Sleep Deprivation and Fatigue

Effects on Performance in Residency Training

Adapted from the American Academy of Sleep Medicine

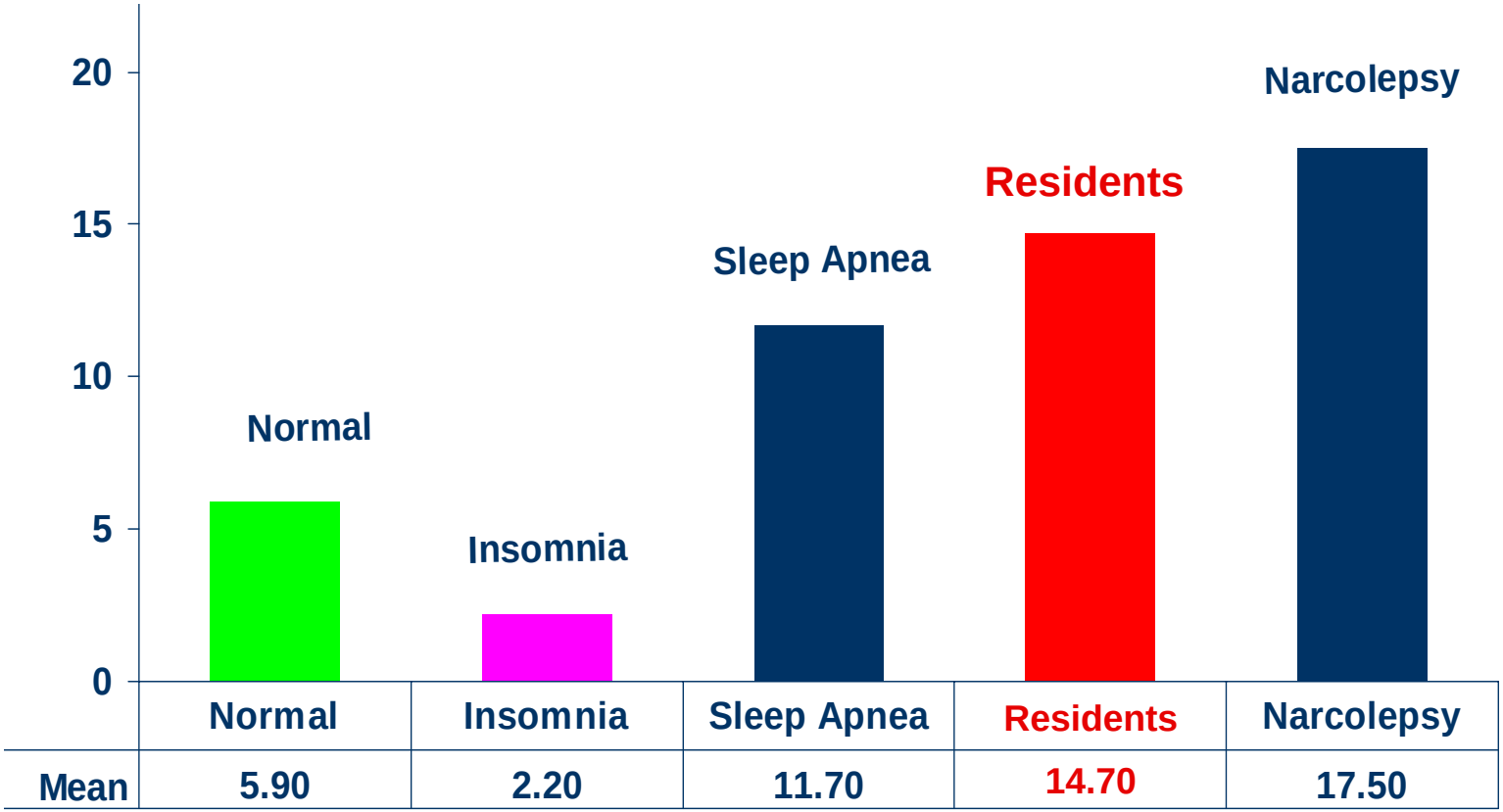
Learning Objectives

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

What is the Problem?

- We know relatively little about sleep needs & sleep physiology
- Performance problems associated with sleep deprivation and fatigue exists and may be underestimated
- There is no “drug test” for sleepiness
- The culture says…
  - ✓ Sleep is optional
  - ✓ You’re a wimp if you need more sleep
  - ✓ Less sleep equals more dedication

Epworth Sleepiness Scale



	Normal	Insomnia	Sleep Apnea	Residents	Narcolepsy
Mean	5.90	2.20	11.70	14.70	17.50

Sleepiness in residents equals that found in patients with serious sleep disorders

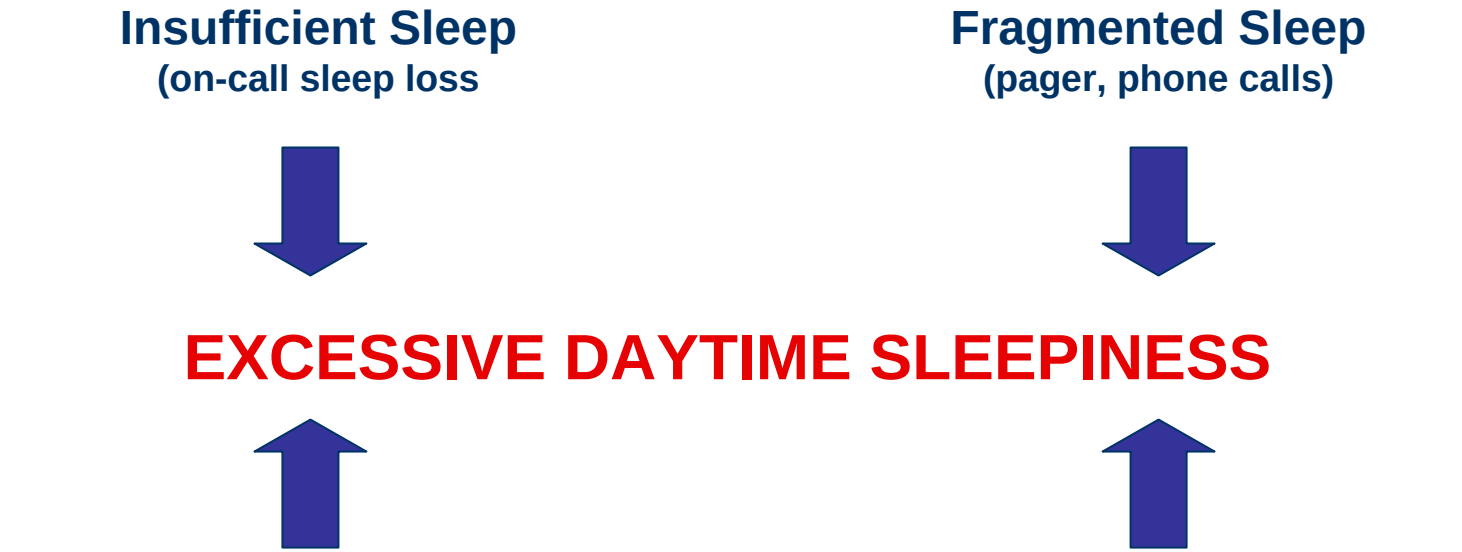
Mustafa and Strohl, unpublished data. Papp, 2002

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.

A Conceptual Framework



How Much Sleep is Enough?

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: Getting less than 8 hours of sleep starts to create a "sleep debt" which must be paid off.

The Circadian Clock Impacts You

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

Adaptation to Sleep Loss

Myth: I've learned not to need as much sleep during residency

Fact: Sleep needs are gentically determined & cannot be changed

Fact: Humans do not "adapt" to getting less sleep than needed

Consequences of Chronic Sleep Deprivation

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

Lingenfelser et al, 1994

Pediatrics: Time required to place an intra-arterial line increased significantly in sleep-deprived

Storer et al, 1989

Consequences of Chronic Sleep Deprivation

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

Bertram 1988

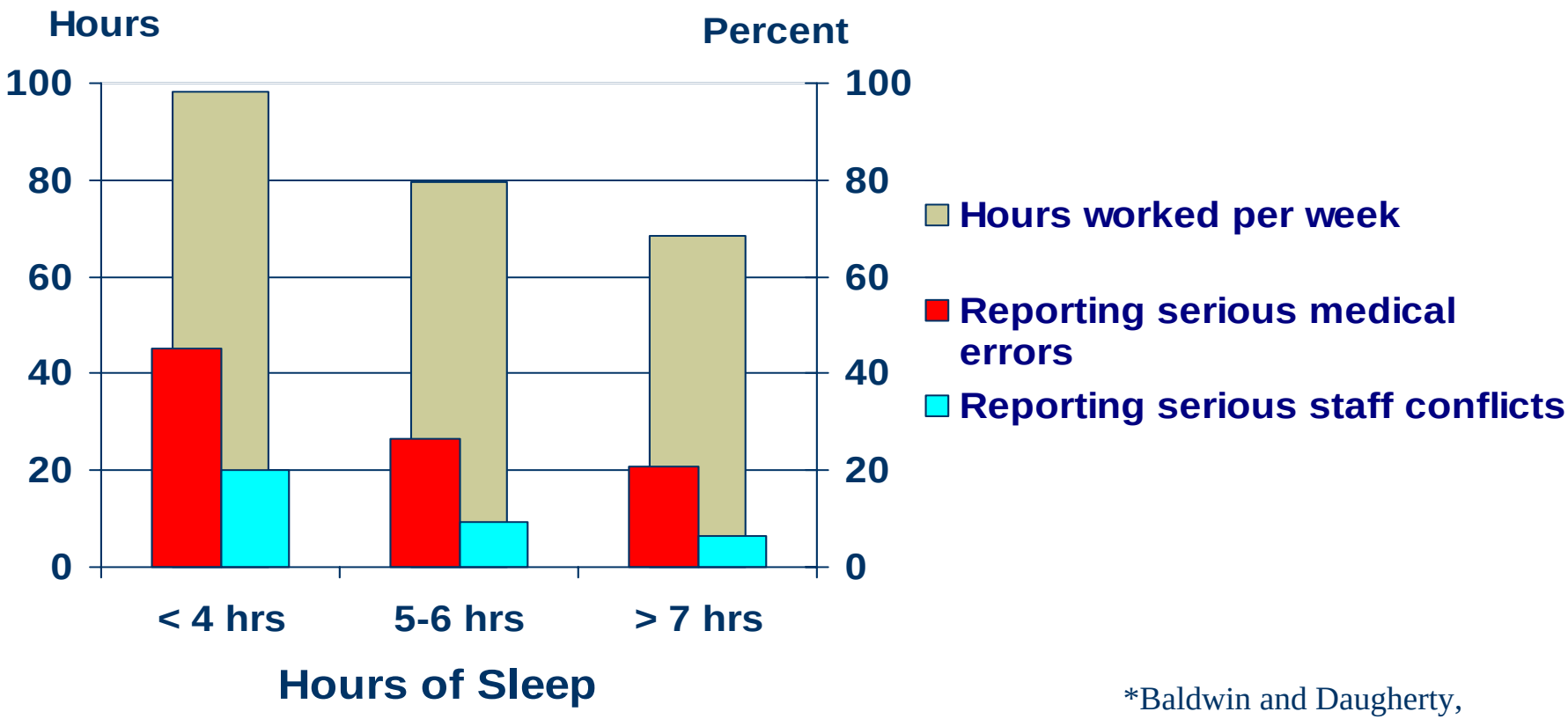
Family Medicine: Scores achieved on the ABFM practice in-training exam negatively correlated with pre-test sleep amounts

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.”

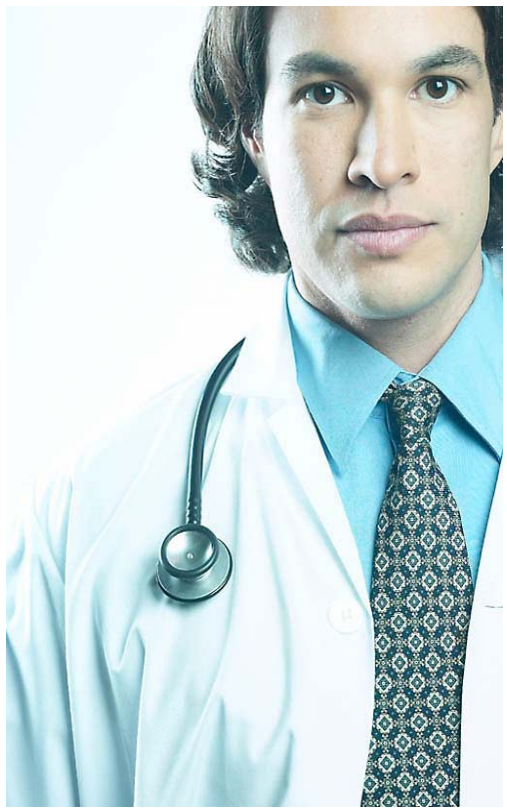
Work Hours, Medical Errors, and Workplace Conflicts by Average Daily Hours of Sleep*



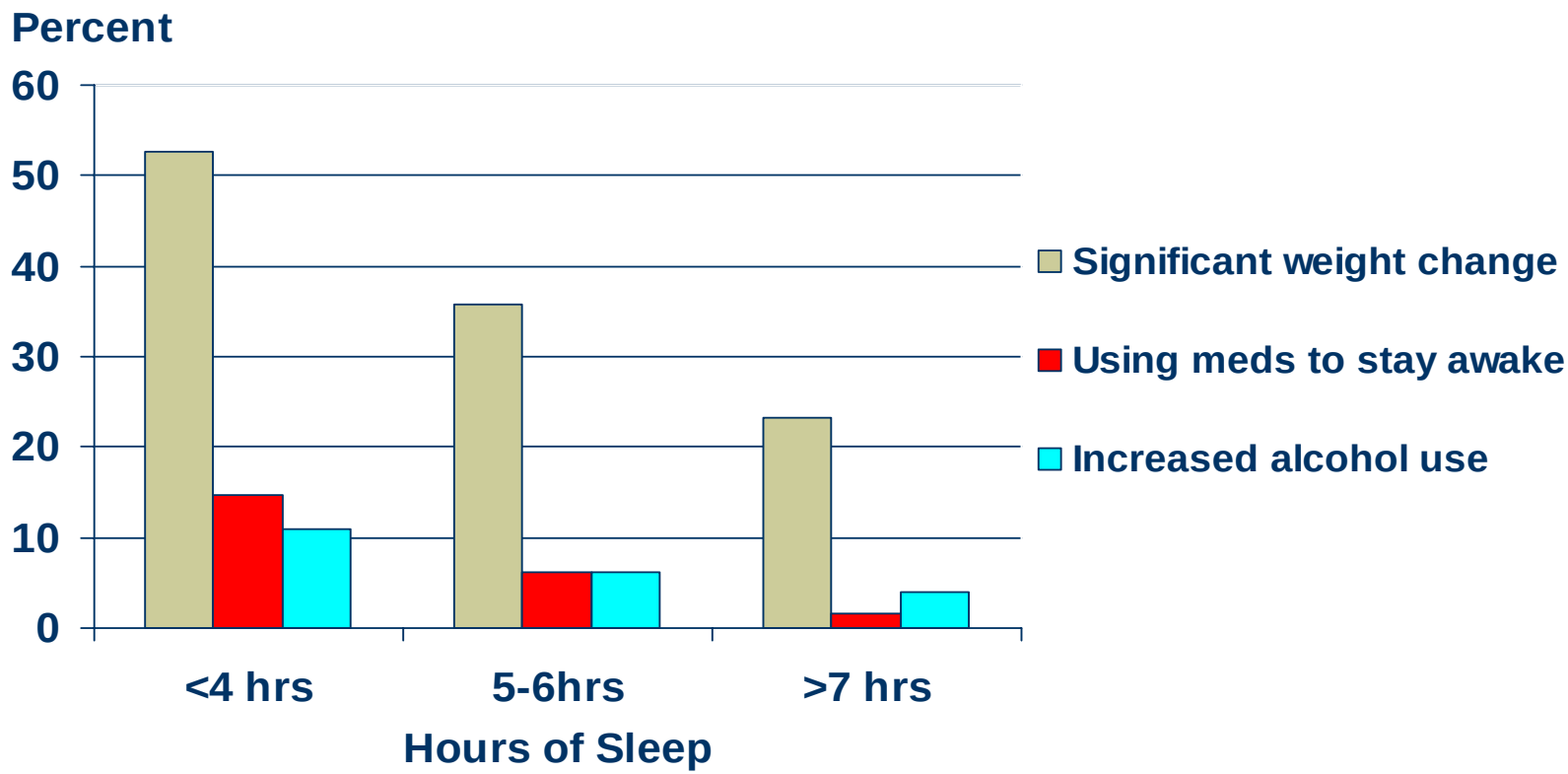
*Baldwin and Daugherty,
1998-9 Survey of 3604 PGY1,2 Residents

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.”

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.

Estimating Sleepiness

Myth: **I can tell how tired I am and 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 (microsleep) without knowing it!**

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

Alertness Management Strategies

Myth: I'd rather just "power through" when I'm tired; besides, when I 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.

Alertness Management Strategies

- There is no “magic bullet”
- Know your own vulnerability to sleep loss
- Learn what works for you from a range of strategies

Napping

Naps temporarily improve alertness

Types: Preventative (pre-call) and 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)--
If not, nap whenever you can!

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

Naps take the edge off but do not replace adequate sleep.

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**
  - **tolerance may develop**
  - **diuretic effects**

Drugs

Melatonin:	**Little data in residents**
Hypnotics:	**May be helpful in specific situations (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**

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.**

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

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

There was no improvement in performance

Richardson et al 1996

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 during residency.
- When sleepiness interferes with your performance or health talk to your supervisors and program director.

In Summary…

For more information 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

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