

Sleep Takes the Wheel:

STAY IN LANE

How Sleep is the Physiological Driver of the Human Engine



Presented by Jeanne Sherwood, RN, CWWS

Goals & Objectives



In this session attendees will:

Gain Insight on:

The Sleep Center's Regulation of Body Systems

The "Domino Effect" Impact of Sleep Deprivation on Body Systems

Altered Human Function & Mental Processing Resulting from Sleep Deprivation

Learn strategies to:

Proactively Assist the Body to Adjust to Altered Sleep Patterns

Sleep Deprivation Causes a Very Real Biological Impact



- **Sleep Deprivation:**

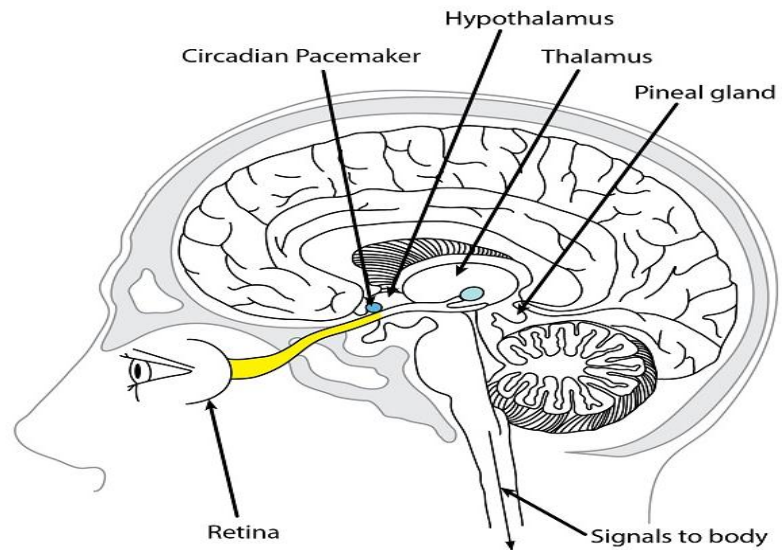
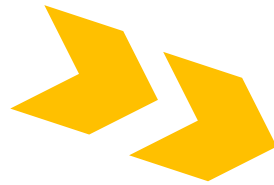
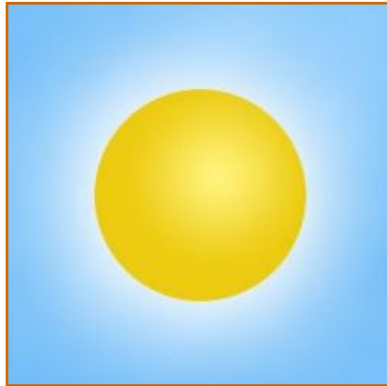
- Creates a Critical and Continuous State of “INJURY” to the Body and Body Systems.
- The Body’s Reaction is to Compensate and Preserve Vital Life Preserving Processes.
- The Result is a Reduction in Human Performance and Function.

How Sleep Impacts the Body

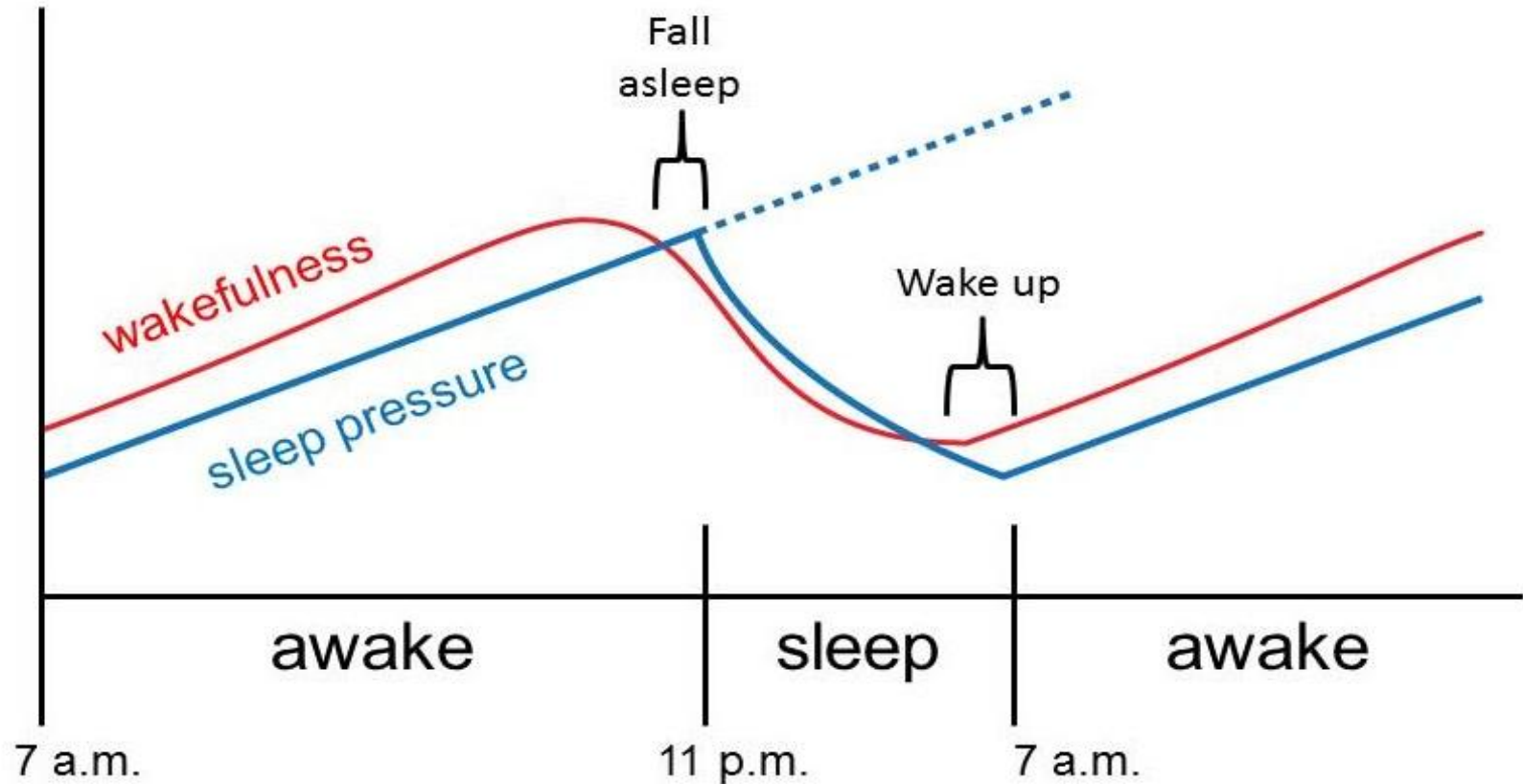


The Natural Circadian Clock: SCN

Regulates Wakefulness, Sleep Drive and Multiple Body Systems



The Body's Powerful Sleep Drive



SCN Regulation of Body Systems

Hypothalamus
Body Temperature
Thyroid Hormones
Appetite

Aorta/Heart
Heart Rate
Palpitations
Immune Response

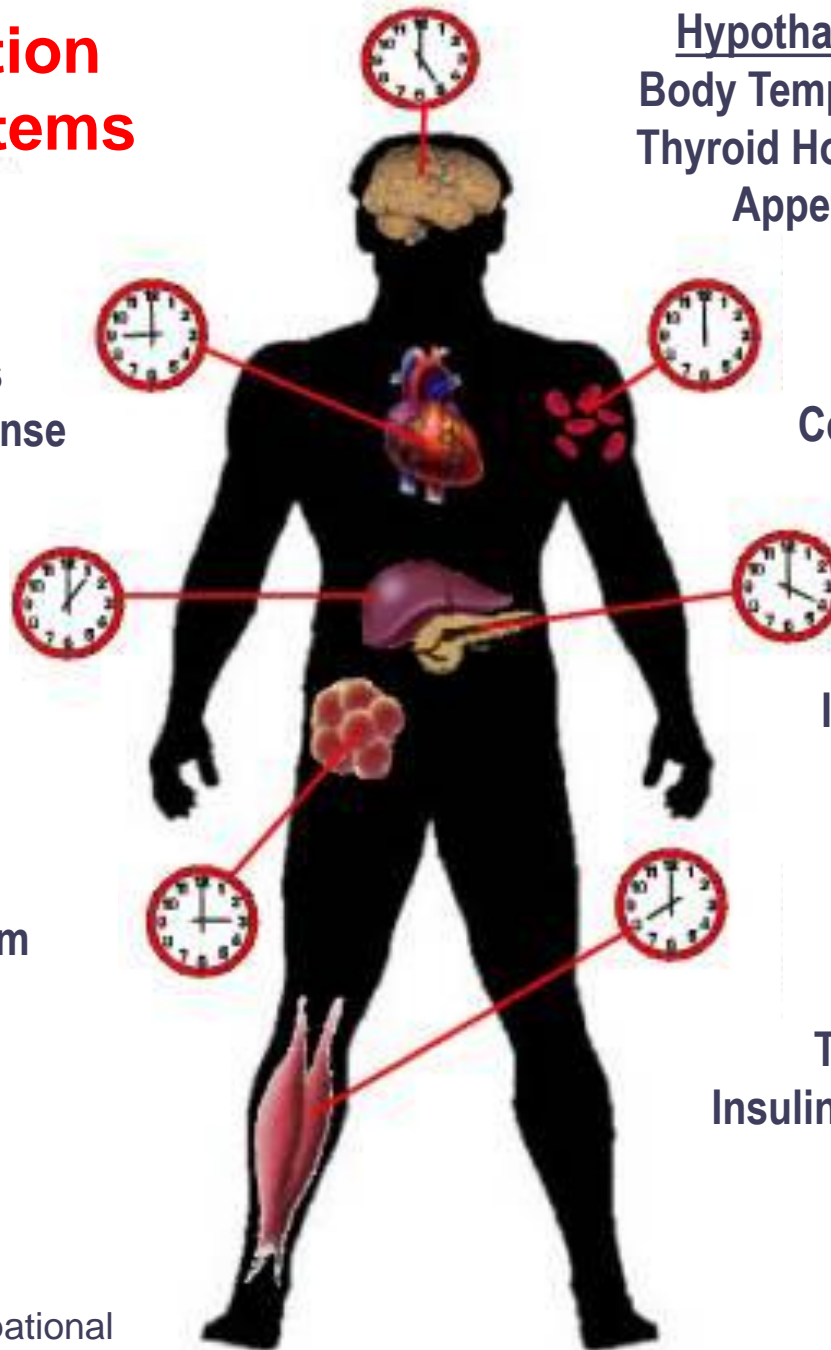
Inflammation
Cell Proliferation

Liver
Coagulation
Carbohydrate Metab.

Pancreas
Insulin Insufficiency

Adipose
Lipid Metabolism
Endocrine

Muscle
Contraction
Tremors/Aches
Insulin Uptake Resistance



Sleep Deprivation & Human Function



A Sleep Deprived Person Experiences Very Powerful Forces which lead to Decreased Function & Quality of Life:

- Fatigue, Depressed Mood, Apathy
- Cognitive Impairment, Poor Moral Judgement, Hallucinations
- Poor Memory, Difficulty Maintaining Thought
- Psychomotor Slowing, Activity Avoidance
- Irritability, Quick to Anger, Mood Changes
- Lapses in Alertness, Reduced Attention Span, ADHD Type Behaviors, Severe Yawning
- Weight Gain, Poor Digestion
- Onset of Disease Such as DM, Thyroid Disorder
- Inability to Handle Stress and Multitask

Altered Sleep Impact on Health

Focus: Altered Appetite



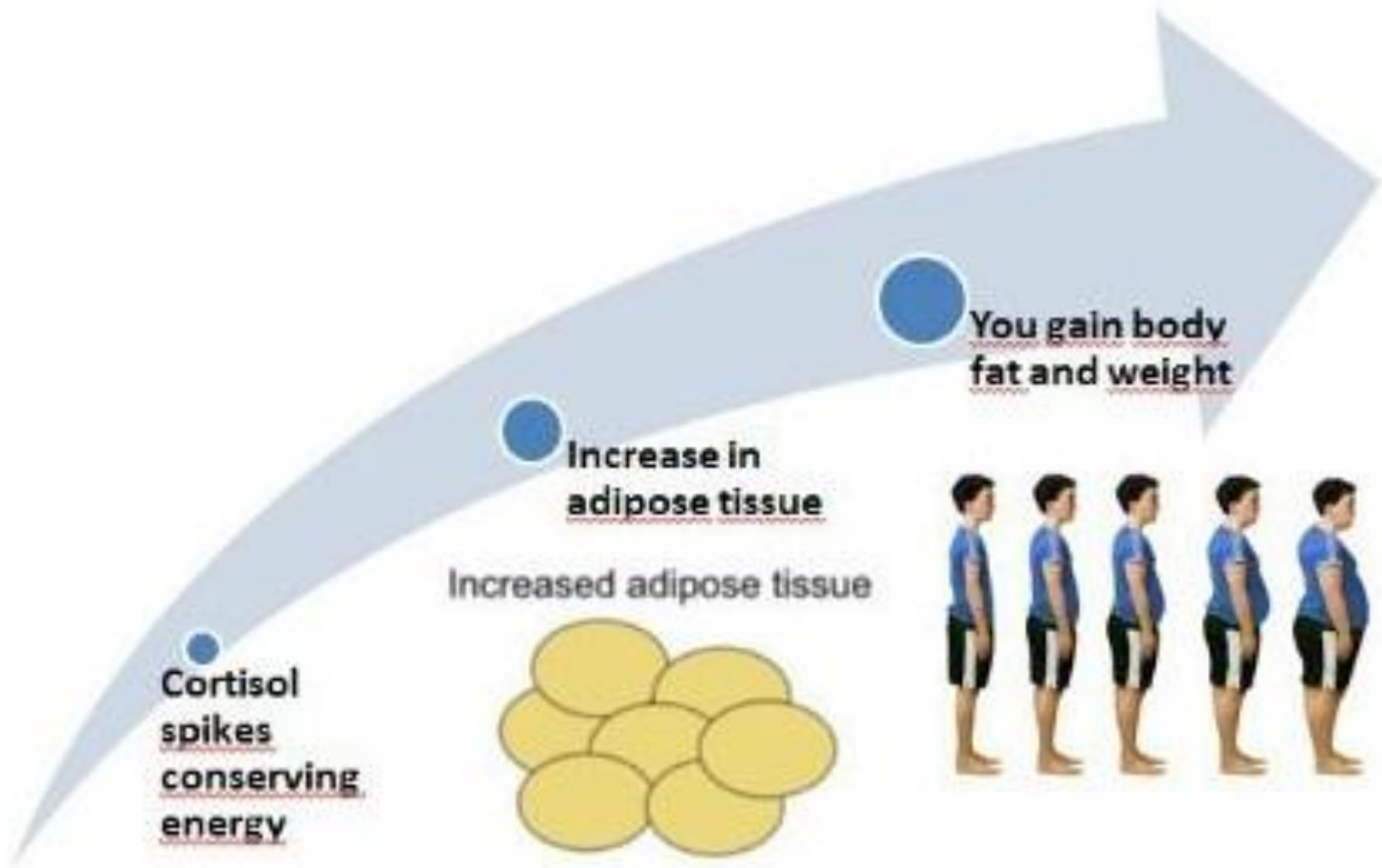
Ghrelin signals the Brain that it's time to eat.

Leptin cues the brain that you are full.



Altered Sleep Impact on Health

Focus: Increased Body Fat



Altered Sleep Impact on Health

Focus: Behavior Patterns



Health Behaviors Contributing to Health Conditions & Higher Risk:

- Poor Eating Patterns
- Smoking
- Lack of Exercise
- Alcohol Consumption
- **Reduced Self-Discipline**

Cause & Effect: Health and Sleep Issues



Health Conditions often Present with Sleep Issues:

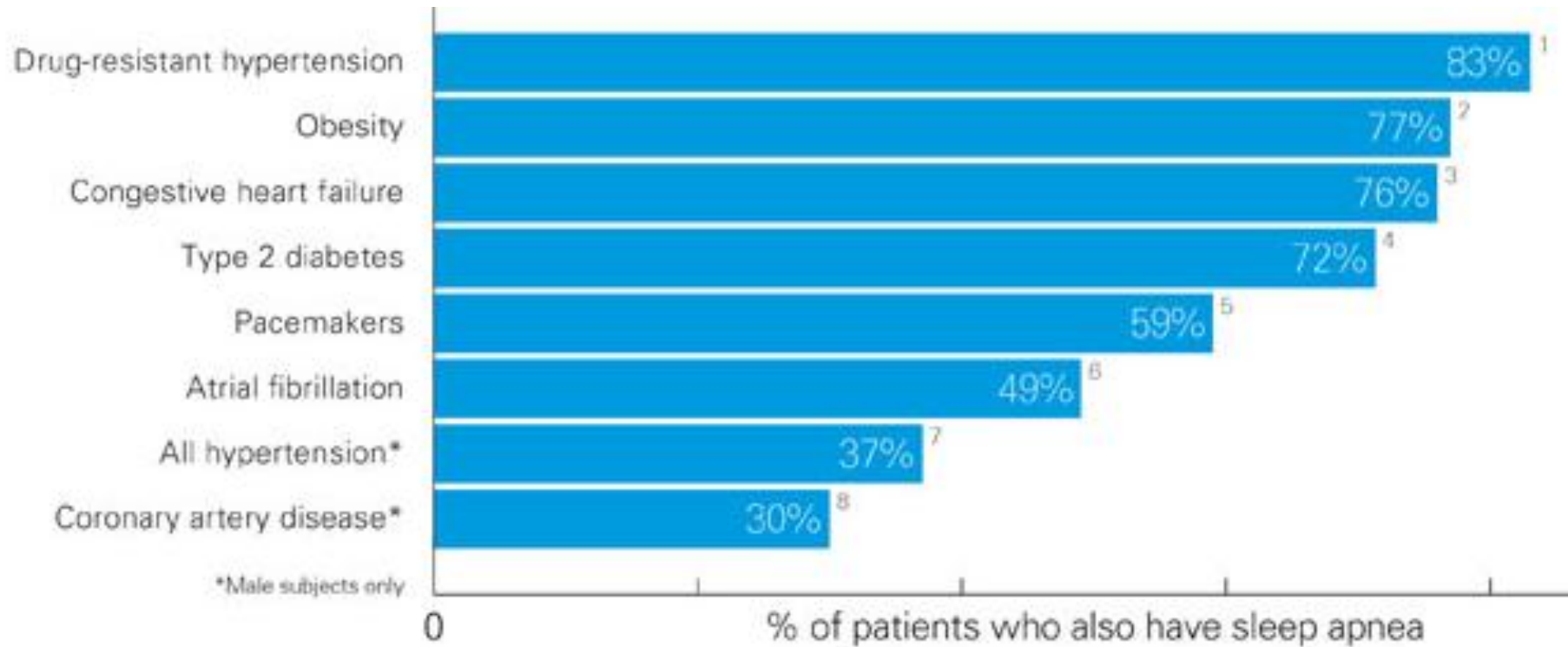
- Hypertension
- Obesity
- Heart Disease



Health Conditions Influence Sleep Quality/Quantity:

- Stress
- Pain
- Mood Disturbances
- GI Reflux
- Lung Disease

Prevalence of Coexisting Sleep Issues | Health Conditions



1 Logan AG et al. *J Hypertens* 2001

2 O'Keefe T and Patterson EJ. *Obes Surg* 2004

3 Oldenburg O et al. *Eur J Heart Fail* 2007

4 Einhorn D et al. *Endocr Pract* 2007

5 Garrigue P et al. *Circulation* 2007

6 Gami AS et al. *Circulation* 2004

7 Sjöström C et al. *Thorax* 2002

8 Schäfer H et al. *Cardiology* 1999

Strategies to Increase Safety: Awareness of Reduced Function



- Slower Reaction Time
- Reduced Attention Span
- Impaired Information Processing

Strategies to Increase Safety: Coping Strategies Do Not Work



- People often use methods such as physical activity or dietary stimulants to cope with sleep loss, masking their level of sleepiness.
- When a sleep deprived person sits still, performs repetitive tasks (such as driving long distances), gets bored, or lets down their coping defenses, SLEEP COMES QUICKLY.
- It is virtually impossible to fight the biological pressure to sleep

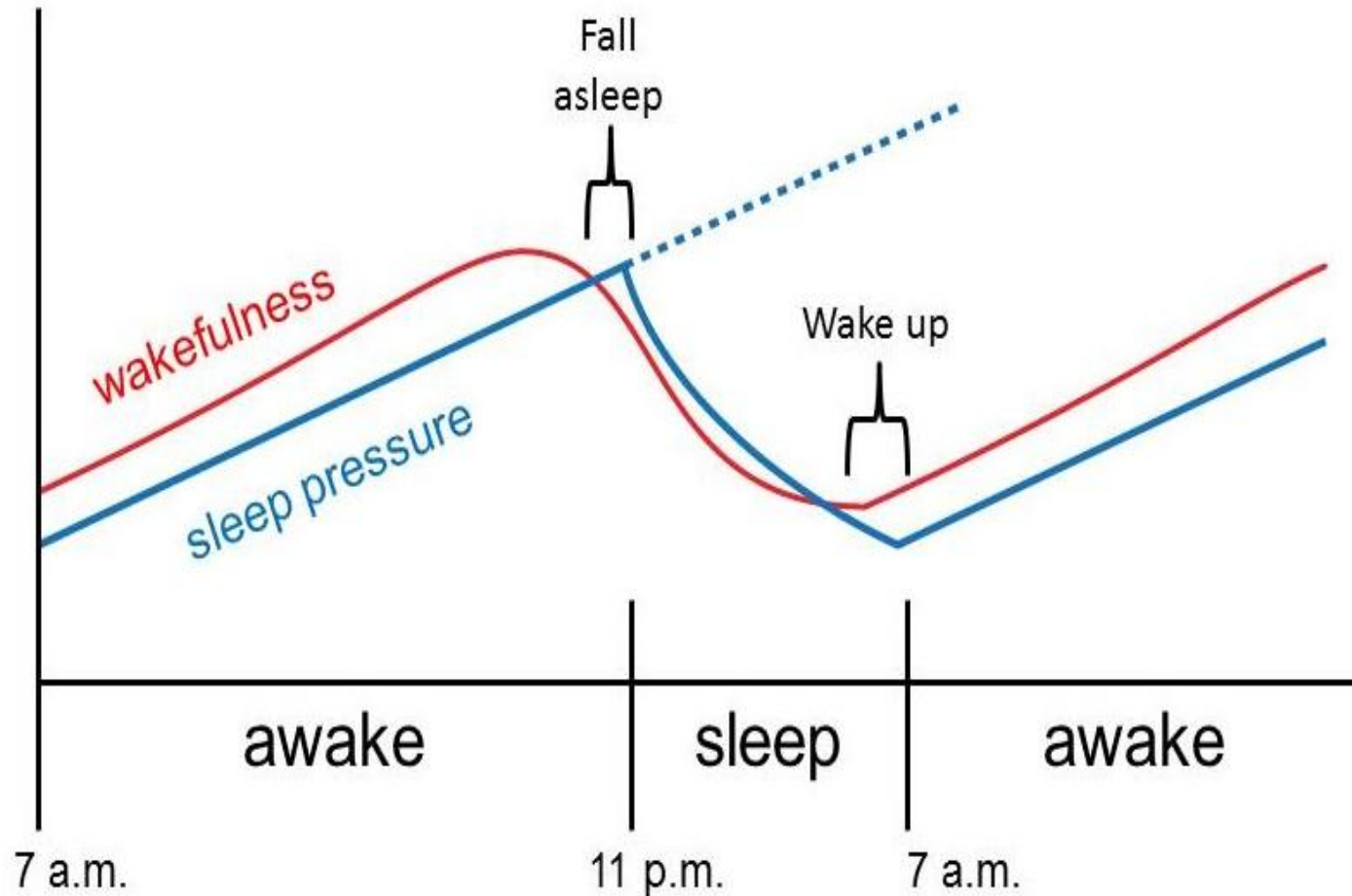
Strategies to Increase Safety: Awareness of High Risk Factors



Factors that Increase Force and Power of Sleep Drive:

- Time of Day
- Time Awake + Sleep Debt
- Time on Task

Time of Day: Sleep Pressure, Circadian Wakefulness Rhythm Synchronized



Time Awake: Fatigue-related Impairment vs Alcohol Intoxication



Participants' performances were tested and compared under two separate conditions:

- After staying awake for extended periods and
- After reaching a certain blood alcohol concentration (BAC).

**Being awake for 17 hours
is similar to having a BAC of 0.05%**

**Being awake for 24 hours
is similar to having a BAC of 0.10%**

Best Practice Considerations: Known High Risk Factors



Populations at Higher Risk for Accidents Related to Sleep Deprivation:

- Age/Gender: 16 to 29, Males
- Shift Workers
- Untreated Sleep Disorders
- Driving for Extended Time with No Break
- Medications/Alcohol

Best Practice Considerations: Awareness and Education



- Honest Assessment of Current State of Personal Sleep Health
- Maintain Sleep Health as a Priority and Essential Need
- Awareness of Warning Signs of Sleepiness
- Recognize Factors Contributing to Higher Risk for Accidents

Questions?



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