# Sleep: The Foundation of Improved Health Outcomes

# Today's Moderator

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# About PCDC

Primary Care Development Corporation (PCDC) is a national nonprofit organization and a community development financial institution catalyzing excellence in primary care through strategic community investment, capacity building, and policy initiatives to achieve health equity.

# Disclaimer

The views, opinions, and content expressed in this presentation do not necessarily reflect the views, opinions, or policies of the Center for Mental Health Services (CMHS), the Substance Abuse and Mental Health Services Administration (SAMHSA), or the U.S. Department of Health and Human Services (HHS).

SAMHSA
Substance Abuse and Mental Health Services Administration

www.samhsa.gov

# Integrating Care Through a Biopsychosocial Approach to Health

- Improve awareness, screening and interventions to support addressing sleep challenges and corresponding impacts:
  - Identify interrelated effects of sleep deficiency
  - Build skills for partnering with patients around sleep
  - Develop an interdisciplinary toolbox on sleep

(Image courtesy C. Aguilar)

# Solving for Sleep Webinar Series

- December 3rd – Sleep: The Foundation of Improved Health Outcomes
- January 7th – Unseen Impacts: Health Disparities and Sleep
- February 4th – Behavioral Health Lens on Sleep: Assessment and Intervention
- March 4th – One Good Night: Experiences of Insomnia for Patients and Families Across the Lifespan
- April 1st – Physical Health and Primary Care Lens on Sleep: Assessment and Intervention
- May 6th – What about Us? A Discussion with and for Healthcare Providers

***For further information and to register, please visit [pcdc.org/sleep](pcdc.org/sleep)***

# Presenters

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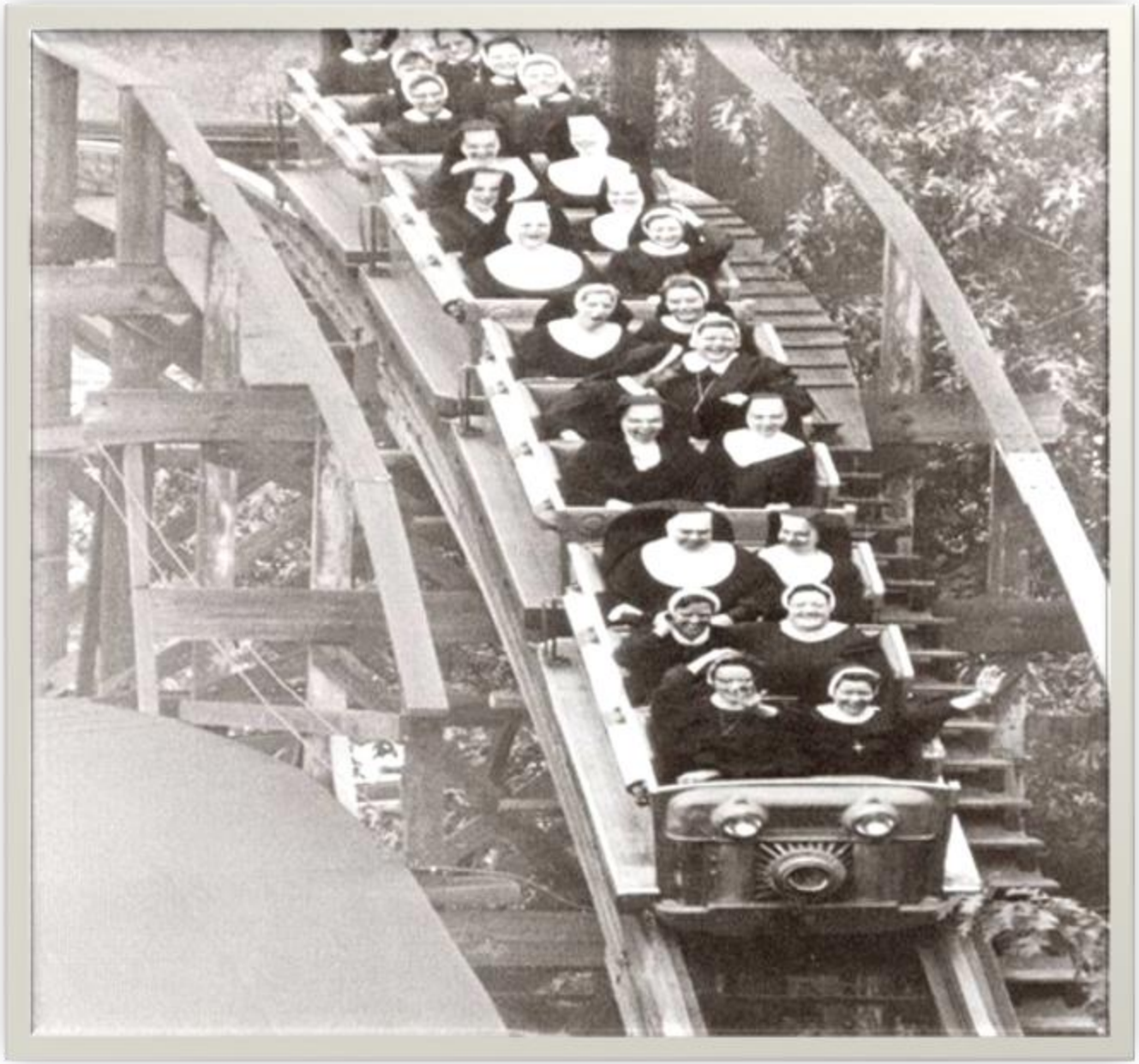
Chief Medical Officer
Pittsburgh Mercy

No disclosures

# My Story

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Pittsburgh Mercy
Family Health Center


Your
Care
Team

# Audience Demographics Poll

- Do you work in a:
  - Primary care setting
  - Behavioral health setting
  - Integrated care setting

- Are you working primarily as a:
  - MD/DO
  - Nurse Practitioner
  - Physician Assistant
  - Registered Nurse
  - Medical Assistant
  - Therapist
  - Social Worker
  - Care Manager
  - Other

# Health Impact of Sleep

- When did you learn about the health impact of sleep?
  - I'm still new to this
  - In school
  - During on-the-job training/supervision/residency
  - From colleagues
  - Because of a patient(s)
  - From broader field networks

# Setting the Stage

# Today's Key Objectives

- Have a basic understanding of why we sleep and why lack of sleep is a major problem across industrialized nations.
- Point out the harms of chronic insomnia to optimal physiological functioning and wellbeing.
- Develop a differential diagnosis of causes of excessive daytime sleepiness.
- Describe the diagnostic criteria of insomnia disorder.

# Takeaways

- Sleep is integral and not incidental to good physical and mental health
- Insomnia should be treated as a separate clinical entity even if it occurs as part of an underlying medical, psychiatric or substance related problem. It is a symptom and a driver of other symptoms.
- Providers should routinely screen for sleepiness and lack of sleep and utilize the three pillars of healthy sleep to target diagnosis and treatment.
- The current pandemic has exacerbated the problem of sleep in our society. The good news is that we have lots to offer in terms of treatment and recommendations.

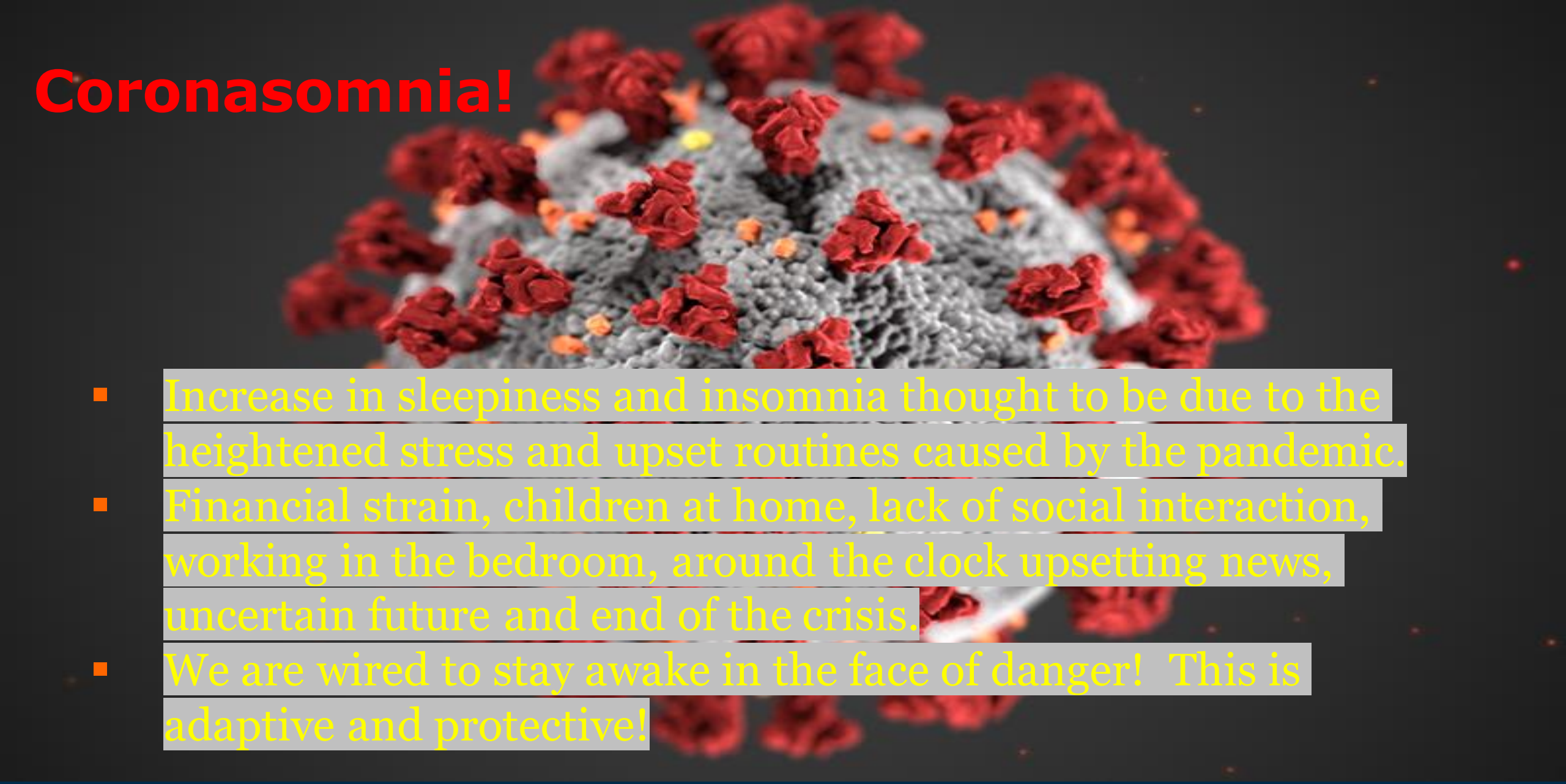
# Why This Matters

# Establishing Relevance

- NIH and the Institute of Medicine in 2006 published: Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem
  - 50 to 70 Million Americans Chronically suffer from a disorder of sleep, hindering daily functioning and associated with increased risk of Diabetes, Hypertension, Obesity, Depression, heart attack and Stroke.

- WHO has declared a sleep loss epidemic in industrialized nations with roughly 10 to 15 percent of people worldwide suffering from chronic insomnia.
- CDC in 2016 reports that 1/3 of the US population was NOT getting 7 or more hours of sleep per night.
- In primary care, 50-80% of patients, when asked, say they don't sleep well.

# Coronasomnia!

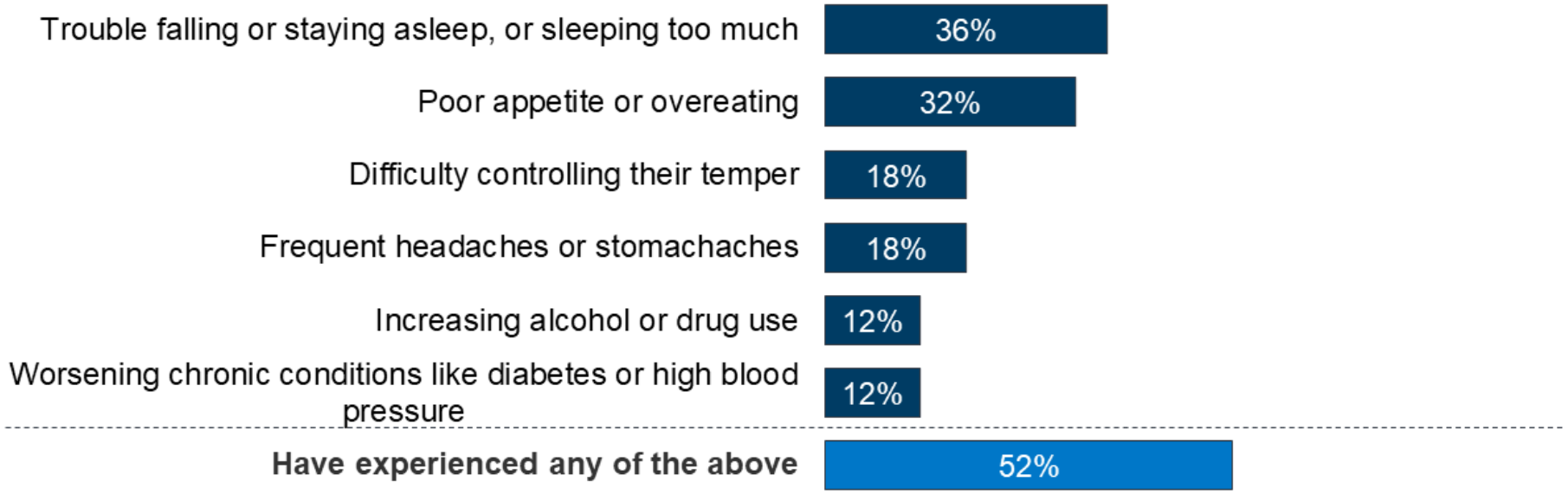


- Increase in sleepiness and insomnia thought to be due to the heightened stress and upset routines caused by the pandemic.
- Financial strain, children at home, lack of social interaction, working in the bedroom, around the clock upsetting news, uncertain future and end of the crisis.
- We are wired to stay awake in the face of danger! This is adaptive and protective!

Figure 11

# Just Over Half Have Experienced Adverse Effects Due To Worry And Stress Related To The Coronavirus Outbreak

Percent who say, in the past two months, they have experienced each of the following due to worry or stress related to the coronavirus outbreak:




SOURCE: KFF Health Tracking Poll (conducted July 14-19, 2020). See topline for full question wording.

KFF
HENRY J KAISER FAMILY FOUNDATION

# Poor Sleep Impacts Individuals Differently

- Poor sleep is disproportionately impacting (among others):
  - Ethnic and racial minority populations (particularly those already experiencing discrimination)
  - Caregivers
  - People with behavioral health conditions
  - Individuals from lower socioeconomic status

- Insufficient and poor-quality sleep can amplify impacts of social determinants of health

https://doi.org/10.1016/j.sleh.2020.07.007
https://doi.org/10.1093/sleep/zsaa187
https://doi.org/10.5664/jcsm.8570

# Bidirectional Associations between COVID-19 and Psychiatric Disorder: Retrospective Cohort Studies of 62354 COVID-19 Cases in the USA

- "Using a large federated electronic health record network in the USA to create propensity score matched cohorts of patients, we found that COVID-19 survivors have a significantly higher rate of psychiatric disorders, dementia, and insomnia. We also showed that a previous psychiatric illness is independently associated with an increased risk of being diagnosed with COVID-19."
- Rates of insomnia diagnosis were also markedly elevated, in agreement with predictions that circadian disturbances will follow COVID-19 infection.

Lancet Psychiatry 2020 Published Online November 9, 2020 https://doi.org/10.1016/S2215-0366(20)30462-4

# Patient Impact

- Do you think lack of sleep impacts the patients you serve?
  - Not much
  - Maybe a little
  - Some
  - A lot
  - Quite a lot

# Case Study

- SG is a 68-year-old male with a history of hypertension and gout who presents with difficulty falling asleep and staying asleep. He works as a motivational speaker and prior to the pandemic had a thriving business nationally and internationally. He now has changed most of his business to Zoom meetings but found the change very difficult and stressful. Because of all his travel in past, he had been using Tylenol PM to help get to sleep on occasion. Since the start of the pandemic, he has been using either Benadryl or Tylenol PM every night, but it's not working any longer.

# Case Study

- Next step would be:
  - Give him some Zolpidem and move on to the next patient
  - Perform a history and physical examination targeting questions around sleep hygiene
  - Review his medication list for prescribed and/or OTC meds
  - 2 and 3

# Why We Sleep

- Evolution
- Moral judgement
- Mental health
- Physical health
- Optimal function for memory and creativity
- What happens when we sleep?

# Sleep - Evolution

- "Sleep is idiotic!" – Matthew Walker PhD – author of "Why We Sleep"
- All animals need sleep
  - Elephant – 4 hours
  - Humans – 8 hours
  - Tigers and Lions – 15 hours
  - Bats – 19 hours
- We spend 1/3 of our lives sleeping.
- If everyone needs to sleep, it MUST be very important.
- Humans are the only species to deprive themselves of sleep and have negative physical and mental health complications.

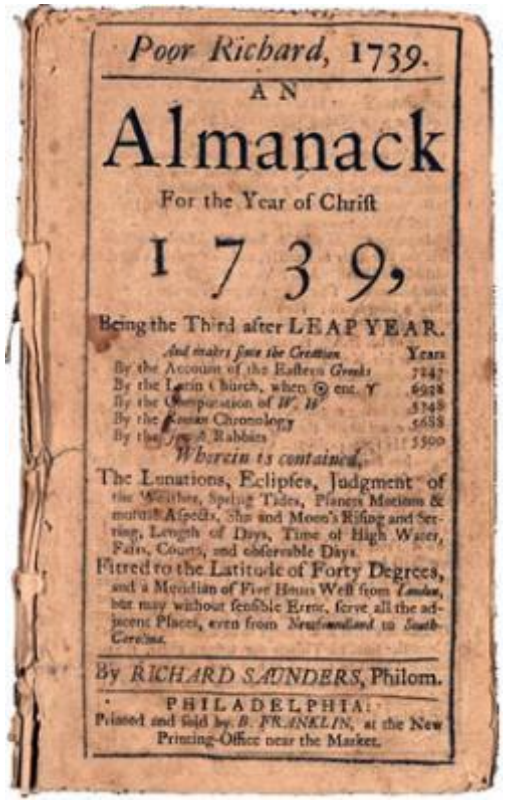
# Your Sleeping Pattern

- What best describes your sleeping patterns?
  - Night owl (I do best working later in the day and evening and like to sleep in)
  - Morning Lark (I get up early and I'm ready to go! By the evening, I need to get to bed on time and fade fast)
  - Somewhere in between

# Sleep– Moral Judgement

Nature needs five
Custom takes seven
Laziness takes nine
And wickedness eleven

“Early to bed and early to rise, makes a man healthy wealthy and wise”

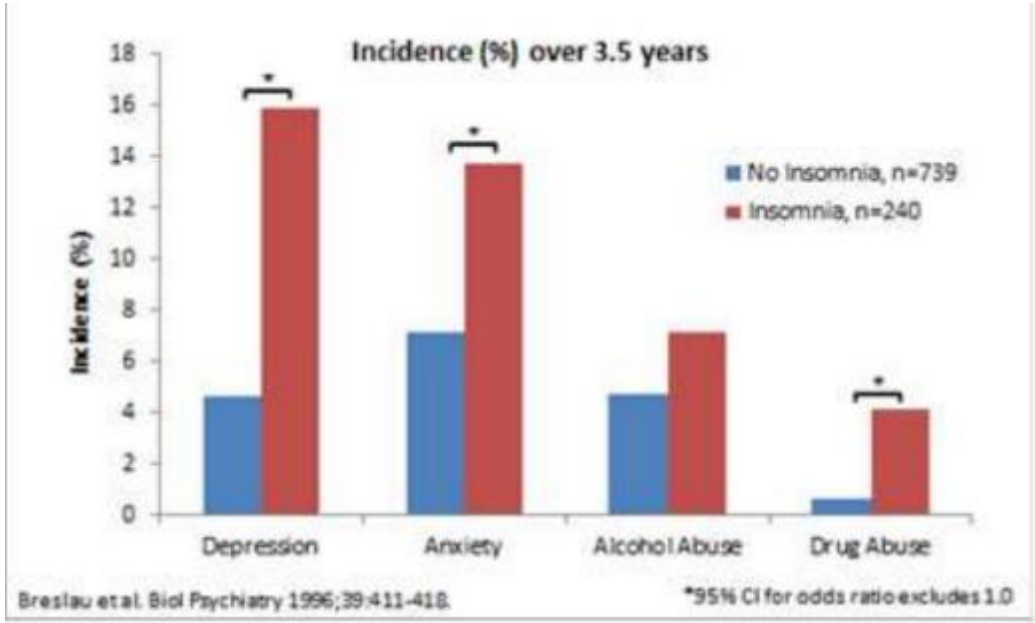

Poor Richard, 1739.
AN
Almanack
For the Year of Christ
1739,
Being the Third after LEAP YEAR.
And many from the Creation Years
By the Account of the Eastern Greeks 7247
By the Latin Church, when ⊙ enters ♈ 6928
By the Computation of W. W. 5748
By the Roman Chronology 5688
By the Jews & Rabbins 5500
Wherein is contained,
The Lunations, Eclipses, Judgment of the Weather, Spring Tides, Planets Motions & mutual Aspects, Sun and Moon's Rising and Setting, Length of Days, Time of High Water, Fairs, Courts, and observable Days.
Fitted to the Latitude of Forty Degrees, and a Meridian of Five Hours West from London, but may without sensible Error, serve all the adjacent Places, even from Newfoundland to South-Carolina.
By RICHARD SAUNDERS, Philom.
PHILADELPHIA:
Printed and Sold by B. FRANKLIN, at the New Printing-Office near the Market.

# Sleep – Moral Judgement

- Our bodies internal clocks or circadian rhythms genetically wire us to a sleep wake rhythm!
- You cannot choose your circadian cycle since genetics makes you a night owl (1/3)or a morning lark (1/3).
- Society tends to paint night people as lazy and standard employment schedules force night owls into an unnatural sleep wake pattern that cause decreased performance and health.
- Could this have been an evolutionary advantage?

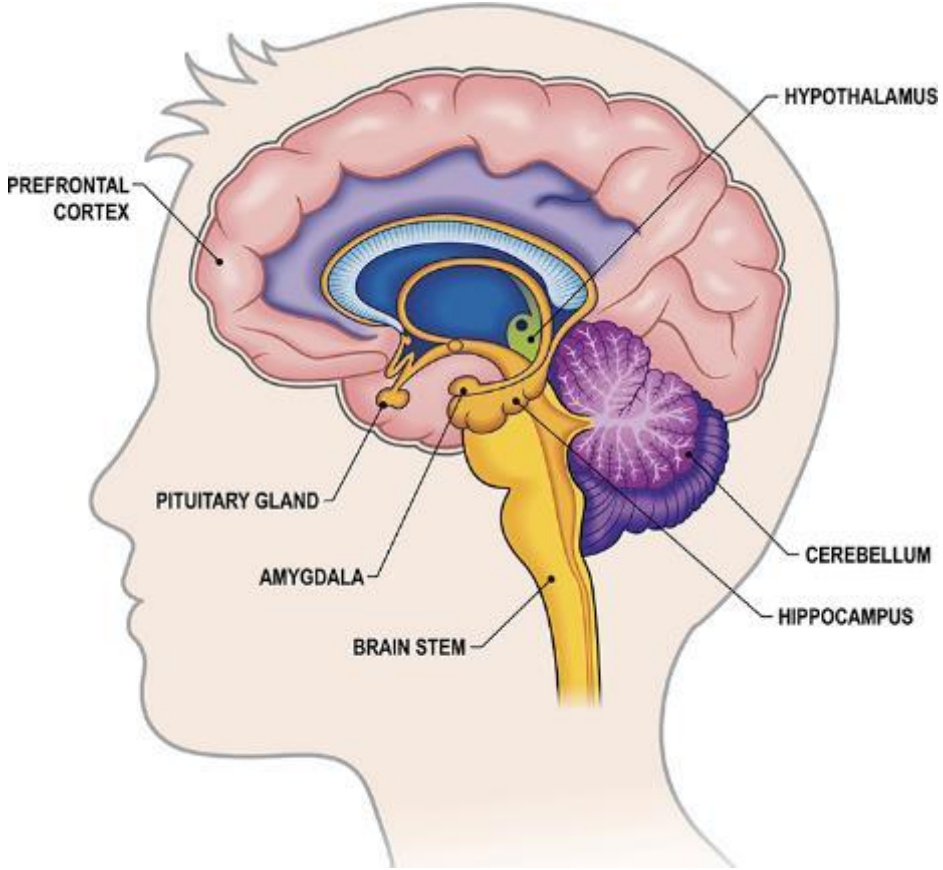

# Sleep-Mental Health

Insomnia has a strong association with Depression, Anxiety, and increased alcohol and drug use.



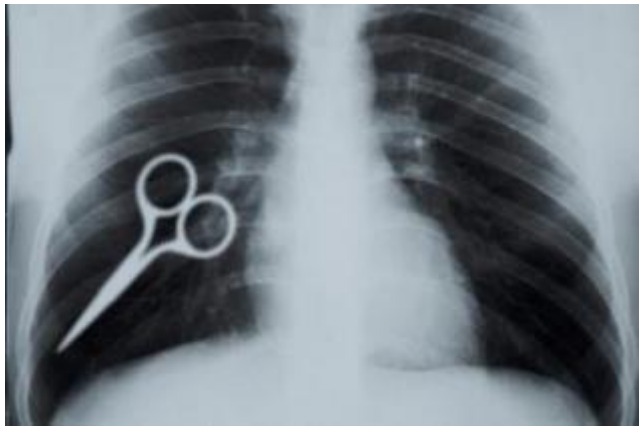
# Sleep- Mental Health- (How we are wired)

| | |
|---|---|
| Neocortex and prefrontal cortex: Executive Functioning | • What Can I learn?<br>• What Can I reason? |
| Limbic System/Amygdala: Emotions and memory | • Am I loved?<br>• Am I understood? |
| Brain Stem: Survival functions | • Am I Safe? |



# Sleep-Physical Health

- Sleep deficiency is linked to many chronic health problems, including heart disease, kidney disease, high blood pressure, diabetes, stroke, obesity, chronic pain and Alzheimer's. (NIH 2020)
- Sleep deficiency is also associated with an increased risk of injury in adults, teens and children, falls in the elderly.
- Sleep deficiency has played a role in human errors linked to tragic accidents, such as nuclear reactor meltdowns, grounding of large ships and aviation accidents.
- *"The shorter you sleep, the shorter your life"*- Matthew Walker PhD



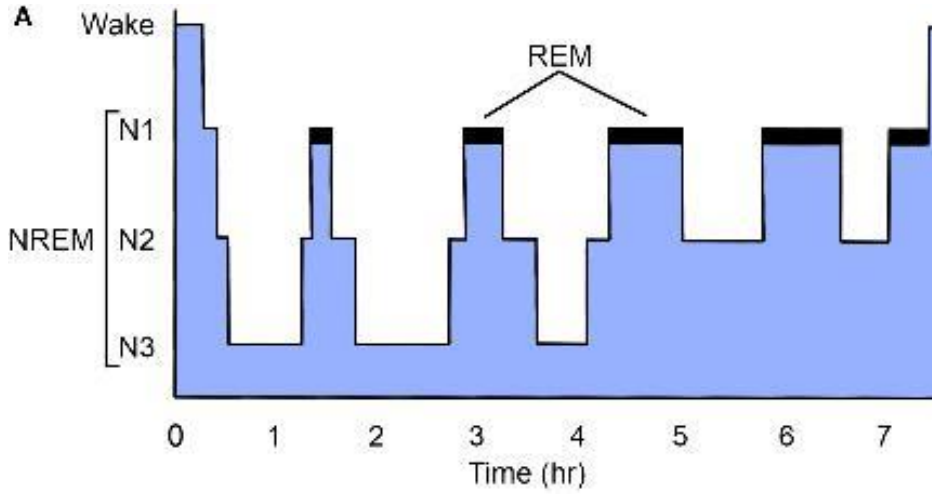
# Sleep – Optimal Function for Memory, Creativity and Physical Performance

- NREM and REM sleep are important in consolidating memories, learning new memories and retaining old memories.
- REM is important in creativity and emotional processing, without noradrenaline stimulating strong emotional reactions.
- 2014 Journal of Pediatric Orthopedics – significant association with lack of sleep and sports related injuries.
- NBA Players:
  - More than 8 hours sleep – 12% increase in minutes played, 29% increase in points per minute
  - Less than 8 Hours of sleep – 37% increase in turnovers, 45% increase in fouls!

# Why We Sleep - Stages

- Polysomnogram – Electroencephalography and other sensors
- Wake- 2/3 of a 24-hour day!
- Rapid Eye Movement (REM) conjugate, irregular, eye movement – 18 to 20% of sleep, consolidation of important memory, pruning of less important. Safe place to experience activity that is emotional.
- Non-Rapid Eye Movement (NREM) – Important for learning fact bases, textbook etc.
- NREM induced heavily by accumulation of adenosine.
- NREM – Somnambulism occurs here!
- The true purpose of sleeping is poorly understood.
- Theories include restoration, energy conservation, and memory consolidation.

A




B

| | Wake | NREM sleep | REM sleep |
|---|---|---|---|
| **Psychological features** | Varying amounts of alertness and attentiveness | Unconscious, or bland thoughts | Vivid, story-like dreams |
| **Physiological features** | Sympathetic tone variable | Sympathetic tone low; roving eye movements in light NREM sleep | Sympathetic tone variable; bursts of fast saccadic eye movements |
| **EEG pattern (5 sec)** |  |  |  |
| **Developmental changes** | Short wake bouts in infants and young children | Deep NREM sleep abundant in children, but gradually decreases across adulthood | Abundant in infants, steady levels across adulthood; NREM-REM cycle short in infants |

# Insomnia is not the same as Sleep Deprivation!

# Diagnosis - Insomnia Disorder

- Diagnostic criteria (DSM-5)
  - Dissatisfaction with sleep quantity or quality
  - Sleep difficulty occurs despite adequate opportunity to sleep
  - Associated with ≥ 1 of the following symptoms:

| Difficulty initiating sleep | Difficulty maintaining sleep | Early morning awakening |
|---|---|---|

  - Symptoms occur ≥ 3 nights per week and is present for ≥ 3 months
  - Clinically significant distress or impairment in important areas of functioning
  - Does not occur exclusively during the course of another sleep-wake disorder
  - Not caused by a medication, substance, or medical or psychiatric condition

American Psychiatric Association, 2013.

## International Classification of Sleep Disorders, third edition (ICSD-3) diagnostic criteria for chronic insomnia disorder

| Diagnostic criteria A-F must be met: | |
|---|---|
| A | The patient reports, or the patient's parent or caregiver observes, one or more of the following:<br>▪ Difficulty initiating sleep*<br>▪ Difficulty maintaining sleep¶<br>▪ Waking up earlier than desired$^{\Delta}$<br>▪ Resistance to going to bed on appropriate schedule<br>▪ Difficulty sleeping without parent or caregiver intervention |
| B | The patient reports, or the patient's parent or caregiver observes, one or more of the following related to the nighttime sleep difficulty:<br>▪ Fatigue/malaise<br>▪ Attention, concentration, or memory impairment<br>▪ Impaired social, family, occupational, or academic performance<br>▪ Mood disturbance/irritability<br>▪ Daytime sleepiness<br>▪ Behavioral problems (eg, hyperactivity, impulsivity, aggression)<br>▪ Reduced motivation/energy/initiative<br>▪ Proneness to errors/accidents<br>▪ Concerns about or dissatisfaction with sleep |
| C | The reported sleep-wake complaints cannot be explained purely by inadequate opportunity (ie, enough time is allotted for sleep) or inadequate circumstances (ie, the environment is safe, dark, quiet, and comfortable) for sleep |
| D | The sleep disturbance and associated daytime symptoms occur at least three times per week |
| E | The sleep disturbance and associated daytime symptoms have been present for at least three months |
| F | The sleep/wake difficulty is not better explained by another sleep disorder |

* In general, delays of >20 minutes for children and young adults and >30 minutes for middle-aged and older adults are considered clinically significant.
¶ In general, periods of awakening in the middle of the night of >20 minutes for children and young adults and >30 minutes for middle-aged and older adults are considered clinically significant.
Δ In general, waking up >30 minutes before normal awakening time is considered clinically significant.

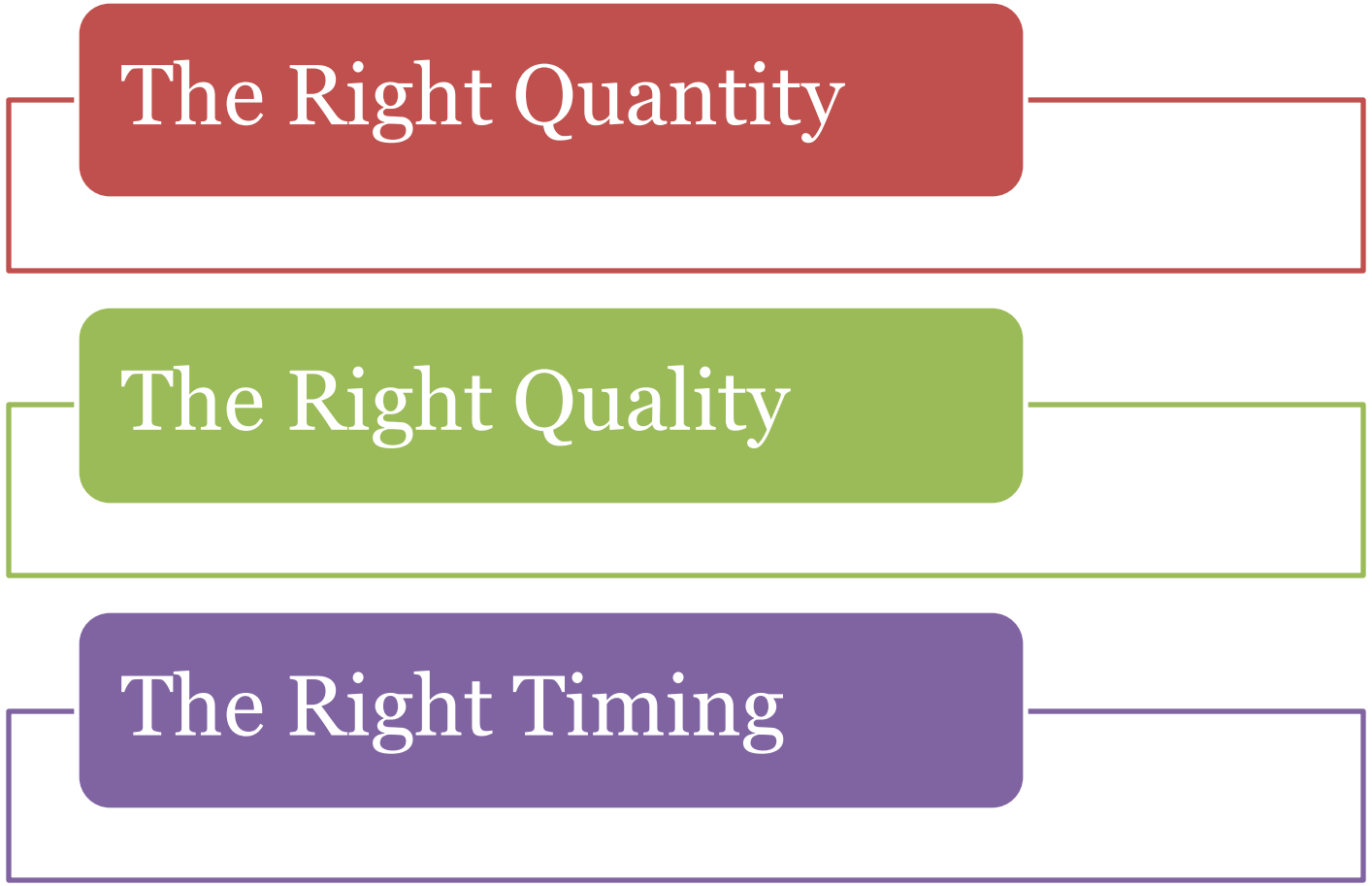
# What about a Polysomnogram?

- Obstructive Sleep Apnea- suspected sleep disordered breathing
- Cheyne- stokes breathing
- COPD
- Periodic limb movements
- Parasomnias
- Narcolepsy

# What about screening tools?

- Pittsburgh Sleep Quality Index
- Sleep Problems questionnaire calculator
- Generally useful as research tools and not helpful in primary care practice in general

# The Three Pillars of Healthy Sleep



# Average Sleep of U.S. Adults

- According to a 2013 Gallup Poll, U.S. Adults get how much average sleep on the weekdays?
  - 6.8 hours
  - 7.3 hours
  - 7.8 hours
  - 8.0 hours

# Average Sleep of U.S. Adults

- Answer: 40% of adults report <7 hours on weekdays and 7.4 on the weekends

# Sleep Quantity

| Age Group | | Recommended Hours of Sleep Per Day |
|---|---|---|
| Newborn | 0–3 months | 14–17 hours (National Sleep Foundation)[1]<br>No recommendation (American Academy of Sleep Medicine)[2] |
| Infant | 4–12 months | 12–16 hours per 24 hours (including naps)[2] |
| Toddler | 1–2 years | 11–14 hours per 24 hours (including naps)[2] |
| Preschool | 3–5 years | 10–13 hours per 24 hours (including naps)[2] |
| School Age | 6–12 years | 9–12 hours per 24 hours[2] |
| Teen | 13–18 years | 8–10 hours per 24 hours[2] |
| Adult | 18–60 years | 7 or more hours per night[3] |
| | 61–64 years | 7–9 hours[1] |
| | 65 years and older | 7–8 hours[1] |


1. Hirshkowitz M, Whiton K, Albert SM, Alessi C, Bruni O, et al. The National Sleep Foundation's sleep time duration recommendations: methodology and results summary. *Sleep Health*. 2015;1(1):40–43.
2. Paruthi S, Brooks LJ, D'Ambrosio C, Hall WA, Kotagal S, Lloyd RM, et al. Recommended amount of sleep for pediatric populations: a consensus statement of the American Academy of Sleep Medicine. *J Clin Sleep Med*. 2016;12(6):785–786.
3. Watson NF, Badr MS, Belenky G, et al. Recommended amount of sleep for a healthy adult: a joint consensus statement of the American Academy of Sleep Medicine and Sleep Research Society. *Sleep*. 2015;38(6):843–844.

# Quality of Sleep - Insomnia

## Sleep disorders

- Central Sleep Apnea
- Obstructive Sleep Apnea
- Restless Leg Syndrome

## Psychiatric

- Depression
- Bipolar Disorder
- Substance use disorder or withdrawal
- Postraumatic Stress Disorder
- Anxiety

## Cardiovascular

- Congestive Heart Failure
- Angina
- Arrhythmia, SVT, Afib etc.

# Quality of Sleep

## Digestive

- Gastric Reflux
- Inflammatory Bowel disease
- Irritable Bowel Disease

## Pulmonary

- COPD
- Asthma

## Reproductive

- Pregnancy (all trimesters)
- Menopause

# Quality of Sleep

## Neurologic

- Chronic Pain including neuropathy
- Dementia Alzheimer's
- Parkinson's disease
- Traumatic Brain injury

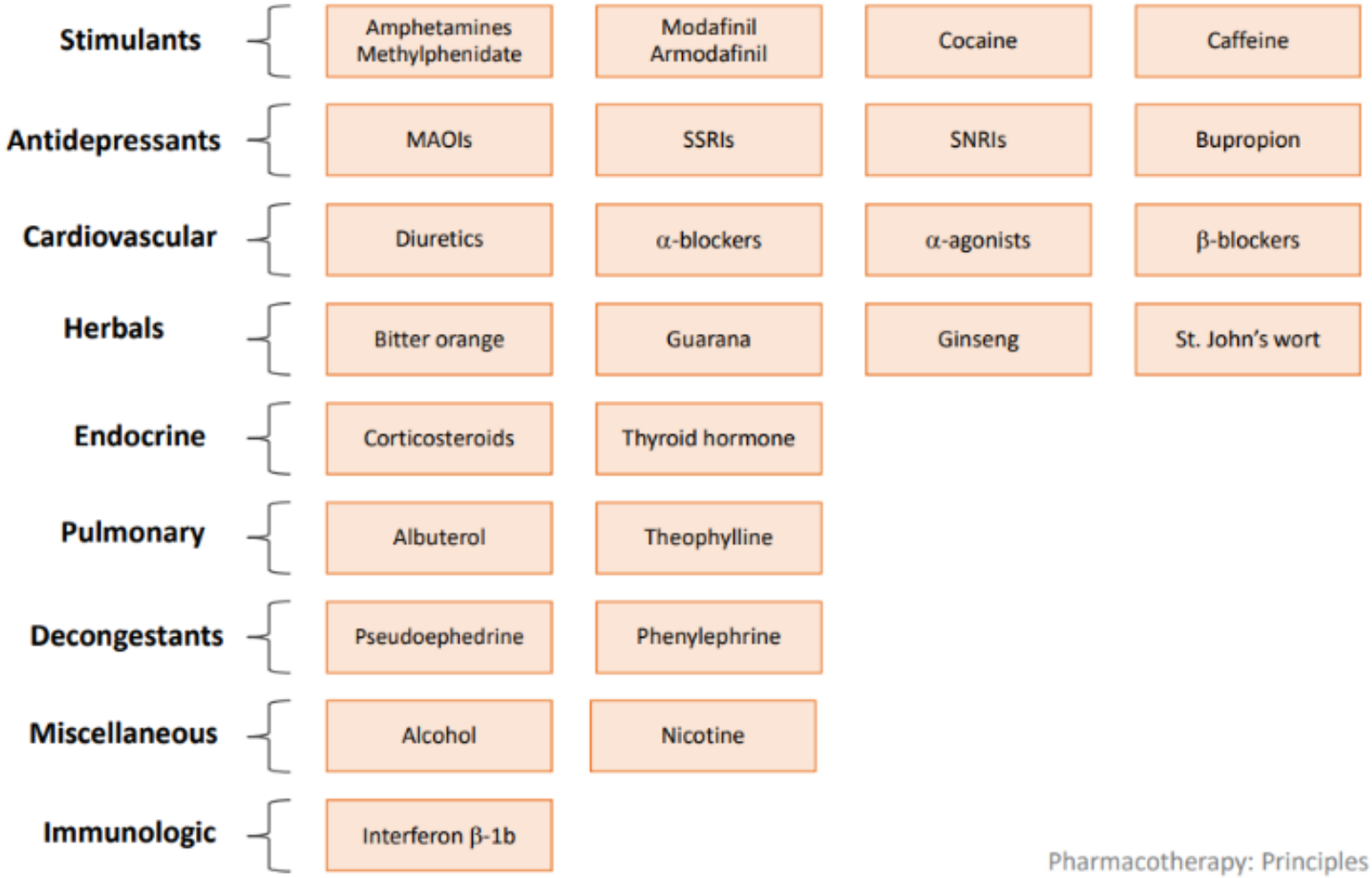
## Endocrine

- Hypothyroidism
- Hyperthyroidism
- Diabetes

## Genitourinary

- Incontinence
- Chronic Renal Failure (puritis, leg cramps etc)
- Benign Prostatic Hypertrophy

# Quality of Sleep - Medications

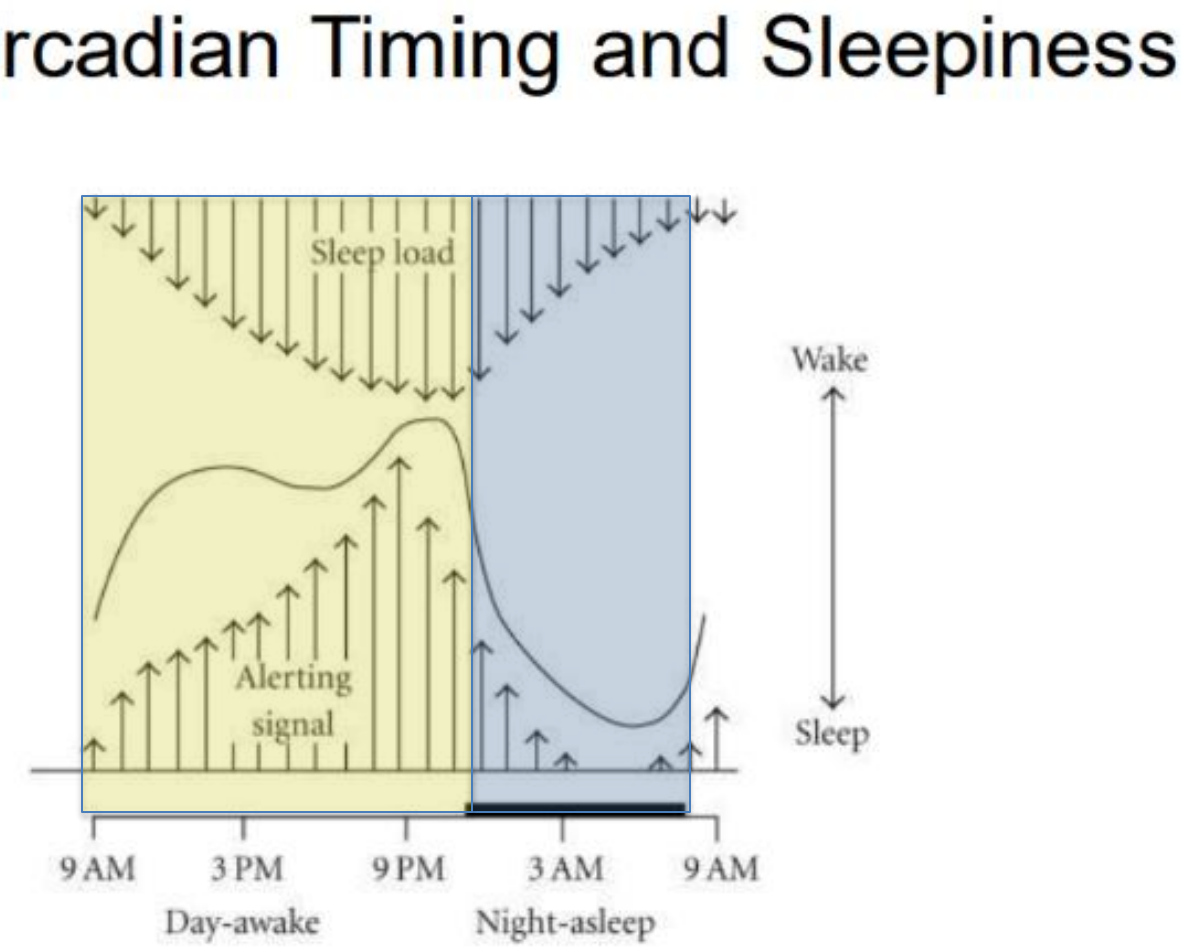



Pharmacotherapy: Principles

# Sleep – The Right Timing – Circadian System

- Intrinsic timekeeping system that modulates physiological systems operating on a 24.2-hour day including temperature, cortisol, and appetite.
- Actively drives wakefulness to offset sleep homeostatic system, that builds up the longer you stay awake!
- To keep alignment with a 24 hour per day clock, the circadian system must adjust with time cues called zeitgebers.
- The most important zeitgeber is the environmental light dark cycle.
- Retinal circadian photo receptors are very sensitive to blue light. Some controversy currently regarding the impact of light emitting devices causing phase delay and melatonin suppression.

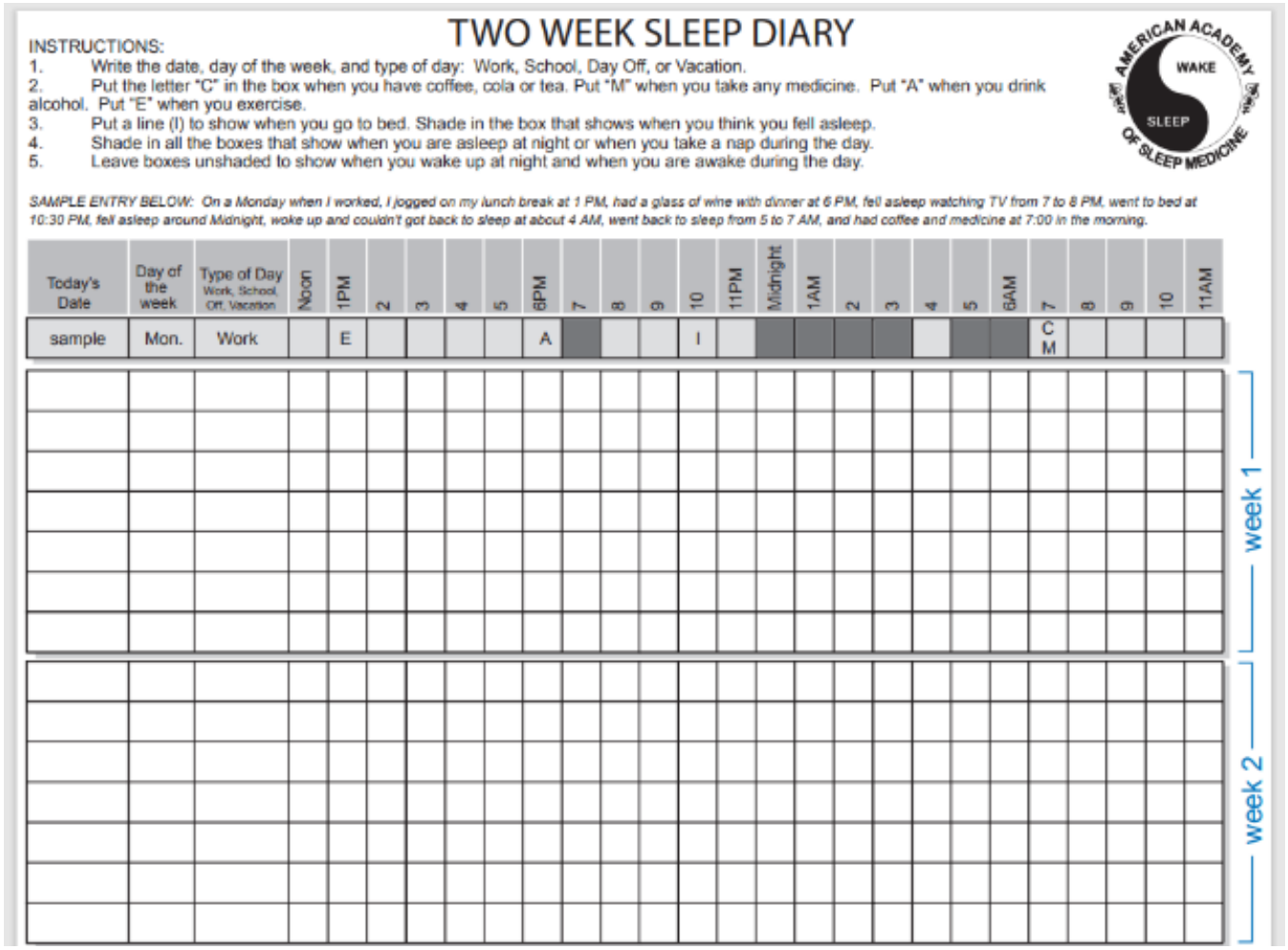
# Sleep – The Right Timing



# Sleep – The Right Timing Actigraphy

- Accelerometer or light sensor worn on the nondominant wrist, typically for a week or more. - Medical vs Consumer devices
- Proprietary algorithms used in consumer wearable devices
- Generates lots of questions for caregivers on what the data means
- Few have been validated for measuring sleep wake cycle

# The Timing Sleep Diary



## TWO WEEK SLEEP DIARY

INSTRUCTIONS:

1. Write the date, day of the week, and type of day: Work, School, Day Off, or Vacation.
2. Put the letter "C" in the box when you have coffee, cola or tea. Put "M" when you take any medicine. Put "A" when you drink alcohol. Put "E" when you exercise.
3. Put a line (I) to show when you go to bed. Shade in the box that shows when you think you fell asleep.
4. Shade in all the boxes that show when you are asleep at night or when you take a nap during the day.
5. Leave boxes unshaded to show when you wake up at night and when you are awake during the day.

*SAMPLE ENTRY BELOW: On a Monday when I worked, I jogged on my lunch break at 1 PM, had a glass of wine with dinner at 6 PM, fell asleep watching TV from 7 to 8 PM, went to bed at 10:30 PM, fell asleep around Midnight, woke up and couldn't get back to sleep at about 4 AM, went back to sleep from 5 to 7 AM, and had coffee and medicine at 7:00 in the morning.*

| Today's Date | Day of the week | Type of Day Work, School, Off, Vacation | Noon | 1PM | 2 | 3 | 4 | 5 | 6PM | 7 | 8 | 9 | 10 | 11PM | Midnight | 1AM | 2 | 3 | 4 | 5 | 6AM | 7 | 8 | 9 | 10 | 11AM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| sample | Mon. | Work | | E | | | | | A | | | | I | | | | | | | | | C M | | | | |
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# So how do we help? – Treatment of Insomnia

## Cognitive Behavioral

- Sleep Hygiene
- Stimulus control
- Sleep restriction
- Relaxation training
- Cognitive Therapy

## Pharmacologic

- Benzodiazepine receptor agonists
- Melatonin receptor agonists
- Orexin Receptor agonists
- Antidepressants
- Anticonvulsants
- Herbals
- Antihistamines
- Antipsychotics

# Taking Action

# Getting back to our case -

- Most likely cause of SG's insomnia?
- Further work up?
- What about the three pillars in this case?
- What effect did the pandemic have on this case?

# Short Term Action

- Are you willing to look at your own relationship with sleep regarding timing, quality and quantity?
- Can you look at what might be keeping you from optimal function regarding sleep?
- Given the added stress of the pandemic as we head into winter, can you think of ways that you can take better care of your patients by asking about sleep on every encounter?
- What if you just add insomnia to your differential more?

# Long Term Action

- Learn about good practices around sleep hygiene and recommend them to your patients.
- Keep a strict sleep schedule/routine
- Take a hot bath or shower prior to sleeping
- Sleep in a cold (around 65 degrees) dark bedroom
- Avoiding nicotine, caffeine and alcohol
- Exercise in the morning
- Look at medications and supplements that your patient may be taking
- Treat insomnia as a problem to be addressed by itself as a separate entity and not just symptom.

# Tools and Resources

- http://yoursleep.aasmnet.org/pdf/sleepdiary.pdf
- Walker, Matthew (2017). *Why We Sleep: The New Science of Sleep and Dreams*.
- Epworth Sleepiness Scale calculator: http://www.calcz.com/apnea/calc.html
- https://www.ted.com/talks/matt_walker_sleep_is_your_superpower?utm_campaign=tedspread&utm_medium=referral&utm_source=tedcomshare

# True Confessions…

- I feel like I am so jealous of my dog Scout, she sleeps so much!  I get up in the morning, she sleeps in, I come home in the evening, and she is napping…
- The shorter you sleep, the shorter you live…  my dog will outlive me for sure!

# Office Hour

# Upcoming CoE Events:

**CoE Office Hours: Engaging Older Youth to help them Navigate the New Norm**

**Register here for office hour** on Dec. 7, 2-3pm ET

**Compassion Fatigue and Resilience: Strategies for School Based Health Center Providers**

**Register here for webinar** on Dec. 10, 2-3pm ET

**Tips and Tools for Leveraging Trauma Informed Care Techniques to Reduce Stress for Students, Teachers, and Providers**

**Register here for webinar** on Dec. 15, 2-3pm ET

**Interested in an individual consultation with the CoE experts on integrated care?**

Contact us through this form here!

**Looking for free trainings and credits?**

Check out integrated health trainings from Relias here.

# Contact Us

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