

Fatigue



1. Understanding the hazards of fatigue
2. Recognizing signs and symptoms of fatigue
3. Learning to managing fatigue

Estimated time to complete: 10-15 minutes

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Risk to Patients (Anesthesiology Study)

- ❑ Subjective studies in Anesthesiology have revealed that fatigue is perceived as creating significant risk for patients.
 - In two studies of anesthesia caregivers, >50 reported fatigue-related errors.
 - New Zealand Survey-86% reported having committing a fatigue-related error.
- ❑ Critical Incident Report Studies
 - Cooper et al found fatigue to be associated in 6% of critical incidents
 - Australian Incident Monitoring Study -3% of reviewed reports (n+5,600) cited fatigue as contributing factor

Howard 2002;Gander2000;Gaba 2002;Gravenstein 1990; Defoe 2001;
Wu 1991; Morris 2000

Risk to Healthcare Providers

- ❑ Studies suggest fatigue causes clinical impairment
 - Degraded hand-eye coordination in surgeons performing laparoscopy; degraded visual memory in interns
 - Most studies performed in lab setting suffered from methodological flaws
- ❑ No study has proven that fatigue on the part of healthcare providers caused errors that harm patients
- ❑ Other industries have not waited for absolute proof (ie National Transportation Safety Board- NTSB)

Gaba 2002; Rollinson 2003; Asken 1983; Samkoff 1991; Leung 1992; Owens 2001; Weinger 2002

Risk to Providers and Patients

- ❑ Residents are at a >50% risk of sustaining a blood borne pathogen exposure during night work compared with day work.
- ❑ Fatigue has been associated with increased risk for post shift automobile accidents in residents.
- ❑ Female residents have increase incidence of pregnancy induced hypertension, pre-term labor, and small-for-gestational-age infants.

Marcus 1998;Steele 1999; Kowalenko 2000; Dixon 1999; Phelan 1988 ; Miller 1989; Grunebaum 1987; Klebanoff 1990

Circadian Rhythms

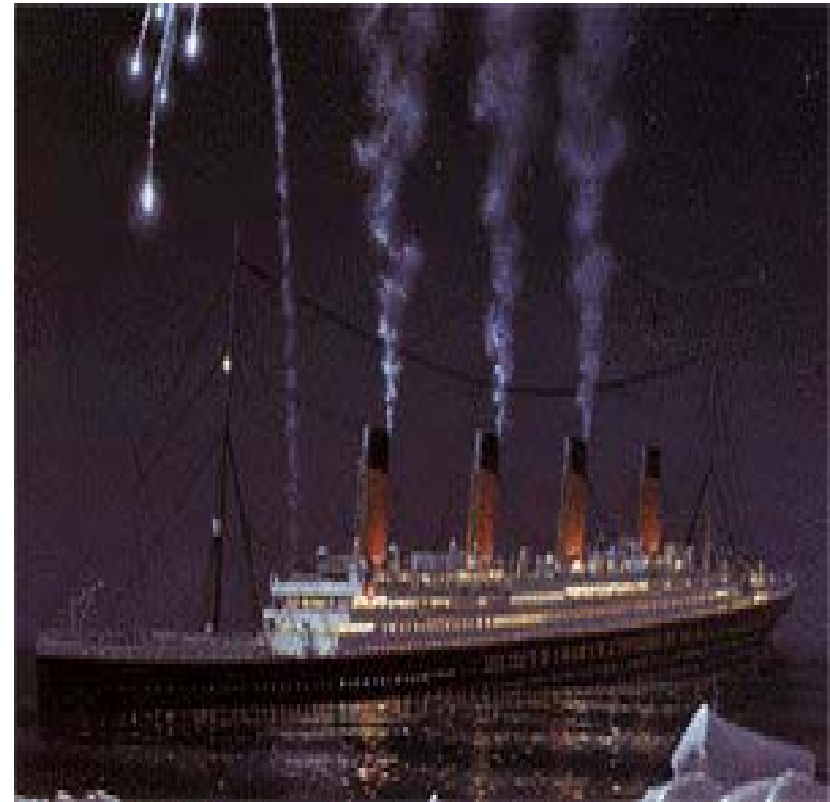
- Humans are biologically day-oriented
 - Function best during the daylight hours
 - Sleep best at night

- Our built-in body clocks control numerous body functions (blood pressure, digestion, hormone secretions, etc.).



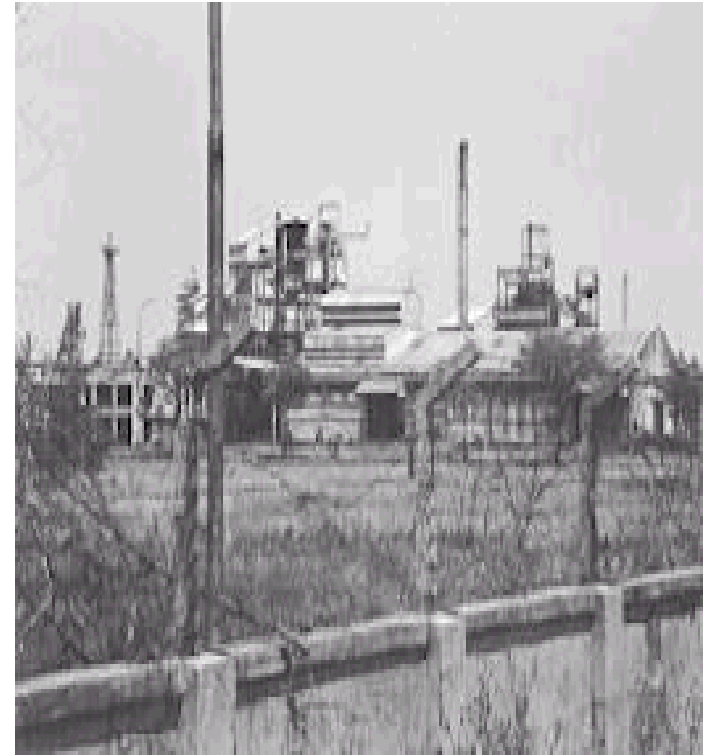
Early Morning Accidents Secondary to Fatigue

- ❑ The incident at Three Mile Island nuclear plant occurred at 4 AM.
- ❑ The Chernobyl nuclear disaster happened in the early morning hours.
- ❑ The Titanic...



Early Morning Accidents and Fatigue

- ❑ The Union Carbide chemical accident in Bhopal happened in the pre-dawn hours.
- ❑ This is a time of great vulnerability for truck drivers, railroads, miners, postal workers,even surgeons and nurses.



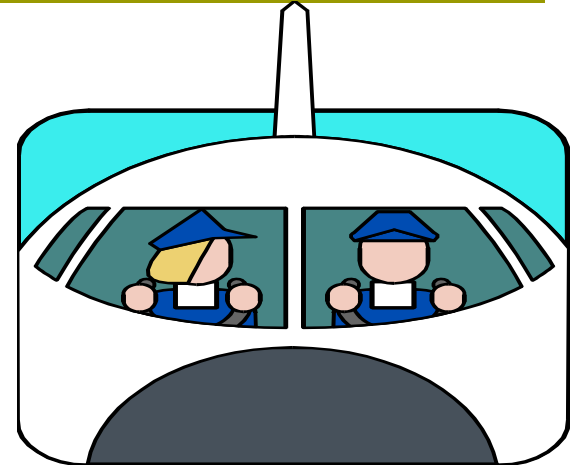
Decreased Alertness



- ❑ **Biologically, alertness decreases with a temperature low point of 3-6A.M. Our concentration is at a low ebb.**
- ❑ **The greatest risk for mistakes due to fatigue are between 3-5AM. Double checking verbal orders is wise.**
- ❑ **Each of us is responsible to identify and take action when fatigue impairs job safety.**

Understanding Fatigue: Based on Pilot Performance

- ❑ Slowed Reaction time
- ❑ Lower levels of vigilance
- ❑ Impaired Decision making
- ❑ Inaccurate calculations
- ❑ Memory Problems
 - Forgetfulness in communicating information
 - Couper 1996; Dinges 1992a; Dinges & Kribbs 1991; Rosekind 1991 et al 1996; Sanquist et al 1996

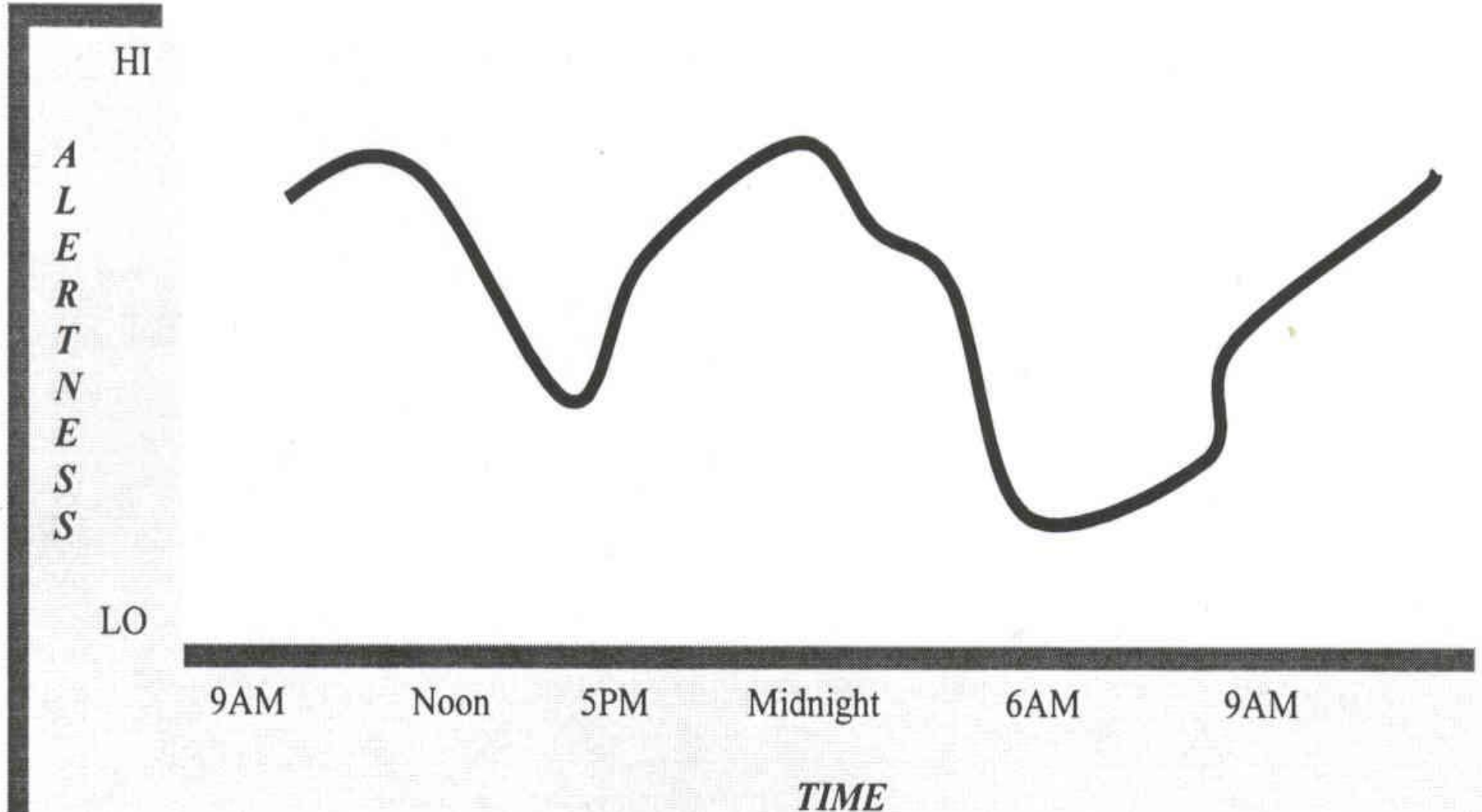


Fatigue: Based on Pilot Performance

- Narrowing of Attention
- Lapsing
 - Delayed or no response to relevant stimuli
- Time in Task Decrement as work period continues
 - Slowing in response time to unexpected stimuli as work period continues
 - Increased errors in judgment and decisions
- Adoption of simpler but riskier strategies

Couper 1996; Dinges 1992a; Dinges & Kribbs 1991; Rosekind 1991 et al 1996; Sanquist et al 1996

Alertness Related to Time



Decreased Sleep/Decreased Performance

- ❑ Cumulative sleep loss and circadian disruption can lead to decreased waking alertness, impaired performance and worsened mood.

Bonnett, 1985; Broughton and Ogilvie, 1992

- ❑ Decreased performance related to sleep loss and circadian disruption has been implicated in some major disasters.
 - Exxon Valdez
 - Three Mile Island
 - Bhopal accidents

Fatigue Impairs Performance

- Sleep deprivation is equivalent to the effects of alcohol intoxication

Fatigue Among Clinicians & the Safety of Patients
David M. Gaba, MD and Steven K. Howard, MD
New England Journal Med; Vol.347 No 16; 10/17/02

- 24 hrs of sustained wakefulness is equivalent to 0.10 % Blood Alcohol Concentration.

Dawson and Reid , 1997

(The legal limit in most states is now 0.08% BAC)

- “Surgeons awake all night had 20% more errors and took 14% longer to complete the task than those who had a full night’s sleep.”

Lancet, 1998

Symptoms of Fatigue

- Feeling tired; not rested
- Mood changes
 - Irritability
 - Affective liability
- Impaired Cognitive Functioning
 - Poor concentration and memory
 - Decreased attention
 - Calculation problems
 - Difficulty in making quick, correct decisions
- Inability to reliably estimate your own alertness due to above symptoms

Symptoms of Fatigue

- ❑ Slower reaction times
- ❑ Completing tasks in the wrong sequence
- ❑ Forgetting key steps and procedures
- ❑ Reduced physical ability
- ❑ Sensory impairments

Managing Fatigue: Good Sleep Hygiene

Create a sleep-friendly environment

- ❑ Dark window covers / lined curtains
- ❑ Use ear plugs
- ❑ Eye covers
- ❑ Avoid and eliminate sunlight
- ❑ Loud alarm
- ❑ Comfortable temperature
- ❑ Turn phone ringer off or use code-a-phone
- ❑ Alert family and friends as to your sleep patterns

Managing Fatigue: Good Sleep Habits

- ❑ Try to sleep only when drowsy
- ❑ Avoid alcohol (it suppresses REM sleep) and caffeine 4-6 hours before bedtime
- ❑ Avoid nicotine close to bedtime
- ❑ Avoid exercise within 4 hours of bedtime
- ❑ Eat light snack (carbohydrates) prior to bedtime
- ❑ Get up at same time daily

Tricks for the Sleep-Deprived

- ❑ Try a power nap (<45 minutes) in order to add 4-5 waking hours
- ❑ Naps of 1-4 hour duration are good but will take up to 30 minutes to fully wake up
- ❑ Use caffeine strategically – only when you need a boost (Drink 30 minutes prior to desired effect).
- ❑ Disrupted sleep means too little sleep (your circadian rhythm is broken)

Tricks for Night Shift Work ⁽¹⁾

- ❑ Sleep as close to time of work as possible for maximum length of alertness
- ❑ Bank sleep before if you know you will be up for a while
- ❑ If up all night, go to bed 2 hours before usual waking time to get 7-8 hours of REM sleep. (example: if you usually get up at 0500, go to bed at 0300 and use good sleep hygiene)

Tricks for Night Shift Work (2)

- If switching to a night shift, stay up late the night before until 2 hours before normal waking time.
 - (example: If you get up at 0500 daily and are going to work a Monday night shift that starts at 7pm, stay up Sunday night until 0300. Exercise, late movie, caffeine...) , use the sleep hygiene tips (dark room, ear plugs etc..)
- Then, sleep 7-8 hours close to the time of going to work.

The Post-Test

- Now that you have completed the Fatigue Module, we have 8 multiple choice questions for you to review what you have learned.
- Answer the following Questions with the answer that best fits. In some cases more than one are correct but pick the best.

Post-Test : Fatigue 1

1. Fatigue impacts performance in all except which one of the following areas:
 - a) Decreases reaction time
 - b) Impairs cognitive functioning.
 - c) Increases attention span
 - d) Alters mood
 - e) Reduces ability to make quick, correct decisions

Post-Test : Fatigue 2

2. Sleep deprivation for 24 hours is equivalent to a 0.10% blood alcohol level?
 - A. True
 - B. False

Post-Test : Fatigue 3

3. Based on the performance of pilots, which of the following answers is not correct:
- a) Cumulative sleep loss and circadian disruption can lead to impaired performance, worsened mood and slower reaction time.
 - b) Sleep deprivation reduces one's ability to make complex decisions and calculations.
 - c) Limited sleep can cause lapsing and problems with memory.
 - d) Lack of sleep heightens the alertness of fighter pilots.

Post-Test : Fatigue 4

4. After eight hours of uninterrupted sleep at night, the pattern of maximal alertness for most people is:
 - a) Around mid-day
 - b) Early morning and evening
 - c) All morning into early afternoon
 - d) Late morning and early afternoon
 - e) Late afternoon.

Post-Test : Fatigue 5

- 5.** To reduce the effects fatigue, all but one of the following are useful techniques:
- a) Take regular breaks and consider getting a breath of fresh air.
 - b) Avoid alcohol before bedtime.
 - c) Limit the use of caffeine.
 - d) Eat healthy and take proper meal breaks with time to digest, rest and recover.
 - e) Exercise as close to bed time as possible

Post-Test : Fatigue 6

6. Sleep hygiene includes all of the following except:
- a) Dark room
 - b) Comfortable temperature.
 - c) Eye covers.
 - d) Soft alarm for a “non-jarring” awakening
 - e) Notifying family and friends of your sleep pattern

Post-Test : Fatigue 7

7. In anticipation of a series of “night shifts” which one of the following is not a good strategy?
- a) “banking sleep”
 - b) Good sleep hygiene.
 - c) When switching to a night shift, stay up late the night before.
 - d) After a night shift, stay up as long as possible.

Post-Test : Fatigue 8

Resource: *Work/Life Connections-EAP*

If you are having problems, Work/Life Connections-EAP at 936-1327 can help with all but one of the following:

- a) Assessment and referral for treatment of depression, stress, addictions or other concerns.
- b) Provide information regarding resources for eldercare.
- c) Help you deal with personal or work issues of causing distress.
- d) Get you excused from on-call duties for the rest of your career.

Hint: The answer is d.