



Beth Israel Deaconess
Medical Center



A teaching hospital of
Harvard Medical School

Introduction to **Sleep Disorders**

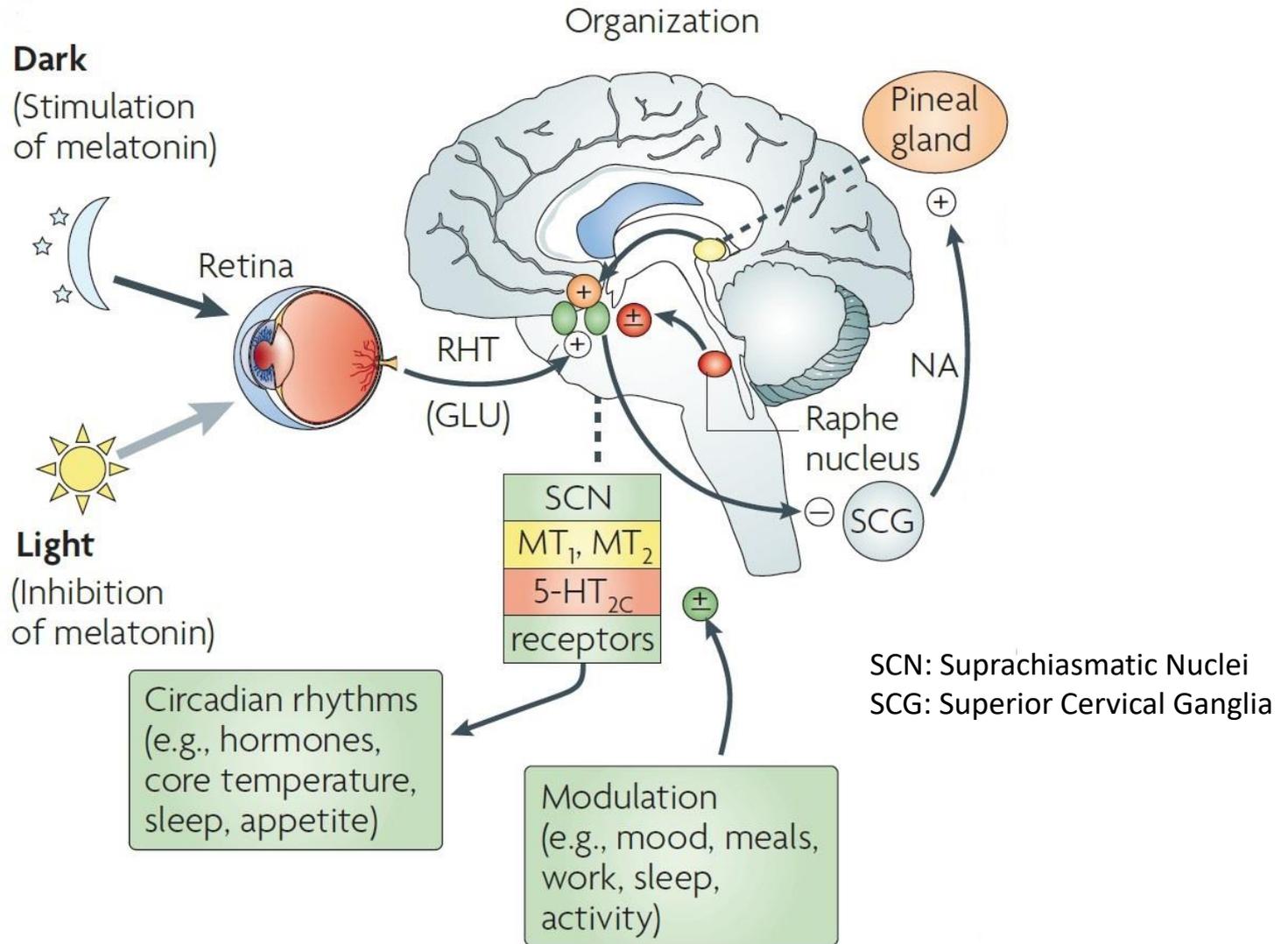
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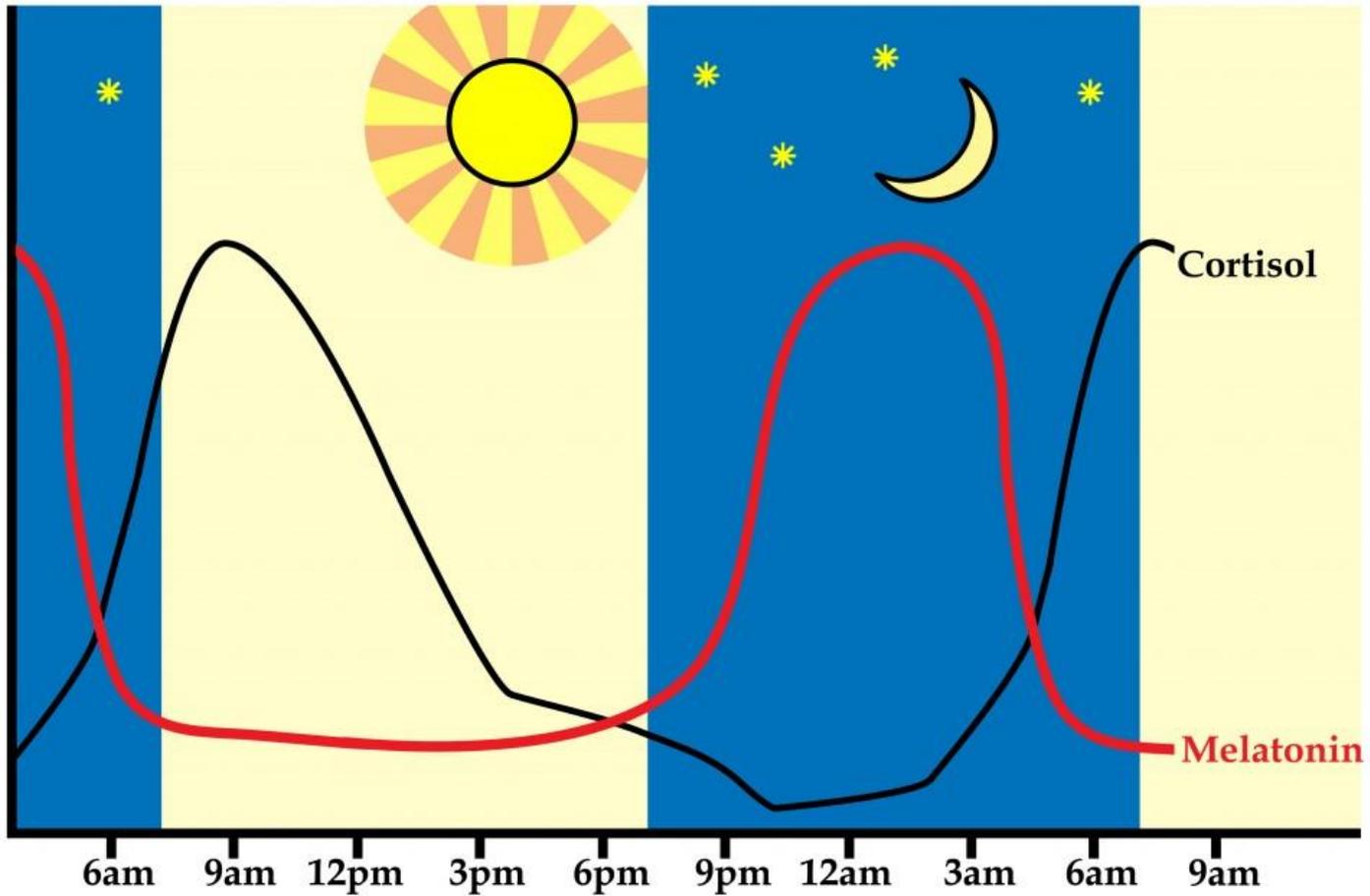
Sleep is Essential to Health

- Key to our health, performance, safety and quality of life
- Essential to our ability to perform both cognitive and physical tasks, engage fully in life and function in an effective, safe and productive way

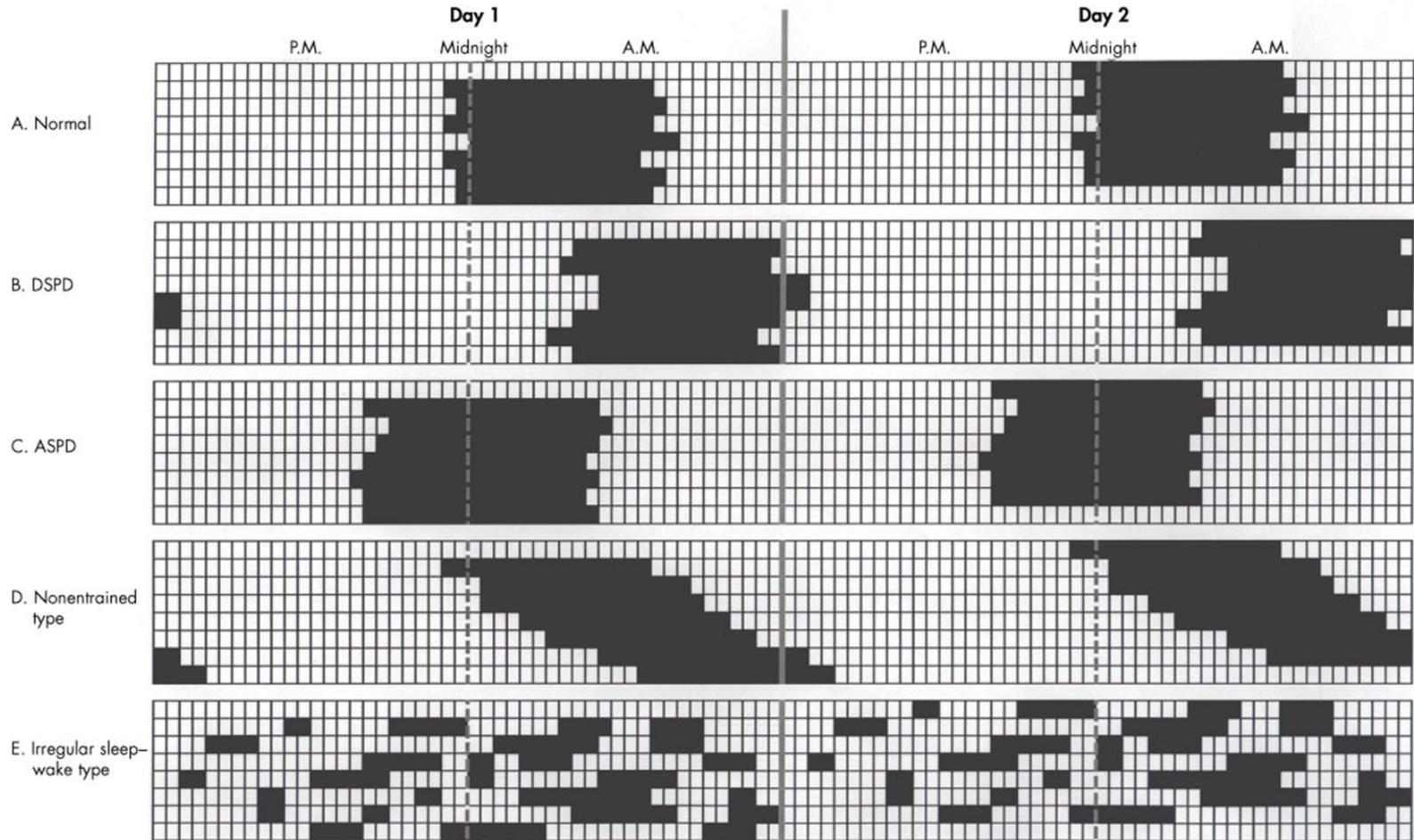
Our Internal Clock



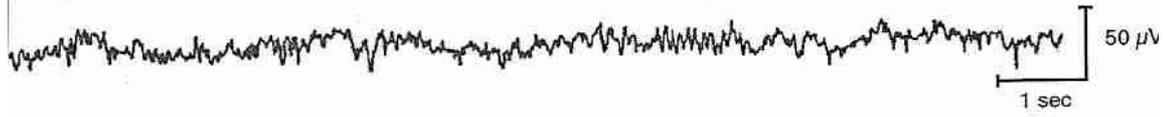
Circadian Rhythm



Owl or Lark?



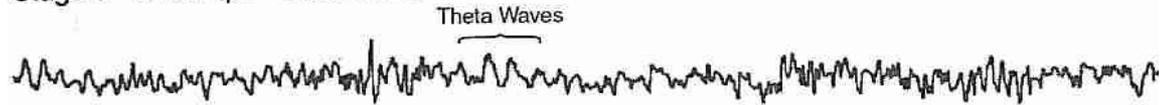
Awake – low voltage – random, fast



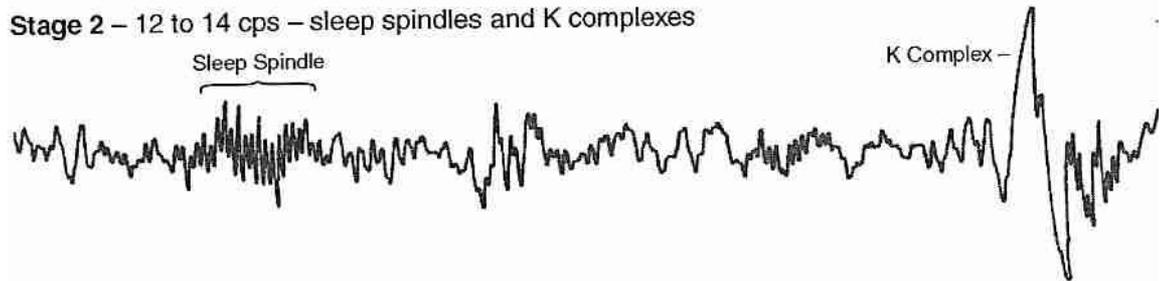
Drowsy – 8 to 12 cps – alpha waves



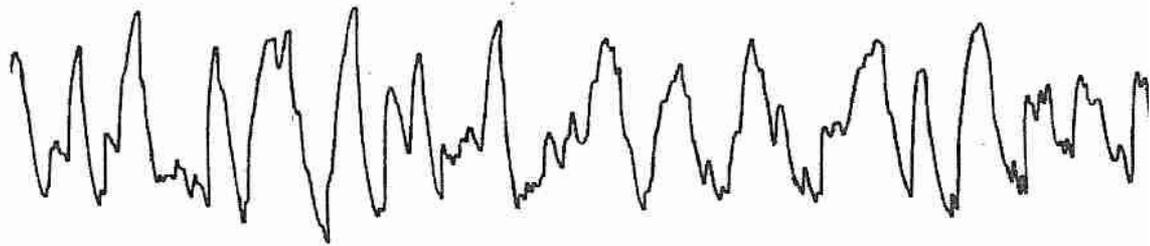
Stage 1 – 3 to 7 cps – theta waves



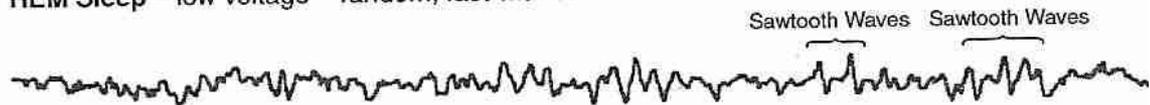
Stage 2 – 12 to 14 cps – sleep spindles and K complexes



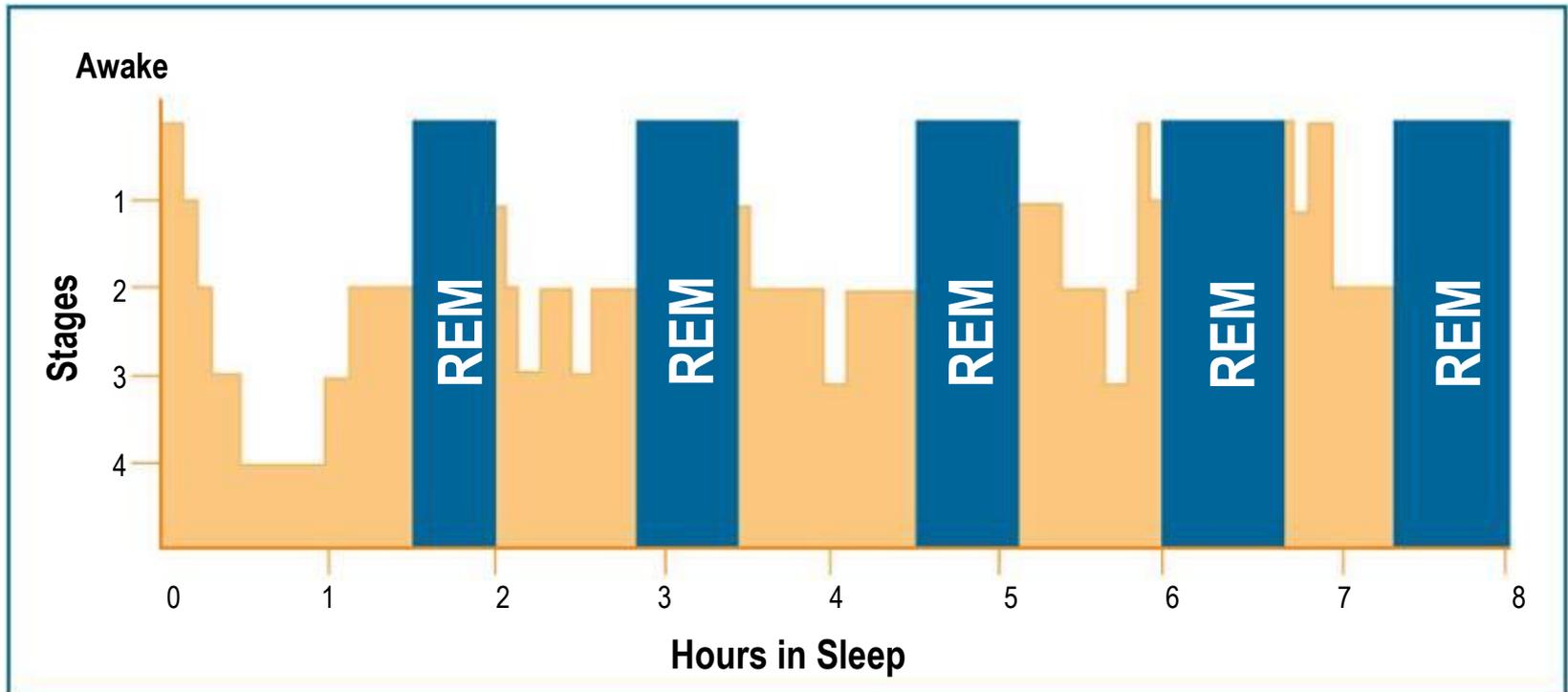
Delta Sleep – 1/2 to 2 cps – delta waves >75 μ V



REM Sleep – low voltage – random, fast with sawtooth waves

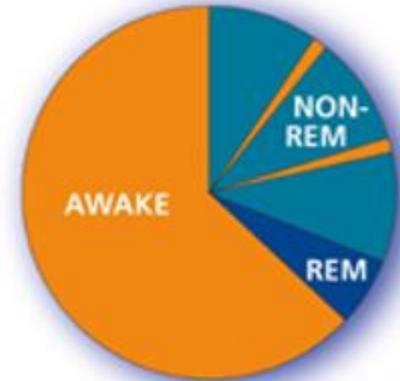
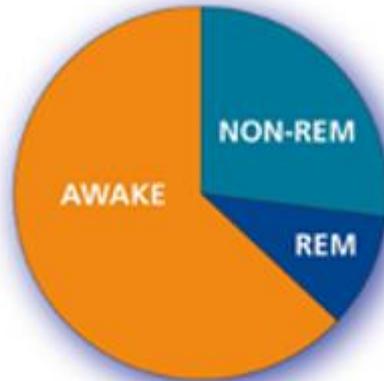
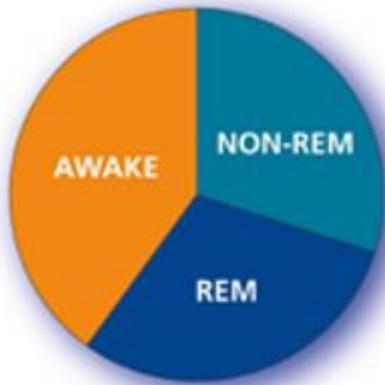


The Sleep Cycle in Adults



Sleep Across Lifespan

National Sleep Foundation



Infancy

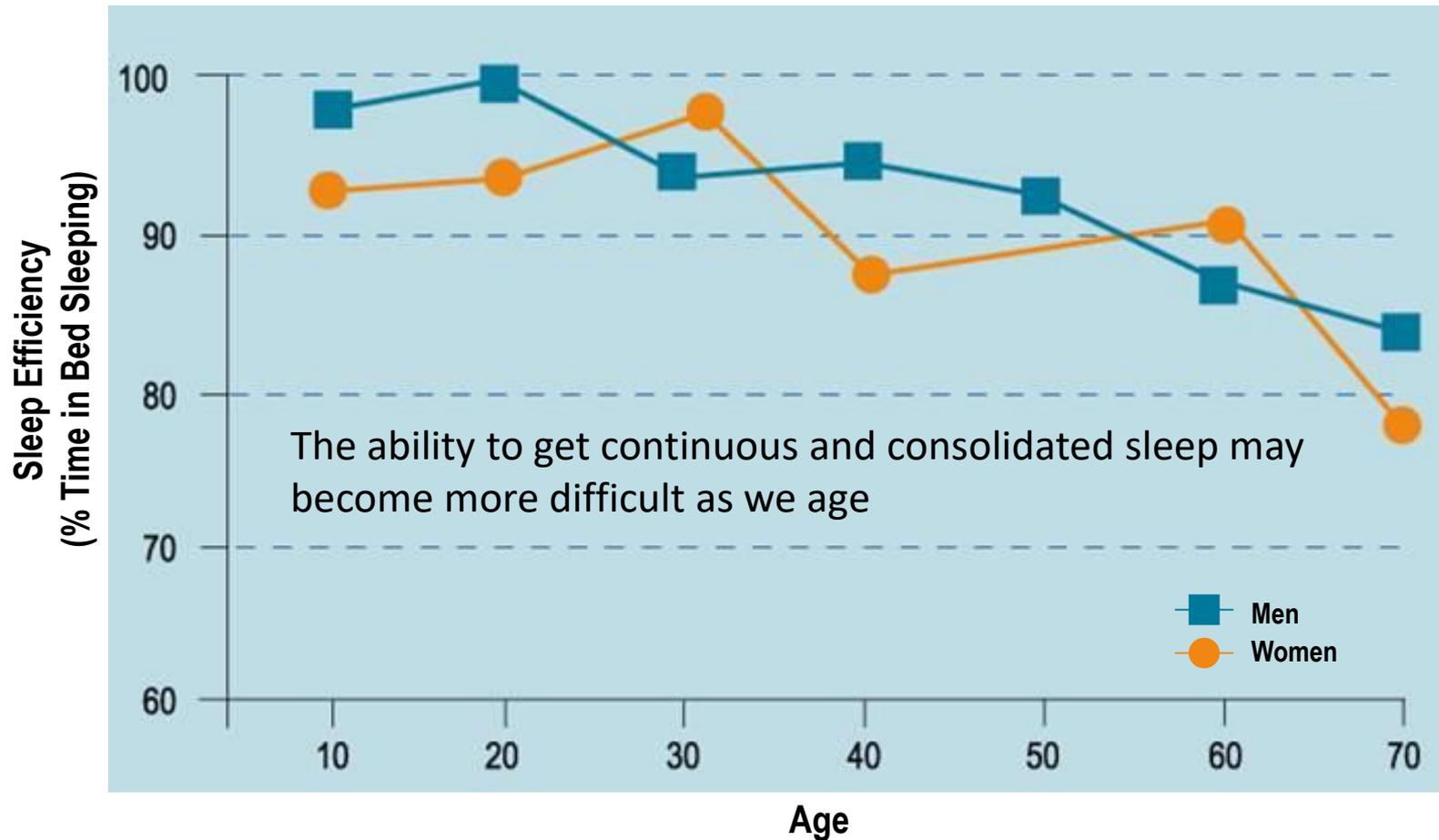


Maturity

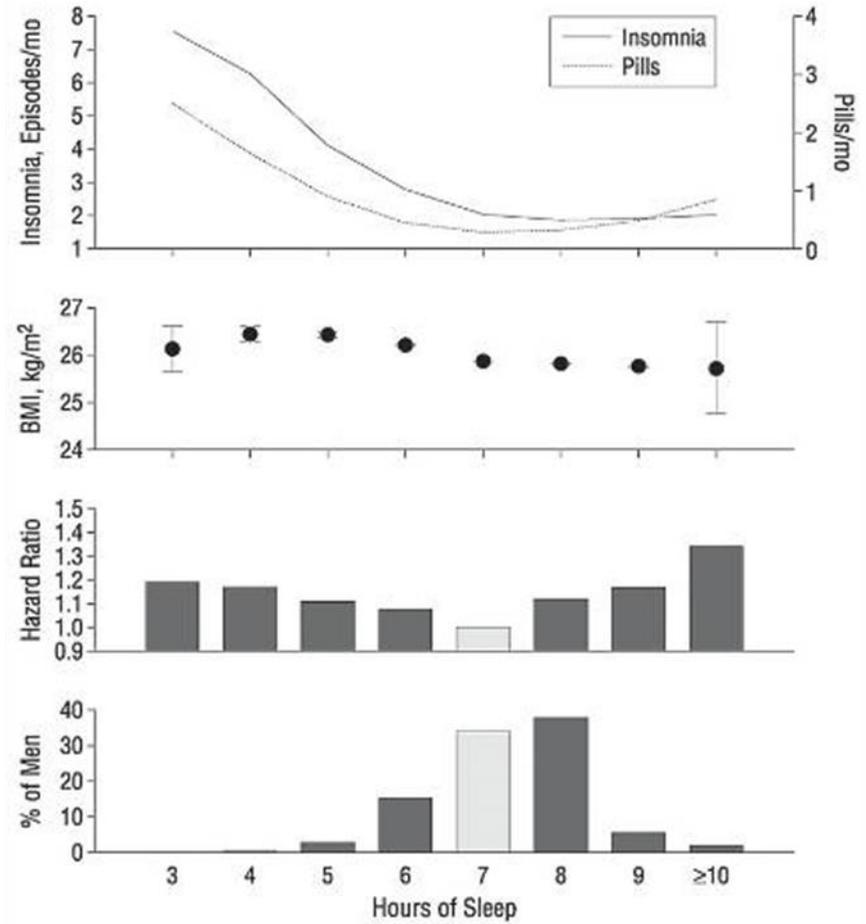
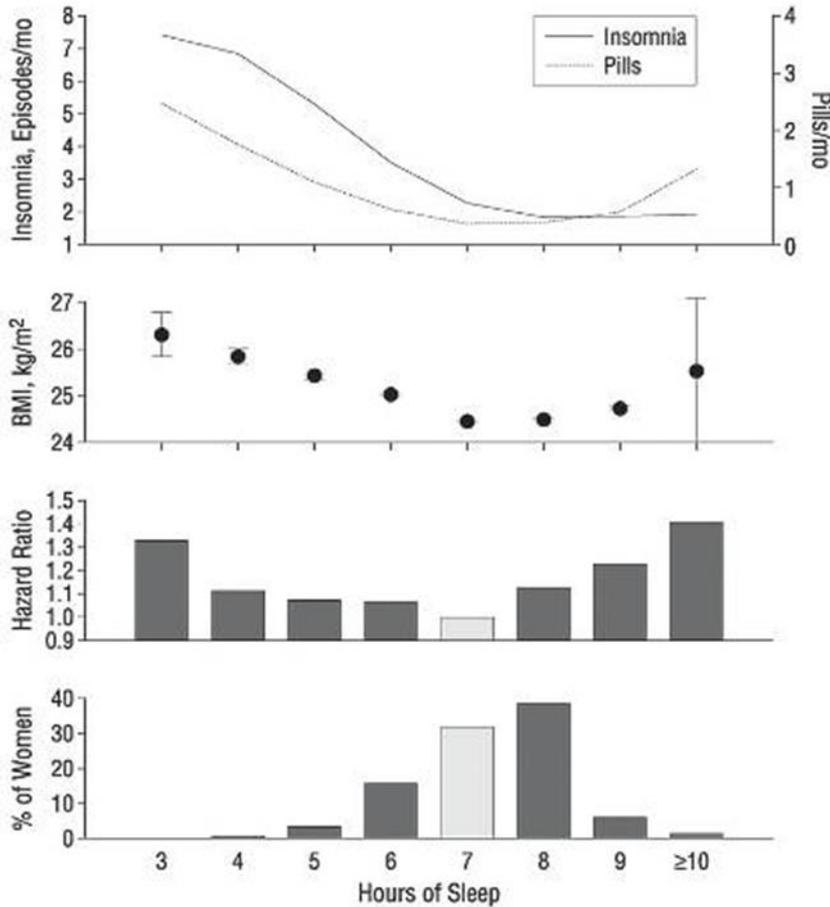


Old Age

Normal Sleep and Normal Aging



Sleep Duration and Health



Sleep Disturbance is **Common**

- Epidemiological survey indicates that 15~35% of the adult population complain of sleep quality disturbance.

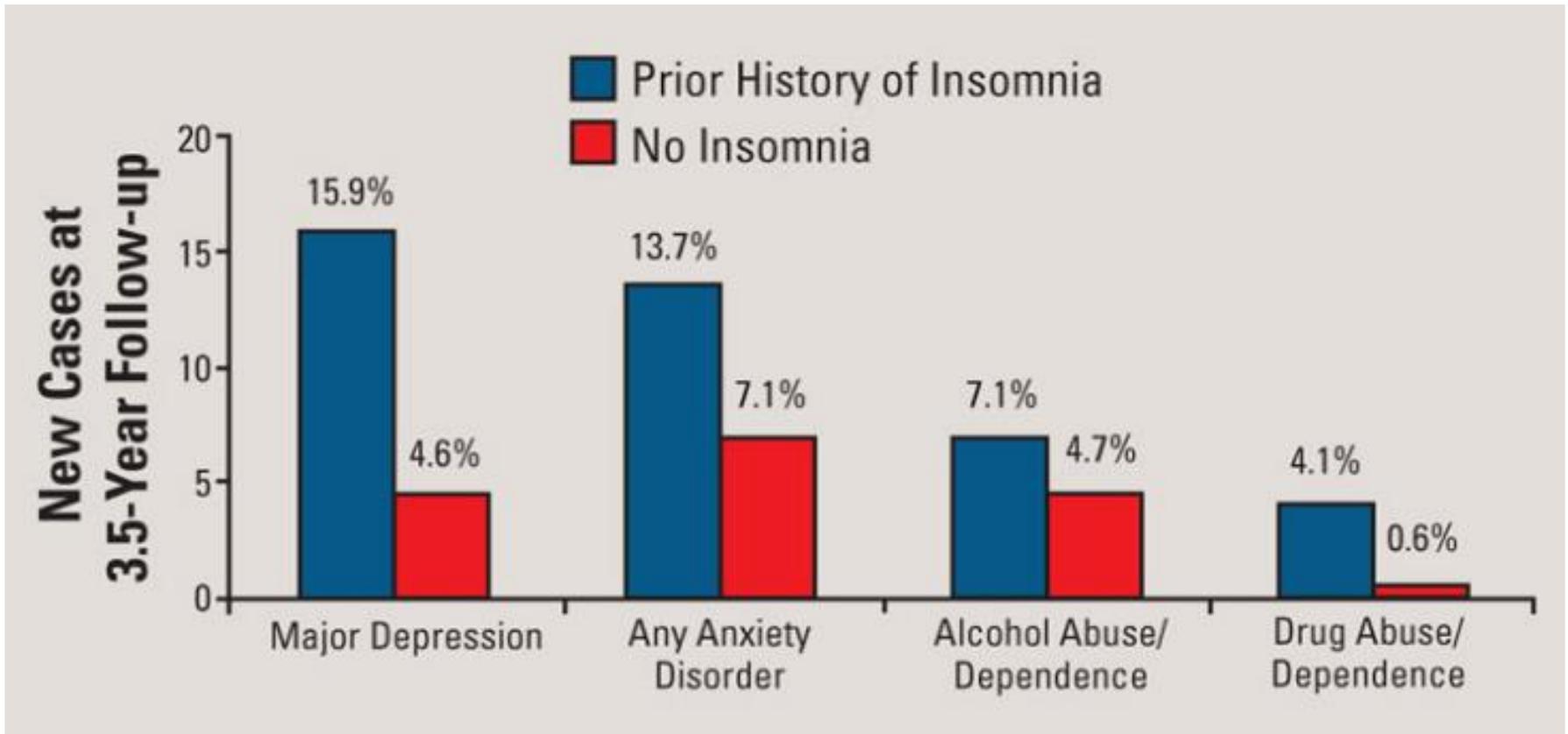
Karacan et al., 1983; Lugaresi et al., 1983;
Welstein et al., 1983; Mellinger et al., 1985

In Taiwan, annual prescription of hypnotics in 2004 is 65 million pills per year (23 million people in total). The prescription increases to 313 million pills in 2014.

Insomnia

- A perception or complaint of inadequate or poor sleep
 - Difficulty falling asleep
 - Frequent awakenings
 - Waking too early and having difficulty falling back to sleep
 - Waking unrefreshed
- A highly prevalent condition affecting as many as 48% of older persons
- Next day consequences

Insomnia **Predicts** Psychiatric Disorders



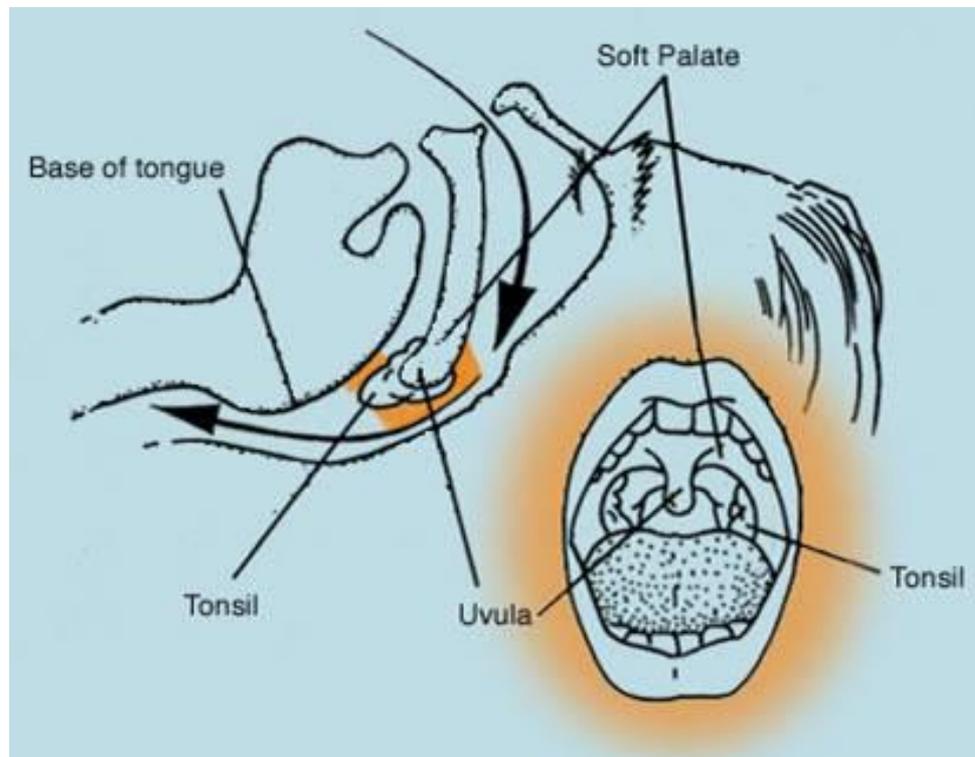
Breslau N, et al. *Biol Psychiatry*. 1996;39:411-418.

Insomnia and Mortality

- **All Cause Mortality**
 - Difficulty initiating sleep (25%)
 - Unrefreshed sleep (24%)
 - Difficulty maintaining sleep (9%)
 - Early morning awakening (4%)
- **Cardiovascular-related Mortality**
 - Difficulty initiating sleep (55%)
 - Unrefreshed sleep (32%)
 - Early morning awakening (9%)
 - Difficulty maintaining sleep (N/A)

Snoring

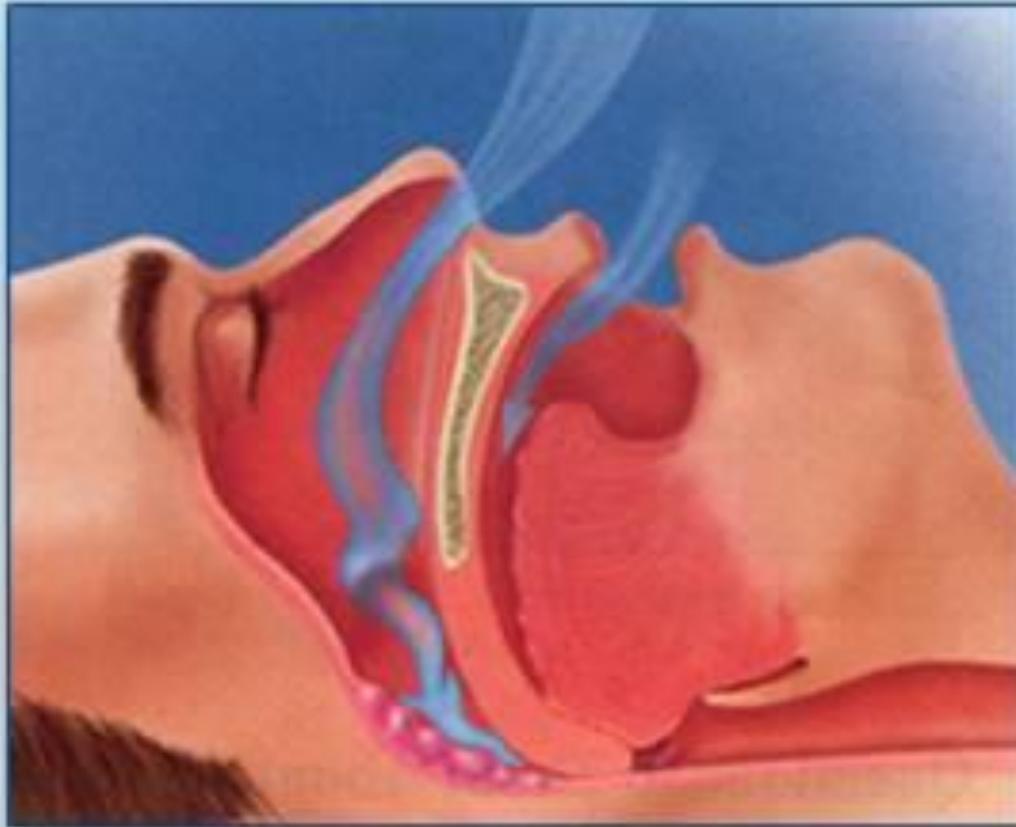
- Partial blockage of airway causing abnormal breathing and sleep disruptions



Snoring

- Very common
- Males
 - Those who are overweight and with large neck size most at risk
- Loud snoring can be a symptom of sleep apnea

Sleep Apnea

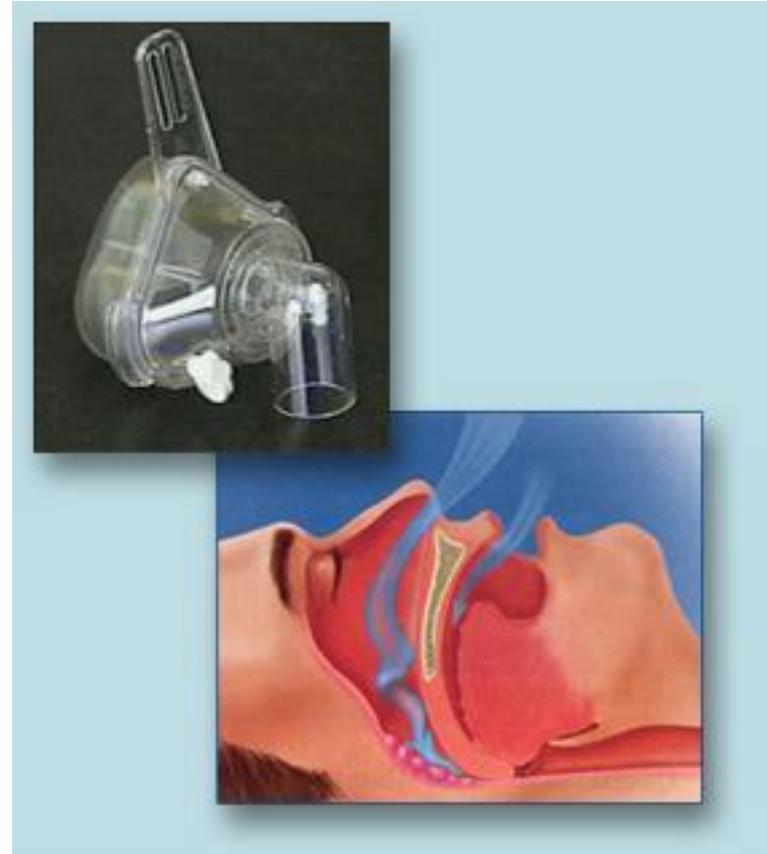


Sleep Apnea

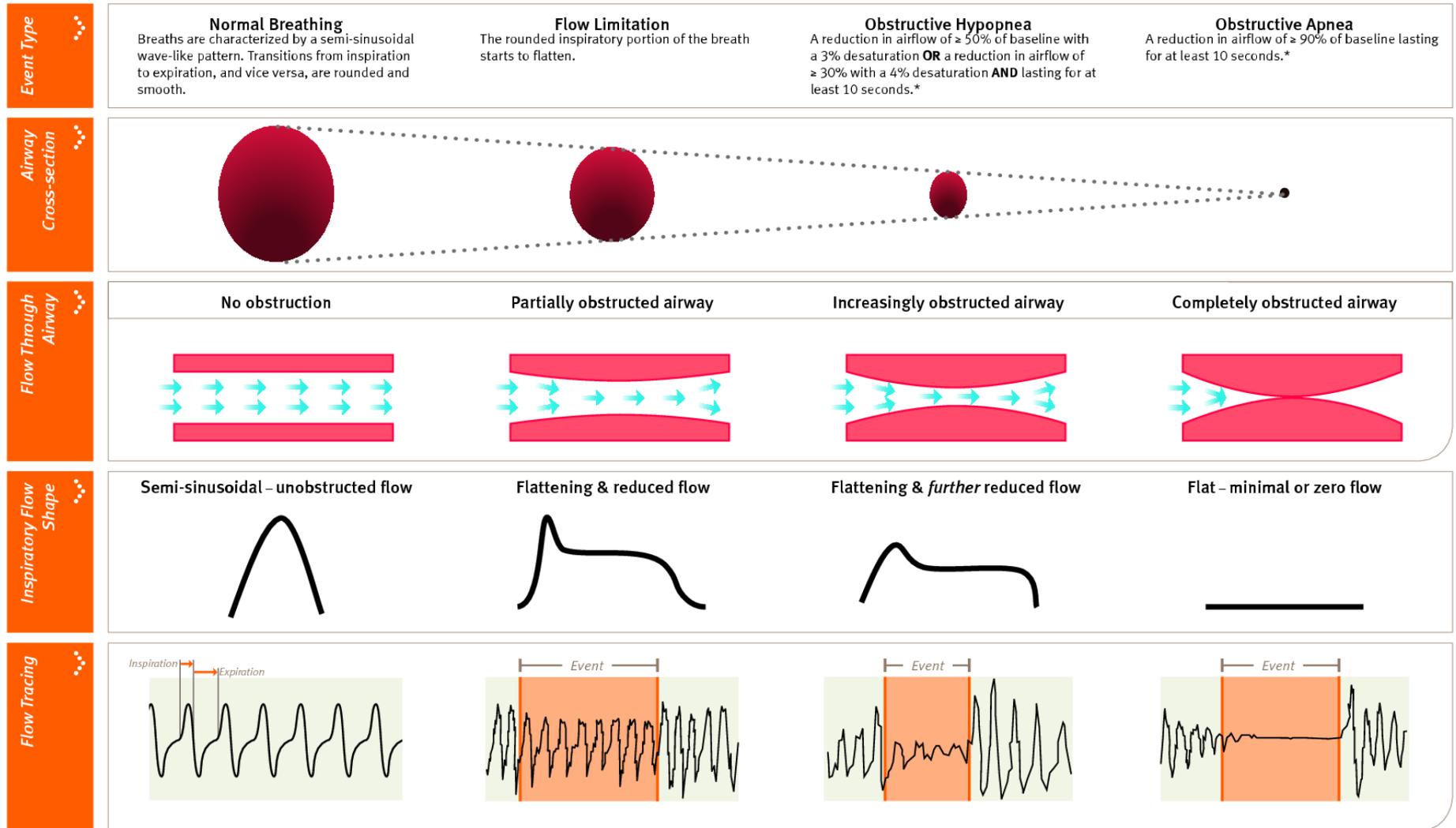
- Increases as we age: affecting 4% and 2% of middle-aged men and women and close to 27% and 19% of older men and women
- Characterized by pauses or gaps in breathing due to an obstruction of the airway

Sleep Apnea

- Signs and Symptoms
 - Loud, regular snoring
 - Daytime sleepiness
 - Hypertension
- Associated with major medical conditions
- Most common treatment
 - CPAP

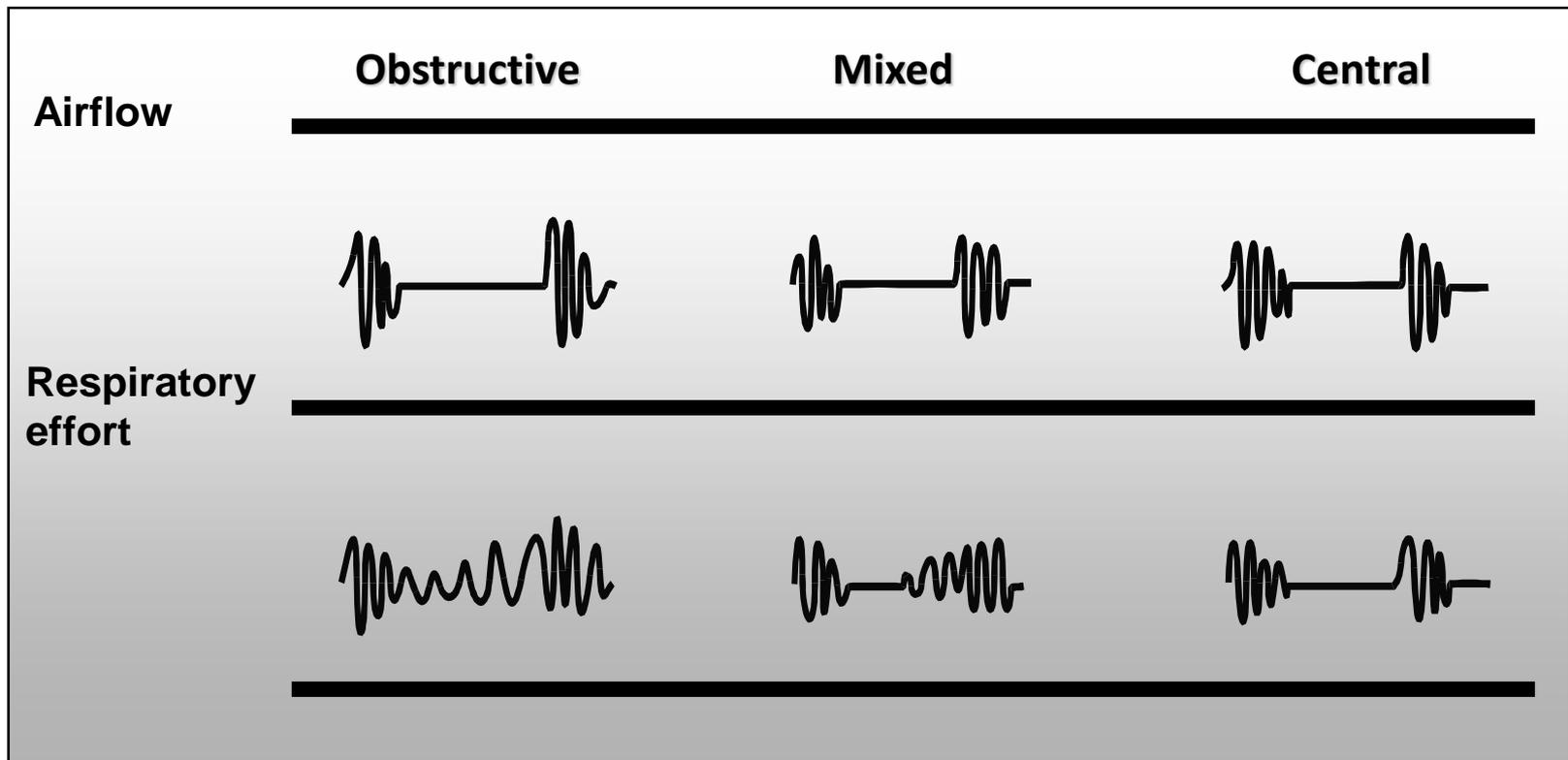


The Fundamentals of Sleep and Obstructive Sleep Apnea



* Iber et al., The AASM Manual for the scoring of sleep and associated events: Rules, Terminology and Technical Specifications, 1st ed.: Westchester, Illinois: American Academy of Sleep Medicine, 2007.

Apnea Patterns



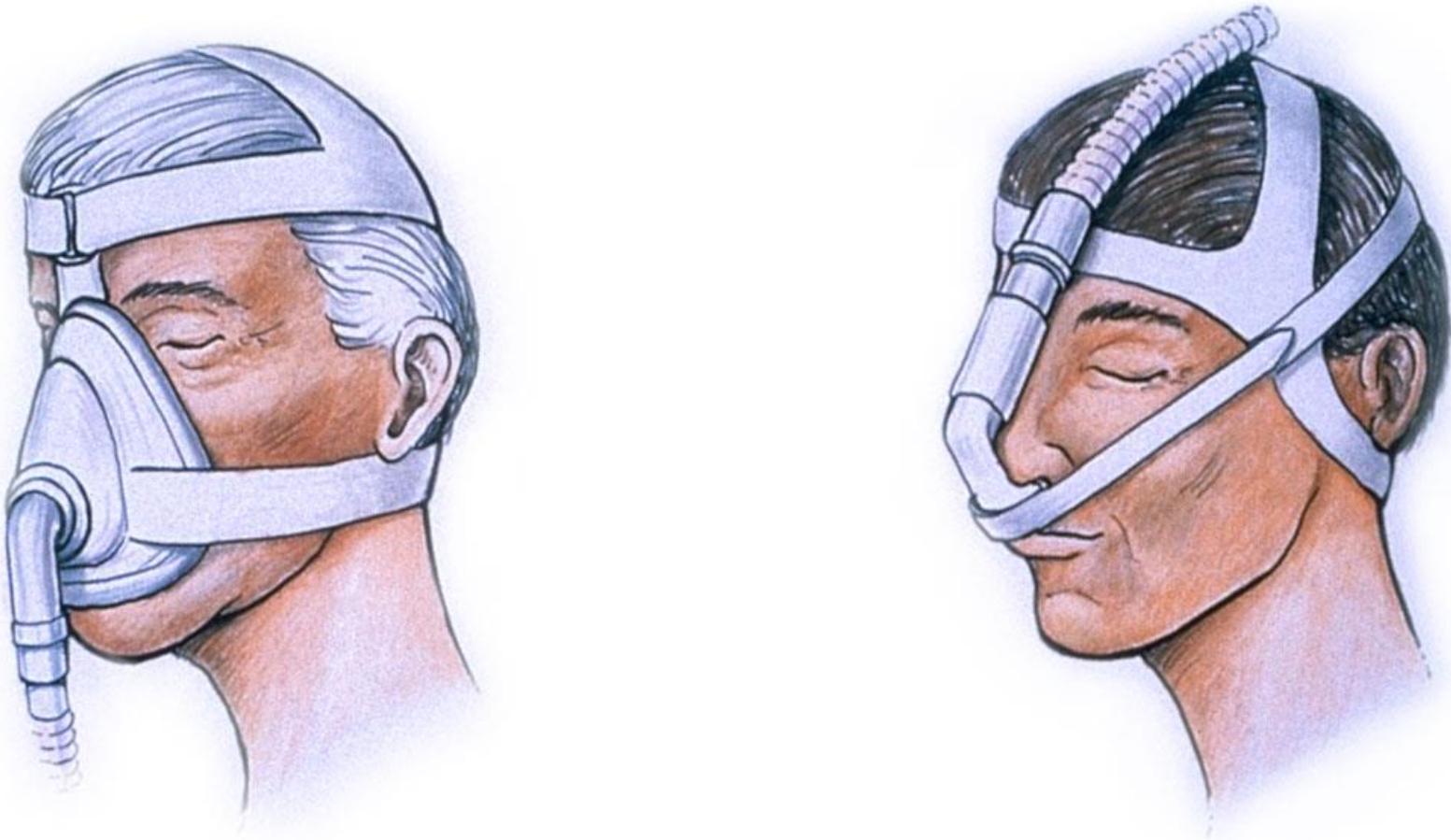
Sleep-Positioning Treatment



Positive Airway Pressure

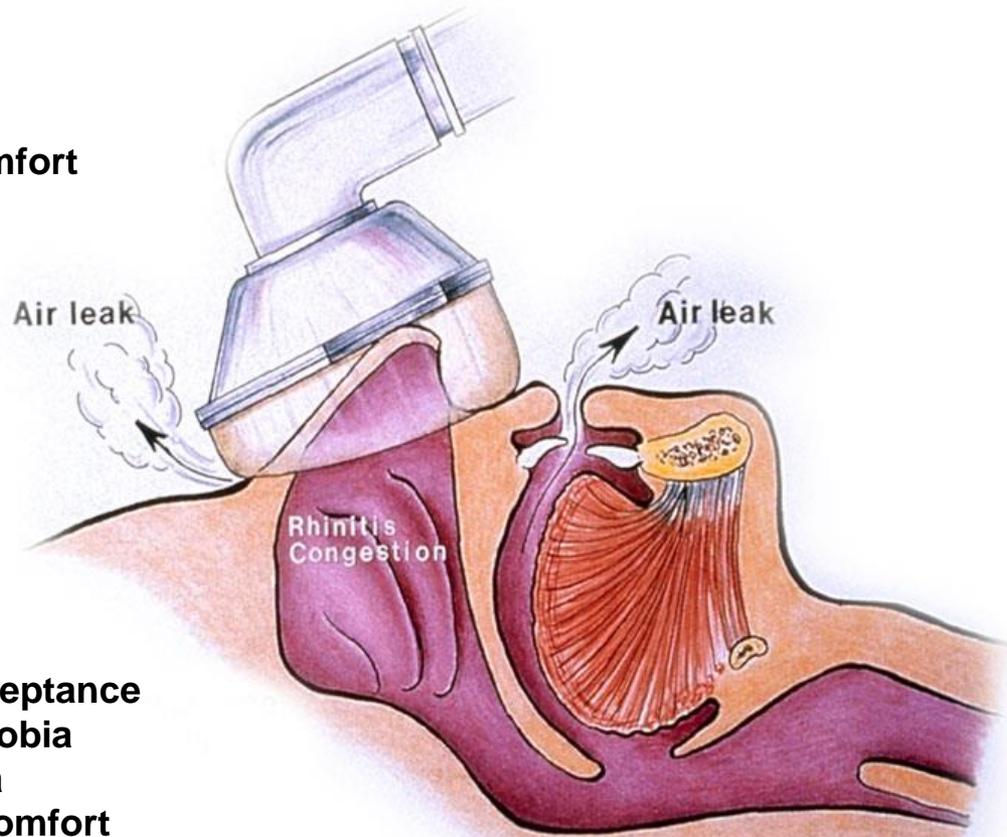


CPAP Masks



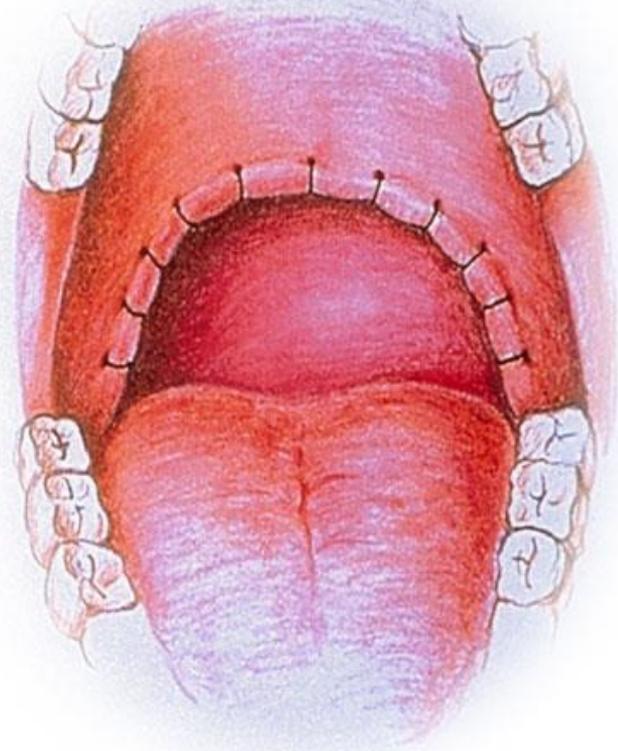
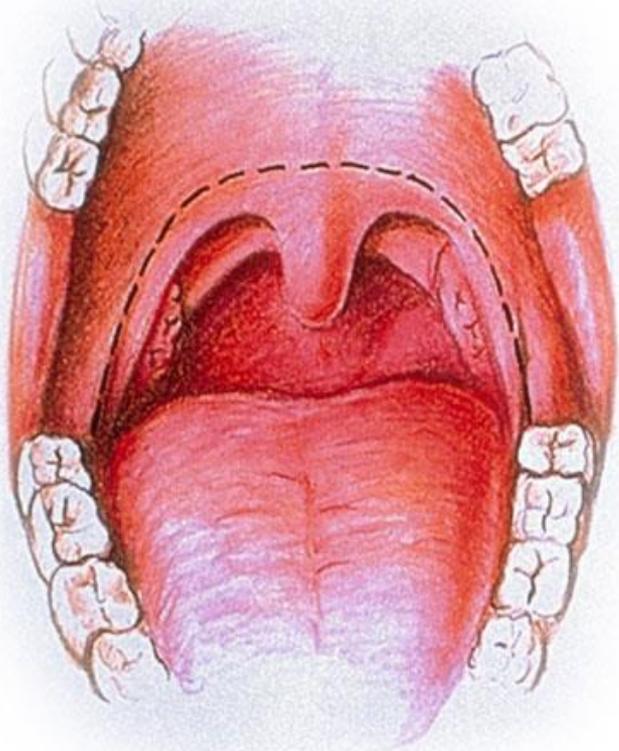
Positive Airway Pressure: Problems

Mask Discomfort



Patient Acceptance
Claustrophobia
Aerophagia
Chest Discomfort

Uvulopalatopharyngoplasty (UPPP)



Restless Legs Syndrome/ Periodic Limb Movement Disorder

- Neurological movement disorders
- Involuntary urge to move due to unpleasant feelings in the legs during sleep or rest
- Jerking of legs and arms during sleep
- Increases with age
- Treatment
 - Dopamine Agonist (e.g., Ropinirole / Requip)
 - Healthy lifestyle
 - Sleep hygiene

Restless Leg Syndrome

- The symptoms are more severe at night
- An irresistible urge to move the legs and/or arms
- The sensations begin following relaxation or a period of staying still, and during sleep
- Temporary relief from these sensations during movement of the affected legs and/or arms

Parasomnias

- Nightmare Disorder
- Sleep Terror Disorder
- Sleepwalking Disorder
- REM Behavioral Disorder

Nightmare

- Usually occurs in early morning when REM sleep dominates.
- The same nightmare may recur repeatedly or different ones may pop up three times a week.
- Stress may induce 60% of nightmares.
- Half of the cases of nightmare disorder appear before age 10; 2/3 before age 20.
- Dreams are clearly remembered

Sleep Terror

- Abrupt awakening from sleep, usually beginning with a panicky scream or cry.
- Intense fear and signs of autonomic arousal
- Unresponsive to efforts from other to calm client
- No detailed dream recalled

Sleep Walking

- Rising from bed during sleep and walking about.
- Usually occurs during NREM and early in the night.
- On awakening, the person has amnesia for episode.
- Runs in families.
- Begins between ages 6 and 12 and may be stress-related.
- Adult sleepwalking is far less common, usually worse and more chronic.

REM Behavioral Disorder

- Late adulthood to older age
- Usually occurs in the last 1/3 of night.
- Sometimes associated with brainstem stroke or degeneration
- Loss of normal REM paralysis nuclei
- Frequently severe injuries

Narcolepsy



Narcolepsy

- Daytime sleepiness
- Cataplexy
- Sleep Paralysis
- Instantaneous REM sleep
- Hypnagogic Hallucinations
- Randomization of NREM and REM tendency throughout a day.

Medical Conditions Associated with Sleep Problems

Medical Conditions increase with age and are often associated with sleep problems and disorders

- Hypertension and Heart Disease
- Heart Failure
- Stroke
- Menopause
- Cancer
- Gastrointestinal Disorders

Medical Conditions Associated with Sleep Problems

Medical Conditions increase with age and are often associated with sleep problems and disorders

- Alzheimer's, Parkinson's and cognitive problems
- Depression
- Arthritis
- Other conditions

Symptom of Insomnia May Indicate Other Conditions

- **Difficulty initiating sleep**
 - Anxiety, depression, or restless leg syndromes
- **Unrefreshed sleep**
 - Sleep apnea
- **Difficulty maintaining sleep**
 - Anxiety, depression, or restless leg syndromes
- **Early morning awakening**
 - Anxiety or depression