HENRY FORD HEALTH®

Sleep and Well-Being

Virginia Skiba, M.D.
Henry Ford Sleep Disorders
and Research Center

Disclosures

- Virginia Skiba, MD- Speaker
  - I have no financial relationships or disclosures
- Melatonin is not FDA approved for any indication

Acknowledgements

- American Academy of Sleep Medicine (AASM) has a slide library with results of their Sleep Prioritization Surveys from 2019-2022.
  - AASM Members are given permission to use those slides.
- A study published in 2019 identified 20 common sleep myths
  - Robbins R, Grandner MA, Buxton OM etc. Sleep myths: an expert-led study to identify false beliefs about sleep that impinge upon population sleep health practices. *Sleep Health*. 2019:409-417.
- All pictures are obtained from Microsoft Office stock images, except as otherwise indicated

Objectives

1. Be able to describe sleep needs for adults and children
2. Review circadian neurobiology
3. Discuss steps for healthy sleep
4. Poor sleep
    1. Triggers
    2. Mitigation strategies
    3. Insomnia, obstructive sleep apnea

Sleep needs

Sleep needs

- Since 2019, the American Academy of Sleep Medicine (AASM) has been commissioning a yearly online survey of over 2,000 adults in the U.S.
- The surveys asks various questions about sleep.

Priorities

On average, U.S. adults ranked:

- **Family** as most important
- **Sleep** as second most important
- **Work** (3), **nutrition/diet** (4), and **exercise** (5) came next
- **Entertainment** was the least important priority

What is the least amount of sleep that most of us need a night?

a. 6 hours a night
b. 7 hours a night
c. 8 hours a night
d. Sleep is not that important

What is the least amount of sleep that most of us need a night?

a. ~~6 hours a night~~

b. 7 hours a night

c. ~~8 hours a night~~

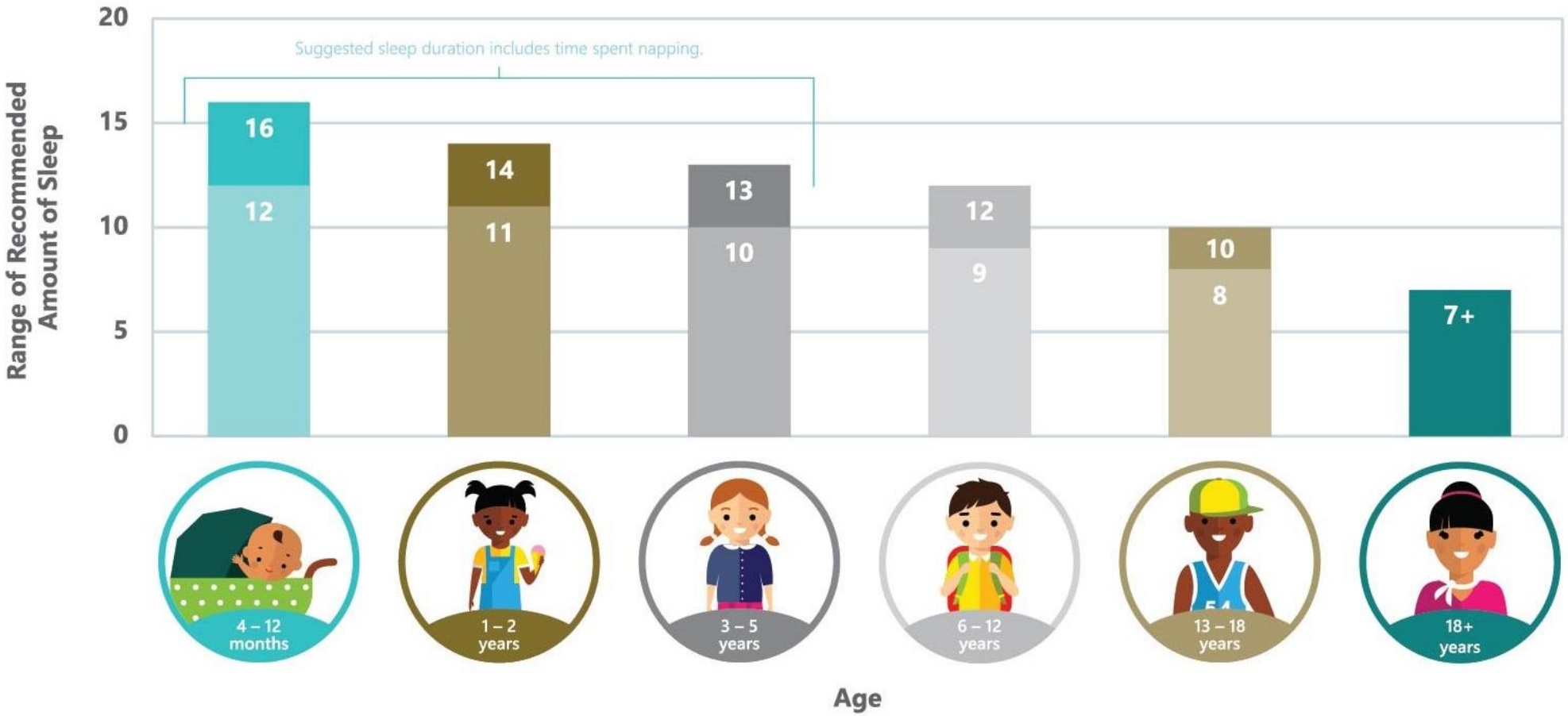
d. ~~Sleep is not that important~~

AASM recommendations

- Although individual sleep needs vary, the American Academy of Sleep Medicine recommends that adults should sleep 7 or more hours per night
- on a regular basis
- to promote optimal health, productivity and daytime alertness.

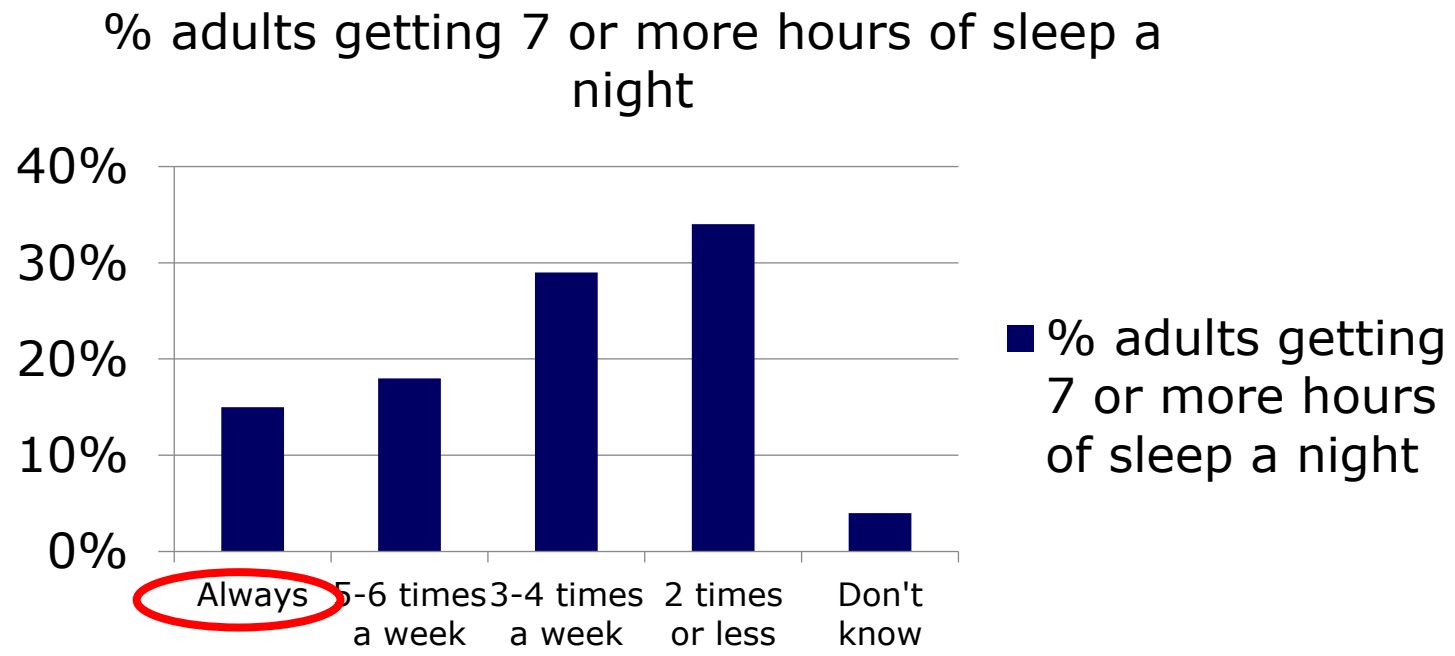
Healthy Sleep Duration

The American Academy of Sleep Medicine recommends that you get the following hours of sleep on a regular basis for optimal health at each stage of life.



Who gets the recommended amount of sleep?

Only 15% of Americans are sleeping 7 hrs or more every night



Myth vs Fact

During sleep, the brain is not active.

Myth vs Fact

Myth: *During sleep, the brain is not active .*

- ✓ ***Fact:*** *Neuronal activity in the brain becomes larger in amplitude in certain parts of the brain during sleep.*
- ✓ *Sleep plays an important role in clearance of neurotoxic waste from the brain.*
- ✓ *Memory becomes consolidated during sleep.*

Proposed Biological Functions of Sleep

- Body and brain tissue restoration
- Facilitation of waste clearance of the central nervous system via the lymphatic system
- Energy conservation
- Adaptation
- Memory reinforcement and consolidation
- Synaptic neuronal network integrity
- Gene expression in sleep/wakefulness
- Thermoregulation

Sleep Deprivation: Acute

- Longer reaction time
- Lapses in attention
- Lost information
- Poor short-term memory
- Reduced motivation
- Sleepiness
- Poor performance

Deficits are worse:

- At circadian low points
- When sedentary
- With no feedback
- With reduced light or sound
- With low motivation, interest or novelty

Berry 2012

Sleep Deprivation: Chronic

Increase:

- Sleepiness
- Attention lapses
- Medical errors
- Motor vehicle accidents
- Cortisol, ACTH, norepinephrine
- Gherlin (hunger)
- Insulin resistance

Decrease:

- Vigilance
- Working memory
- Cognition, attention
- Pain tolerance
- Seizure threshold
- Leptin (satiety)
- Acute antibody response to vaccination

Berry 2012

Insufficient sleep?

True or False?

If I don't get enough sleep, I will always know that I am tired.

Insufficient sleep?

~~True~~ or False?

If I don't get enough sleep, I will always know that I am tired.

Chronically sleep-deprived individuals do not recognize their degree of impairment!

Why is sleep important?

- **Healthy sleep reduces the risk of:**
  - Mental health problems such as depression
  - Obesity
  - Medical conditions such as heart disease, Type 2 diabetes, and stroke
  - Cognitive problems such as Alzheimer's Dementia
  - Accidents

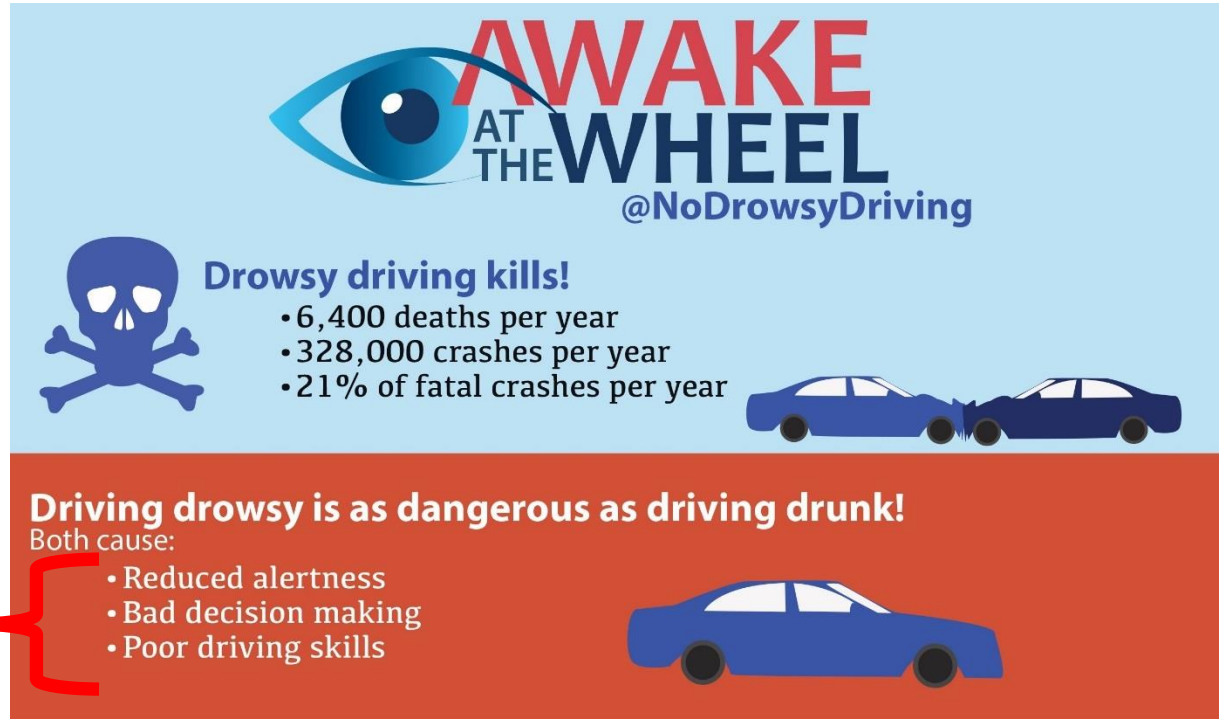
Drowsy Driving

Nearly half (**45%**) of Americans admit they have **struggled** to stay awake while **driving**.

Drowsy Driving – Stats

Each year in the U.S., drowsy driving causes an average of **328,000** motor vehicle accidents, including **6,400** fatal crashes. (AAA Foundation, 2014)

Drivers who usually sleep for less than **5 hours** daily had **5.4 times the crash** rate of drivers who reported that they often slept for 7 hours or more. (AAA Foundation, 2016)



Drowsy Driving – Warning Signs

Drowsy Driving Warning Signs:

- You keep yawning
- You are unable to keep your eyes open
- You catch yourself “nodding off”
- You can’t remember driving the last few miles
- You end up too close to cars in front of you
- You miss road signs or drive past your turn
- You drift into the other lane of traffic
- You drift onto the “rumble strip” or the shoulder of the road

Drowsy Driving – Prevention

- Get a full night of **seven to nine hours** of sleep before driving
- Avoid driving late at night
- Avoid driving alone
- On a long trip, share the driving with another passenger
- Pull over at a rest stop and take a nap
- Arrange for someone to give you a ride home after working a late shift
- Drinking, chewing gum, listening to music, opening windows DO NOT WORK!

Review of Circadian Neurobiology

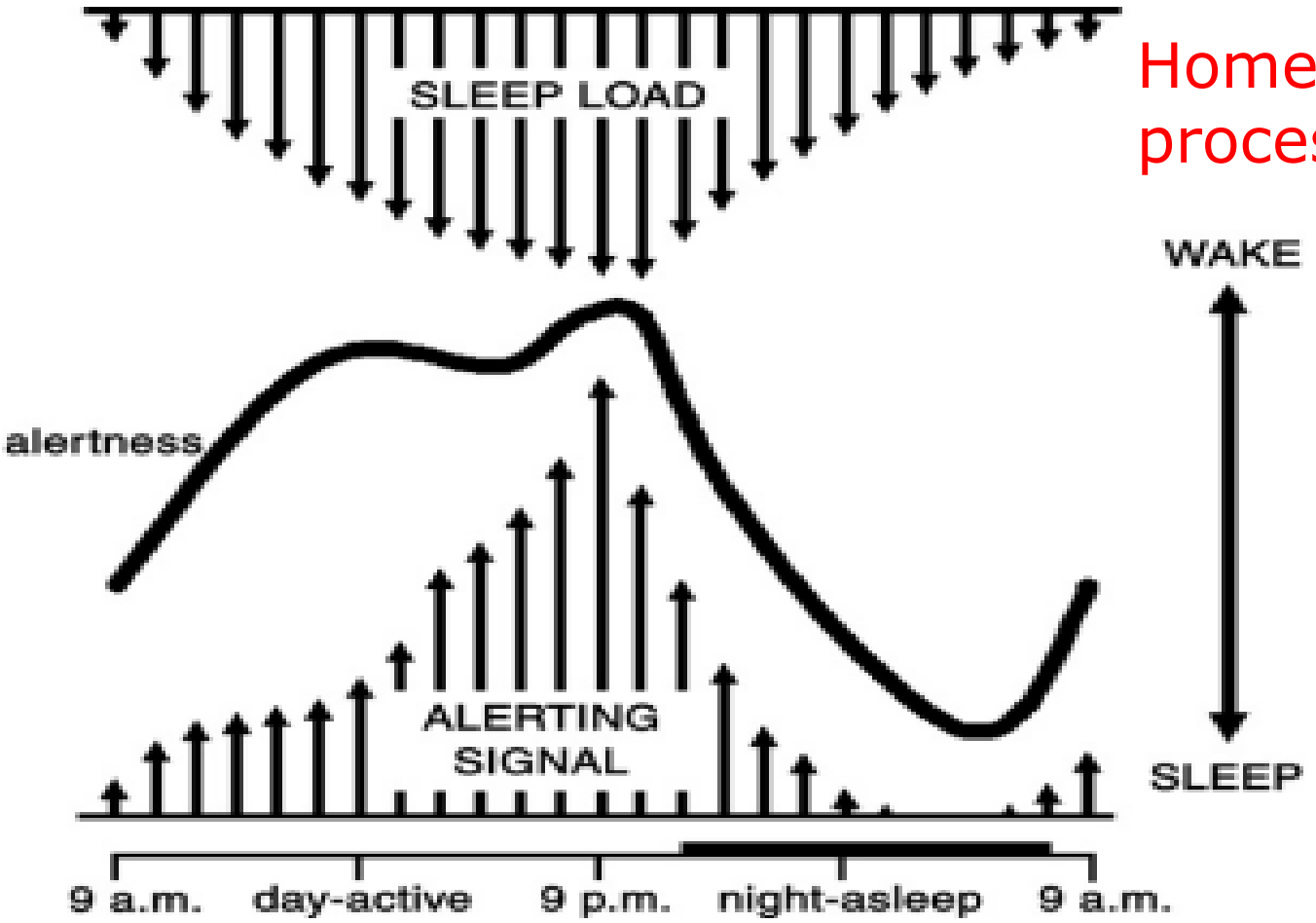
Two Process Model of Sleep Regulation

1) Homeostatic process, Process S
   - Rises during waking and declines during sleep
2) Circadian process, Process C
   - Independent of sleep and waking
   - Maintains alertness during the day

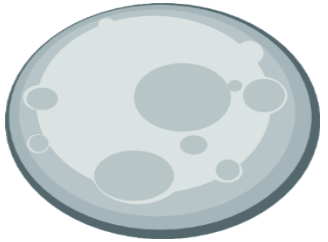
Kryger 2011

Two Process Model

Circadian process, Process C



Homeostatic process, Process S



Beersma 2007

Homeostatic process: Process S

- Sleep load builds during wakefulness, falls during sleep
- There are several sleep-promoting neurochemical agents, including adenosine, prostaglandin D2, Growth Hormone-Releasing Hormone
- Adenosine binds to A1 receptors on the cholinergic neurons of the basal forebrain ⇒ decreasing the firing of these neurons ⇒ causing a reduction in cortical arousal
  - Caffeine blocks adenosine A1 and A2a receptors, promoting wakefulness

Kryger 2011

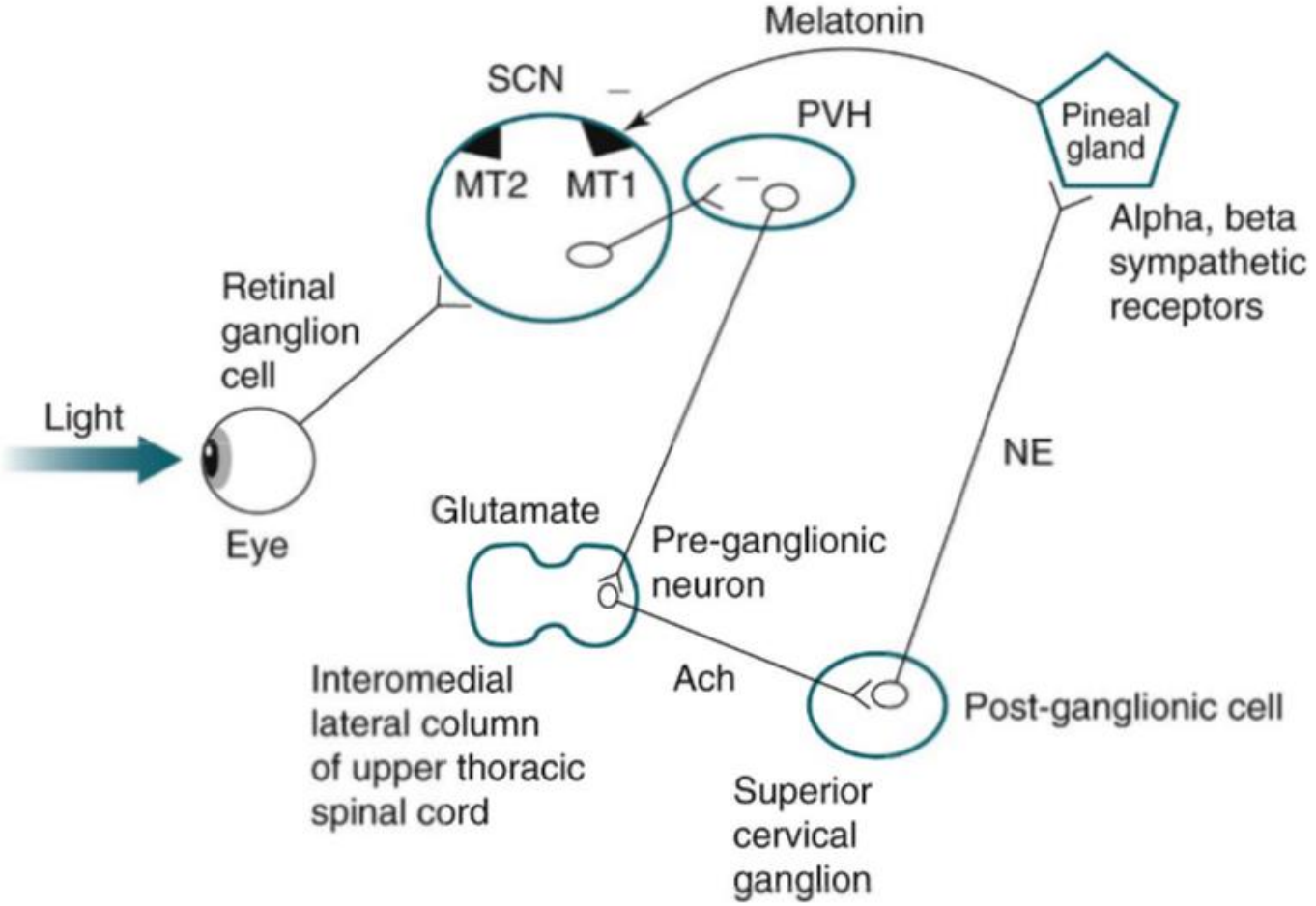
Circadian process: Process C

- Suprachiasmatic Nucleus (SCN) in the anterior thalamus is the major circadian pacemaker of the body
  - controls the rhythms of sleep-wake propensity, core body temperature, and secretion of various hormones
  - SCN neurons inhibit the pineal gland, thus inhibiting production of melatonin

Berry 2012

Circadian process: Process C

1. Light stimulates the melanopsin-containing retinal ganglion cells (circadian photoreceptors)
2. Presence of light is communicated to the SCN via the Retinohypothalamic Tract (RHT)
3. SCN neurons travel via the cervical spinal cord to inhibit the pineal gland
4. This inhibits release of melatonin



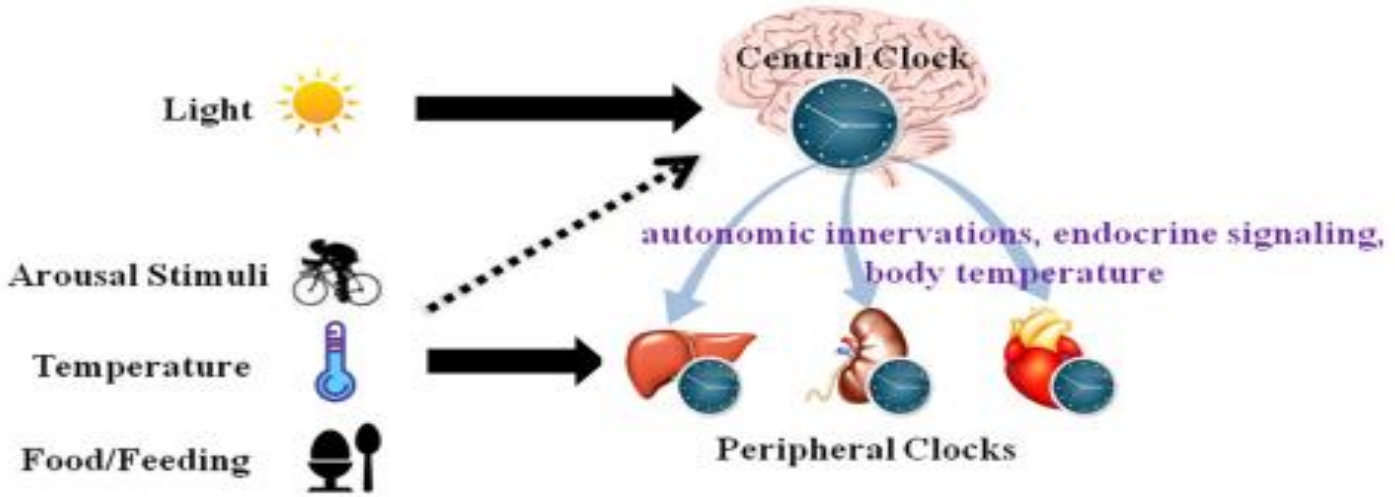
Berry 2012

Melatonin

- Melatonin receptors are located in the SCN, the entire CNS and most cells in the periphery
- The sensitivity of these receptors is greatest at light-dark transitions and onset of melatonin secretion
- SCN contains MT1 and MT2 receptors
  - MT1 receptors are involved in the regulation of REM sleep and circadian rhythm
  - MT2 receptors are involved in the regulation of NREM sleep

Synchronization of the circadian clock

- SCN contains cells that oscillate
  - Period of this rhythm is called *tau*
  - The mean value of tau in humans is 24.2 hrs
  - External stimuli (*zeitgebers*) entrain the SCN to the 24-hour day



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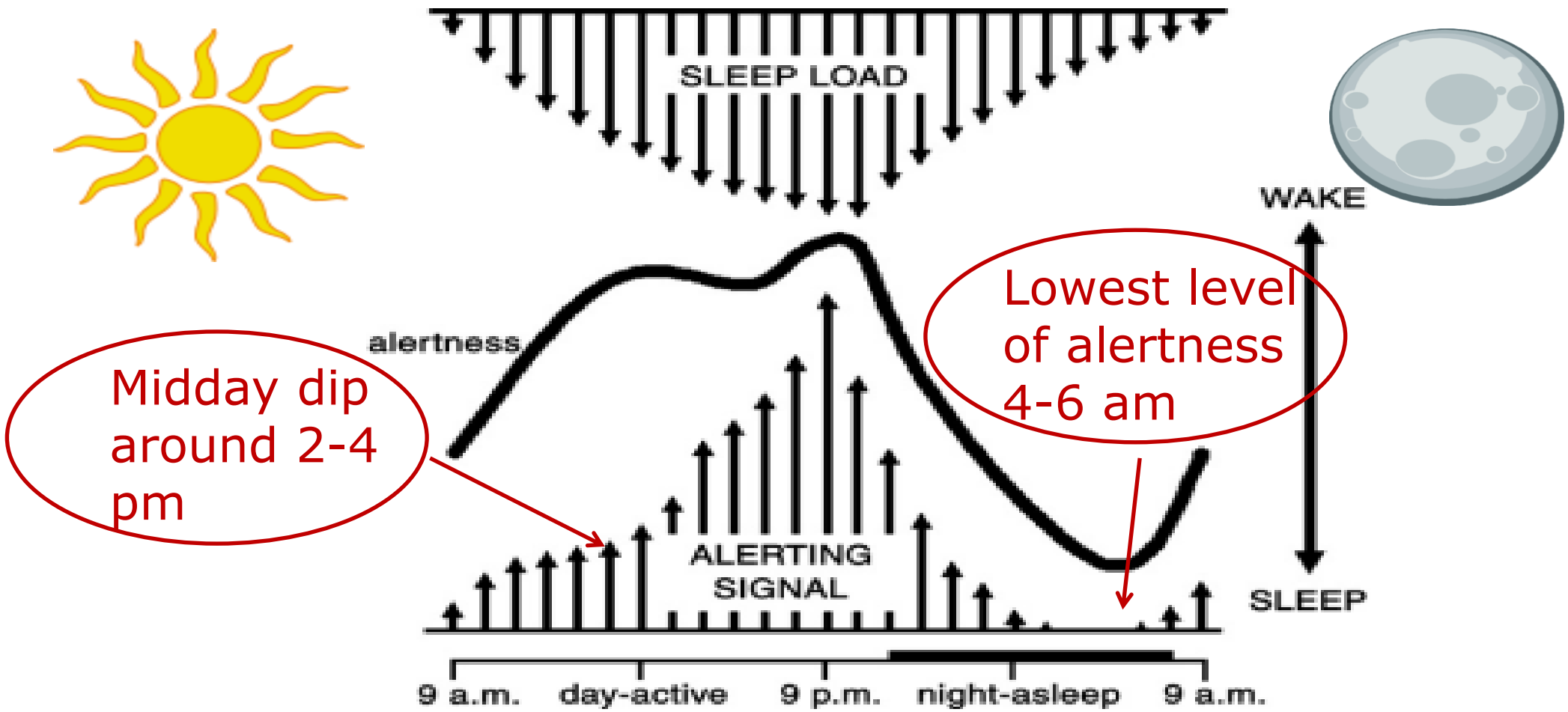
Berry 2012, Xie 2019

Alerting Signal



Beersma 2007

Question

At what time of day should you be most concerned about risk for medical errors?

a) 8:00 – 10:00 am
b) 1:00 – 3:00 pm
c) 8:00 – 10:00 pm
d) 2:00 – 4:00 am

Question

At what time of day should you be most concerned about risk for medical errors?

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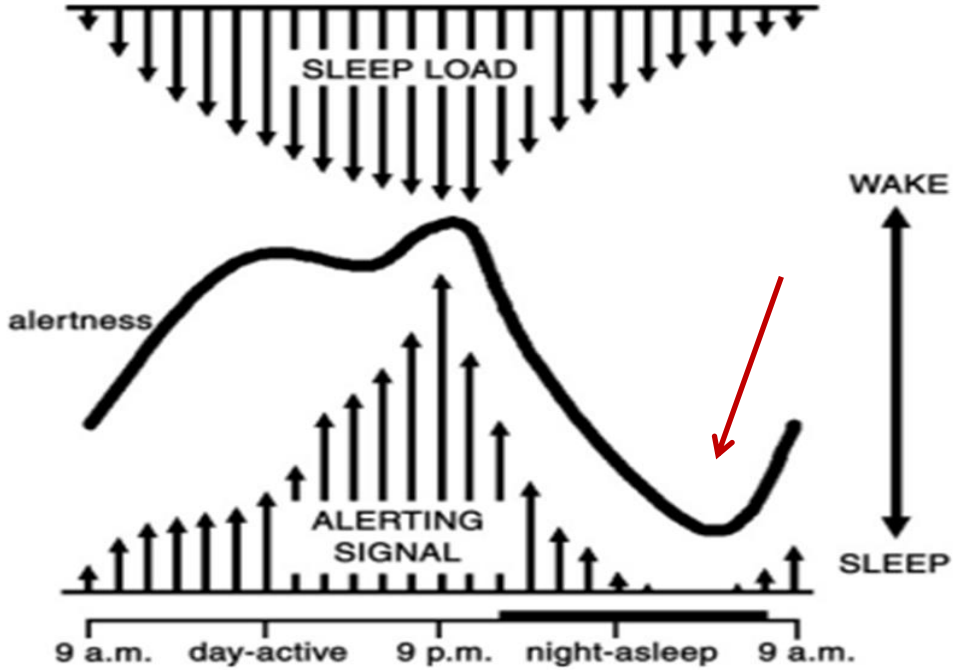
d) 2:00 – 4:00 am



Markers of Circadian Phase

1. CBT-min: core body temperature minimum
2. DLMO: dim light melatonin onset

Markers of Circadian Phase

CBT-min: core body temperature minimum

- Occurs about 2 hours before habitual (spontaneous) awakening from nocturnal sleep
- 4-5 am in most individuals
- Light after the CBTmin induces a phase advance and light before the CBTmin induces a phase delay.

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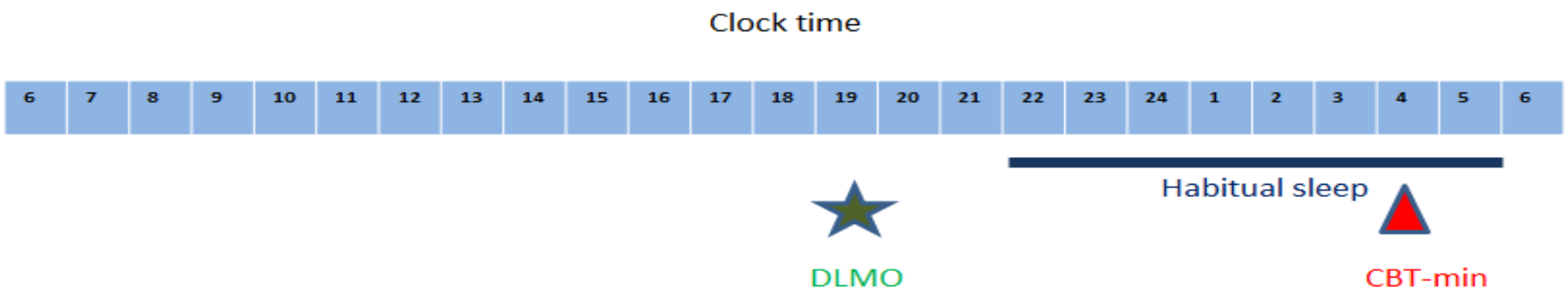
Markers of Circadian Phase

DLMO: dim light melatonin onset

- Occurs about 2-3 hrs before typically bedtime
- 8 pm in most individuals
- Melatonin administered before DLMO induces a phase advance. Melatonin given after DLMO induces a phase delay.



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Delayed Sleep-Wake Disorder

- AKA “night owls”
- Individuals cannot fall asleep at a socially acceptable time
- If allowed to maintain their own chosen schedule, they would usually sleep for a normal duration and feel rested
- Often seen in teenagers and young adults

Delayed Sleep-Wake Disorder Treatment

1. Strategically timed melatonin (AASM practice parameter)
2. Post-awakening light therapy in conjunction with behavioral treatments (AASM practice parameter)
3. Behavioral treatments
   - Keep sleep schedule same on days off/weekends and workdays
   - Avoid light in the evenings
   - Gradually advance bedtime

Light therapy

https://www.sunbox.com/shop/10000-lux-bright-lights/new-sunray-ii-floor-stand-combo-package-copy/ accessed 4/14/2023

https://www.myluminette.com/en-us accessed 4/14/2023

Question

A 24-year-old man recently finished graduate school and is now looking for a job. Throughout his time at school, he went to bed at 3:00 AM and woke up at 11:00 AM, sleeping well. His prospective jobs all require that he arrive at work at 8:00 AM, however, he is having trouble getting to sleep before 3:00 AM and is groggy at 7:00.

To advance his bedtime, when should melatonin be administered?

A. 6 pm

B. 10 pm

C. 2 am

D. Do not use melatonin as it has not been shown to improve sleep

A 24-year-old man recently finished graduate school and is now looking for a job. Throughout his time at school, he went to bed at 3:00 AM and woke up at 11:00 AM, sleeping well. His prospective jobs all require that he arrive at work at 8:00 AM, however, he is having trouble getting to sleep before 3:00 AM and is groggy at 7:00.

Habitual sleep: 3 am to 11 am

DLMO:

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Habitual sleep: 3 am to 11 am

DLMO: 1 am

Melatonin to phase advance:

A 24-year-old man recently finished graduate school and is now looking for a job. Throughout his time at school, he went to bed at 3:00 AM and woke up at 11:00 AM, sleeping well. His prospective jobs all require that he arrive at work at 8:00 AM, however, he is having trouble getting to sleep before 3:00 AM and is groggy at 7:00.

Habitual sleep: 3 am to 11 am

DLMO: 1 am

Melatonin to phase advance: before DLMO

Answer

A 24-year-old man recently finished graduate school and is now looking for a job. Throughout his time at school, he went to bed at 3:00 AM and woke up at 11:00 AM, sleeping well. His prospective jobs all require that he arrive at work at 8:00 AM, however, he is having trouble getting to sleep before 3:00 AM and is groggy at 7:00.

To advance his bedtime, when can melatonin be administered?

A. 6 pm

B. 10 pm (DLMO is around 1 am, melatonin given 2-3 hrs before DLMO will lead to greatest phase advance)

C. 3 am

D. Do not use melatonin as it has not been shown to improve sleep

Answer

A 24-year-old man recently finished graduate school and is now looking for a job. Throughout his time at school, he went to bed at 3:00 AM and woke up at 11:00 AM, sleeping well. His prospective jobs all require that he arrive at work at 8:00 AM, however, he is having trouble getting to sleep before 3:00 AM and is groggy at 7:00.

To advance his bedtime, when should light therapy be administered?

A. 7 am

B. 8 am

C. 10 am

D. noon

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CBTmin:

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Habitual sleep: 3 am to 11 am

CBTmin: 9 am

Light to phase advance:

A 24-year-old man recently finished graduate school and is now looking for a job. Throughout his time at school, he went to bed at 3:00 AM and woke up at 11:00 AM, sleeping well. His prospective jobs all require that he arrive at work at 8:00 AM, however, he is having trouble getting to sleep before 3:00 AM and is groggy at 7:00.

Habitual sleep: 3 am to 11 am

CBTmin: 9 am

Light to phase advance: after CBTmin

Answer

A 24-year-old man recently finished graduate school and is now looking for a job. Throughout his time at school, he went to bed at 3:00 AM and woke up at 11:00 AM, sleeping well. His prospective jobs all require that he arrive at work at 8:00 AM, however, he is having trouble getting to sleep before 3:00 AM and is groggy at 7:00.

To advance his bedtime, when should light therapy be administered?

A. 7 am

B. 8 am

C. 10 am

D. noon

Steps for healthy sleep

Prioritizing sleep (i.e. sleep hygiene)

1. Create a schedule that prioritizes regular, sufficient sleep.
2. Get at least 7 hours of sleep per 24 hours.
3. Given yourself a “buffer” before you head to bed.
4. Reserve your bed for sleep.
5. Avoid alcohol, excessive caffeine and other drugs.
6. Make your sleep space a sanctuary.
7. Stay active and head outdoors.

Prioritizing sleep: regular sleep

- **Create a schedule that prioritizes regular, sufficient sleep.**
  - Keep a regular bedtime and wake time.
  - Regular meals and exercise will help anchor your sleep routine.

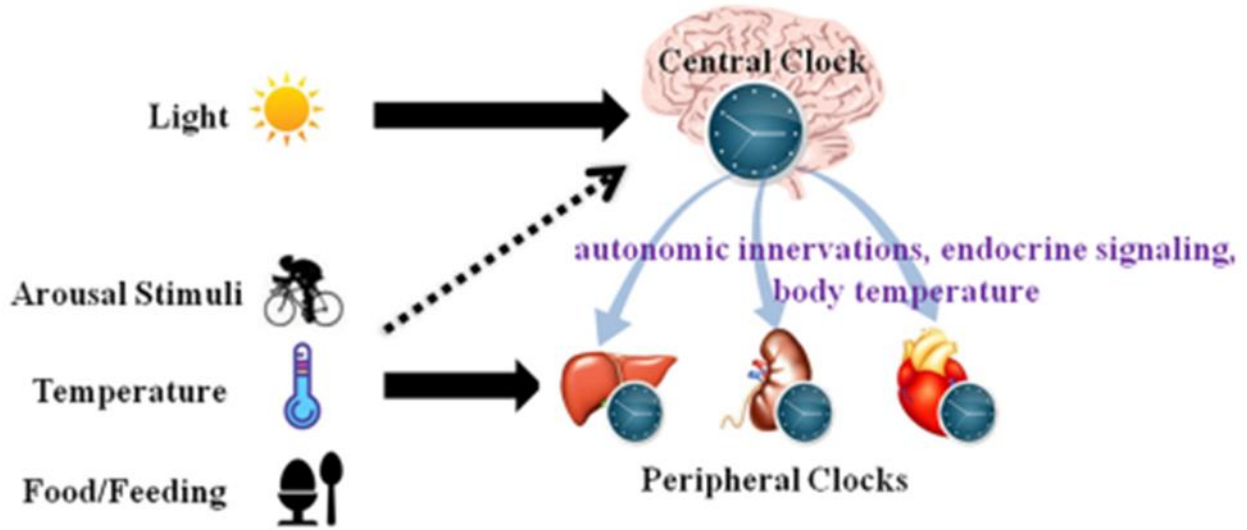


Figure from Xie 2019

Prioritizing sleep: 7 hrs of sleep

- **Get at <u>least 7 hours</u> of sleep per 24 hours.**
  - If getting sufficient sleep in one bout is not possible, try to take a "power nap" for an energy boost.
  - Allow yourself to become fully alert after your short nap.
  - Avoid late naps as they can make it difficult to fall asleep at your bedtime.

Prioritizing sleep: buffer zone

- **Given yourself a "buffer" before you head to bed.**
  - Disconnect from the stress of your day to relax 30-60 minutes before bedtime.
  - Avoid heavy exercise, bright lights, disturbing or stimulating content.
  - Examples include reading a book, light stretching, music.

Prioritizing sleep: bed for sleep

- **Reserve your bed for sleep.**
  - We want to have healthy associations between the bed and sleeping.
  - Engage in behaviors that help connect your bed with sleep.
  - Avoid electronics, including your phone, when in bed.
  - If you are not able to sleep, consider leaving the bedroom and doing something quiet and relaxing and return to bed when ready to fall asleep.

Myth vs Fact

Alcohol before bed will improve your sleep

Myth vs Fact

Myth: *Alcohol before bed will improve your sleep*

- ✓ ***Fact:*** *While alcohol reduces the time to fall asleep, it disturbs sleep in the second part of the night.*
- ✓ *It delays REM sleep onset, leading to rebound of REM sleep and vivid nightmares in the second part of the night.*
- ✓ *Alcohol can worsen underlying sleep apnea.*

Prioritizing sleep: avoid stimulants and alcohol

- **Avoid alcohol, excessive caffeine and other drugs.**
  - Avoid alcohol within 3 hours of bedtime. It can disrupt your sleep.
  - Caffeine taken too close to bedtime can also disrupt sleep.
  - We just don't know enough about marijuana and CBD…
    - Some basic science studies suggest that cannabis sedative effects occur through release of adenosine in the basal forebrain

Roehrs 2021

Myth vs Fact

For sleeping, it is better to have a warmer bedroom than a cooler bedroom

Myth vs Fact

Myth: *For sleeping, it is better to have a warmer bedroom than a cooler bedroom*

- ✓ ***Fact:*** *Studies show that a warm environment is associated with poor sleep.*
- ✓ A temperature between 65°F and 70°F is often recommended for sleep

Prioritizing sleep: make sleep space comfortable

- **Make your sleep space a sanctuary.**
  - Dark, quiet, cool environment can protect sleep.
  - Set boundaries and let others know when you plan to sleep.

Prioritizing sleep: stay active

- **Stay active and head outdoors.**
  - Regular activity and outdoor light timed during your wake period can help maintain your body's sleep-wake rhythm.

Poor sleep: triggers

Poor sleep triggers

- Bad sleep will happen, be aware of your triggers.

Bedtimes

True or False?

Most Americans have a set bedtime and most go to bed by the set bedtime.

Bedtimes

True or False?

Most Americans have a set bedtime and ~~most go to bed by the set bedtime.~~

Set Bedtime

More than half (**55%**) of U.S. adults have a **set** "**bedtime**," or a usual time when they go to bed.

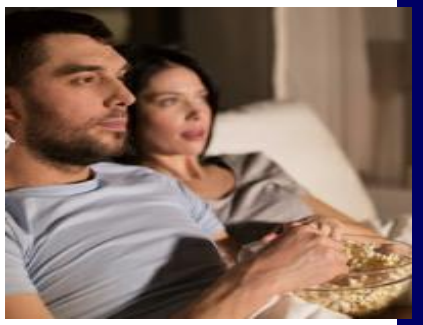
Miss Bedtime

Nearly one in four (**24%**) Americans said they feel **frustrated** when they stay up past their bedtime and **16%** said they feel **worried**.

Younger individuals are more likely to feel **frustrated**, **worried** and **guilty** about staying up past their bedtime.

So why do we miss our bedtimes?

- Binge watching (95% of those aged 18 to 44)
- Social media (80%, 2022)
- Reading before bed (68%)
- Watching a sporting event (58%)
- Playing video games (63%, 2022)
- Eating before bed (87% adults)
- Drinking alcohol (37% often or sometimes, 2022)
- Working late (82%)
- Exercise before bed (79%)

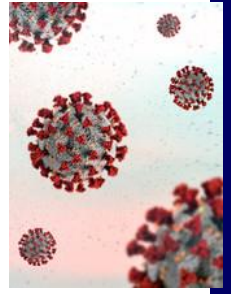


2020, 2022

Americans lose sleep to…

- Worries about politics (22% worry always, almost always or often)
- Worries about health (38%)
- Worries about finances (48%)
- Worries about COVID-19 (18%)
- Worries about the environment (28%)

COVID-19 and sleep



- Over half of Americans (56%) say they have experienced an increase in sleep disturbances since the beginning of the pandemic
  - "COVID-somnia"
  - Those 35-44 years old had the highest rate of COVID-somnia at 70%
- Problems included:
  - Trouble falling and staying asleep (more common in women and those 55 and older)
  - Less nightly sleep
  - Worse quality sleep
  - More disturbing dreams

Sleepiness and feeling well rested

- Only 35% Americans wake up feeling rested (always or often)
- Women (32%) are 1.5 times more likely than men (21%) to “rarely or never” wake up feeling well-rested
- 81% of women say that sleepiness affects their daily activities, compared to 74% of men (always, almost always, often, sometimes)

When are we more tired?

- Traveling (54%)
- New Year's Day (67%)
- Day after Super Bowl (39%)
- July 5th (41%)
- World Series (22%)
- Day after Election Night (33%)
- Black Friday (33%)
- Day after birthday (35%)

- Switching from Standard to Daytime Saving Time (DST), on Monday, fatal crashes increase up to 6%
- First week of school in the fall (40%)

Start of Daylight Saving Time

More than half (**55%**) of U.S. adults feel **extremely** or **somewhat tired** after "springing forward" to **daylight saving time**.

- 63% of Americans support the elimination of seasonal time changes in favor of a national, fixed, year-round time.

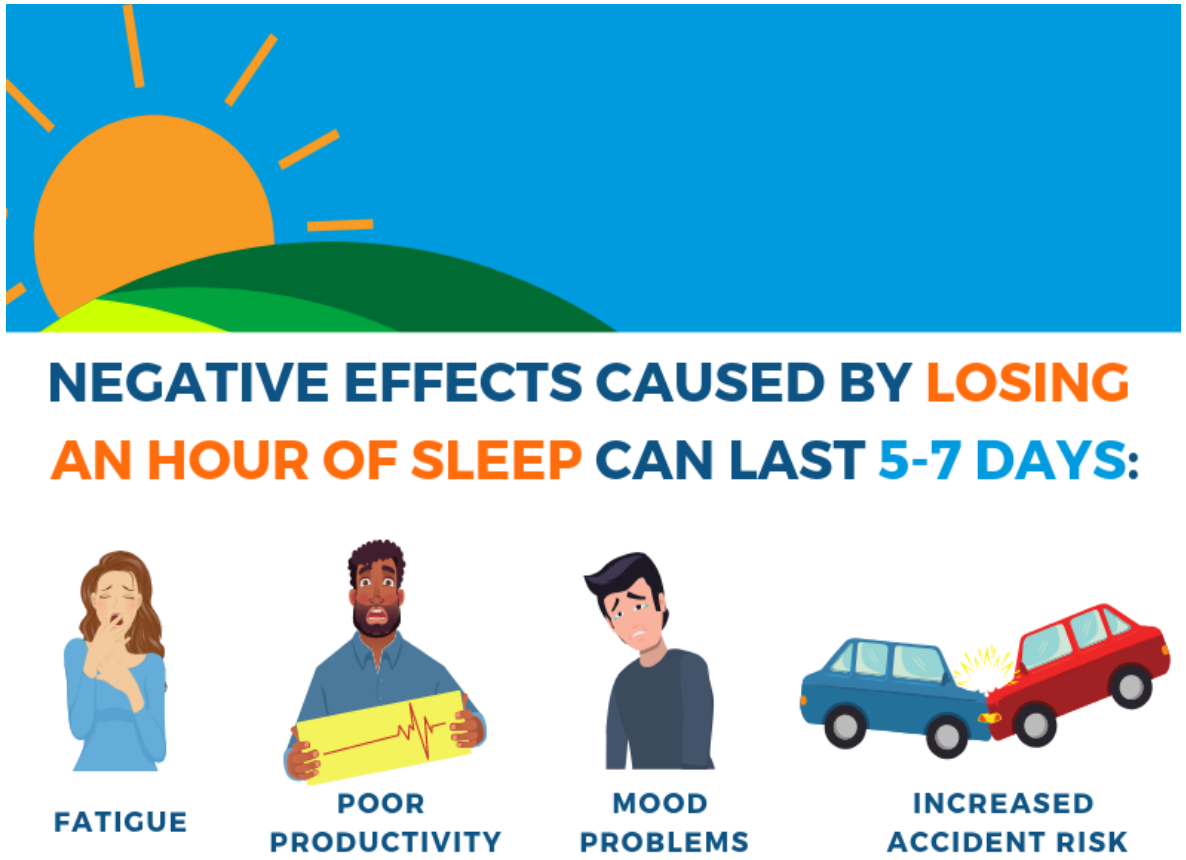
Seasonal Time Changes – Position Statement

AASM issued a position statement in October 2020, calling for the **elimination** of **seasonal time changes** in support of a fixed, **standard time**, which more closely aligns with the daily rhythms of the body's internal clock.

Daylight Saving Time – Stats and Studies

Studies regarding the sleep **health effects** of DST show:

- Moving into or out of DST has adverse effects on sleep/wake patterns that last about **five to seven days**.
- The effects of changing to DST are probably most notable for those who enter the change with **insufficient sleep.**



Why permanent standard time?

- By shifting the clock time an hour forward, DST causes a misalignment between clock time and solar time, interfering with our circadian timing.
- This disruption results in a condition known as “social jet lag”
  - It is associated with an increased risk of obesity, metabolic syndrome, cardiovascular disease, and depression
- Permanent DST would delay sunrise to 8 am in much of the US, and after 9 am in some northern states.
  - This would lead to more seasonal affective disorder and make it even more difficult for children to wake up for school

Why permanent standard time?

- Permanent DST has been tried!
- Congress enacted the Emergency Daylight Saving Time Energy Conservation Act of 1973.
- After just one winter of permanent DST, the trial was ended, and Congress reversed course by amending the legislation to reinstate standard time during the winter months beginning in November 1974.

School Start Times

Almost **60%** of middle school students and nearly **75%** of high school students get **insufficient sleep** on school nights. (CDC, 2016)

The AASM recommends a national standard of middle school and high school start times of **8:30 a.m. or later.**

Risks of Poor Sleep Health – Children and Teens

Regularly sleeping fewer than the number of recommended hours is associated with **attention**, **behavior**, and **learning problems**. Insufficient sleep also increases the risk of **accidents, injuries, hypertension, obesity, diabetes**, and **depression**.

School Start Times

60% of parents and **more than half** of all Americans (54%) say that **school starts too early** in the morning for middle school and high school students.

Those aged **18-24** (**60%**) feel more strongly school starts too early than those aged **55-64** (**27%**).

Get involved and get more information!

https://www.startschoollater.net/

Poor sleep: mitigation strategies

Mitigation strategies

1. Recognize the trigger
2. Prioritize sleep
3. Manage fatigue that may still arise

Boards coming up…

A 43-year-old physician has his boards coming up. He is very stressed that he won't be quite ready and is going over all his notes in bed until he falls asleep. What advice do you have for your friend?

a. Keep reading and going over your notes every day, you don't want to mess up!
b. Just relax and have a couple glasses of wine before you go to bed.
c. Stop reviewing the notes about an hour before you go to bed, do something relaxing to unwind.
d. Stop reviewing your notes at 10 pm and then just watch old medical TV shows in bed.

Boards coming up…

A 23-year-old physician has his boards coming up. He is very stressed that he won't be quite ready and is going over all his notes in bed until he falls asleep. What advice do you have for your friend?

a. ~~Keep reading and going over your notes every day, you don't want to mess up!~~

b. ~~Just relax and have a couple glasses of wine before you go to bed.~~

c. Stop reviewing the notes about an hour before you go to bed, do something relaxing to unwind.

d. ~~Stop reviewing your notes at 10 pm and then just watch old medical TV shows in bed.~~

Managing fatigue

1. Bank sleep
2. Use caffeine strategically
3. Nap strategically
4. Use bright light
5. Take breaks
6. Use checklists and reminders

Managing fatigue: bank sleep

- Some studies have demonstrated that “banking” sleep by getting up to 10 hrs of sleep at night minimizes performance impairment during a subsequent period of sleep restriction.
- For example, if you know you will have to work long hours on Monday, get tons of sleep on the weekend!
- Or if you will be traveling, get more sleep the nights before.

➢ Do not go into a stressful situation with a sleep debt!

Managing fatigue: use caffeine strategically

- Caffeine is more effective if you use it only when you need it (otherwise you build up a tolerance to it).
  - Caffeine blocks adenosine receptors
  - Tolerance develops by upregulation of adenosine receptors
- Avoid large doses of caffeine, as this may cause you to feel a crash or to get a headache after it wears off.
- Rapidly absorbed orally. Half life is 3.5 to 5 hours.
- Stimulant effect can last for up to 7 hours in a typical young adult.

Managing fatigue: nap strategically

- For extended duty or overnight shifts, consider taking a brief nap in the afternoon, before the shift.
- Watch out for post-nap grogginess (sleep inertia) that may impair your performance upon awakening from longer naps.
- Consuming caffeine just before a “power nap” may improve your alertness after a nap.

Managing fatigue: use bright light

- Our body's internal clock is reset by light exposure each day.
- For most of us, this means bright light in the morning to help promote alertness and avoiding bright light in the evenings that can suppresses our body's signal to sleep.
- However, if working nights, bright light at night can help promote alertness at night when it is needed.

Managing fatigue: take a break

- Fatigue is more pronounced during prolonged and monotonous activities (such as reading or listening to a talk).
- You can improve alertness and performance for a short period of time with:
  - an activity break, such as walking
  - a shorter microbreak, such as stretching the head, neck and shoulders

Managing fatigue: use checklists and reminders

- Fatigue can increase the risk for mistakes.
- Using tools such as checklists and cross-checking procedures with colleagues has been shown to reduce fatigue-related errors.
  - ➢ Standardized hand-offs

Fatigue in the workplace

- Cognitive performance is the result of:
  1. Duration of prior sleep
     - Long duration (30-40 min) boring tasks are especially sensitive to sleep deprivation
  2. Time since awakening
  3. Phase of the circadian rhythm of alertness
  4. Time on task
     - Time-on-task effects (fatigue) arise from work-related depletion of cognitive resources over time
     - Can be reversed by time off-task (not sleep)

Kryger 2011

Fatigue in the workplace

- Cognitive performance is the result of:
  1. Duration of prior sleep
  2. Time since awakening
  3. Phase of the circadian rhythm of alertness
  4. Time on task
- Individuals cannot be relied upon to accurately self-estimate their accident risk

Shift work

- Recurring work schedule that overlaps the usual time for sleep.
  1. A misalignment of the endogenous circadian rhythm with the work schedule can occur.
  2. Chronic partial sleep deprivation may also occur from working shifts.

➢ Results in insomnia and/or excessive sleepiness

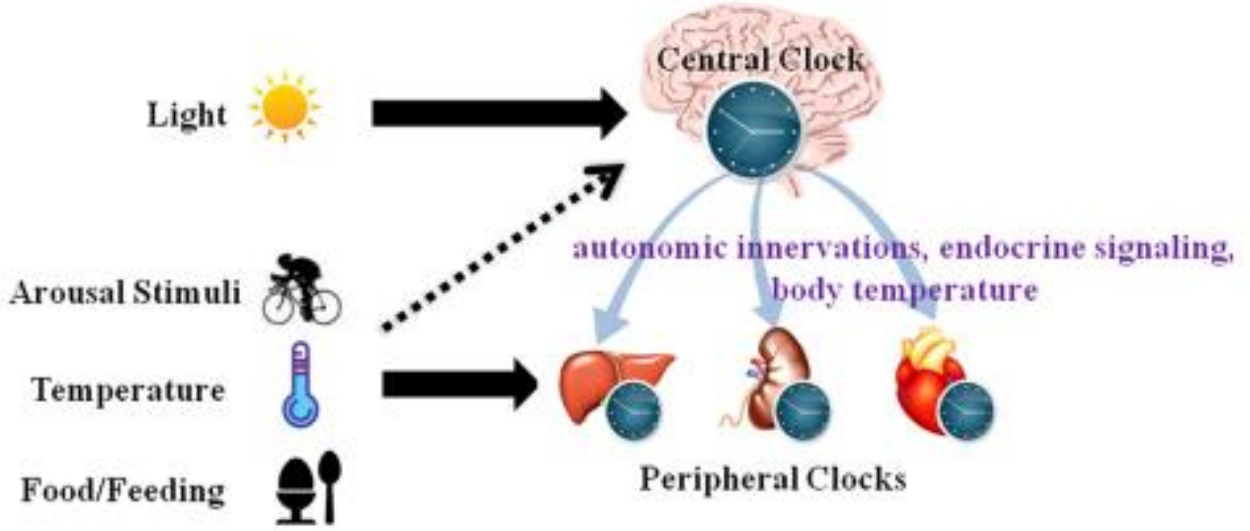


Figure from Xie 2019

Shift work

- Shift workers experience more:
  - Sleep complaints
  - Medical complications (obesity, heart disease, GI complaints, cancer)
  - Psychiatric disorders (depression, anxiety, alcohol abuse)
  - Cognitive dysfunction (poor attention and memory, increased risk for accidents and errors)

Working nights

A 32-year-old hospitalist is working nights, 7 pm to 7 am. She gets home, showers, eats, checks her phone. She then watches TV until she falls asleep around 11 am and wakes up at 3 pm to get kids from school. She is very sleepy at work.

What can you suggest that she does differently?

a) Take zolpidem at 8 am to help her fall asleep faster

b) Take a quick shower, eat a small meal and go to sleep as soon as she gets home

c) Take modafinil at work to help her be more awake

d) Do what she is doing, but take melatonin at work at 5 am

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Shift work sleep-wake disorder treatment

- Let's break down the treatment into:
  1. Improving diurnal sleep
  2. Enhancing alertness at night

Improving diurnal sleep

- Avoid light exposure on the way home from work (AASM practice parameter: guideline)
- Sleep immediately after night shift
  - Light-blocking shades, ear plugs, eye mask
- Use two sleep periods
  1. **Anchor sleep** period of about 4 hrs taken every day regardless of schedule (typically 8 am to 12 pm)
  2. 3-4 hr sleep period taken depending on the work schedule
- Exogenous melatonin to promote daytime sleep (1-10 mg) (AASM practice parameter: guideline)

Morgenhaler 2007. Kryger 2011

Enhancing alertness

- Planned napping before or during shift (AASM practice parameter: standard)
- Light exposure during shift and avoidance of light after shift (AASM practice parameter: guideline)
- Caffeine use (AASM practice parameter: option)
  - Caffeine *before* a nap may reduce sleep inertia
- modafinil and armodafinil (AASM practice parameter: guideline)

FDA approved medications for SWD

- modafinil: 200 mg once a day (max 400mg/day)
- armodafinil: 150 mg once a day
- Taken 1 hour before start of work shift
- Common side effects: headache, nausea, insomnia, dizziness
- Serious reactions: Stevens-Johnson syndrome, mood changes
- Drug-drug interactions: oral contraceptives

Poor sleep: sleep disorders

Chronic insomnia

- What is it?
  - Most common sleep complaint, occurring in up to 35% of adults
  - Difficulty falling asleep or staying asleep, or waking up too early
- Why do we care?
  - Fatigue, lack of energy
  - Poor concentration and memory
  - Lack of motivation, irritability
  - Errors and accidents

Insomnia

- What are the treatment options?
  - Behavioral changes
  - Cognitive behavioral therapy for insomnia (CBT-I), either in person or digital
  - Medications (not first line)

Myth vs Fact

If you have difficulty falling asleep, it is best to stay in bed and try to fall back to sleep.

Myth vs Fact

Myth: *If you have difficulty falling asleep, it is best to stay in bed and try to fall back to sleep.*

✓ ***Fact:*** *Staying in bed while awake and worrying about sleep and other stressors worsens the negative association between bed and not sleeping and leads to increased arousal.*

Behavioral treatments for chronic insomnia that you implement do you in your office

- Stimulus control
- Sleep restriction therapy
- Relaxation therapy
- NOT sleep hygiene alone!

Goals of therapy

1. Improvement in sleep quality and/or time
2. Improvement in insomnia-related impairments (energy, attention, fatigue, somatic symptoms)
3. Other goals:
   - Sleep onset latency <30 minutes
   - Wakefulness after sleep onset <30 minutes
   - Decreased frequency of awakenings
   - Total sleep time >6 hrs

Stimulus control

- Goal is to extinguish the negative association between the bed and undesirable outcomes (such as wakefulness, frustration, worry)
  - These negative outcomes are often a result of a conditioned response to prolonged periods of being in bed awake trying to sleep
- Ultimately, the goal is for the patient to form a positive and clear association between the bed and sleep

Schutte-Rodin 2008

Stimulus control instructions

- Maintain a regular schedule, avoid naps, use the bed for sleeping only
- Go to bed only when feeling sleepy
- If you are not able to fall asleep when you first go to bed or in the middle of the night, and you are awake for 20 minutes or so, or if you start to feel anxious, leave the bed and engage in a relaxing quiet activity until you feel sleepy again.
- Following these steps does NOT help you fall asleep faster on that given night, but rather helps to break the negative association between the bed and not sleeping.

Sleep restriction therapy

- Many patients spend excessive time in bed trying to catch up on sleep.
- The goal of sleep restriction therapy is to limit time in bed, causing an increase in sleep drive.
- As sleep drive increases, and opportunity to sleep is only available for a certain period at night, sleep becomes more consolidated.

Schutte-Rodin 2008

Sleep restriction therapy instructions

- During CBT-I, patient will keep sleep logs and review with the therapist

1. In your office, you can quickly calculate how much sleep the patient is getting
2. Set a desired wake time (to be kept daily)
3. Set a bedtime that will achieve the total sleep time you calculated (goal is to be in bed no more than 8 hrs, but no less than 6 hrs)
4. Warn the patient they may experience some sleepiness (which is good), but caution about drowsy driving
5. As long as they are awake < 30 minutes at bedtime and < 30 minutes in the middle of the night, you can move the bedtime earlier by 30 minutes every 2 weeks

Sleep restriction therapy example

- Current sleep schedule:
  - Your patient tells you she goes to bed at 9 pm. She falls asleep around 11 pm.
  - She then wakes up throughout the night and thinks she is awake for 2 hrs at night.
  - Wakes up at 8 am but likes to stay in bed until 10 am.
  - Time in bed: 11 hrs Total sleep time: 7 hrs
- New sleep schedule:
  - Desired wake time (agreed upon with the patient): 8 am
  - Calculated bedtime will be 1 am

Relaxation therapy

- Goal is to lower somatic and cognitive arousal states which interfere with sleep
- Encourage the patient to find what is best for them!
  - Progressive muscle relaxation
  - Guided imagery
  - Breathing exercises
  - Meditation
  - Listening to relaxing music

Schutte-Rodin 2008

Obstructive sleep apnea

- What is it?
  - Caused by muscle relaxation at the back of the throat, causing the airway to get completely or partially blocked off
  - Snoring, pauses in breathing, chocking during sleep
  - Insomnia, waking up at night, nocturia
  - Morning headaches
  - Irritability, difficulty concentrating
  - Fatigue and daytime sleepiness
  - Sexual dysfunction

Myth vs Fact

Although annoying for bed partners, loud snoring is mostly harmless.

Myth vs Fact

Myth: *Although annoying for bed partners, loud snoring is mostly harmless*

✓ ***Fact:*** *Snoring is a primary symptom of OSA that places individuals at an elevated risk for adverse cardiovascular events.*

Obstructive sleep apnea

- Why do we care?
  - Hypertension
  - Heart disease, atrial fibrillation, stroke
  - Diabetes
  - Depression
  - Excessive sleepiness, accidents, impaired judgment

Obstructive sleep apnea: CPAP is still first line and most effective

- Air pressure acts as a stent to keep the back of the throat open
- Newer devices are small, much more quiet, more comfortable

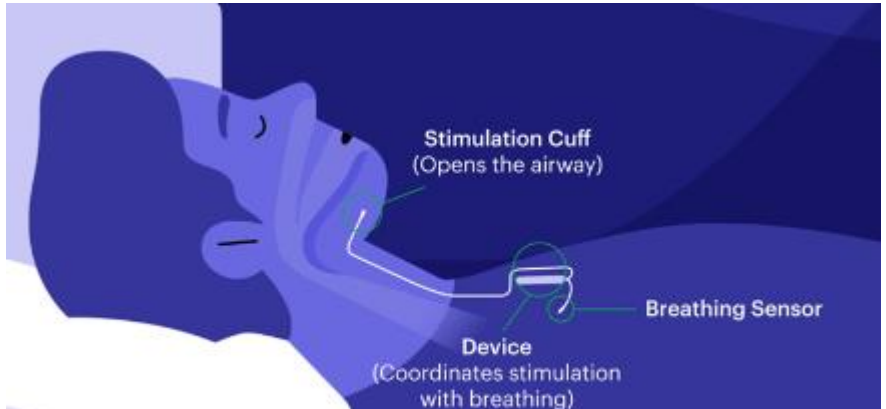
Resmed.com, accessed 4/18/2023

Obstructive sleep apnea: oral appliance

- Fitted by a trained dentist
- Used typically in mild to moderate sleep apnea
- Device that fits in the mouth, over upper and lower teeth, to move the lower jaw forward
- Repeat sleep study to document effectiveness
- Patient needs regular follow up with a dentist

Obstructive sleep apnea: upper airway stimulation

- An option for patients with moderate to severe obstructive sleep apnea who struggle with CPAP
- Are not significantly obese (BMI <33)
- Stimulation of the hypoglossal nerve in the neck causes the tongue to move forward, opening up the airway
- Improves sleep apnea severity (at 1 year, 83% of patients had reduction of events at least 50% and to less than 20 events an hour)



https://professionals.inspiresleep.com/, accessed 4/18/2023

Thaler, 2020

Obstructive sleep apnea: weight loss

- Weight loss improves OSA severity
- Bariatric surgery referral is recommended in patients who are intolerant or unaccepting of PAP therapy

Kent, 2021

Concluding thoughts

- Sleep is important!
- Prioritize sleep and follow good sleep hygiene practices
- Be aware of your triggers for poor sleep
- Be prepared to manage your triggers and fatigue
- Consider sleep disorders

AASM

TIP SHEET FOR HEALTH CARE PROVIDERS:

Prioritizing Sleep & Managing Fatigue

https://aasm.org/clinical-resources/provider-fact-sheets/

PRIORITIZING SLEEP

Health care workers are at particular risk for poor sleep. for physical, mental, and emotional well-being. Here ar healthy sleep.

Take the time to value yourself and what you do fo

1. Create a schedule that prioritizes regular, sufficient sleep. Work and pers time consuming, making it hard to get sufficient sleep. Whenever you can, try to and wake time and schedule regular meal and exercise times appropriately. Havi help you obtain sufficient rest, nutrition and exercise.

2. Get at least 7 hours of sleep per 24 hours. Remember, some won't feel resto hours or more. If getting that much sleep in one bout is impossible due to your w a short "power nap" for an energy boost. Allow yourself time to become fully aler

3. Give yourself a "buffer" before you head to bed. Disconnect from the stres 60 minutes before bedtime. Avoid heavy exercise, bright lights, or disturbing ima the hour before bed. Examples of relaxing activities may include reading a book, or meditation; these can help the brain to transition to sleep.

4. Reserve your bed for sleep. Tempting though it may be to crawl under the co episodes of your favorite show, don't do it! Avoid all electronics — including you Engage in behaviors that help connect your bed with sleep. If you awaken and fi sleep, consider leaving the bedroom and doing something non-electronic, quiet to bed when you are ready to fall asleep.

5. Avoid alcohol and excessive caffeine. A drink at the end of a hard day may b disturb your sleep and reduce sleep quality and continuity. Don't drink alcohol w Caffeine in limited quantities can help increase alertness temporarily, but it may c excess or too close to bedtime.

6. Make your sleep space a sanctuary. A dark, quiet environment can protect s cover windows, and keep your electronics powered off. If you are a shift worker, s others know when you plan to sleep so that you have a chance to get uninterrup

7. Stay active and head outdoors if possible. Not only is regular activity a goo work stress, but outdoor light timed during your wake period can help maintain y sleep-wake rhythm.

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TIP SHEET FOR HEALTH CARE PROVIDERS:

Prioritizing Sleep & Managing Fatigue

MANAGING FATIGUE

It is important for all health care workers to prioritize sleep to sustain alertness and performance while at work. The tips below may help mitigate on-the-job fatigue. However, following these tips cannot fully compensate for the effects of sleep loss, circadian misalignment, stress, or work overload. Whenever possible, achieving adequate rest and sleep is key.

Prioritize sleep and seek help for any sleep problems that arise.

1. **Bank sleep on days off**. Some studies have demonstrated that "banking" sleep by getting up to 10 hours of sleep at night minimizes performance impairment during a subsequent period of sleep restriction.
2. **Use caffeine strategically.** Caffeine is more effective if you only use it when you need it. Choose caffeine-free beverages during the day when you are rested and reserve caffeine for situations when you are feeling sleepy. Avoid large doses of caffeine because you may feel a "crash" or get a headache after the caffeine wears off. Consuming the amount of caffeine in a regular cup of tea or coffee can help sustain alertness and performance.
3. **Nap strategically**. For extended-duty or overnight shifts, consider taking a brief nap in the afternoon before, or on break during, the shift to reduce your fatigue at work. Note that post-nap grogginess may impair your performance upon waking from longer naps (e.g., > 30 minutes) , so plan around duties carefully. Taking caffeine just before a "power nap" may reduce the grogginess that one normally experiences upon waking.
4. **Use bright light, especially on the night shift.** Your body's internal clock is reset by light exposure each day. This causes your body to promote sleepiness at night and alertness during the day. Exposure to light at night helps promote alertness at night. During a night shift, spend time in a bright room when you can.
5. **Take an activity break or microbreak**. Engaging in a vigorous activity or stretching for several minutes can improve alertness and performance for a short period of time after the activity break. Aerobic activities such as taking a walk, short jog or bike ride can improve alertness and performance on the night shift. Taking a shorter microbreak — for example stretching the head, neck, and shoulders for a few minutes — has been shown to improve alertness and performance during surgical procedures.
6. **Use checklists and communicate with your team**. Fatigue can increase the risk of mistakes. However, using tools like checklists and cross-checking procedures with colleagues has been shown to reduce fatigue-related errors.

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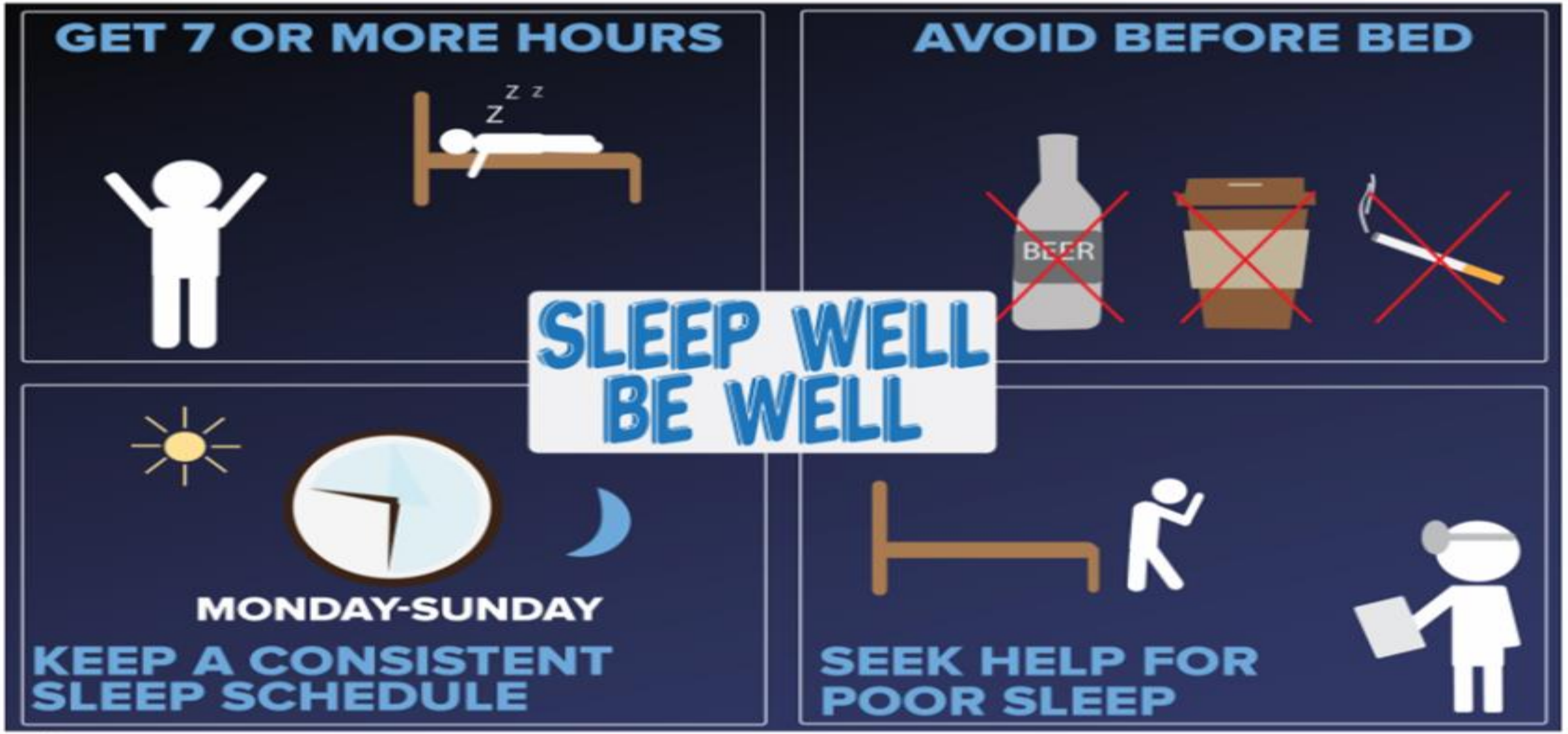
NATIONAL HEALTHY SLEEP AWARENESS PROJECT



FOR MORE INFORMATION VISIT: WWW.SLEEPEDUCATION.ORG/HEALTHYSLEEP

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