

# **Sleep and Sleep Disorders**

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# Sleep

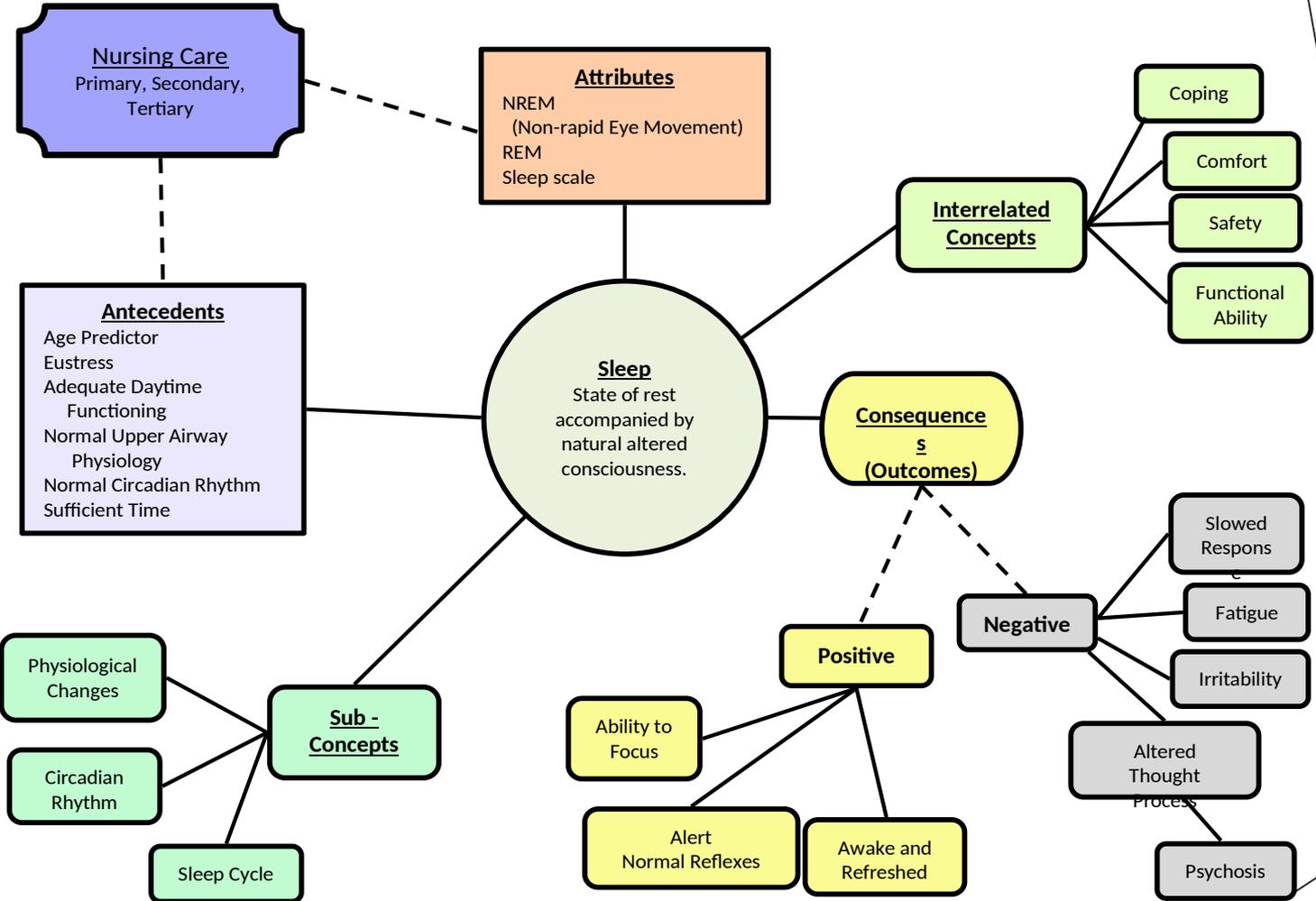
- ▶ A physiological process
- ▶ The body's rest cycle
- ▶ Associated with recumbency & immobility
- ▶ Lacks conscious awareness but easily awakened
- ▶ Essential for healthy functioning and survival

# Sleep

- ▶ State in which an individual lacks conscious awareness of environmental surroundings but can be easily aroused
  - ▶ Insufficient sleep
  - ▶ Fragmented sleep
  - ▶ Nonrestorative sleep



# Sleep Concept



# Sleep Disturbances and Disorders

- ▶ Sleep Disturbance
  - ▶ Conditions of poor sleep quality
- ▶ Sleep Disorders
  - ▶ Abnormalities unique to sleep
    - ▶ Insomnia
    - ▶ Narcolepsy

# Sleep-Wake Cycle

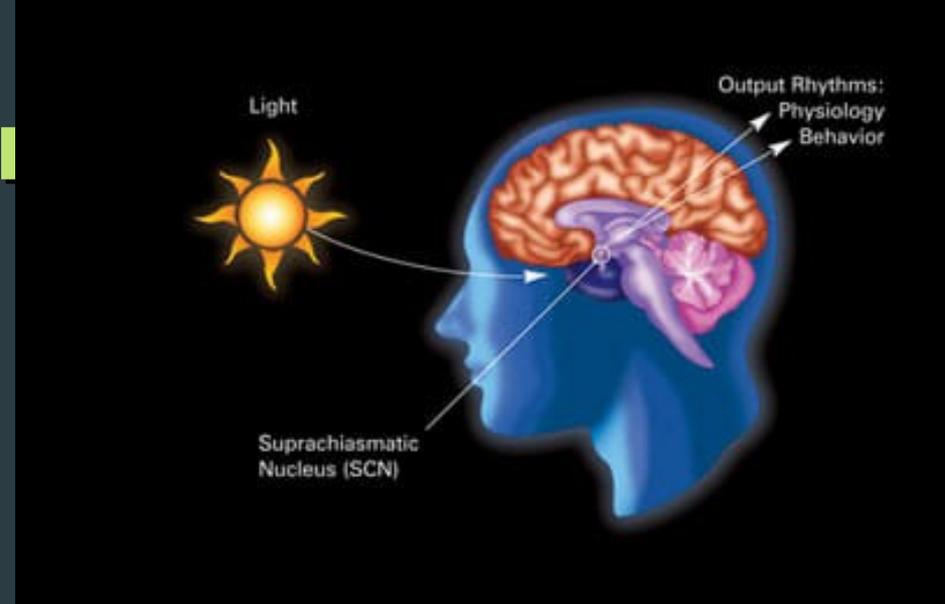
- ▶ Controlled by the brain
- ▶ Wake behavior
  - ▶ RAS and various neurotransmitters
  - ▶ Orexin (hypocretin)

# Reticular Activating System (RAS)

- ▶ Sensory stimuli within cerebral cortex
- ▶ Regulates Sleep-wake cycle
- ▶ 4 functions
  - ▶ Motor
  - ▶ Sensory
  - ▶ Visceral
  - ▶ Consciousness

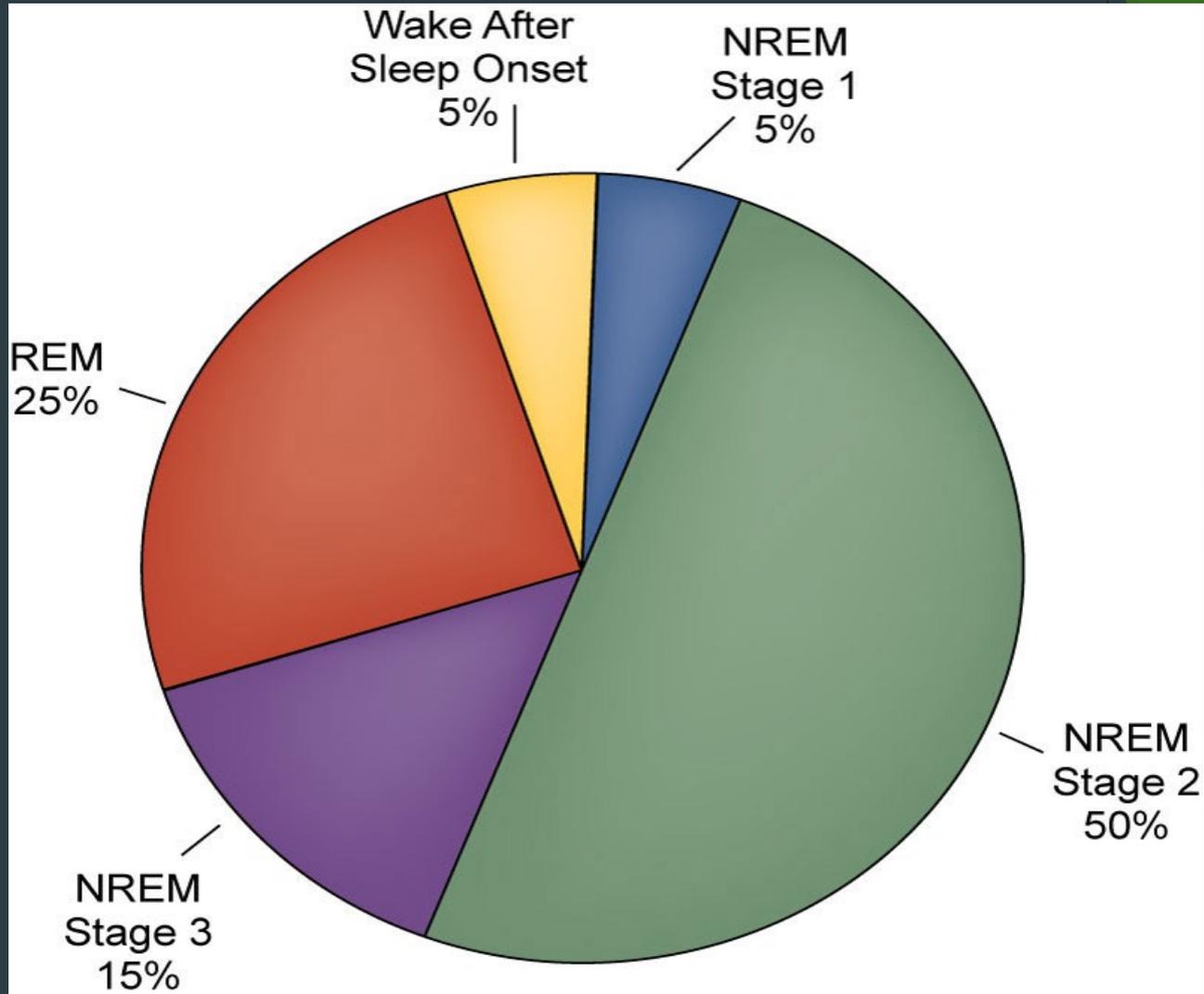
- ▶ <https://www.youtube.com/watch?v=DFguWHx1pgU>
- ▶ <https://www.youtube.com/watch?v=QCnfAzAlhVw>

# Circadian Rhythm



- ▶ Managed by the suprachiasmatic nucleus (SCN) in hypothalamus
- ▶ Synchronized through light detectors in retina
- ▶ Light is the strongest time cue

# Stages of Sleep



# Phases of Sleep

- ▶ Sleep Latency
- ▶ NREM (non-rapid eye movement): 3 stages
- ▶ REM (Rapid Eye Movement)

# Sleep latency

- ▶ Starts when eyes are closed for sleep
- ▶ Ends when Non-Rem sleep is entered
- ▶ Time varies – usually 10-40 minutes

# NREM Sleep

- ▶ 75% to 80% of sleep time
- ▶ Divided into three stages
  - ▶ Stage 1: slow eye movements
  - ▶ Stage 2: HR and temperature decrease
  - ▶ Stage 3: deep or slow wave sleep (SWS); delta waves, parasomnias

# Parasomnias

- Unusual and often undesirable behaviors while falling asleep, transitioning between sleep stages, or during arousal from sleep
- Due to CNS activation

# Parasomnias

## ► Parasomnias

- Sleepwalking
- Sleep terrors
- Nightmares
- Sleep paralysis
- Sleep hallucinations



# REM Sleep

- ▶ 20 to 25% of sleep cycle
- ▶ Occurs 3 to 4 times a night
- ▶ Greatly reduced skeletal muscle tone
- ▶ Period when most vivid dreaming occurs

# Stages of Sleep



## NREM Stage N1: Falling Asleep

- heartbeat and breathing slow down
- muscles begin to relax
- **Lasts: A few min.**

## NREM Stage N2: Light Sleep

- heartbeat and breathing slow down further
- no eye movements
- body temperature drops
- brain produces "sleep spindles"
- **Lasts: About 25 min.**

## NREM Stage N3: Slow Wave Sleep

- deepest sleep state
- heartbeat and breathing are at their slowest rate
- no eye movements
- body is fully relaxed
- delta brain waves are present
- tissue repair and growth, and cell regeneration
- immune system strengthens

## REM Stage R:

- primary dreaming stage
- eye movements become rapid
- breathing and heart rate increases
- limb muscles become temporarily paralyzed
- brain activity is markedly increased

# Aging and sleep

## ▶ Middle age

- ▶ More stage shifts - ↓ in NREM3 and REM
- ▶ Resistant to sleep deprivation
- ▶ Increased awakenings
- ▶ Changes in sleep efficiency

## ▶ Older adults

- ▶ Phase changes – go to bed earlier and arise earlier

# Audience Response Question

Which statement is true regarding REM sleep?  
Select all that apply.

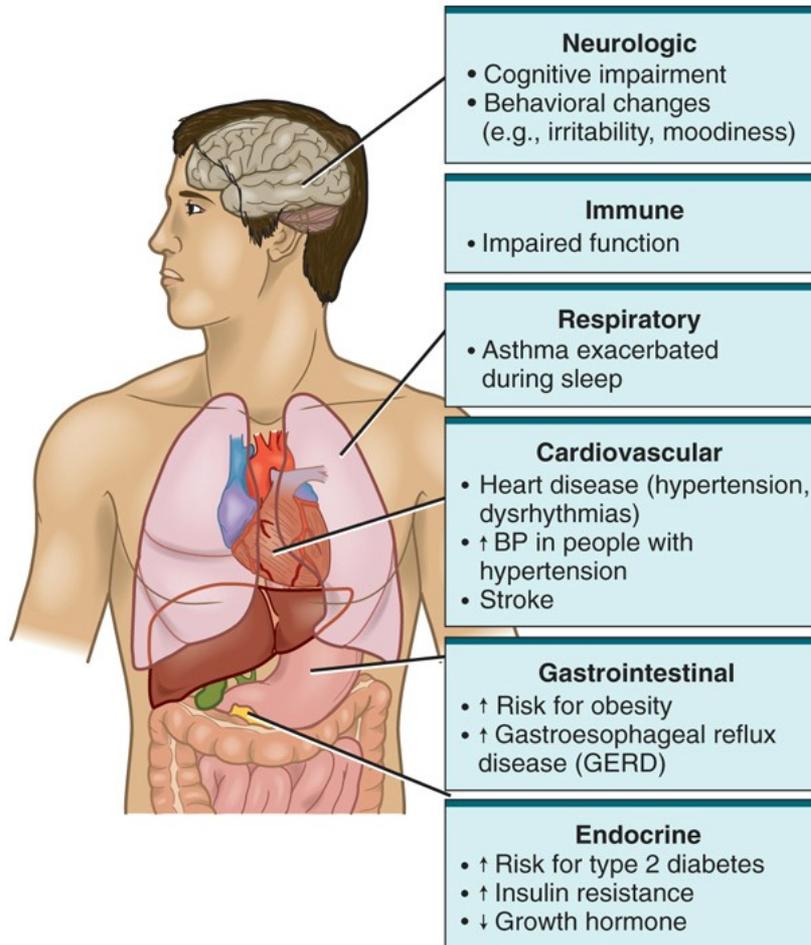
- a. Muscle tone is greatly reduced
- b. It occurs only once in the night
- c. It is separated by distinct physiologic stages
- d. The most vivid dreaming occurs at this phase

# Audience Response Question

What is the best description for sleep?

- a. Quiet state in which there is little brain activity
- b. Loosely organized state similar to coma
- c. State in which pain sensitivity decreases
- d. State in which the individual lacks conscious awareness of the environment

# Effects of Sleep Deprivation and Sleep Disorders



# Sleep Disturbances in the Hospital

▶ Hospitalization associated with decreased sleep time

- ▶ Environmental sleep-disruptive factors
- ▶ Psychoactive medications
- ▶ Acute and critical illness

# Insomnia

- ▶ **Symptoms include:**
  - ▶ Difficulty falling asleep
  - ▶ Difficulty staying asleep
  - ▶ Waking up too early
  - ▶ Complaints of waking up feeling unrefreshed

# Insomnia

## ▶ **Acute Insomnia**

- ▶ Difficulty falling asleep or remaining asleep for at least 3 nights/week for less than a month

## ▶ **Chronic Insomnia**

- ▶ Same symptoms as acute
- ▶ Daytime symptoms that persist for 1 month or longer

# Insomnia

- ▶ **Aggravated by inadequate sleep hygiene**
  - ▶ Stimulants
  - ▶ Medications
  - ▶ Using alcohol to induce sleep
  - ▶ Irregular sleep schedules
  - ▶ Nightmare
  - ▶ Exercising near bedtime
  - ▶ Jet lag



# Chronic Insomnia

## ▶ **Etiology**

- ▶ Often no known cause
- ▶ Stressful life event
- ▶ Psychiatric illness or medical condition
- ▶ Medications or substance abuse

# Insomnia

## ▶ **Clinical manifestations**

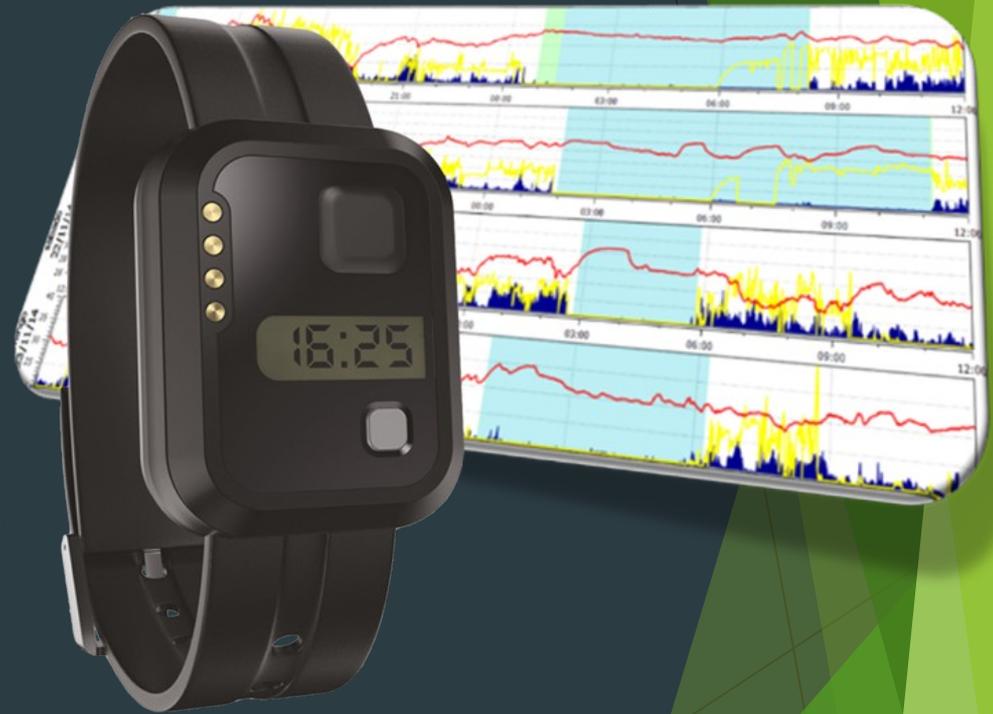
- ▶ Difficulty falling asleep (long sleep latency)
- ▶ Frequent awakening (fragmented sleep)
- ▶ Prolonged nighttime awakenings
- ▶ Feeling unrefreshed on awakening (Nonrestorative sleep)
- ▶ Fatigue, trouble with concentration
- ▶ Forgetfulness, confusion
- ▶ anxiety

# Insomnia

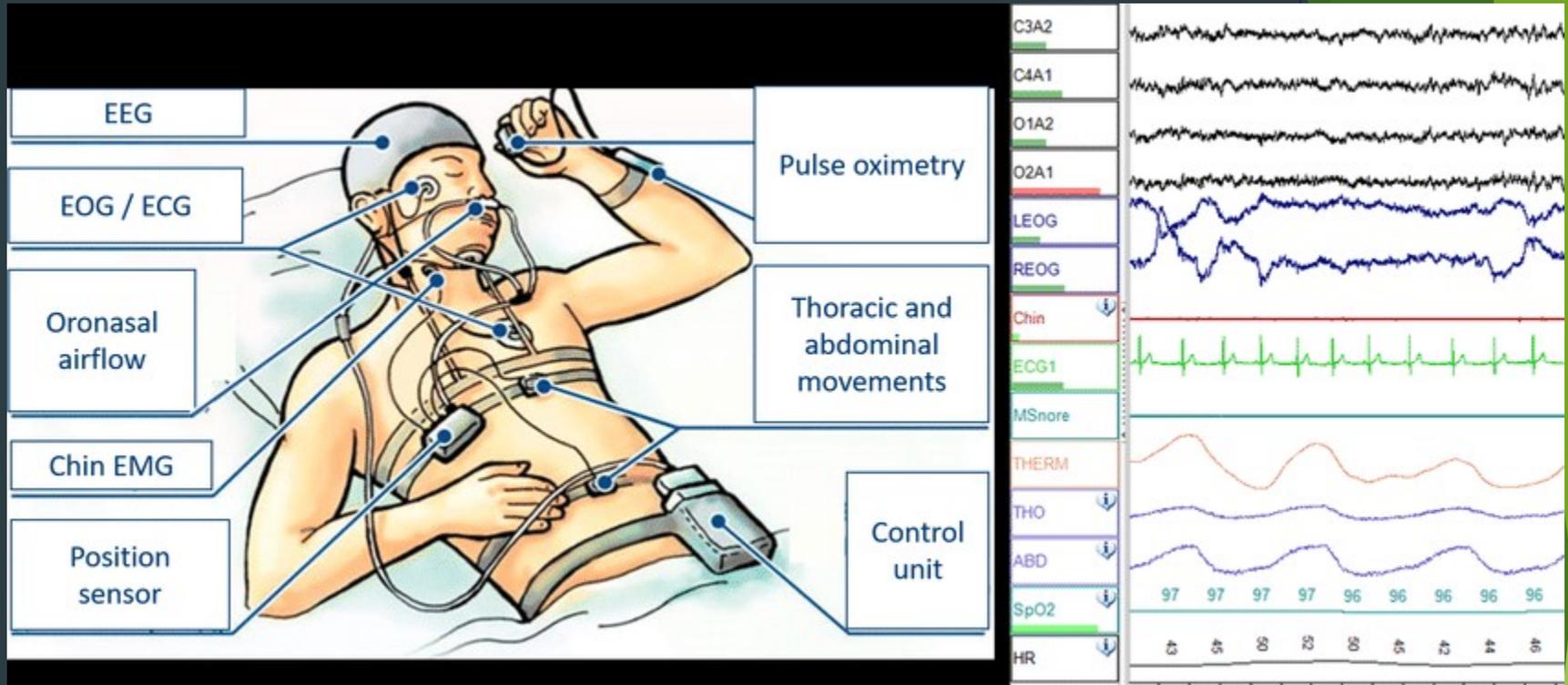
- ▶ **Diagnosis**
  - ▶ Self-report
  - ▶ Actigraphy
  - ▶ Polysomnography (PSG)

# Actigraphy

Watch like device,  
worn on the wrist,  
that can  
determine sleep  
and wake over a  
14 day period.



# Polysomnograph y



# Insomnia

- ▶ **Interprofessional Care**
  - ▶ Education
  - ▶ Track sleep
  - ▶ Sleep hygiene (Table 7-3)
  - ▶ Cognitive-behavioral therapy for insomnia (CBT-I)
  - ▶ Complementary and alternative therapies
  - ▶ Drug therapy

# Insomnia

## ▶ Causes

- ▶ Psychiatric
- ▶ Medical illness, medications
- ▶ Stress: finances, employment, school, life
- ▶ Substances: caffeine, alcohol, nicotine
- ▶ Exercise
- ▶ Age, gender
- ▶ Other factors: travel

# Insomnia

## ▶ **Treatment**

- ▶ Begin with least invasive
- ▶ Cognitive behavior therapy
- ▶ Therapist: counseling

# Insomnia: Drug therapy

- ▶ Benzodiazepines
- ▶ Benzodiazepine-receptor-like agents
- ▶ Melatonin-receptor agonist
- ▶ Antidepressants
- ▶ Antihistamines
- ▶ Alternative therapies

# Insomnia: Drug therapy

- ▶ **Sedative-Hypnotic Drugs**
  - ▶ Drugs that depress CNS function
  - ▶ Primarily used to treat anxiety and insomnia
  - ▶ Antianxiety agents or anxiolytics
  - ▶ Distinction between antianxiety effects and hypnotic effects depends on dosage

# Insomnia: Drug therapy

## Benzodiazepines

- ▶ Used to treat anxiety and insomnia
- ▶ Used to induce general anesthesia
- ▶ Used to manage seizure disorders, muscle spasms, panic disorder, and alcohol withdrawal
- ▶ Potential for abuse
- ▶ Can produce physical dependence

# Insomnia: Drug therapy

- ▶ **Benzodiazepines used specifically for sleep**
  - ▶ **temazepam (Restoril)**
  - ▶ **triazolam (Halcion)**
- ▶ **Common Benzodiazepines**
  - ▶ diazepam (Valium)
  - ▶ lorazepam (Ativan)
  - ▶ alprazolam (Xanax)

# Benzodiazepines

## ▶ **Pharmacologic effects**

- ▶ CNS: reduce anxiety and promote sleep
- ▶ Cardiovascular system: Oral vs. intravenous
- ▶ Respiratory system: Weak respiratory depressants

## ▶ **Therapeutic uses**

- ▶ Anxiety
- ▶ Insomnia
- ▶ Seizure disorders, muscle spasm
- ▶ ETOH withdrawal, perioperative applications

# Benzodiazepines

- ▶ **Adverse effects**
  - ▶ CNS depression
  - ▶ Amnesia
  - ▶ Sleep driving
  - ▶ Paradoxical effects
  - ▶ Respiratory depression
  - ▶ Abuse

# Benzodiazepines

- ▶ **Acute Toxicity**
- ▶ **Oral overdose**
  - ▶ Drowsiness, lethargy, and confusion
- ▶ **Intravenous toxicity**
  - ▶ Life-threatening reactions, profound hypotension, respiratory arrest, and cardiac arrest

# Benzodiazepines

- ▶ **General treatment measures**
  - ▶ **Oral:** gastric lavage, activated charcoal, and dialysis
- ▶ **Treatment with flumazenil (Romazicon)**
  - ▶ Competitive benzodiazepine receptor agonist
  - ▶ Reverses sedative effects of benzodiazepines but may not reverse respiratory depression
  - ▶ Monitor for seizures when benzodiazepine stopped
  - ▶ Effects fade an hour after administration: monitor for sedation

# Benzodiazepine- Receptor-Like agents

- ▶ **Zolpidem (Ambien)**
  - ▶ Sedative-hypnotic
  - ▶ Short-term management of insomnia
  - ▶ Side effects: daytime drowsiness and dizziness

# Benzodiazepine-Receptor-Like agents

- ▶ **Zaleplon (Sonata)**

- ▶ Approved for short-term management of insomnia
- ▶ Most common side effects: headache, nausea, drowsiness, dizziness, myalgia, and abdominal pain

# Benzodiazepine-Receptor-Like agents

## ▶ Eszopiclone (Lunesta)

- ▶ Approved for treating insomnia
- ▶ No limitation on how long it can be used
- ▶ Generally well tolerated
- ▶ Adverse effect: bitter aftertaste, headache, somnolence, dizziness, and dry mouth
- ▶ Low potential for abuse

# Antidepressants

- ▶ **Trazodone (Oleptro)**

- ▶ Atypical antidepressant with strong sedative actions
- ▶ Can decrease sleep latency and prolong sleep duration
- ▶ Does not cause tolerance or physical dependence

- ▶ **Doxepin and Amitriptyline**

- ▶ Old tricyclic antidepressant with strong sedative actions
- ▶ Used to treat patients who have trouble staying asleep

# Antihistamines

- ▶ **Diphenhydramine (Benadryl)**
  - ▶ May be added to nighttime cold/pain preparations
- ▶ **Doxylamine (Unisom)**
  - ▶ Can be purchased without prescription
  - ▶ Less effective
  - ▶ Tolerance develops quickly (1 to 2 weeks)
  - ▶ Adverse effects: daytime drowsiness and anticholinergic effects
  - ▶ Not intended for long term use

# Alternative medicines

- ▶ **Complementary and alternative therapies**
- ▶ Melatonin: effective related to jetlag and shift work
- ▶ Valerian root, chamomile, passionflower, lemon balm, lavender: have very mild sedative effects, proof of benefits in insomnia is lacking
- ▶ White noise and relaxation strategies

# Insomnia: nursing management

## ▶ Nursing Assessment:

- ▶ Sleep history
- ▶ Assess diet, caffeine, and alcohol intake
- ▶ Ask about sleep aids
- ▶ Sleep diary for 2 weeks
- ▶ Medical history: factors that affect sleep

# Insomnia: Nursing Diagnoses

- ▶ Sleep deprivation
- ▶ Disturbed sleep pattern
- ▶ Readiness for enhanced sleep

# Insomnia: nursing implementation

- ▶ **Assume primary role in teaching sleep hygiene**
  - ▶ Decrease caffeine intake
  - ▶ Bedtime routine
  - ▶ Decreased blue light before bedtime
  - ▶ Reduce light and noise
- ▶ **Teach patient about sleep medications**

# Epworth Sleepiness Scale

0 = would **NEVER** doze

1 = **SLIGHT** chance of dozing

2 = **MODERATE** chance of dozing

3 = **HIGH** chance of dozing

**1-6** Congratulations, you are getting enough sleep

**7-8** Your score is average

**9+** Very sleepy and should continue to seek sleep assistance

## Situation

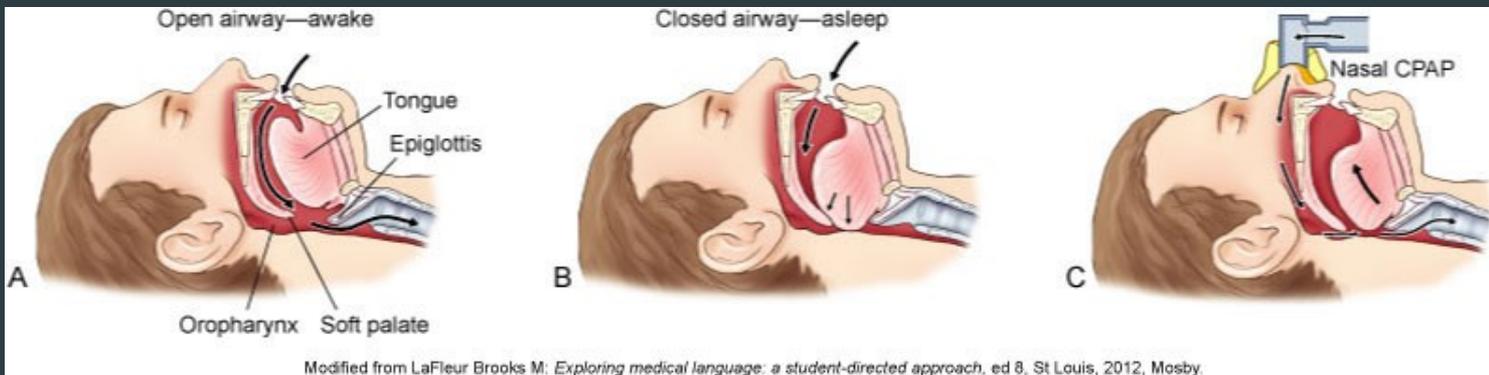
- ▶ Sitting and reading
- ▶ Watching television
- ▶ Sitting inactive in a public place (e.g. theater or class)
- ▶ As a passenger in a car for an hour without a break
- ▶ Sitting and talking to someone
- ▶ Sitting quietly after lunch without alcohol
- ▶ In a car, while stopped for a few minutes in the traffic

## **TOTAL SCORE**

# Sleep apnea

[https://www.youtube.com/watch?v=TgC\\_S09Xea4&t=2s](https://www.youtube.com/watch?v=TgC_S09Xea4&t=2s)

# How Sleep Apnea Occurs



# SLEEP APNEA



## Symptoms

- Loud Snoring
- Excessive day time sleepiness
- Frequent episodes of obstructed breathing during sleep
- Morning headache
- Unrefreshing sleep
- Increased irritability

## Treatments

### Non-Surgical

- Change sleep position
- Decrease weight
- CPAP (Continuous Positive Airway Pressure)
- Drug Therapy for Underlying Cause

### Surgical

- Adenoidectomy
- Uvulectomy
- Remodeling posterior oropharynx
- Bariatric surgery to ↓ weight



# Respiratory and Sleep Problems

- ▶ Sleep apnea
  - ▶ Snoring and hypoventilation
  - ▶ Obesity hypoventilation syndrome
  - ▶ Reduced chest wall compliance
  - ▶ ↑ work of breathing
  - ▶ ↓ total lung capacity and functional residual capacity
  - ▶ Also called obstructive sleep apnea-hypopnea syndrome (OSAHS)
  - ▶ Partial or complete upper airway obstruction during sleep
  - ▶ Apneic period may include hypoxemia and hypercapnia.
- ▶ Complications can result in
    - ▶ Hypertension
    - ▶ Cardiac changes
    - ▶ Poor concentration/memory
    - ▶ Impotence
    - ▶ Depression

# Clinical Signs and Symptoms

- Apnea is cessation of spontaneous respirations for longer than 10 seconds.
  - Each obstruction may last from 10 to 90 seconds.
  - Apnea and arousal cycles occur repeatedly, as many as 200 to 400 times during 6 to 8 hours of sleep.
- ▶ Frequent arousal during sleep
  - ▶ Insomnia
  - ▶ Excessive daytime sleepiness
  - ▶ Witnessed apneic episodes
  - ▶ Loud snoring
  - ▶ Morning headache
  - ▶ Irritability

# Risk Factors

Sleep apnea occurs in 2% to 10% of Americans but is considered to be underreported

- ▶ obesity (body mass index  $>28$  kg/m<sup>2</sup>)
- ▶ age  $>65$  years
- ▶ neck circumference  $>17$  inches
- ▶ craniofacial abnormalities that affect the upper airway, and acromegaly.
- ▶ Smokers are more likely to have OSA.
- ▶ OSA is more common in men than in women until after menopause, when the prevalence of the disorder is the same in both genders. Women with OSA have higher mortality rates

## Lab and Diagnostic Testing

May take one or two nights for complete diagnosis depends.

- ▶ Polysomnography aka sleep study



# Treatment

- ▶ Mild Sleep Apnea
  - ▶ Sleeping on one's side
  - ▶ Elevating head of bed
  - ▶ Avoiding sedatives and alcohol 3 to 4 hours before sleep
  - ▶ Weight loss
  - ▶ Oral appliance
- ▶ Severe (>15 apnea/hypopnea events/hr)
  - ▶ CPAP
    - ▶ Possible compliance issues
  - ▶ BiPAP
  - ▶ Surgery
    - ▶ Uvulopalatopharyngoplasty (UPPP or UP3)
    - ▶ Genioglossal advancement and hyoid myotomy (GAHM)

# Patient Teaching

If patient on CPAP or BiPAP remind them to always take with them if overnight trips are planned.

- ▶ Explain benefit of losing weight
- ▶ Explain benefit of sleeping on side
- ▶ Explain the need to avoid sedatives or alcohol 3-4 hours prior to bedtime
- ▶ Stress reduction
- ▶ Stress importance of exercise
- ▶ Avoid smoking
- ▶ Self image disturbance

# Discharge Planning

- ▶ Case manager- need for equipment
- ▶ Nutritional consult
- ▶ Spiritual consult



# Nursing Diagnosis

- ▶ Anxiety
- ▶ Insomnia
- ▶ Imbalanced Nutrition  
more than body  
requires
- ▶ Knowledge deficit



# CPAP With Nasal Mask



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**Management of sleep apnea often involves sleeping with a nasal mask in place. The pressure supplied by air coming from the compressor opens the oropharynx and nasopharynx.**

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[http://snoring.sdghealth.com/cpap\\_machine\\_snoring\\_treatment.html](http://snoring.sdghealth.com/cpap_machine_snoring_treatment.html)

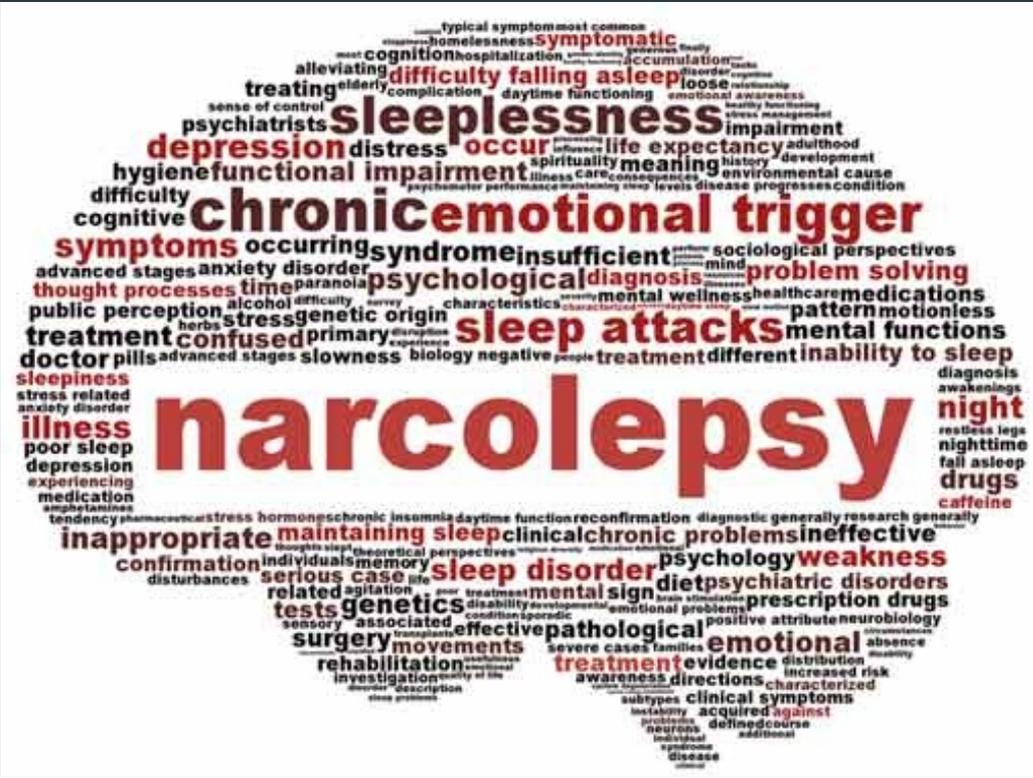


<https://www.cpapclinic.ca/missing-page.php>

# CPAP with Nasal Pillows



# **Sleep disorders: Narcolepsy**



# Narcolepsy



- ▶ Brain unable to regulate sleep-wake cycles normally
- ▶ Causes uncontrollable urges to sleep, often go directly into REM sleep
- ▶ Unknown cause
  - Associated with destruction of neurons that produce orexin
  - Orexin – neuropeptide that regulates sleep/wake cycles
  - Low levels of orexin lead to difficulty staying awake

# Narcolepsy



## ▶ Two types:

- Type 1: with cataplexy
- Type 2: without cataplexy

## ▶ Symptoms

- Sleep paralysis
- Cataplexy
- Fragmented nighttime sleep

# Narcolepsy

## ▶ Nursing and Interprofessional Management

- Teach about sleep and **sleep hygiene**
- **Take naps**
- Avoid heavy meals and alcohol
- Ensure patient safety
- Lifestyle changes

# Narcolepsy: drug therapy

- Modafinil (Provigil)
- ▶ Armodafinil (Nuvigil)
- ▶ Both are wake-promotion drugs

# Gerontologic Considerations



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# Gerontologic Considerations

## ▶ Older age is associated with

- Overall shorter total sleep time
- Decreased sleep efficiency
- More awakenings
- Insomnia symptoms

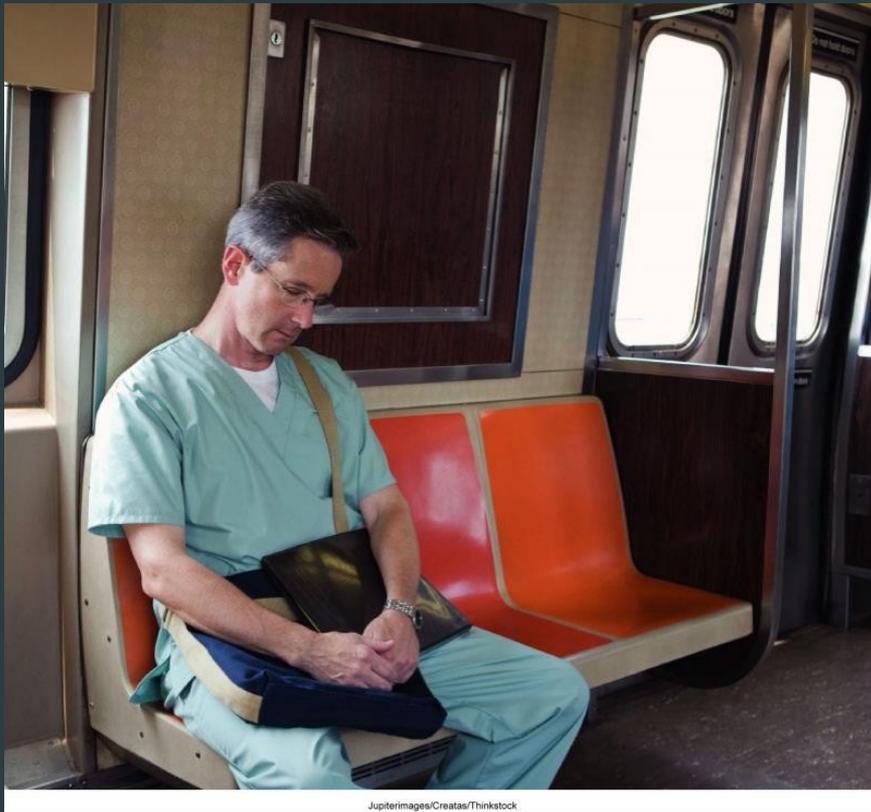
# Gerontologic Considerations

## ▶ Sleep

- Awakenings during the night increases risk for falls
- Medications used by older adults can contribute to sleep problems
- Avoid long-acting benzodiazepines

# Nurse Fatigue

# Nurse Fatigue

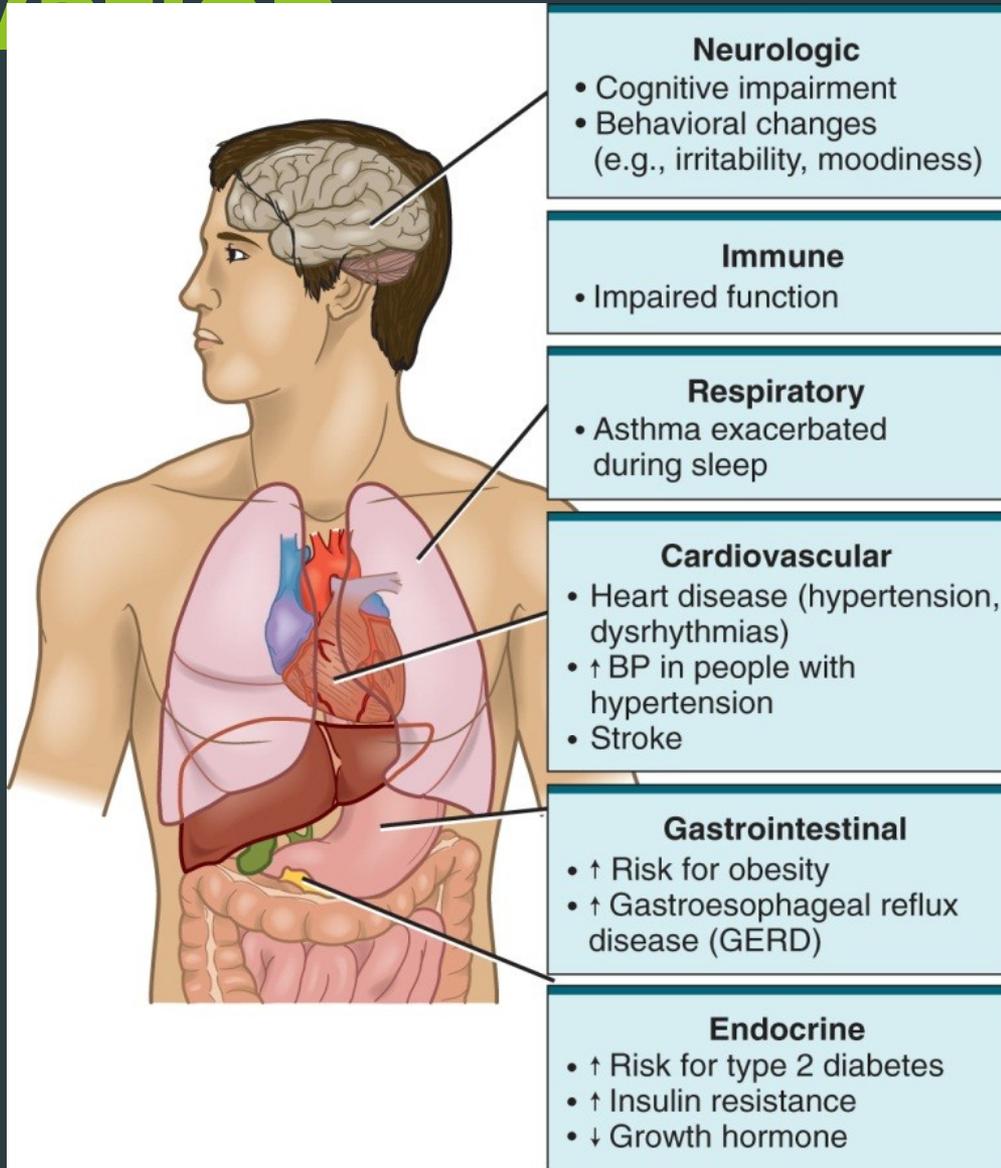


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# Nurse Fatigue: Facts

- ▶ Inadequate sleep
- ▶ Extended work hours
- ▶ Increased Risk for errors

# Effects of Sleep Deprivation



# Who is at risk?

- ▶ **Nurse Compassion Fatigue**

- ▶ <https://www.youtube.com/watch?v=irJGyzc9ijk>

- ▶ **Patients**

- ▶ **Nurse**

- ▶ Awake for 17 hours

- ▶ Equals same cognition as blood alcohol level 0.05%

- ▶ Awake for more than 24 hours

- ▶ Equivalent to blood alcohol level 0.10%

# National Academy of Medicine

- ▶ Formerly Institute of Medicine
  - ▶ Nonprofit organization devoted to safety and evidence-based practice in healthcare
- ▶ Recommendations
  - ▶ No more than 12 hours
    - ▶ 24 hour period
  - ▶ Limit to 60 hours
    - ▶ 7 day period

<https://www.youtube.com/watch?v=d1jse4vKvjM&t=75>

# Nurse fatigue: Management

## ▶ **Do's**

- ▶ Take at least one break in addition to lunch break
- ▶ Use caffeine therapeutically as a stimulant to stay awake
- ▶ Nutrition: complex carbs and protein
- ▶ Exercise

## ▶ **Don'ts**

- ▶ ***DO NOT*** drink alcohol (depressant)

# Shift Work Sleep Disorder

- ▶ Characterized by:
  - ▶ Insomnia
  - ▶ Excessive sleepiness

# Shift Work Sleep Disorder

## ▶ Symptoms

- ▶ Fatigue or malaise
- ▶ Difficulty paying attention or concentrating
- ▶ Memory impairment
- ▶ Mood disturbance or irritability
- ▶ Excessive daytime sleepiness
- ▶ Hyperactivity, impulsivity, aggression, and other behavioral problems
- ▶ Reduced motivation, energy, or initiative
- ▶ Higher risk of errors or accidents
- ▶ Feelings of sleep dissatisfaction

# Special Sleep Needs of Nurses

- ▶ Nurses on permanent night or rapidly rotating shifts are at increased risk of experiencing shift work sleep disorder
- ▶ Use strategies to help reduce distress associated with shift work
  - ▶ On-site napping
  - ▶ Consistent sleep-wake schedule

# Questions?



# References

- ▶ <https://www.sleepfoundation.org/shift-work-disorder/symptoms>
- ▶ <https://www.cpap.com/blog/best-sleeping-positions-sleep-apnea/>
- ▶ Potter and Perry's Fundamentals of Nursing
- ▶ Lewis' Medical-Surgical Nursing