Asleep at the Wheel
Understanding and Preventing Drowsy Driving

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### Conflict of Interest Disclosures for Speakers

1. I do not have any potential conflicts to disclose.

2. I wish to disclose the following potential conflicts of interest:

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<tr>
<th>Type of Potential Conflict</th>
<th>Details of Potential Conflict</th>
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<td>Grant/Research Support</td>
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3. The material presented in this lecture has no relationship with any of these potential conflicts, OR

4. This talk presents material that is related to one or more of these potential conflicts, and the following objective references are provided as support for this lecture:

   1. 
   2. 
   3.
When “9:00 to 5:00” Isn’t an Option

Sleep and Shift Workers
Binal Kancherla, M.D.
Associate Professor
Baylor College of Medicine
Shiftwork

A shift worker is anyone who follows a work schedule that is outside of the typical "9 to 5" business day

- Approximately 25% of the North American working population work shiftwork

- At a given workplace, more than one shift is worked during the 24-hour day
  - A shift often lasts 8 hours but may be shorter or longer

- National Sleep Foundation
The Perils of Shift Work

- Depression
- Stress & anxiety
- Divorce
- Increased smoking
- More errors & accidents
- Digestive & gastrointestinal problems
- Cardiovascular disease
- Higher cholesterol
- Possible Carcinogen*
  - Higher incidence of breast, colon, and prostate CA
Circadian Rhythms

• Many human physical functions follow daily rhythms or 24-25 hour cycles
  – Sleeping, walking, digestion, secretion of adrenalin, body temperature, blood pressure, pulse, other body functions
  – The body uses cues from its processes and from the environment such as clock time, social activities, the light/dark cycle, and meal times to keep the various rhythms on track
Zeitgebers

• External cues to synchronize circadian rhythms
  – Light
  – Melatonin
  – Eating and drinking patterns
  – Social interactions
Sunlight enters through your eyes. Acting through the hypothalamus, sunlight regulates our circadian rhythm through complex pathways that include melatonin, serotonin and body temperature. Improving your circadian rhythm has dramatically positive effects on your body and mood.
Depending on each person, your body’s internal clock (called *circadian rhythm*) signals sleep twice a day:
The cycle of sunlight and darkness also affects our *circadian rhythm*, in addition to the length of time that you’ve been awake...

*the longer you stay awake, the more you need to sleep.*
Circadian Rhythms

• Involvement in shiftwork, in particular night work, results in a disruption of these inherent rhythms.

• These phase shifts occur slowly over a considerable period.
  – Some people can start to adapt after 2-3 days while some take much longer.

• Adjustment on “days off” does not happen because most individuals go back to normal day schedules
Circadian Rhythms

• Circadian rhythm phase shifts induced by shiftwork can have significant effects on the worker in terms of:
  • performance efficiency
  • motivation
  • sleep patterns
  • family and social life
  • health
The bottom line…

- Has a strong need for sleep
- When you withhold sleep what happens?
- Your brain will make you sleep
  No matter the time of day
  Or the action you may be involved in
Shift Work and Crash Risk
Shift Work and Crash Risk

• Nearly three-quarters of adults in America (71%) drive a car to and from work, and many are drowsy drivers

• Shift workers are more likely to drive to or from work drowsy (36% vs. 25%)

• Crashes or near misses
  – 4:00 – 6:00 a.m.
  – midnight – 2:00 a.m
  – 2:00 – 4:00 p.m.

National Sleep Foundation, http://drowsydriving.org
Lack of sleep mimics blood alcohol concentration

- 24 hours without sleep: 0.10%
- 21 hours without sleep: 0.08% (legal limit in all states)
- 18 hours without sleep: 0.05%
Crash Data Stats

• Occurs late at night or early morning hours or mid afternoon

• Injuries tend to be serious or fatal

• Involves single vehicles leaving roadway

• Occurs on high speed roadways, long stretches of road

• Involves driver traveling alone

• No evidence of braking – no skid marks nor evasive maneuvers evident
Shiftwork Disorder

- Shift work sleep disorder is a circadian rhythm sleep disorder
- The main complaint for people with shift work sleep disorder is excessive sleepiness. Other symptoms include:
  - Insomnia
  - Disrupted sleep schedules
  - Reduced performance
  - Difficulties with personal relationships
  - Irritability/depressed mood
Symptoms of Shift Work Disorder

- Insufficient sleep ~ 5.5 hours
- Dozing off at work
- Quality of sleep
- Reduced sense of well being
- >50% report insomnia
- >30% report excessive daytime sleepiness
- 23% report both
Treatment

• Minimize exposure to bright light when sleeping
• Sleeping in a cool room - lower core body temp
• No stimulant medications in second half of the shift
• Use of caffeine in early shift
• Planned napping
• Decrease shifts to 8-10 hours
Bright Light Therapy

• Use of bright light intermittently for 20 minutes during the night shift
  – Work performance improved
  – Alertness improved
  – Mood improved
Melatonin

Melatonin levels peak in the middle of the night.

The pineal gland begins producing melatonin in the evening.

Melatonin levels decline to low daytime amounts.
Modafinil

• Used to reduce sleepiness in shift workers
• Activates brain areas that control wakefulness (hypothalamus)
• Side effects- nausea, dizziness, and insomnia
• Should not be used in place of adequate sleep habits
Shift Work:
Promoting Alertness at Work

• Take short breaks
• Use the buddy system
• Exercise on breaks
• Use caffeine as a tool not as a crutch
• Schedule demanding tasks when you are most alert
• Share ideas with others in the same position
• Eat healthy
Shift Work: Promoting Sleep at Home

**LIGHT**

- Darken the bedroom & bathroom
- Install light blocking & sound absorbing curtains or shades
- Wear eye shades
- Wear dark sunglasses on the drive home
Shift Work: Promoting Sleep at Home

SOUND

• Wear ear plugs or white noise machine
• Install carpeting & drapes to absorb sound
• Unplug the telephone & publicize your work schedule to family & friends
Avoid Drowsy Driving

• If you feel drowsy, pull over in a well-lit rest area – take a 20-minute nap.
• Start your trip well rested. Get enough sleep every night.
• Avoid driving when you have a sleep deficit.
• Avoid driving between midnight and 7 am and in the mid afternoon (circadian rhythm).
• Do not drive alone
• Make regular stops – every 100 miles or 2 hours
• Switch drivers
• Caffeine doesn’t replace sleep – takes 30 mins feel affect
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