

## Tired All The Time!



Presented by  
Fred Hardinge, DrPH, RD  
PositiveChoices.com

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## Yo-Yo Ma Forgets Cello!

\$2.5 million, 266 yr. old instrument



“I did something really stupid. I was in such a rush, I was so exhausted, I’d given a concert at Carnegie Hall last night. I just forgot!”

New York (AP)  
October 16, 1999

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## Three Questions!

1. Can you commit suicide by not breathing?
2. Can not eating be fatal?
3. Can you kill yourself by not sleeping?

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It all depends on what you are doing when you fall asleep--willingly or unwillingly!

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## The tired brain simply goes to sleep ... zzzzzz

- If we go long enough without sleep, our brain will simply fall asleep, regardless of what we are doing--even while we are walking or talking.
- The seriousness of the outcome depends on what we are doing when we go to sleep!



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## Sleep Deprivation Can Be Deadly!

“Emergency medicine residents are 6.7 times more likely to have a MVC due to falling asleep at the wheel during their residency” than before residency.

Steele, et al. Academic Emergency Medicine 1999;6(10):1050-1053.  
Geer, et al. Anesthesiology 1997;87(3A):A938.  
Academic Emergency Medicine 2000;7(5):451



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## But I Don't Feel Like I Need Much Sleep!

- Studies show that sleep deprivation decreases objective measures of performance
- Yet... sleep deprived college students subjectively rated their alertness higher than did their well-rested colleagues.

Pilcher, et al. Effects of sleep deprivation on performance: a meta-analysis. Sleep 1996 May;19(4):318-26.

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## Americans Are Tired!

2008 Gallup/Newsweek Survey

- 37% very tired more than 3 days per week!
- 25% tired all the time!



Almost 2/3 of population are tired most of the time!

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## Current Trends

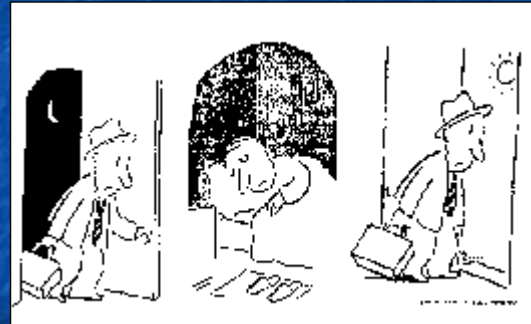
- Adults sleep 1.5 hours less per day than our grandparents!
- Teens sleep 2.5 hours less per day since 1962!



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## Proud to Be Pooped!



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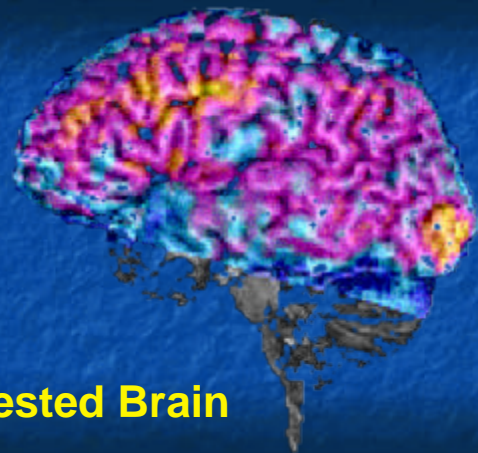
## A Few Well Known Disasters

- Exxon Valdez accident (1989)
- Chernobyl nuclear release
- Challenger disaster (1989)
- Friendly-fire incidents in Desert Storm
- Death of young pilot, Jessica

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## Rested Brain



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## Tired Brain

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"Fatigue selectively targets the highest order of cognitive mental functions. Critical thinking becomes *impossible*."

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## The High Order Mental Functions

- Discernment
- Judgment
- Initiative
- Creativity
- Forethought



Decision-making

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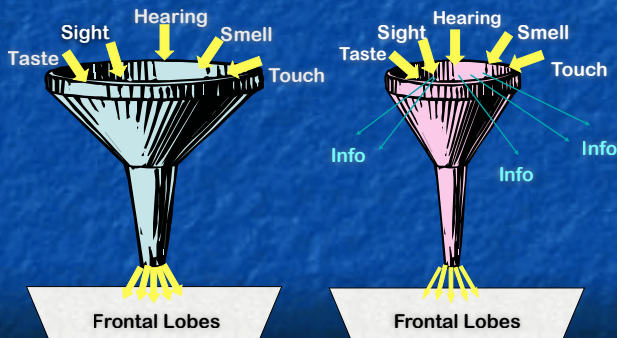
## Fatigue Primarily Affects Two Areas of the Brain

- Thalamus: gates (passes) sensory information to the higher centers of brain
- Frontal lobes: processes info to make decisions
  - ▶ current information from senses
  - ▶ previously learned information

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## Fatigue "Chokes" the Thalamus



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## Fatigue Lowers Cognitive Efficiency

- Reduces ability to process new information efficiently
- Lessens awareness of our surroundings
- Impairs learning new information
- Decreases long-term memory
- Decision-making falls to chance levels



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“Unreasonable hours are destructive to the physical, the mental, and the moral powers. If the brain were given proper periods of rest, the thoughts would be clear and sharp, and business would be expedited.” 7T 256

A tired person is *inefficient, slower, less safe* and makes more *mistakes!*



## Three Basic Causes of Fatigue

- Long hours of physical work or activity
- Long hours of mental work
  - Poor stress management skills (emotional stress)
- The lack of sufficient sleep

OR

**ANY COMBINATION OF THE ABOVE!**

“Today there is a ubiquitous intrusion of personal, social and cultural activity into the time traditionally reserved for sleep!”

## Technology Has Increased Fatigue



|                         |          |   |            |
|-------------------------|----------|---|------------|
| Interface:              | Simple   | → | Complex    |
| Demands:                | Physical | → | Mental     |
| Options:                | Few      | → | Many       |
| Training:               | Once     | → | Continuous |
| Span of Responsibility: | Narrow   | → | Broad      |
| Cost of Error:          | Minimal  | → | Large      |

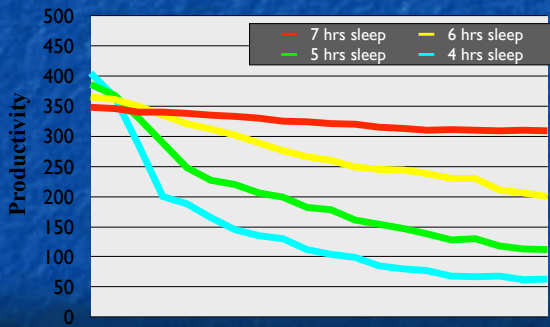


George M. Beard (1839-1883)  
*American Nervousness, Its Causes and Consequences, 1881*

“The chief primary cause of . . . [the] very rapid increase of nervousness is modern civilization, which is distinguished from the ancient by these five characteristics:

- steam power
- the periodical press
- the telegraph,
- the sciences,
- and the mental activity of women.”

## The Impact of Sleep Debt On Productivity



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## Risks from Sleep Deficit

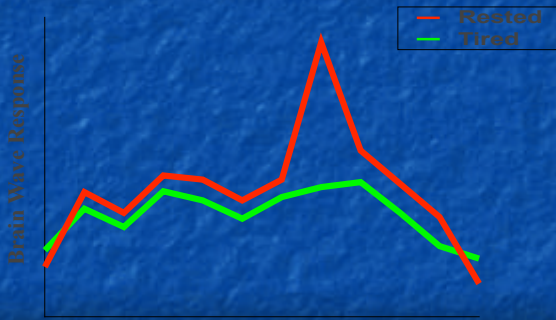
- After four 8-hour recovery nights of sleep,
- subjects were still making more errors than when they started.

Belenky, et al. *J Sleep Res.* 2000;9(4):335-52. *J Sleep Res.* 1999;8(4):237-45. Review.

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Brain Wave Response



IMPACT OF SMALL AMOUNTS OF SLEEP LOSS

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## Sleep deprivation effects: not just in your head

- Sleep has traditionally been viewed from its effects on brain activity and function.
- New research shows its effects on other organs may be very significant to physical health.

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## Immune Function Impaired by Sleep Loss

- A 37% decrease in NK cells was observed with one night's sleep loss ( $p < 0.02$ )
- Normal levels returned with rest
- Conclusion: sleep deprivation may increase susceptibility to illness.

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Sleep Research Online 2(4): 107-111, 1999

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## Sleep deficit and obesity linked?

- Even moderate sleep debt causes altered metabolic state in healthy young males comparable to that of diabetics, with 30% impairment in glucose metabolism.
- The growing epidemic of sleep deprivation may be causally linked to the coincident epidemic of obesity.

Spiegel K, Leproult R, Van Cauter E. Impact of sleep debt on metabolic and endocrine function. *Lancet* 1999;354(9188):1435-9.

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## Health Risks from Sleep Deficit

- After 4 hours of sleep for 6 nights, healthy young men had blood tests that nearly matched those of diabetics
  - ▶ Ability to process blood sugar reduced by 30%
  - ▶ Huge drop in their insulin response (↑obesity)
  - ▶ Elevated levels of stress hormone cortisol, which can lead to hypertension and memory impairment.

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Spiegel K, Leproult R, Van Cauter E. *Lancet* 1999;354(9188):1435-9

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## Sleep Deficit and Obesity May be Linked

- The growing epidemic of sleep deprivation may be causally linked to the coincident epidemic of obesity.
- Interactions of sleep loss and leptin and ghrelin!

Spiegel K, Leproult R, Van Cauter E. Impact of sleep debt on metabolic and endocrine function. *Lancet* 1999;354(9188):1435-9

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## Sleep Deprivation Limits Our Ability to Do the Hard Things

- 50 young, healthy subjects (32 female, 18 male)
- Effort Assessment Task used
- Assessed following sleep (7.4 hours) and sleep deprivation (1.7 hours)
- Conclusions: Those sleep deprived were found unwilling to work at tasks that required more than automatic performance!

Engle-Friedman, et al *Sleep* 1999;(22):151

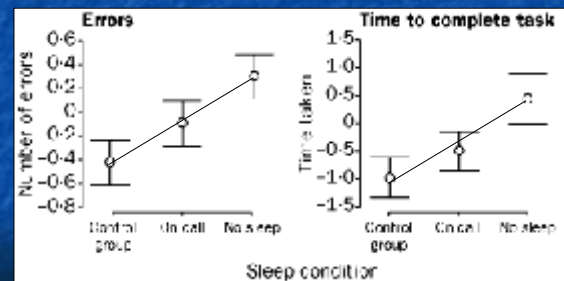
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## Surgeon's Performance Affected

- Performance on laproscopic training simulator decreases with less sleep



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Taffinder, et al. Effect of sleep deprivation on surgeons' dexterity on laparoscopy simulator. *Lancet* October 10, 1998;352:1191.

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## Why Do We not Sleep Enough?

- Demands of a 24-hour society and rotating shift work
- Family needs superimposed on work responsibilities
- Increased time spent watching TV and surfing the Internet
- Insomnia, sleep apnea and other disorders
- We do not VALUE sleep

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## Impairs Cognition and Judgment

- Similar to alcohol intoxication
  - ▶ an actual performance impairment
  - ▶ a decreased awareness of that impairment.
- It impairs cognition and judgement, as well as motor function.

Pitcher, et al. Effects of sleep deprivation on performance: a meta-analysis. *Sleep* 1996; May;19(4):318-26.

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## Sleep impairment and intoxication

- Studies comparing alcohol intoxication impairment with impairment from sleep deprivation have shown striking parallels between the two states of consciousness.
- Approximately 16-18 hours of continuous wakefulness in healthy adults produced performance impairments comparable to legal intoxication with alcohol.  
(BAC >0.08%)

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Dawson, et al. *Nature* 1997;388:235.  
Williamson AM, et al. *Occup Environ Med* 2000;57:649-655.

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## Which is Better? Tired or Drunk

### Wakefulness

17 hrs.

=

### Equivalent BA

0.05

24 hrs.

=

0.1

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Nature 1997 Jul 17; 388 (6639): 235

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## Moderate Sleep Deprivation Equivalent to Legal Levels of Alcohol Intoxication

“After 17 hours of wakefulness performance on most tests was equivalent or worse than that on a BAC of 0.05%. Response speeds were up to 50% slower for many tests and accuracy measures were significantly poorer than at this level of alcohol. After 22 hours without sleep, performance reached levels equivalent to the maximum alcohol dose given to subjects (BAC of 0.1%) Sleep is needed at the end of the day if adverse effects of performance are to be avoided.”

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## Sleep Loss vs Ethanol Ingestion

- sleep loss was more potent in its sedative effects
- comparable in effects on psychomotor performance.
- ethanol produced greater memory deficits
- all subjects were less aware of their overall performance impairment.

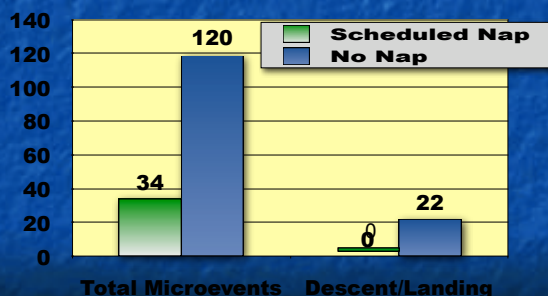
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Roches T, et al. Ethanol and sleep loss: a "dose" comparison of impairing effects. *Sleep*. 2003 Dec; 15:2681-981-5.

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## Take a Nap! First Aid for Fatigue

Last 90 minutes of transpacific flights

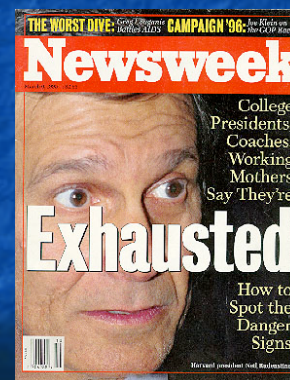


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NASA Technical Memo 103884

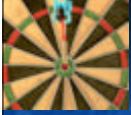
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## Fatigue Affects Even the Best!



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## Fatigue Fighter<sup>®</sup> Strategies

1. Get adequate sleep regularly -- 8-9 hours per night.
2. Exercise 30-60 min. every day.
3. Learn to control your stress.
4. Eat properly & drink plenty of water.
5. Avoid caffeinated beverages, tobacco, and alcohol.
6. Rest a day each week & annual vacation.
7. If you suspect a sleep disorder, see your doctor.

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## Peter is Tired and Denies Jesus!

“And when he thought about it, he wept.”

Mark 14:66-72

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## Spiritual Consequences of Fatigue

### 1. Increases Susceptibility to Temptation

“Anything that lessens physical strength enfeebles the mind and makes it less capable of discriminating between right and wrong. We become less capable of choosing the good and have less strength of will to do that which we know to be right.” COL 3:46

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## Spiritual Consequences of Fatigue

### 2. Lack of Spiritual Vigilance

“And if he should come in the second watch, or come in the third watch, and find them so [watching], blessed are those servants. . . Therefore you also be ready, for the Son of Man is coming at an hour you do not expect.” Luke 12:38-40

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## Spiritual Consequences of Fatigue

### 3. Diminishes spiritual insight into God's Word.

“Hearing you will hear and shall not understand, and seeing you will see and not perceive; for the heart of this people has grown dull. Their ears are hard of hearing, and their eyes they have closed, lest they should see with their eyes and hear with their ears.” Isaiah 6:9-10



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## Spiritual Consequences of Fatigue

### 4. Lessens Desire to Communicate with God



“Sometimes when fatigued by labor or oppressed with care, parents do not maintain a calm spirit, but manifest a lack of forbearance that displeases God, and brings a cloud over the family.” ST April 17, 1884

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## Spiritual Consequences of Fatigue

### 5. Disorientation & Loss of Anchor Points

**“For false christs and false prophets will rise and show signs and wonders to deceive, if possible, even the elect.”** Mark 13:22



**FATIGUE IS THE DEVIL'S  
END-RUN AROUND  
GOD'S END-TIME  
PEOPLE!**

**“God instituted the Sabbath as a day of rest to repair nature's exhausted energies. No mind can continue day after day without cessation, either in business which taxes the mental powers, or in the acquirement of knowledge, without injury. There is no night in Heaven. There is no wear and weariness of the human machinery. . .**

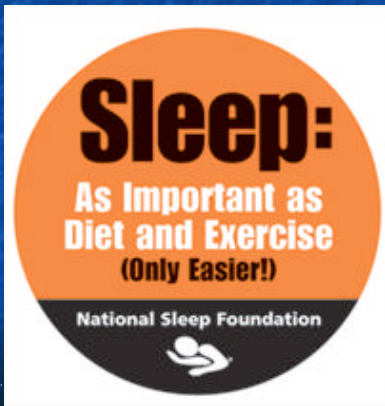
**“There we shall never be sensible of fatigue; never need or want repose. There is no tire in performing God's will; we shall never be wearied in sounding his praise. We shall always have the freshness of the morning. *But as we are now in this world, with bodies which weary, we must pay heed to God's plans, and take repose when we need***

### **A Rested Person Makes a Better Lover!**

- God
- Spouse
- Children
- Others



I know from the testimonies given me from time to time for brain workers, that sleep is worth far more before than after midnight. Two hours' good sleep before twelve o'clock is worth more than four hours after twelve o'clock. . . . 7MR 224.3



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- [fred@positivechoices.com](mailto:fred@positivechoices.com)
- [PositiveChoices.com](http://PositiveChoices.com)  
PO Box 19039  
Spokane, WA 99219  
USA



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