



**The following product has been
developed by the
American Academy of Sleep Medicine**

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SLEEP, ALERTNESS, and FATIGUE EDUCATION in RESIDENCY



Learning Objectives

1. List factors that put you at risk for sleepiness and fatigue.
2. Describe the impact of sleep loss on residents' personal and professional lives.
3. Recognize signs of sleepiness and fatigue in yourself and others.
4. Challenge common misconceptions among physicians about sleep and sleep loss.
5. Adapt alertness management tools and strategies for yourself and your program.

The Scope of the Problem

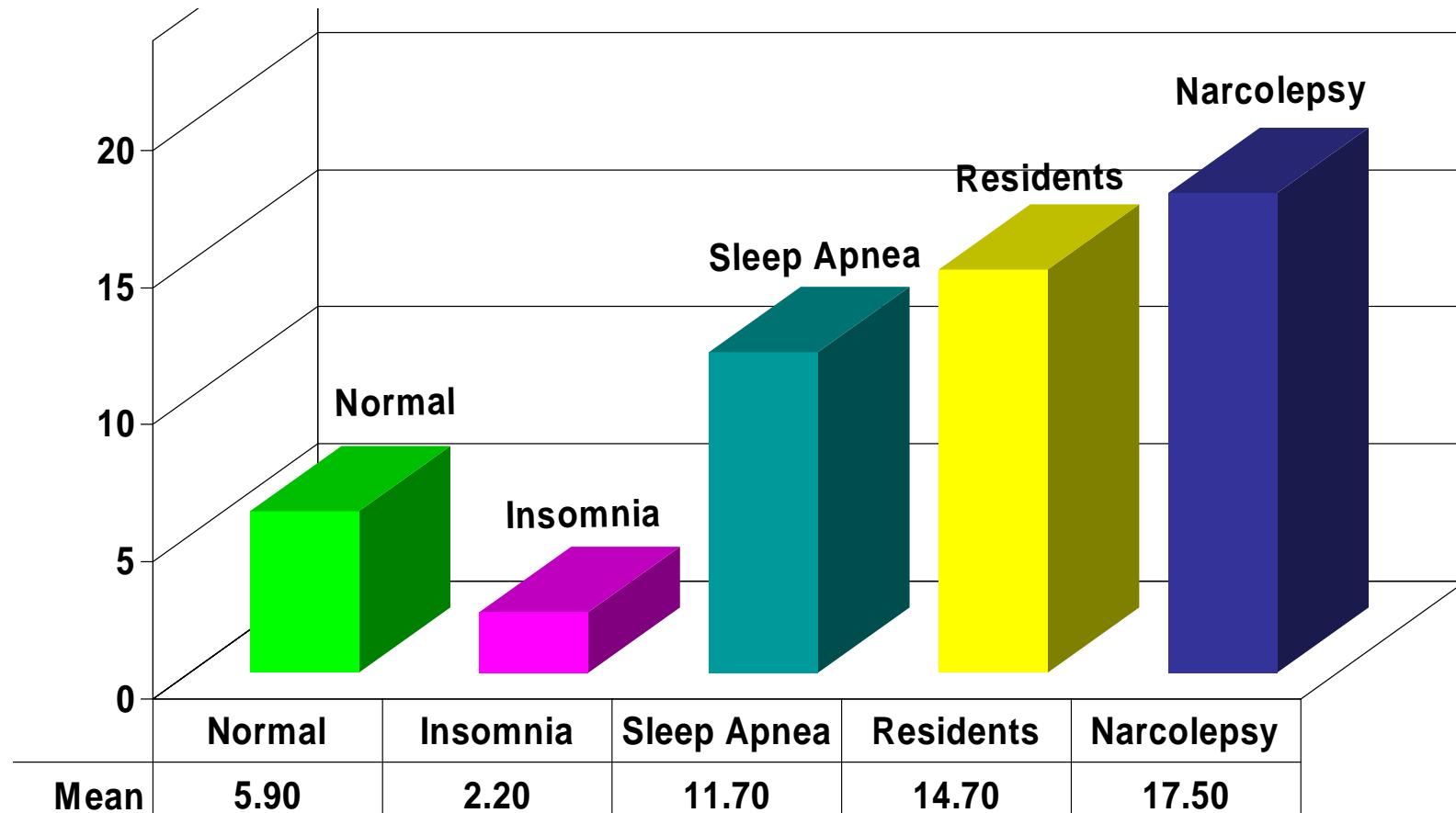


“... I always had a prior theory that when you look up all the old sixties research how do you brainwash someone? You sleep deprive them. That's number, two, and three. Sleep deprive them. You feed them bad food and you repeat things over and over again. It's like that kind of covers residency.”



**Despite this, the problem of
sleepiness and fatigue in
residency is underestimated.**

Epworth Sleepiness Scale



Sleepiness in residents is equivalent to that found in patients with serious sleep disorders. Mustafa and Strohl, unpublished data. Papp, 2002



Why So?

- **Physicians know relatively little about sleep needs and sleep physiology.**
- **There is no “drug test” for sleepiness.**
- **Most programs do not recognize and address the problem of resident sleepiness.**
- **The culture of medicine says:**
 - **“Sleep is “optional” (and you’re a wimp if you need it)”**
 - **“Less sleep = more dedicated doc”**



What causes sleepiness?





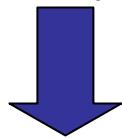
Myth: “It’s the really boring noon conferences that put me to sleep.”

Fact: Environmental factors (passive learning situation, room temperature, low light level, etc) may unmask but **DO NOT CAUSE SLEEPINESS.**

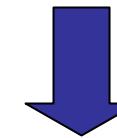


Conceptual Framework (in Residency)

Insufficient Sleep
(on call sleep loss/inadequate recovery sleep)



Fragmented Sleep
(pager, phone calls)



EXCESSIVE DAYTIME SLEEPINESS



Circadian Rhythm Disruption
(night float, rotating shifts)

**Primary
Sleep Disorders**
(sleep apnea, etc)

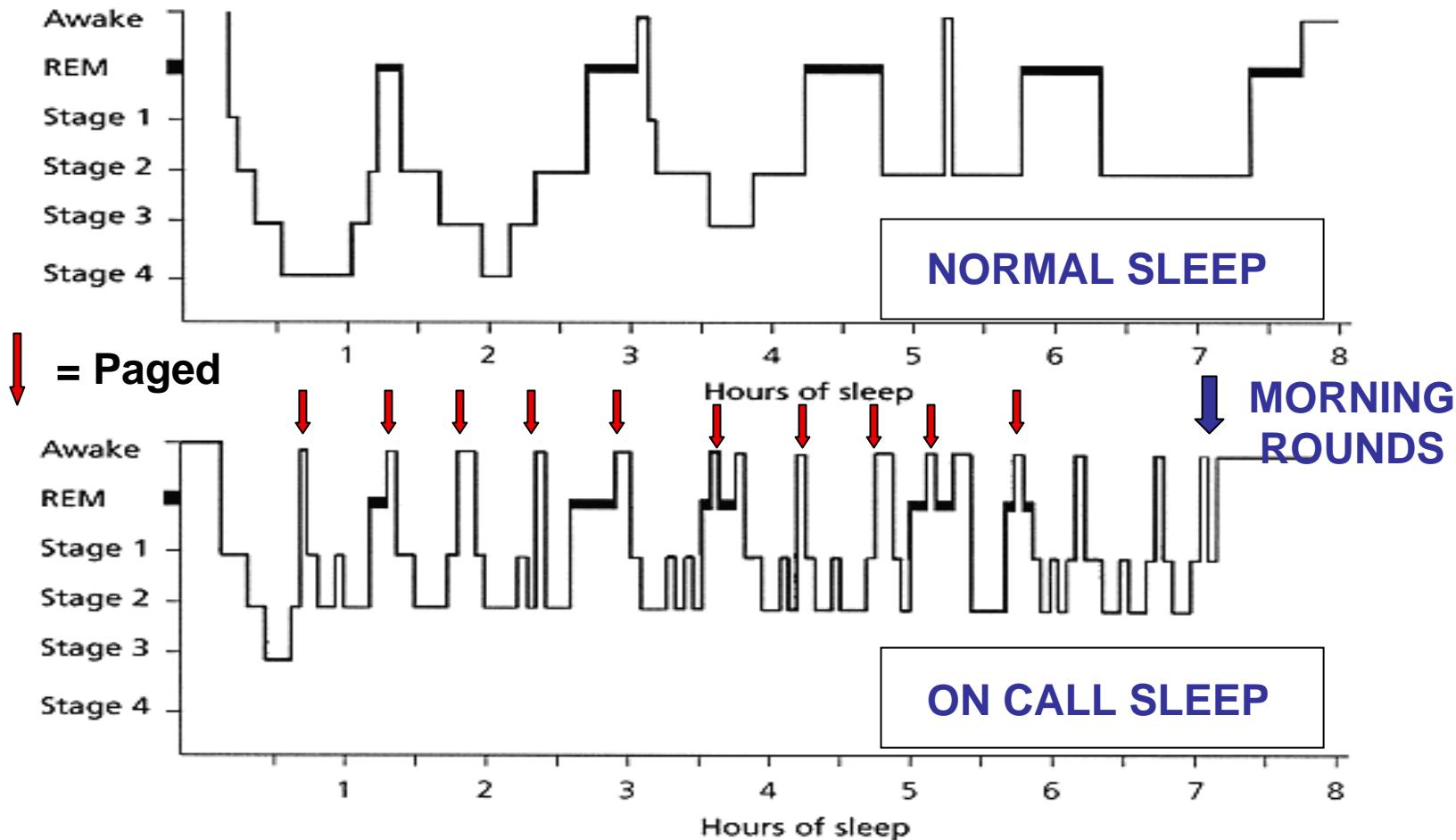




Sleep Needed vs Sleep Obtained

- **Myth:** “I’m one of those people who only need 5 hours of sleep, so none of this applies to me.”
- **Fact:** Individuals may vary somewhat in their tolerance to the effects of sleep loss, but are not able to accurately judge this themselves.
- **Fact:** Human beings need 8 hours of sleep to perform at an optimal level.
- **Fact:** **Getting less than 8 hours of sleep starts to create a “sleep debt” which must be paid off.**

Sleep Fragmentation Affects Sleep Quality

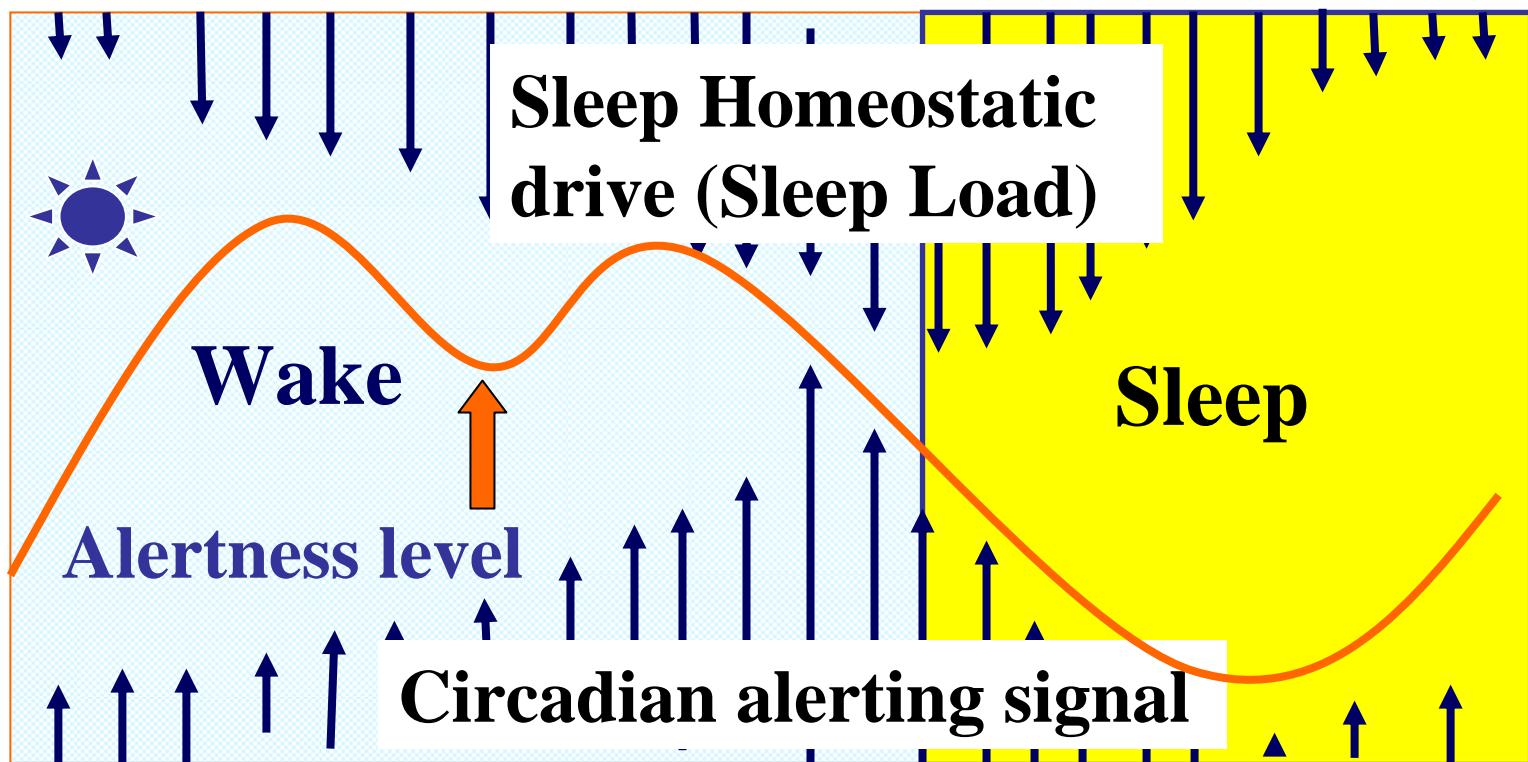


The Circadian Clock Impacts You



- It is easier to stay up later than to try to fall asleep earlier.
- It is easier to adapt to shifts in forward (clockwise) direction (day → evening → night).
- Night owls may find it easier to adapt to night shifts.

Interaction of Circadian Rhythms and Sleep



9 AM

3 PM

9 PM

3 AM

9 AM

Time



Sleep Disorders: Are you at risk?

- **Physicians can have sleep disorders too!**
 - Obstructive sleep apnea
 - Restless legs syndrome
 - Periodic limb movement disorder
 - Learned or “conditioned” insomnia
 - Medication-induced insomnia



Adaptation to Sleep Loss

Myth: “I’ve learned not to need as much sleep during my residency.”

Fact: Sleep needs are genetically determined and cannot be changed.

Fact: Human beings do not “adapt” to getting less sleep than they need.

Fact: **Although performance of tasks may improve somewhat with effort, *optimal* performance and *consistency* of performance do not!**



Consequences of Chronic Sleep Deprivation

Sleep is a vital and necessary function, and sleep needs (like hunger and thirst) must be met.





- **Surgery:** 20% more errors and 14% more time required to perform simulated laparoscopy **post-call (two studies)** Taffinder et al, 1998; Grantcharov et al, 2001
- **Internal Medicine:** efficiency and accuracy of ECG interpretation impaired in **sleep-deprived interns** Lingenfelter et al, 1994
- **Pediatrics:** time required to place an intra-arterial line increased significantly in **sleep-deprived** Storer et al, 1989



Across Tasks

Emergency Medicine: significant reductions in comprehensiveness of history & physical exam documentation in second-year residents Bertram 1988

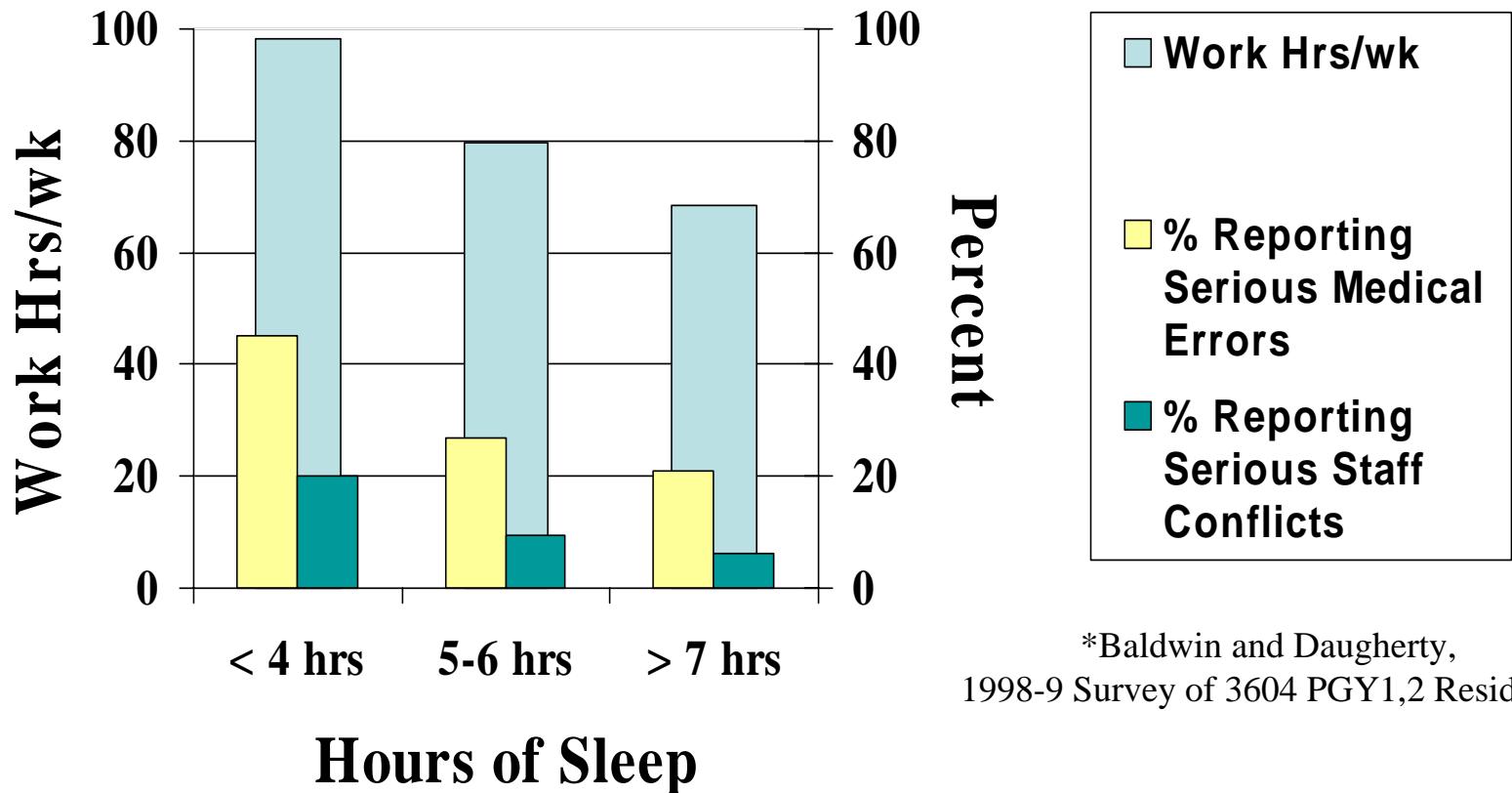
Family Medicine: scores achieved on the ABFM practice in-training exam negatively correlated with pre-test sleep amounts Jacques et al 1990



Impact on Professionalism

“Your own patients have become the enemy...because they are the one thing that stands between you and a few hours of sleep.”

Work Hours, Medical Errors, and Workplace Conflicts by Average Daily Hours of Sleep*



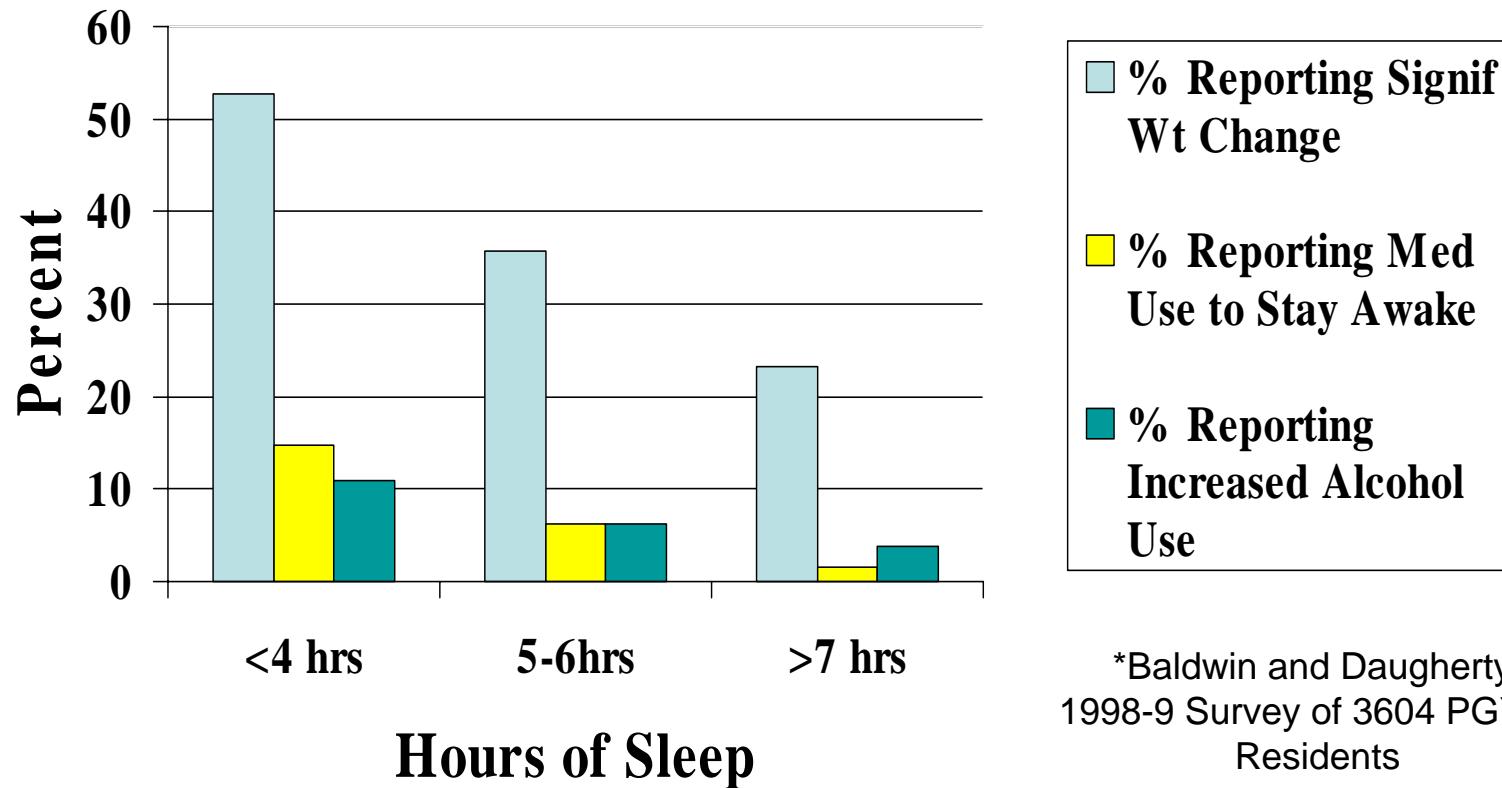
*Baldwin and Daugherty,
1998-9 Survey of 3604 PGY1,2 Residents



Bottom Line:

You need to be alert to take the best possible care of your patients and **yourself**.

Adverse Health Consequences by Average Daily Hours of Sleep*



*Baldwin and Daugherty,
1998-9 Survey of 3604 PGY1,2
Residents



Sleep Loss and Fatigue: Safety Issues

- 58% of emergency medicine residents reported near-crashes driving.
 - 80% post night-shift
 - Increased with number of night shifts/month
- Steele et al 1999
- 50% greater risk of blood-borne pathogen exposure incidents (needlestick, laceration, etc) in residents between 10pm and 6am. Parks 2000

Impact on Medical Education



“We all know that you stop learning after 12 or 13 or 14 hours. You don’t learn anything except how to cut corners and how to survive.”



Impact on Medical Education

- Residents working longer hours report decreased satisfaction with learning environment and decreased motivation to learn. Baldwin et al 1997
- Study of surgical residents showed less operative participation associated with more frequent call. Sawyer et al 1999



Impact on Medical Errors

- Surveys: more than 60 % of anesthesiologists report making fatigue-related errors.

Gravenstein 1990

- Case Reviews:

- 3% of anesthesia incidents
- 5% “preventable incidents”
- 10% drug errors Williamson 1993
- Post-op surgical complication rates 45%,
higher if resident was post-call

Morris 2000

“**fatigue-related**”

Haynes et al 1995



Recognizing Sleepiness in Yourself and Others



- **Myth:** “If I can just get through the night (on call), I’m fine in the morning.”
- **Fact:** A decline in performance starts after about 15-16 hours of continued wakefulness.
- **Fact:** The period of lowest alertness after being up all night is between 6am and 11am (eg, morning rounds).



Estimating Sleepiness

Myth: “I can tell how tired I am and I know when I’m not functioning up to par.”

Fact: Studies show that sleepy people *underestimate* their level of sleepiness and *overestimate* their alertness.

Fact: The sleepier you are, the *less accurate* your perception of degree of impairment.

Fact: You can fall asleep briefly (“microsleeps”) without knowing it!



Anesthesia Resident Study

- Residents did not perceive themselves to be asleep almost half of the time they had actually fallen asleep.
- Residents were wrong 76% of the time when they reported having stayed awake.

Howard et al 2002



Recognize The Warning Signs of Sleepiness

- Falling asleep in conferences or on rounds
- Feeling restless and irritable with staff, colleagues, family, and friends
- Having to check your work repeatedly
- Having difficulty focusing on the care of your patients
- Feeling like you really just don't care



**If you don't recognize that
you're sleepy,
you're not likely
to do anything about it.**



Alertness Management Strategies





Myth: “I’d rather just “power through” when I’m tired; besides, even when I can nap, it just makes me feel worse.”

Fact: Some sleep is always better than no sleep.

Fact: At *what time* and for *how long* you sleep are key to getting the most out of napping.



Napping

Pros: Naps temporarily improve alertness.

Types: preventative (pre-call)
operational (on the job)

Length:

short naps: no longer than 30 minutes to avoid the grogginess (“sleep inertia”) that occurs when you’re awakened from deep sleep

long naps: 2 hours (range 30 to 180 minutes)



Napping

Timing:

- if possible, take advantage of circadian “windows of opportunity” (2-5 am and 2-5 pm);
- but if not, nap whenever you can!

Cons: sleep inertia; allow adequate recovery time (15-30 minutes)

Bottom line: Naps take the edge off but *do not replace* adequate sleep.



Healthy Sleep Habits

Get adequate (7 to 9 hours) sleep *before* anticipated sleep loss.

Avoid starting out with a sleep deficit!

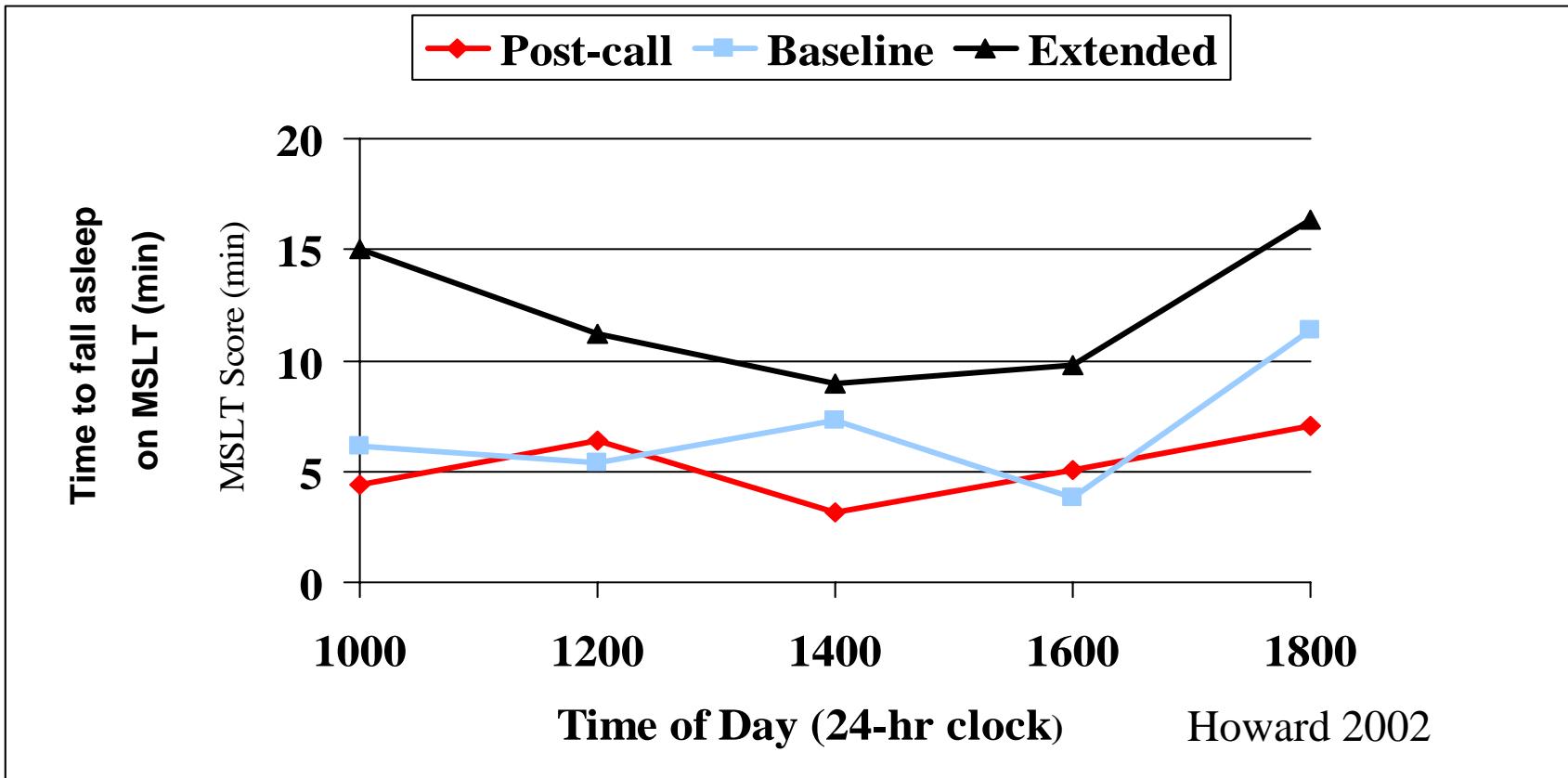


Recovery from Sleep Loss

Myth: “All I need is my usual 5 to 6 hours the night after call and I’m fine.”

Fact: Recovery from on-call sleep loss generally takes 2 nights of extended sleep to restore baseline alertness.

Fact: Recovery sleep generally has a higher percentage of deep sleep, which is needed to counteract the effects of sleep loss.



Sleepiness level post-call  vs on a normal (baseline) schedule  was equivalent in anesthesia residents. A period of extended sleep  (over 4 nights) normalized post-call sleepiness levels.



Healthy Sleep Habits

- Go to bed and get up at about the same time every day.
- Develop a pre-sleep routine.
- Use relaxation to help you fall asleep.
- Protect your sleep time; enlist your family and friends!



Healthy Sleep Habits

- Sleeping environment:
 - Cooler temperature
 - Dark (eye shades, room darkening shades)
 - Quiet (unplug phone, turn off pager, use ear plugs, white noise machine)
- Avoid going to bed hungry, but no heavy meals within 3 hours of sleep.
- Get regular exercise but avoid heavy exercise within 3 hours of sleep.



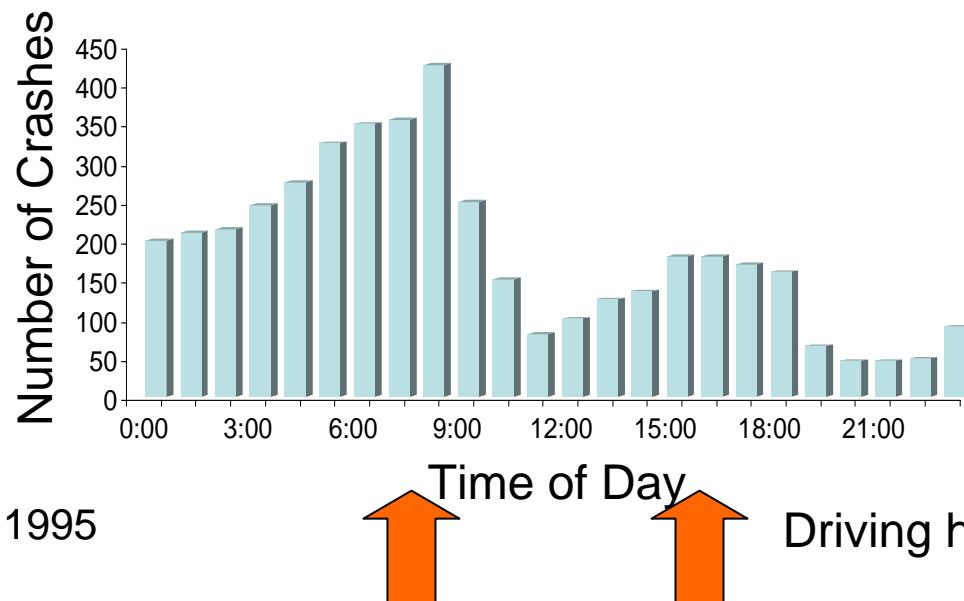
Recognize Signs of DWD *

- Trouble focusing on the road
- Difficulty keeping your eyes open
- Nodding
- Yawning repeatedly
- Drifting from your lane, missing signs or exits
- Not remembering driving the last few miles
- Closing your eyes at stoplights

* *Driving While Drowsy*

Risk Factors for Drowsy Driving

- Taking any sedating medications
- Drinking even small amounts of alcohol
- Having a sleep disorder (sleep apnea)
- Driving long distances without breaks
- Driving alone or on a boring road



Pack et al 1995



Drive Smart; Drive Safe

- AVOID driving if drowsy.
- If you are really sleepy, get a ride home, take a taxi, or use public transportation.
- Take a 20 minute nap and/or drink a cup of coffee before going home post-call.
- Stop driving if you notice the warning signs of sleepiness.
- Pull off the road at a safe place, take a short nap.



Drowsy Driving: What Does Not Work

- Turning up the radio
- Opening the car window
- Chewing gum
- Blowing cold air (water) on your face
- Slapping (pinching) yourself hard
- Promising yourself a reward for staying awake



**It takes only a 4 second
lapse in attention to have a
drowsy driving crash.**



Drugs

- **Melatonin:** little data in residents
- **Hypnotics:** may be helpful in *specific* situations (eg, persistent insomnia)
- **AVOID:** using stimulants (methylphenidate, dextroamphetamine, modafinil) to stay awake
- **AVOID:** using alcohol to help you fall asleep; it induces sleep onset but disrupts sleep later on



Caffeine

- *Strategic* consumption is key
- Effects within 15 – 30 minutes; half-life 3 to 7 hours
- Use for temporary relief of sleepiness
- Cons:
 - disrupts subsequent sleep (more arousals)
 - tolerance may develop
 - diuretic effects



Adapting To Night Shifts

- **Myth:** “I get used to night shifts right away; no problem.”
- **Fact:** It takes at least a week for circadian rhythms and sleep patterns to adjust.
- **Fact:** Adjustment often includes physical and mental symptoms (think jet lag).
- **Fact:** Direction of shift rotation affects adaptation (forward/clockwise easier to adapt).



How To Survive Night Float

- Protect your sleep.
- Nap before work.
- Consider “splitting” sleep into two 4 hour periods.
- Have as much exposure to bright light as possible when you need to be alert.
- Avoid light exposure in the morning after night shift (be cool and wear dark glasses driving home from work).



“The best laid plans...”

Study: Impact of night float coverage
(2am to 6am)

Results: “protected” interns slept less than controls; used time to catch up on work, not sleep; thus **there was no improvement in performance**

Richardson et al 1996



Alertness Strategies

- There is no “magic bullet.”
- Know your own vulnerability to sleep loss.
- Learn what works for you from a range of strategies.
- There needs to be a shared responsibility for fatigue management and a “culture of support” in the training program.



In Summary...

- Fatigue is an impairment like alcohol or drugs.
- Drowsiness, sleepiness, and fatigue cannot be eliminated in residency, but can be managed.
- Recognition of sleepiness and fatigue and use of alertness management strategies are simple ways to help combat sleepiness in residency.
- When sleepiness interferes with your performance or health, talk to your supervisors and program director.



For More Information Contact:
Your local Sleep Education Advocate
or visit
www.aasmnet.org/MEDSleepprogram.htm



**“Patients have a right to expect a healthy,
alert, responsible, and responsive
physician.”**

*January 1994 statement by American College of Surgeons
Re-approved and re-issued June 2002*