Surviving Shiftwork Safely

Deb Fell-Carlson, RN, MSPH, COHN-S, HEM

Loss Control Program Advisor

March 11, 2009

Objectives

- Define "shift work"
- Define "Circadian Rhythm"
- Describe two health effects that may be related to shift work
- Describe two personal interventions to reduce the risk
- Describe two organizational interventions designed to reduce the risk

Thoughts as we begin...

- Pace
- Break
- Questions
- Expectations

Work Schedules in the USA – A Medley

- Alternate shifts and flexible schedules historically dependent upon business need
- Schedule flexibility is becoming increasingly important as workers consider work-life balance when making career and job decisions
- 24 hour society results in increased shiftwork

Shiftwork

- Shiftwork Also called "alternate shift"
- Any schedule deviating from traditional daytime 8-hr shift
- Generally, if the shift starts and stops between 6a and 6p, it is considered a traditional daytime shift
- Evening shift is most common alternate shift
- Extended shift – longer than eight hours
- Rotating shift - combination of days, evenings, and night shifts

The Science of Sleep

Fact or Fiction?

- Sleep is a time when your body and brain shut down for rest and relaxation
- Getting 1 hour less sleep per night than needed will not affect daytime functioning
- Your body adjusts quickly to different sleep schedules
- The main cause of insomnia is worry
- Microsleep results in a momentary "black out"

Fact or Fiction?

- You can make up for lost sleep during the week by sleeping more on weekends
- Naps are a waste of time
- You can tell when you are about to fall asleep
- Snoring is a normal part of sleep
- People need less sleep as they get older

Sleep is Complex

- Metabolism slows, but body continues to function
- Two types of sleep
  - NREM (Non-Rapid Eye Movement)
  - REM

NREM – "Quiet Sleep"

- Stage N1: Drowsiness
  - Transition from waking to sleeping
  - Sudden muscle jerks, sensation of falling
  - Experiences differ among individuals
  - Typically lasts about 5 minutes in young adult
  - Quick - akin to a switch
- Stage N2: Light sleep
  - Eye movement stops
  - Muscles alternately relax, contract
  - Body temperature, heart rate drop
  - Built-in vigilance system - EEG
  - Lasts 10-25 minutes per cycle, about half the night in young adult
  - *Moderately refreshing*

NREM – "Quiet Sleep"

- Stage N3: Deep sleep
  - Slow wave, or "delta" sleep
  - Blood pressure drops, body temperature drops
  - Heart rate drops about 25%
  - Difficulty with awakening; feel groggy or disoriented
    - Bedwetting
    - Night terrors
    - Sleepwalking
- Renews and repairs the **body**
- Less blood to brain; cools
- Typically spend about 20% of the night in this stage
- Nearly absent in most people over age 65
- Sleep-deprived people pass quickly into this stage and spend most of their sleeping time here

REM – "Dreaming" Sleep

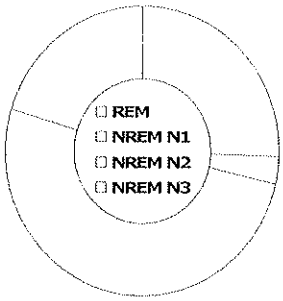
- Active period of sleep
- Intense brain activity, similar to when awake; dreaming
- Breathing is rapid and irregular
- Eyes dart behind closed eyelids
- Sympathetic nervous system (fight or flight) twice as active
- Limbs temporarily paralyzed
- Heart rate increases, blood pressure rises
- 25% of total night in young adult
- "Refreshing" sleep restores the **mind**
  - Removes irrelevant information
  - Helps to process new information
  - Facilitates learning, memory

Sleep Architecture

- Average adult needs 7-9 hours sleep nightly
- NREM and REM alternate through the night; cycle repeats four to six times, approximately every 90 minutes
- Most deep sleep occurs in the first half of the night, most REM in the last half
- Cutting your sleep short (early rising) cuts your REM sleep
- "REM Rebound" – Sleep-deprived individual enters REM earlier and spends a higher proportion of time in it when he or she is finally able to get an undisturbed night's sleep

Proper balance between NREM and REM is essential for restorative sleep

Typical Distribution of NREM and REM Sleep



Sleep and Aging

- Need for sleep does not decrease with age
  - N3 sleep drops by half b/t ages of 20-30; nighttime awakenings double
  - N3 NREM (quiet) continues to diminish as we age; over 65 have 5% or less
    - Awakenings continue to increase
    - Falling asleep takes longer
    - Naps can help, midday best
  - Fitness allows for more sound sleep as we age; slows process

Sleep Regulators

- Sleep influenced by
  - Homeostasis
  - Circadian Rhythm

Homeostasis

- Body's "steady state" mechanism
- Neurotransmitters (not fully understood); thought to be related to adenosine blood levels
  - Adenosine levels rise throughout the day and evening until sleep is irresistible
  - Levels drop throughout the night; need for sleep is reduced toward morning hours
  - Caffeine blocks adenosine receptors - disrupts this cycle

Circadian Rhythm

- Innate biological clock regulates sleep and waking
- Consists of neurons in the hypothalamus
- Regulates physiological (body temperature, blood pressure, hormone levels, etc.) and behavioral cycles

Circadian Rhythm

- Almost every tissue has a circadian rhythm
- Strongest desire for sleep between midnight and dawn
- Corresponding dip in alertness (less strong) in mid-afternoon

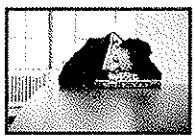
- Synchronized to external physical and social cues – synchronizers or "Zeitgebers"
  - Light is the strongest synchronizing agent; promotes wakefulness during daylight hours
  - Social activity/cognitive pressure
  - Melatonin - levels start climbing at dusk
  - Exercise

Exercise and the Circadian Rhythm

- Moderate exercise can change the timing of sleep by up to an hour
- Takes six days to significantly alter through exercise
- Time spent in deep sleep is longer after exercising on the previous night
- Avoid exercise within last two hours before going to sleep
- Exercise between 12:30A and 2A:
  - For maximum effect on alertness and sleep delay
  - To improve alertness the following day

Internal Circadian Rhythms vs. External Cues

- Circadian system is intolerant of major schedule changes
- Sleep is better if schedule is synchronized to the *internal* circadian rhythms and *external* light-dark cycle and cues



Sleep is Essential to Good Health

- Experts agree that sleep is essential
  - To allow the mind and body to repair itself
  - For certain biochemical and physiological processes

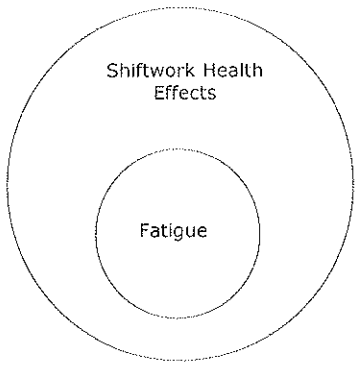
Sleep Disorders

- Physical or neurological (nervous system) sleep problems
- Require a physician's assessment and care
- Increase vulnerability to fatigue
- Examples of sleep disorders include:
  - Sleep apnea
  - Restless leg syndrome
  - Insomnia
  - REM Disorder
  - Narcolepsy
  - Sleepwalking

Epworth Sleepiness Scale

- Likelihood of sleep per activity
  - 0 - Would never doze or sleep
  - 1 - Slight chance
  - 2 - Moderate chance
  - 3 - High chance
- Score:
  - 0-10 Normal range
  - 10-12 Borderline
  - 12-24 Abnormal
- Sitting and reading
- Watching TV
- Sitting, inactive in a public place
- As a passenger in a car for an hour without a break
- Lying down to rest in the afternoon
- Sitting and talking to someone
- Sitting quietly after a lunch without alcohol
- In a car, while stopped for a few minutes in traffic

Health and Safety Effects of Shiftwork and Fatigue

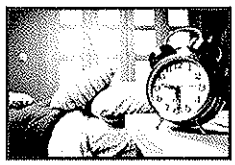


Sleep Deprivation

- Typical person can go 16 – 17 hours between sleep sessions
- Sleep deprivation sets in after this point
- Fatigue, then exhaustion
- Sleep debt results from cumulative sleep deprivation
- Disrupts
  - Immune system
  - Endocrine systems
- Contributes to
  - Obesity – crave carbs
  - Diabetes
  - High blood pressure

Sleep Debt

- Getting less sleep than is needed – even 1 hour must be repaid
- If you need your alarm clock you likely have a sleep debt
- The larger the debt, the more good sleep it takes to pay it back
- Cumulative; produces similar impairment as losing an entire night's sleep
- Results in fatigue



"Side-Effects" of Sleep Debt

- Microsleep
  - A lapse of attention and awareness unrelated to activity, lasts up to 10 or 15 seconds; brain is asleep
  - Brain does not respond to sensory inputs such as noise
- Automatic Behavior
  - Routine tasks performed without conscious thought
  - Does not respond to changes in environment (e.g., missing an exit)

Dangerous!

Fatigue Defined

- Feeling of tiredness or exhaustion that comes from physical or mental exertion
- Message to the body to rest
- Can be aggravated by acute lack of sleep or an accumulated sleep debt
- Not a perception – it is a physiological state

Health Effects of Fatigue

- Neurobehavioral functioning is impaired
  - Ineffective communication
  - Decreased ability to manage stress
  - Reduced short term memory
  - Decreased mental agility; inability to problem-solve
  - Inability to concentrate, mind wanders, alertness impaired; inability to notice things they usually would notice
  - Impaired perception, judgment, and decision-making; make more mistakes, take risks they would not usually take

Health Effects of Fatigue

- Impaired ability to respond appropriately to changes in environment; when they do respond, response is slower
- Moodiness – general lack of emotional control (giddy, restless, irritable or grouchy, depressed)

Health Effects of Shiftwork

- Combination of disruption of Circadian rhythm and fatigue - 2-3x increase in
  - Cardiovascular disease
    - Increased chance of heart attacks
    - Smoking
    - Poor nutrition
  - Digestive disorders
  - Sleep disorders
  - Human error

Health Effects of Shiftwork

- Chemical metabolism changes
  - Can impact how worker responds to chemicals in the workplace and to medications
  - Changes hormone secretion
- Increased medication use
- Social isolation

Disrupts circadian rhythm

Jet Lag Similar to "Shift Lag"

- Internal circadian signals do not correspond with external cues in the new time zone
- Symptoms include:
  - Fatigue
  - Irritability
  - Diminished performance
  - Diminished alertness
  - More prone to mishaps
- Sleepiness
- Disorientation
- Poor concentration
- Poor sleep/insomnia
- Digestive difficulties/nausea
- Impaired motor control/slowed reflexes
- Symptoms lessen as traveler (or worker) adapts

Studies

- 20 hrs of sustained wakefulness = impairment consistent with 0.10 percent blood alcohol concentration
- Similar results for subjects with sleep apnea
- **PERCEPTION** of improved performance common after 24 hours without sleep

Results more profound if smaller amounts of sleep loss – as little as one hour a night - was sustained over a few nights

Studies

- Average night shiftworker sleeps about 4-5 hrs on workdays
- 50% of shift workers spend at least 24 hours awake on the first night shift of their work period
- 45% of shift workers surveyed reported inability to get good quality sleep
- 56% reported going 18-27 consecutive hours without sleep in the past week
- 82% report that it is difficult to stay awake at work
- 10 – 20% of shift workers admit to falling asleep at work
- **50% of all highway crashes are related to fatigue in some way**

Shiftwork Intolerance

- Some people have great difficulty adapting to shiftwork
- Individual factors predisposing to shiftwork intolerance are not fully understood. In general:
  - Age over 40-50
  - Rigid sleep requirements
  - Especially sensitive to rhythm desynchronization
  - Social, family and community factors

Shiftwork Maladaptation Syndrome

- Small number of workers affected
- Inability to adapt to shift work in spite of prevention strategies
- Listed as a mental disorder in the Diagnostic of Statistical Manual of Mental Disorders

Shiftwork Maladaptation Syndrome

- Complaints include:
  - Sleep difficulties
  - Persistent fatigue that is not relieved by rest
  - Changes in behavior (e.g., unusual irritability, poor performance)
  - Digestive system problems
  - Regular use of sleeping pills

Shiftwork Maladaptation Syndrome

- Symptoms worsen with continued exposure until eventually:
  - Fired
  - Quit
  - Injured
- Medications are not a recommended solution
- Long term restriction from shiftwork

Does Shiftwork Cause Cancer?

- Shiftwork that causes circadian disruption recently classed as **"Probable Carcinogen"** by International Agency for Research on Cancer – focus was breast cancer
- Information is "compelling but not conclusive"
- This category is used when there is sufficient evidence of carcinogenicity in experimental animals with strong evidence that the carcinogenesis is mediated by a mechanism that also operates in humans

Does Shiftwork Cause Cancer?

- Examples of "probable carcinogens"
  - UV radiation (including tanning beds)
  - Diesel engine exhaust
  - Creosotes
  - Emissions from high temperature frying
  - Heating with wood
- Examples of carcinogens
  - Asbestos
  - Silica
  - Oral contraceptives
  - Estrogen therapy
  - Solar radiation
  - Alcohol
  - Wood dust
  - Tobacco

Melatonin

- Circadian disruption is the issue; exposure to light during the biological night suppresses melatonin production
  - Stops cancer cell growth
  - Potential free-radical scavenger; antioxidant effect
  - Immune-modulator
  - Increased reproductive hormone levels (e.g., estrogen) stimulates growth of hormone-sensitive cells in the breast

Melatonin

- Production is sensitive to light; the brighter the light, the greater the melatonin suppression
- Workers who have schedules that allow them to adapt to day sleeping (i.e., circadian rhythm has adapted) may have melatonin protection even during daytime sleep
- More years on nights = more risk

Societal Impact

- Society's most critical jobs require shiftwork
  - Firefighting
  - Emergency medical services
  - Law enforcement
  - Security
  - Hospital personnel
  - Pilots (trains, planes)

Bottom Line

- More studies are needed
- Don't start taking melatonin pills – long term effects have not been studied
- Beware of hungry marketers

Managing Risks Associated with Shift Work

Shiftwork Safety Considerations

- Highest rate of workplace injuries is usually found among shift workers
- Probability of an injury rises and falls with alertness
- Catastrophic incidents are more likely at times when workers are most prone to sleep
  - Between midnight & 6 am
  - Between 1 pm & 3 pm

Chernobyl, Three Mile Island, Exxon Valdez incidents all occurred during the night shift

Shiftwork Safety Considerations

- Driver fatigue is a leading cause of motor vehicle crashes
- More motor vehicle crashes occur in the early morning hours than at other times – fewer vehicles, but drivers are more sleepy

The hour lost in the switch to daylight savings time causes impairment similar to jet lag

Fatigue Management

- Fatigue can be effectively managed through a collaborative approach to address:
  - Biological clocks/circadian rhythms and worker health
  - Counter-productive or outdated management attitudes, policies, and operating procedures
  - Lack of employee and supervisor knowledge and understanding on how to manage shiftwork, especially fatigue and alertness levels

Fatigue management improves quality of life for the shift worker and productivity and safety for the employer

Fatigue Management Programs

- Are becoming more common as an element in a strong overall health and safety program
- Help increase awareness of hazards related to fatigue
- Help the employer and employee work together to manage the risk factors and hazards to prevent fatigue-related injury and illness

Collaboration: Employee Participation is Important

- Decreased absenteeism
- Teamwork improved
- Decreased fatigue
- Improved daytime sleep quality
- Improved social/family life
- Decreased turnover
- Improved employee understanding of management decisions
- Reduced complaints; improved morale
- Increased productivity

Employees less fatigued when they are allowed to have input on and some control over schedule

Integrating Fatigue Management into Your Culture

- Management commitment is essential
- Promote and communicate a consistent corporate message
- Include fatigue management planning as part of safety expectations in performance review
- Provide positive reinforcement and recognition
- Structure production incentives so they do not contribute to fatigue
- Create an environment that promotes alertness
- Provide additional fluid and nourishment

Integrating Fatigue Management into Your Culture

- Consider shiftwork when making decisions related to:
  - Hazards
  - Available tools and resources
  - Physical requirements of work and challenging environmental conditions
  - Tasks requiring personal protective equipment (PPE)
- Plan carefully and monitor worker fatigue
  - Temperature extremes
  - Noise
  - Poor ventilation
  - Extended periods away from home
  - Wearing certain PPE

Working Conditions and Task Design

- Fatigue is worsened by
  - Tedious, boring, or simple tasks that last more than 30 minutes
  - Complex, mentally challenging tasks
- Structure work to minimize fatigue hazards:
  - Duration
  - Repetition
  - Monotony

Recognition and Assessment of Fatigue

- A standardized assessment tool helps bring consistency to supervisory fatigue assessment. Consider the following questions:
  - How many hours did the employee work in the past week? What was the pattern?
  - Are there contributing environmental factors?
  - Is the employee mentally, physically, and emotionally able to meet the demands of the work?
  - What is the physical intensity of work?

Recognition and Assessment of Fatigue

- Is the employee:
  - Suffering from acute sleep loss? Sleep debt?
  - Required to work alternate shifts?
  - Experiencing life stressors?
- How well has this employee coped in the past?
- Does the employee get support at work and at home?

Evaluating Fatigue in Incident Analysis - Considerations

- When and where did the worker last sleep? How long?
- Did the worker feel rested?
- Which shift was the employee working (time of day)?
- How many consecutive hours worked? Consecutive days?
- What was the shift length?
- How long/when was the worker's last break b/t shifts?
- What was the nature and length of the task?
- Working conditions? (e.g., noise, temperature extremes, etc.)

Examples of Fatigue Management Program Areas of Emphasis

- Working conditions
  - Hazards, PPE
  - Breaks
  - Rest between workdays and day-off patterns
  - Extended or compressed workweeks
  - On call time
  - Traveling after hours and across multiple time zones
- Napping
- Employee training
  - Fatigue management
  - Lifestyle training
- Wellness interventions
  - Nutrition
  - Exercise
  - Preventive health services
- Supervisor training
  - Recognition of fatigue
  - Incident analysis

Management Role

- Examples:
  - Assessing and documenting a worker's level of fatigue; reassigning or allowing for rest as appropriate
  - Accountability for fatigue management program policy, practices, and procedures
  - Considering fatigue in incident analysis
  - Coaching and promoting effective fatigue prevention techniques

Lifestyle Training

- Personal fatigue management skills must be taught; not easily picked up "on the job"
- Better results when family included in training programs

Trained employees sleep longer, get more and better daytime sleep, use less caffeine

Lifestyle Training

- Results in improvement in overall health, not just fatigue and fatigue-related conditions. Focus on:
  - Sleep hygiene
  - Naps
  - Wellness considerations (e.g., nutrition, exercise, stress management)
  - Balancing work and home life
- Better understanding of sleep and commitment to improve sleep quantity and quality

Employee Training Content

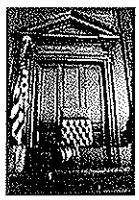
- Examples:
  - Worker role related to fatigue management
  - Effects, signs, and symptoms of fatigue
  - Causes and contributing factors for fatigue
  - Appropriate and inappropriate fatigue interventions
  - Effective fatigue prevention techniques
  - Wellness topics, including stress management
  - Sleep hygiene

Return on Investment

- 20% participation considered cost-effective from a health benefits standpoint; fewer participants needed if employ many shiftworkers
- Improvements in other areas more difficult to measure (productivity, absenteeism, turnover)
- Running or jogging programs cost-effective
- Lifestyle training may be more cost-effective than structured exercise programs

Legal Considerations

- Fatigue traditionally viewed as a behavioral or lifestyle issue unrelated to work
- Ignorance of the risk is not a valid employer defense
- Engage employees in dialogue about alternatives when shiftwork is a problem
- Avoid using alternate shifts as punishment



Shiftwork Scheduling & Task Design

Optimum Scheduling Considers:

- Business needs
- Employee needs and preferences
- Nature of the work
- Day care considerations
- Employee population and ability to adjust
- Shift length and rotation
- Day off patterns
- Crime and violence risks
- Availability of public transportation
- Work-related travel considerations, especially across time zones
- Direct and indirect cost of implementation

Timing of Shift Change

- Later start time is best - both coming and going
  - Shifts requiring workers to wake up before 5am cause more circadian desynchronization than night shifts
  - Ending shifts in the early morning (between 2 am and 5 am) is undesirable to many workers - and dangerous
- Employee input is critical to acceptance

Shift Length Considerations

- Many employees prefer 10 or 12-hr shifts
- Older workers typically less able to adjust to shift work or extended shifts
- Best to make an effort to minimize the intrusion on sleep and social time
- Shift end times should allow worker to get some sleep during "normal" sleep time (e.g. a shift of 10 am to 6 pm, 6 pm to 2 am, or 2 am to 10 am)
- Stagger the shift length (e.g., ten-hour day shift, eight-hour evening shift, six hour night shift)

Fixed Shifts

- Same shift for indefinite period reduces stress
- Nights
  - Allows worker to reset internal clock
  - Fixed night schedules work best if workers maintain the same sleep/wake pattern on their time off
- Evening
  - Can create social desynchronization
  - Most desirable social hours are between 5 pm and 9 pm

Rotating Shifts

- Continual movement of employees across two or more shifts
- Takes at least one week for the circadian rhythm to adapt to a schedule change
- Schedule should be set well in advance and cover as long a period as possible

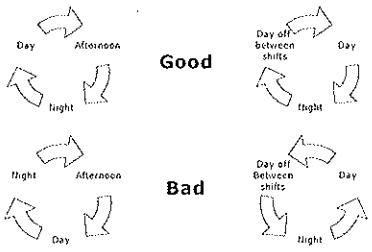
Long Rotation

- Stretch of alternate shifts for four to six weeks
- Better if workers keep their sleep/wake times the same during their days off
- Returning to a day-oriented lifestyle can result in a chronically disoriented circadian rhythm

Short Rotation

- No more than three night shifts in a row
- Quick changeover keeps the circadian rhythm from fully resetting
- Creates less circadian desynchronization than weekly or long rotations
- Example: 1/1/1 rotation: one day shift, one afternoon shift, and one night shift followed by two days off

Forward Rotation is Better



Days Off

- Quality of "off" time influenced by:
  - Number of consecutive days off
  - Timing of days off
- Recovery time should be designed into the schedule after night work rotation - 24 hrs minimum, more is better
- Recommend at least two consecutive days off after each rotational sequence
- Provide for restoration, especially after nights

Time Off Considerations

- If inadequate leisure time is scheduled, workers may become physically exhausted in an attempt to maximize time off
  - Younger workers may choose social activities in lieu of sleep; return to work tired
  - Older workers may tend to use their off time to recover; return to work resentful

Optimize Scheduling of Weekends Off

- Example: Thursday as the last shift of the night shift assignment maximizes usable weekend time
- Provides for adequate recovery time
- Allows worker to remain connected to friends and family

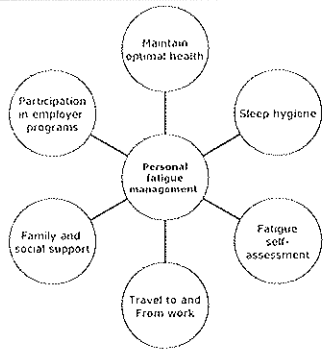
Scheduling Breaks

- In addition to scheduling tasks to allow for sufficient rest and recovery time, consider:
  - Access to proper nutrition
  - Suitable rest areas
  - Opportunities for physical activity

Scheduling Work-Related Travel

- Treat it like regular work time in terms of fatigue management (e.g. scheduled rest breaks and physical activity breaks)
- If workers face a long drive home after working away for several days, they should be encouraged to rest before getting behind the wheel or wait until the following day

Personal Fatigue Management: Improving Worker Health & Stress



Lifestyle training addresses all risk factors... poor health increases vulnerability to fatigue

Maintain Optimal Health

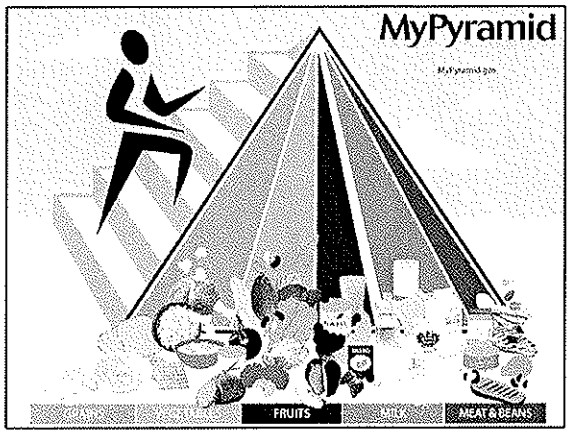
Maintain optimal health

- Wellness
  - Good nutrition on and off the job
  - Regular, daily exercise
  - Get plenty of rest

Nutritional Considerations

Maintain optimal health

- Lack of sleep can lead to eating too often
- Body tries to fuel itself to override fatigue
- Many long term shiftworkers are up to 40 pounds overweight
- Try to eat meals and snacks at the same time every day
- Avoid junk foods; select healthful food choices for energy and nutrition



American Council on Exercise

Maintain optimal health

- Exercise improves sleep quality
- Make physical activity a regular part of the day
  - Choose activities you can enjoy and build into a routine
  - Set a goal to be active most days of the week
- Many exercise-related fact sheets
  - http://www.acefitness.org/fitfacts/default.aspx

Maintain Optimal Health

Maintain optimal health

- Manage stress
  - Know your limits
  - Stay physically fit
  - Find coping strategies that work
    - Exercise
    - Journaling
    - Support groups
    - One-on-one with counselor, friend, family member
    - Faith

Stress Erodes Health, Increases Vulnerability

Maintain optimal health

- Substance abuse
- Chest pain
- Decreased sex drive
- Headaches
- Indigestion
- Muscle aches
- Stomach/bowel problems
- Weight changes
- Anxiety
- Depression
- Forgetfulness
- Irritability
- Resentment
- Insomnia

Maintain Optimal Health

Maintain optimal health

- Personal medical management is important
  - Regular check-ups; follow physician's orders
  - See physician promptly when problems arise
  - Ill employees fatigue more easily
- Medications (over the counter and prescription)
  - May affect sleep or cause drowsiness
  - Sleep loss can affect medication's effects
  - Prescription medicine may impair without worker knowledge

Sleep Hygiene

Sleep hygiene

- Maintain same daily sleep and wake patterns on workdays and days off
- Avoid stimulants late in the day – caffeine, nicotine
- Allow a transition time before bedtime
- Avoid exercise late in the day
- Assure adequate exposure to natural daylight (30 minutes)
- Layer blankets
- Adjust your sleep schedule in advance of the schedule change, e.g., stay up later
- Communicate! Remind friends and family that your sleep is essential

Sleep hygiene

Sleep Hygiene

- Maintain an environment that is dark, cool (66-69 degrees), and noise-free
- To deal with noise:
  - Use a fan to mask noise
  - Earplugs
  - Purchase TV headphones for family members
  - Turn telephone ringer off
  - In a hotel, choose a room away from snack machines and the elevator

Sleep hygiene

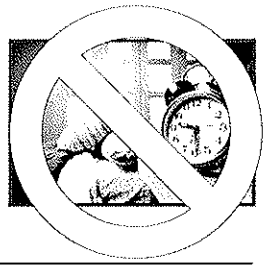
Sleep Hygiene

- Avoid daytime naps of over 30 minutes
- Avoid the "nightcap" – causes awakening at night
- Avoid large meals and beverages late at night
  - Eat lightly throughout the shift
  - Moderate breakfast to help avoid hunger during the day when sleep is needed
- Avoid medicines that delay or disrupt sleep
- Don't lie in bed awake longer than about 20 minutes. Get up and do something relaxing
- See a doctor if the problems persist

Sleep hygiene

Reconcile Sleep Debt

- Short-term debt
  - Hours must be repaid 1:1
  - May take the weekend and a few days the following week to repay
- Long-term debt
  - Take vacation - a week or so off with a light schedule and few obligations
  - Sleep every night until you awake naturally – no alarm



Sleep hygiene

Sleep Hygiene

- Examples of strategies to help individuals to fall asleep faster and stay asleep longer
  - Muscle relaxation
  - Biofeedback
  - Meditation
  - Imagery
  - Breathing techniques
  - Aromatherapy (lavender)
  - Pharmacological
  - Massage
  - Acupuncture
  - Relaxing activity (e.g., warm bath)

Sleep hygiene

Prescription Drugs

- Consult with physician
- Most reduce central nervous system activity
  - Traditional sleep medications may cause rebound insomnia, dependence, drowsiness, dizziness, lightheadedness, and difficulty with coordination
- Newer medications show promise
  - Thought to work by selectively affecting melatonin receptors (neurons) in the part of the brain that regulates the circadian cycle

Sleep hygiene

Pharmacological

- Over-the-counter products
  - Usually do not give sustained relief
  - May lead to daytime drowsiness, blurred vision, and dry mouth

Sleep hygiene

Herbal Products

- Consult your physician
- Studies on safety, efficacy, and dosing yield inconsistent results
- Available over the counter; considered safe for short term use. Examples:
  - Valerian
  - Chamomile
  - Melatonin

Sleep hygiene

Herbal Products - Melatonin

- Claims that it impacts circadian cycle (e.g., promotes sleep)
- Some users say it helps with jet and shift lag
- Long term health effects have not been studied

Track research on complementary modalities at the National Center for Complementary and Alternative Medicine http://nccam.nih.gov/

Fatigue self-assessment

Fatigue Self-Assessment

- Ability to recognize warning signs of fatigue in yourself is essential
- Become aware of the health effects and watch for them
- Fatigue and shiftwork affects individuals differently

If you are too tired to work safely, stop what you are doing and report it!

Fatigue self-assessment

Enform Fatigue Self-Assessment Tool

- Assessment tool developed by Enform - copyrighted:

  http://www.enform.ca/assets/files/enform_fatigue_2006.pdf

- When finished, add up your score, and compare with the rating scale at the end of the test.
- Thinking about the last month, rate yourself on a scale of 1 to 5 for each statement
  - *1 = always*
  - *2 = often*
  - *3 = sometimes*
  - *4 = seldom*
  - *5 = never*

Fatigue self-assessment

Enform Fatigue Self-Assessment Tool

____ 1. I have a nice work/home life balance.

____ 2. I have lots of energy and enjoy life.

____ 3. I socialize with family and friends.

____ 4. I relate well with people and have a good sense of humor.

____ 5. I'm in control of my life and find ways to solve my problems.

Fatigue self-assessment

Enform Fatigue Self-Assessment Tool

____ 6. I'm a good sleeper and wake up refreshed.

____ 7. I don't get stomach aches, tense muscles, or headaches.

____ 8. I do at least 30 minutes of moderate exercise five times a week.

____ 9. I eat 2 or 3 well-balanced meals a day.

____10. I eat breakfast every morning.

Enform Fatigue Self-Assessment Tool

Fatigue self-assessment

_____11. I don't smoke.

_____12. I have no more than 2 alcoholic drinks a day.

_____13. I enjoy my work and feel like I'm doing something useful.

_____14. I'm close to being my proper weight.

_____15. I don't have anxiety, low self-esteem, or depression.

Enform Fatigue Self-Assessment Tool - Scoring

Fatigue self-assessment

- Total your score and compare with the following rating scale:
  - 15-22 - You've got some really positive fatigue management behaviors!
  - 23-38 - You've got some good skills, but need some improvement.
  - 39-75 - You could be more at risk for the effects of fatigue. Read this flip guide to develop some ways to combat and prevent fatigue.

Travel To/From Work

Travel to and from work

- Driving while fatigued is risky
- Plan for shiftwork
  - Informal carpool
  - Vanpool
  - Public transportation
  - Employer-provided transportation

Family and Social Support

Family and social support

- Remind family and friends of personal sleep and food needs due to shift work
- Ask family for help with daily chores
- Set up automated bill pay
- Rearrange social schedules
- Don't skip sleep to try to get everything done
- Seek outside help if needed
- Don't overdo it on your days off

Participation in Employer Programs

Participation in employer programs

- Examples:
  - Wellness programs
  - Exercise and nutrition classes
  - Gym memberships
  - Employee Assistance Programs for stress management

Fatigue at Work

Personal fatigue management

- Use the "buddy system" to watch out for each other
- If it is serious, stop what you are doing and report it so supervisor can reassign or provide an opportunity to rest
- A 20 minute nap is the most effective intervention (assure you are napping in a safe place)
- If just bothersome, try these interventions
  - Take a break and get some exercise, go for a walk, or spend time outside
  - Change something in your routine to stimulate your mind and body
  - Have a light snack and a beverage without caffeine

Napping

- Research shows that a nap of less than 30 minutes improves:
  - Alertness and memory
  - Cognitive performance, mental acuity
  - Ability to respond to visual cues
  - Employee morale and feelings of well-being
  - Speed and accuracy of response
  - Judgment and problem-solving
  - Visual acuity
- Controlled napping becoming more common
- 50% of healthcare facilities surveyed permitted controlled napping at work
- Pagers used to arouse employee in case they are needed

Exercise Considerations

- Safety first! Avoid exercise requiring balance and hand-eye coordination
- Consider exercise bikes, ellipticals and treadmills with handholds
- Management support is essential
  - Equipment purchase
  - Employee education

Shiftwork has its advantages...

- Access to uncrowded stores
- Ability to attend daytime events such as school plays and daytime civic club meetings
- Ability to participate in outdoor sports such as golf, tennis or squash during optimal hours
- More relaxed working atmosphere
- Shiftworkers tend to bond
- Increased variety

Questions?

Deborah Fell-Carlson, RN, MSPH, COHN-S, HEM

debfel@saif.com

(503) 373-8743

Bibliography

- Agency for Healthcare Research and Quality, November 2004 Melatonin for Treatment of Sleep Disorders, prepared by University of Alberta Evidence-based Practice Center, Edmonton, Alberta, Canada Evidence Report/Technology Assessment: Number 108 http://www.ahrq.gov/clinic/epcsums/melatsum.htm
- Bird, R. (2008). A shift too far: the failure to recognize shiftwork maladaptation syndrome as an injury under workers' compensation law. In press, Midwest Law Journal.
- Bird, R. & Mirtorabi, N. (2008). Shiftwork and the law. In press, Berkeley Journal of Employment and Labor Law.
- Circadian Technologies. (2008). Does shiftwork cause cancer? Retrieved August 28, 2008 from http://www.circadian.com/pages/157_white_papers.cfm

Bibliography

- Circadian Technologies. (2008). Napping on the job: policies and benefits in extended hours operations. Retrieved August 28, 2008 from http://www.circadian.com/pages/157_white_papers.cfm
- Circadian Technologies. (2008). Physical exercise and extended working hours. Retrieved August 28, 2008 from http://www.circadian.com/pages/157_white_papers.cfm
- Circadian Technologies. (2008). Shiftwork lifestyle training. Retrieved August 28, 2008 from http://www.circadian.com/pages/157_white_papers.cfm
- Circadian Technologies. (2008). The secret cost of fatigue. Retrieved August 28, 2008 from http://www.circadian.com/pages/157_white_papers.cfm

Bibliography

- Costa, G. (2003). Shift work and occupational medicine: an overview. Occupational Medicine, 53(83-88). Retrieved October 6, 2008 from: http://occmed.oxfordjournals.org/cgi/reprint/53/2/83
- Dobbie, K. (2002) Fatigue-related crashes: An analysis of fatigue-related crashes on Australian roads using an operational definition of fatigue. Australian Transport Safety Bureau.
- Enform. (2006). Guide to safe work: A worker's guide to preventing incidents and injuries related to fatigue. Retrieved October 6, 2008, from: http://www.enform.ca/assets/files/enform_fatigue_2006.pdf

Bibliography

- Enform. (2007). Guide to safe work: Fatigue Management: An employer's guide to designing and implementing a fatigue management program (version 2). Retrieved October 6, 2008, from: http://www.enform.ca/assets/files/gtsw_final_2007.pdf
- Harvard Medical School. (2008). Improving sleep: a guide to a good night's rest. Retrieved on January 30, 2009 from: http://www.health.harvard.edu/
- International Agency of Research on Cancer. (2008). Overall evaluations of carcinogenicity to Humans: list of all agents, mixtures and exposures evaluated to date. Retrieved on October 6, 2008 from: http://monographs.iarc.fr/ENG/Classification/crthalllist.php

Bibliography

- International Agency of Research on Cancer. (2007). IARC monographs programme finds cancer hazards associated with shiftwork, painting, and firefighting. Retrieved on October 6, 2008 from: http://monographs.iarc.fr/ENG/Meetings/vol98-pressrelease.pdf
- Knauth, P., Hornberger, S. (2003). Preventive and compensatory measures for shift workers. Occupational Medicine, 53, 109-116. Retrieved August 28, 2008 from: http://occmed.oxfordjournals.org/cgi/reprint/53/2/109
- McMenamin, T. (2007). A time to work: recent trends in shift work and flexible schedules. Monthly Labor Review Online, 130 (12), 3-15. Retrieved August 28, 2008 from: http://www.bls.gov/opub/mlr/2007/12/art1full.pdf

Bibliography

- National Institutes of Health. (2005) Your guide to healthy sleep. NIH Publication N. 06-5271. Retrieved September 13, 2008 from: http://www.nhlbi.nih.gov/health/public/sleep/healthy_sleep.pdf
- National Sleep Foundation. (2006). Sleep-wake cycle: Its physiology and impact on health. Retrieved September 22, 2008 from: http://www.sleepfoundation.org/atf/cf/%7BF6BF2668-A1B4-4FE8-8D1A-A5D39340D9CB%7D/Sleep-Wake_Cycle.pdf
- National Institute for Occupational Safety and Health. (2004). Overtime and Extended Work Shifts: Recent Findings on Illnesses, Injuries and Health Behaviors. (NIOSH Publication No. 2004-143. Retrieved August 28, 2008 from: http://www.cdc.gov/niosh/docs/2004-143/

Bibliography

- National Institute for Occupational Safety and Health. (1997). Plain Language about Shiftwork. Retrieved August 28, 2008 from: http://www.cdc.gov/niosh/pdfs/97-145.pdf
- Oregon Health and Safety Resource. (2004). Strategies for rotational shiftwork. Retrieved August 28, 2008 from: http://www.cbs.state.or.us/external/osha/pdf/resource/2850_winter-spring2004.pdf
- Safety Daily Advisor. (2008). 3 keys to safer, healthier shift work. Retrieved September 10, 2008 from: http://safetydailyadvisor.blr.com/archive/2008/09/07/safety_management_shift_work_rotation_work_life_health.aspx
- Scott, A. (2001). Shift work hazards. Jacksonville Medicine. Retrieved October 6, 2008 from: http://www.dcmsonline.org/jax-medicine/2001journals/April2001/shiftwork.htm