatigue severity score (p=0.03 and p=0.007)
  - Less pain (p=0.01)
  - Light physical activity and moderate physical activity correlated with better physical function (p=0.04, p=0.006)

WHICH PICTURE IS AN EXAMPLE OF GOOD SLEEP HYGIENE
IF YOU HAVE DIFFICULTY SLEEPING...

• Sleep restriction
  • limit time in bed
  • 20 minute rule
• Sleep hygiene
  • Use your bed only for sleep and sex
  • Avoid watching the clock
  • Limit naps
KEEP A SLEEP DIARY TO IDENTIFY YOUR SLEEP HABITS AND PATTERNS
SEEK HELP FROM A SLEEP SPECIALIST AND A SLEEP STUDY
1. You can “cheat” on the amount of sleep that you get. 1 hour less sleep won’t affect me at all!

2. Health problems have no relation to the amount of sleep one obtains.

3. Watching TV in my bedroom and working on my laptop helps me wind down and fall asleep.

4. Alcohol or wine helps me fall asleep faster.
SUMMARY: WHAT CAN YOU DO?

• Learn about sleep
  • Understand how your sleep changes and observe your habits and experiences
• Apply healthy sleep practices to your sleep style so that you get sufficient quality sleep
• Talk to your doctor about your sleep and see a sleep specialist if you experience chronic difficulty sleeping and/or have symptoms of sleep disorders
QUESTIONS?