**TBI-BH ECHO**

Traumatic Brain Injury – Behavioral Health ECHO

UW Medicine | Psychiatry and Behavioral Sciences

# Return to sleep:
## Nonpharmacologic treatment of insomnia with traumatic brain injury


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# Speaker disclosures

✓ I have no conflicts of interest.

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✓ Jennifer Erickson DO
✓ Jess Fann MD
✓ Cherry Junn MD
✓ Chuck Bombardier PhD
✓ Cara Towle MSN RN MA
✓ David Minor
✓ Amanda Kersey PhD
✓ Lauren Miles

# Objectives

1. Learn about the underlying sleep and wake derangements that lead to insomnia, with special consideration for traumatic brain injury (TBI)
2. Understand how to evaluate insomnia in this population
3. Explore effective nonpharmacologic management strategies for insomnia with TBI, and how to present them to patients

# Case example

- You are seeing a 46-year-old man with mild traumatic brain injury from a motor vehicle accident that occurred 6 months ago. The patient reports that his main issue is difficulty sleeping. After his accident, he felt like he needed to sleep “all the time,” but over the past few months, this has turned into the opposite problem. He lies awake in bed at night unable to sleep. He often wakes up with headaches.
- During the day, he is very fatigued and has a hard time concentrating. Sometimes he will doze off. He worries that his lack of sleep is impacting his recovery and relationships with his family. He believes his ability to sleep was damaged by the accident. He wonders if there is a medication that can help him sleep.
- What now?

# What is insomnia?

- Insomnia can be a **symptom**
  - Difficulty getting to sleep
  - Difficulty staying asleep
  - Waking up too early
- A large number of other conditions, medications, and substances can cause insomnia symptoms
- Most people have experienced insomnia symptoms at some point in their lives

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# What is insomnia?

- Insomnia can also be a **disorder**
  - Chronic insomnia disorder
  - Short-term insomnia disorder
- It is important to note - just because someone is referred to you for “insomnia” doesn’t mean they have chronic insomnia disorder
- Why is this important? Because the most appropriate management for their problem depends on getting the diagnosis right!

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# Insomnia and traumatic brain injury (TBI)

- Insomnia is one of the most common symptoms of TBI
- 30–50% of patients with TBI report new or worsened insomnia following TBI (versus the general population prevalence of 6-10%)
- Insomnia may develop immediately after TBI or later during the recovery period, and is unlikely to remit without targeted treatment, even if other TBI symptoms resolve
- Insomnia is more frequently reported in patients with mild as opposed to moderate or severe TBI
- Severe and chronic insomnia may remain untreated in up to 60% of TBI patients


*Dietch & Furst, Front Neurol, 2020; Mathias & Alvaro, Sleep Med, 2012; Ouellet et al, J Head Trauma Rehabil, 2006; Ford et al, Sleep Med Rev, 2020*

# Impacts of insomnia

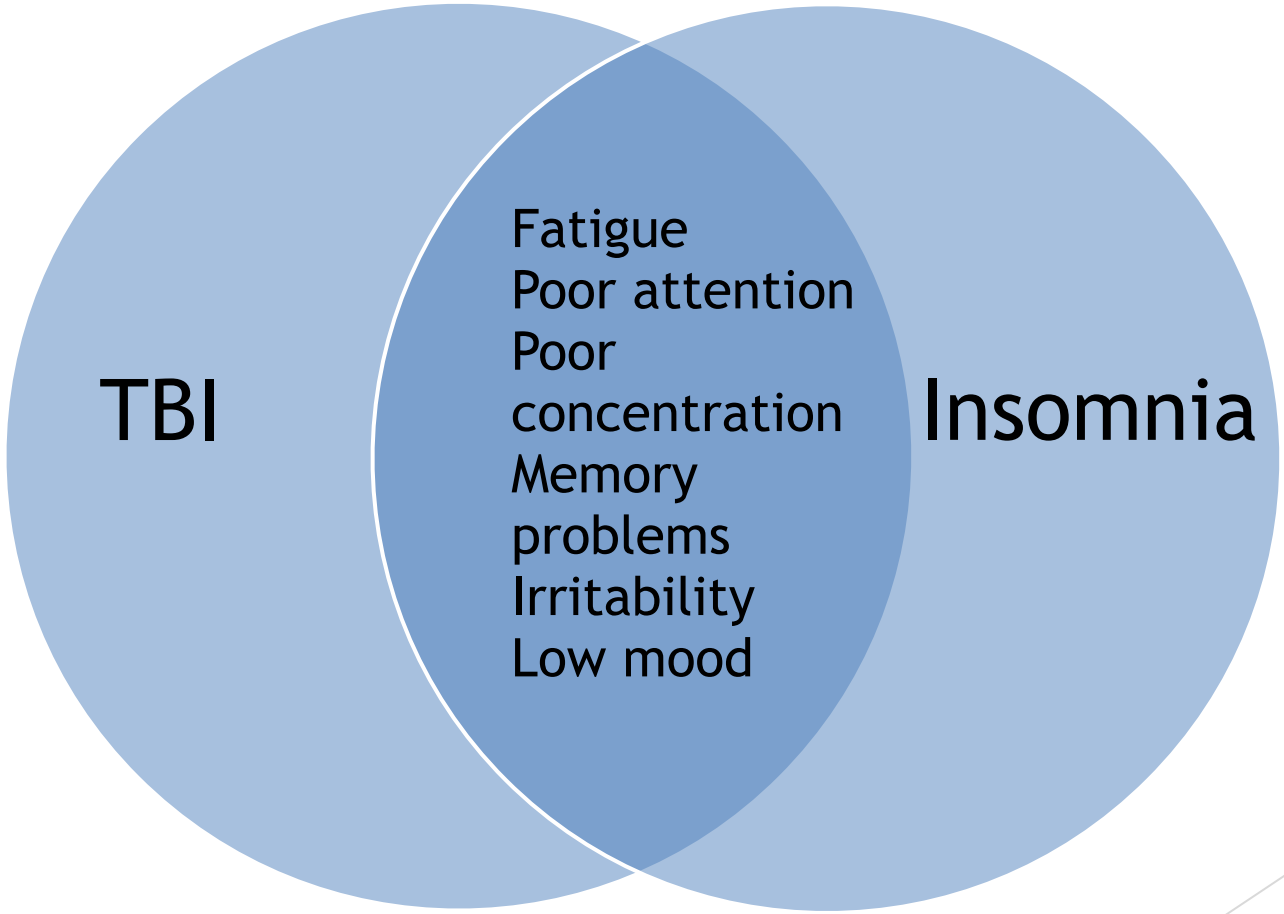
Chronic insomnia is associated with increased risk for:

- Depressive episodes (new onset and relapse)
- Suicide
- Cognitive impairments across multiple domains
- Difficulty engaging in rehabilitation activities
- Substance abuse
- Future accidents and injuries
- Cardiovascular disease

Despite this, insomnia is often underrecognized as a *disorder* by both patients *and* providers.

*Roth, J Clin Sleep Med, 2007; Larsson et al, Circulation, 2019; Lowe et al, Disabil, Rehabil, 2020; Wardle-Pinkston et al, Sleep Med Rev, 2019; Worthington & Melia, Brain Injury, 2006; Ford et al, Sleep Med Rev, 2020*

# Many symptoms of TBI and insomnia overlap




*Dietch & Furst, Front Neurol, 2020*

# Diagnostic criteria for chronic insomnia disorder


- One or more of the following:
  - *Difficulty initiating sleep*
  - *Difficult maintaining sleep*
  - *Waking up earlier than desired*
  - *Bedtime resistance*
  - *Difficulty sleeping without parent/ caregiver intervention*
- With one or more <u>related problems</u> like fatigue, impaired performance, mood problems, or dissatisfaction about sleep
- Has occurred at least <u>3 times/week for at least 3 months</u>
- <u>Cannot be explained by lack of opportunity</u> to sleep or a poor sleep environment
- <u>Cannot be *solely* explained</u> by another sleep disorder, medical disorder, mental disorder, or medication/substance use

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*International Classification of Sleep Disorders, 3rd Edition, Text Revision, 2023*

# Insomnia as a *comorbid* disorder

- It was commonly believed that chronic insomnia was in some cases a symptom of disorders such as major depression, PTSD, chronic pain, or TBI ("secondary insomnia")
- However.... even when other problems resolve, the insomnia may persist, and untreated insomnia can predict the development of other health problems
- We now consider insomnia to be a comorbid disorder that warrants independent treatment
- Successful treatment of insomnia as a separate disorder has the potential to substantially improve symptoms and recovery from TBI
- When diagnostic criteria for chronic insomnia are met, it should always be given as a diagnosis, and managed as a separate condition

*Lichstein, Sleep Med Rev, 2006*

# Understanding the problem

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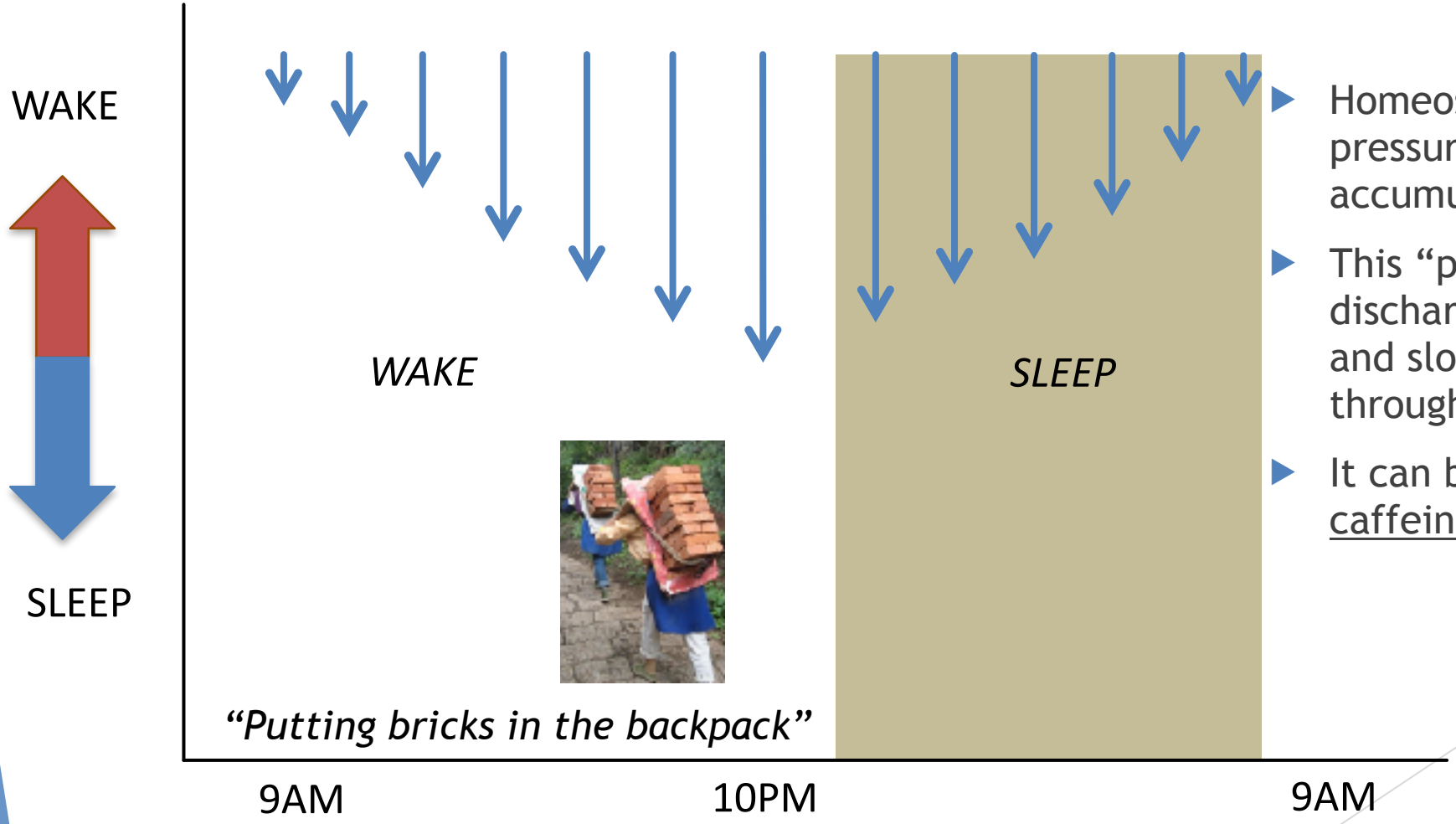
# The two-process theory of sleep regulation

- There are two main processes that impact sleep and wake drives:
  - Homeostatic sleep drive (“process S”)
  - Circadian rhythm (“process C”)
- These two processes work together to promote alertness and sleepiness at the appropriate times of day and night

Borbély, *Hum Neurobiol*, 1982; Borbély et al, *J Sleep Res*, 2016

# Homeostatic sleep drive

The "pressure to sleep" that increases the longer a person is awake




- Homeostatic sleep pressure occurs with accumulation of adenosine
- This "pressure" is discharged during sleep and slowly wears off through the night
- It can be reduced by caffeine and naps

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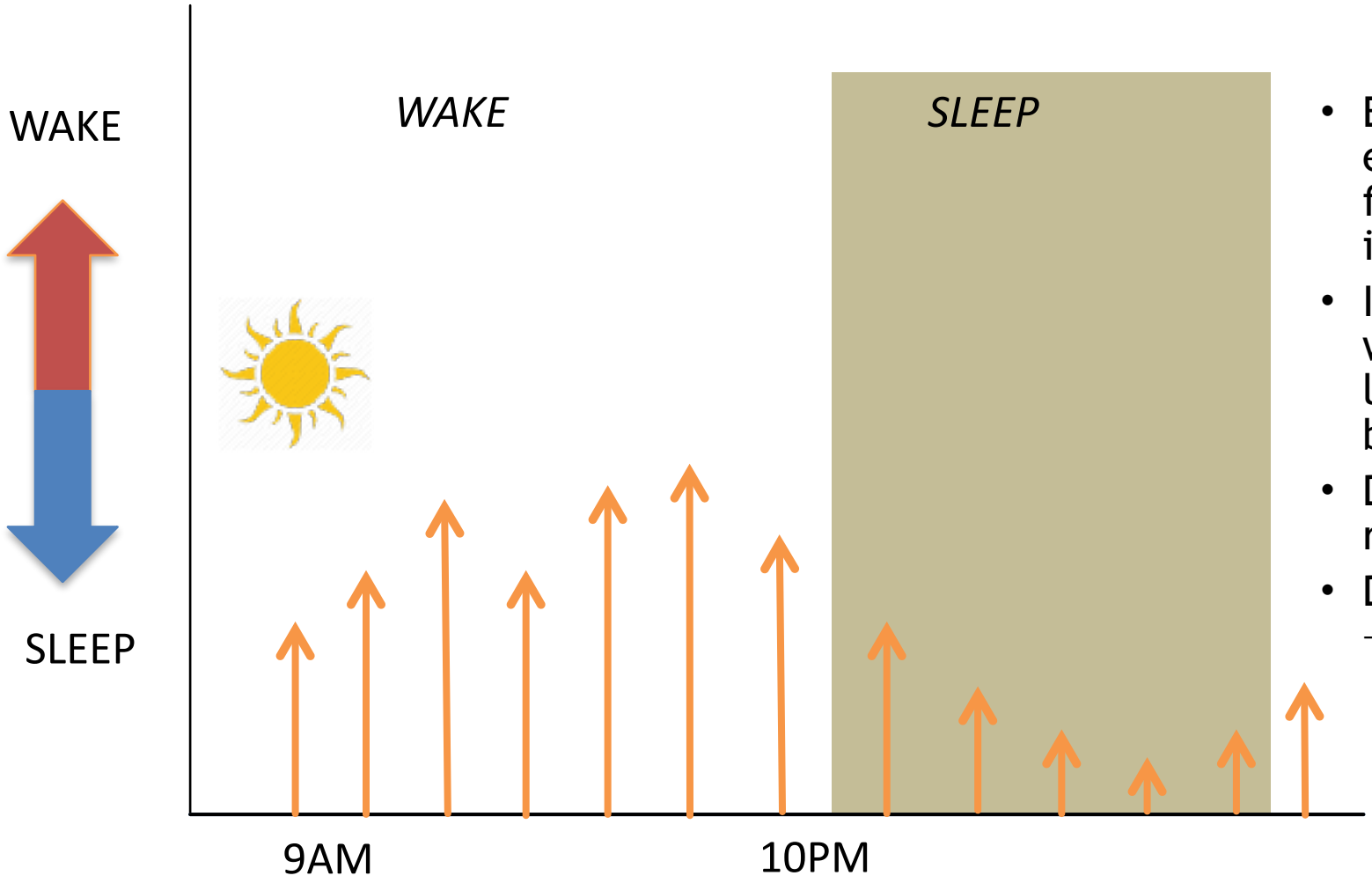
# Circadian rhythm

Daily ~24h cycle set by the suprachiasmatic nucleus (SCN, “master clock”) and peripheral “clocks” in cells of other organ systems




- Entrained to the external world by light, food, activity, social interaction
- Inhibited by melatonin, which is released in dim light conditions ~2 hours before sleep onset
- Dictates many bodily rhythms
- Does not change quickly – at most, one hour/day

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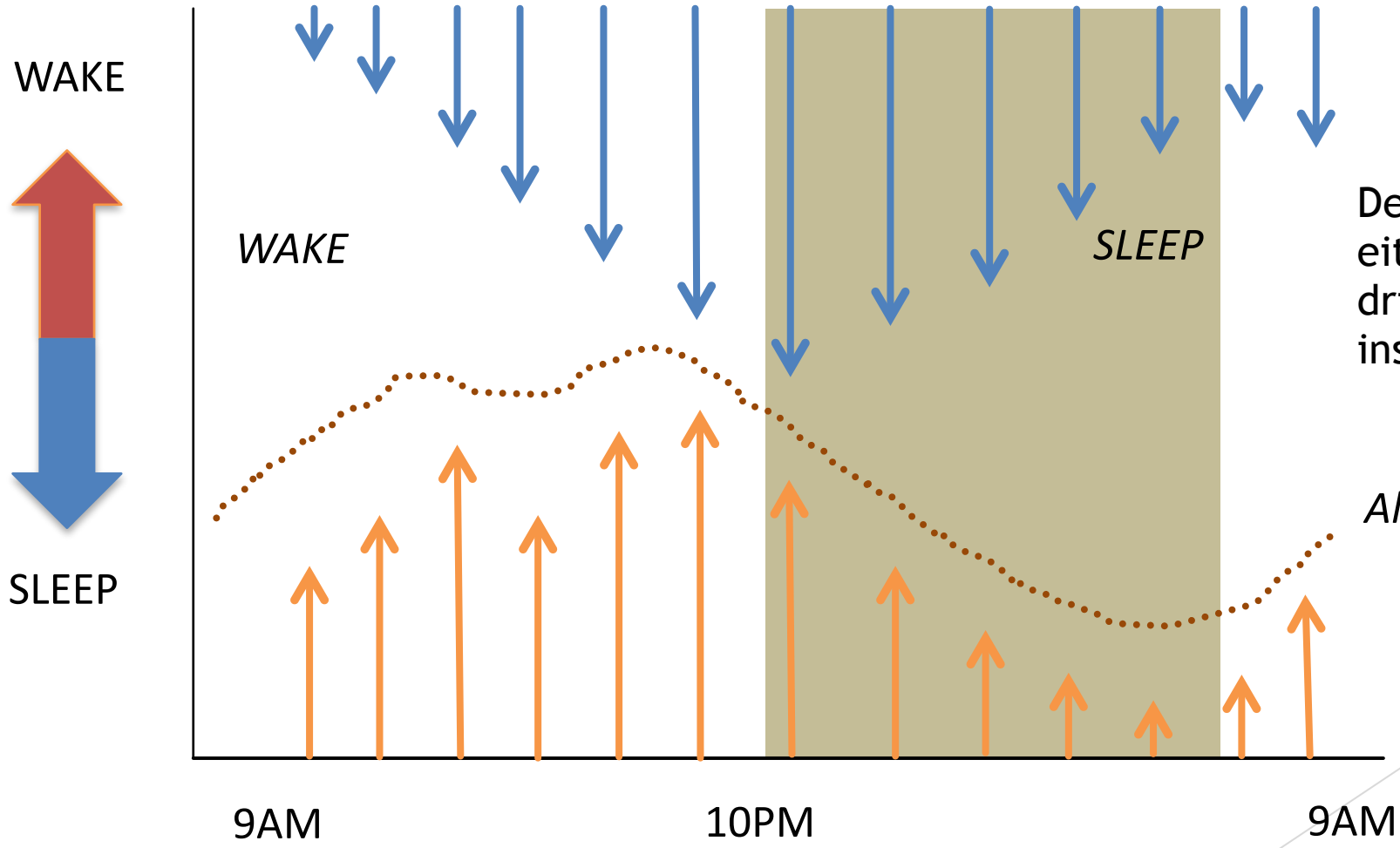
# These two drives work together to coordinate sleep-wake timing




Derangements in either of these drives can lead to insomnia!

*Alertness level*

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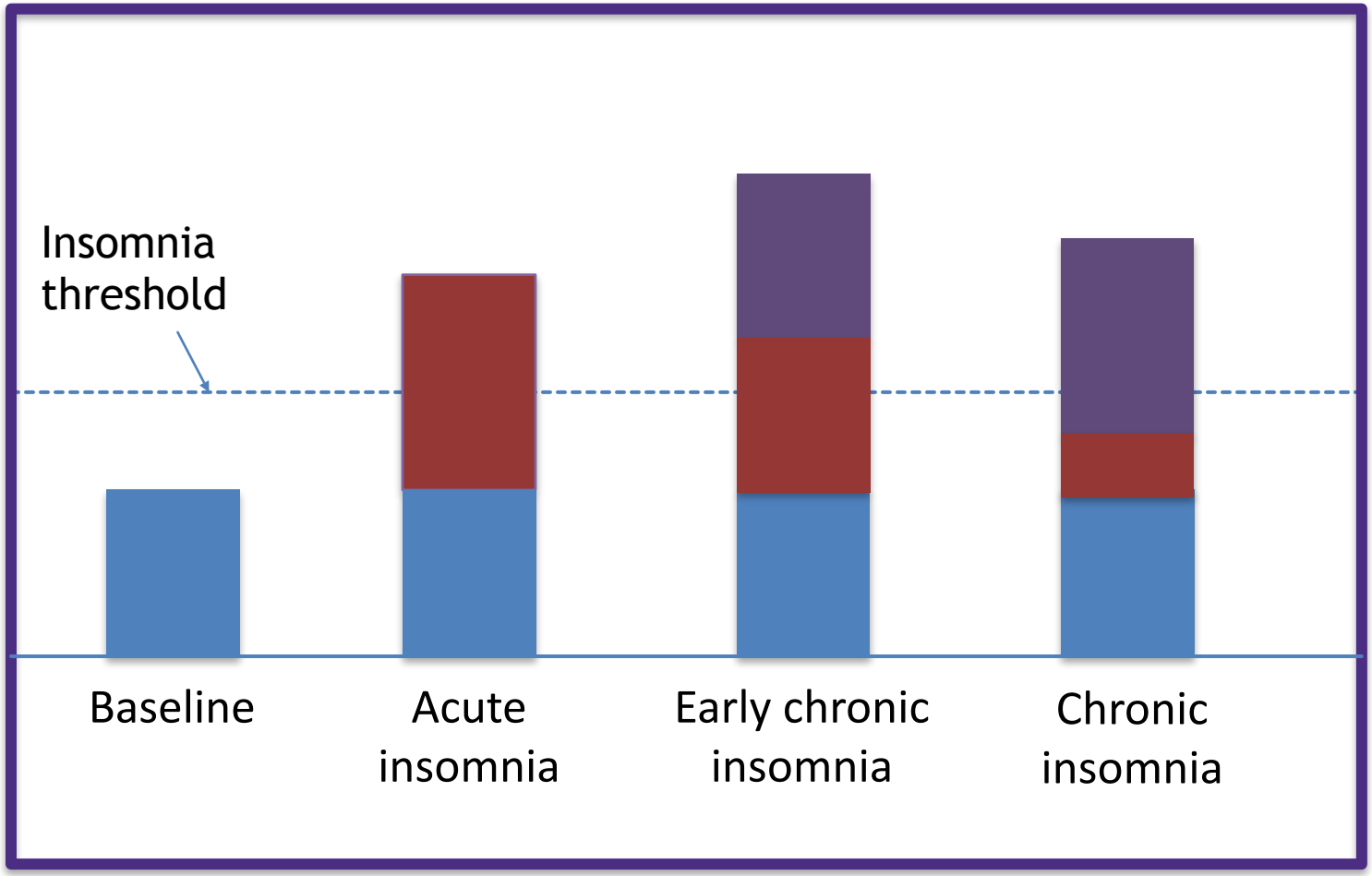
# The 3 P's of insomnia development




**Perpetuating factors**

Worry about sleep
Worry about functioning
Too much time in bed
Irregular sleep schedule/ napping
Hyperarousal response
Reliance on sleep aids/ substances

<u>Perpetuating factors are the main problem with chronic insomnia</u>

*Spielman et al, Psychiatric Clinics of North America, 1987*

# TBI as a precipitating factor for insomnia

- TBI may serve as a precipitating event in the development of chronic insomnia, either directly or indirectly
  - Neurological changes
  - Pain
  - Post-traumatic stress
  - Depression
  - Changes in lifestyle and activity level
- Insomnia can decrease over time; one study found that 73% of patients with TBI had sleep complaints ~3 months after their accident, but only 30% had insomnia ~30 months after their accident

*Dietch & Furst, Front Neurol, 2020; Ouellet et al, J Head Trauma Rehabil, 2006*

# TBI as a precipitating factor for insomnia

- Insomnia is more likely to persist into the recovery period for mild TBI if perpetuating factors are present, similarly to insomnia without TBI
  - Going to bed earlier
  - Sleeping in later
  - Taking naps
- In the acute phase of TBI, individuals can also experience a period of increased sleep need that may be followed by an eventual return to baseline sleep duration – but the patient may continue to attempt to stay in bed longer than they can sleep

*Dietch & Furst, Front Neurol, 2020*

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# Maladaptive association with the bed

- The patient with insomnia often spends more time awake in bed
  - Ruminating
  - Feeling anxiety and frustration about sleep
  - Worrying that lack of sleep will impact recovery
  - Worrying that their sleep is permanently broken
- This becomes a HABIT of being awake in bed
- The association is strengthened when they try to increase their sleep opportunity by:
  - Going to bed early
  - Staying in bed when they can't sleep

# Hyperarousal

- Over time, anxiety and sleep deprivation can lead to a hyperarousal state
- Hyperarousal is a chronic stress response – "tired but wired"
  - HPA axis activation (elevated ACTH, cortisol)
  - Increased metabolic rate, temp, HR, BP, muscle tension
  - Higher daytime noradrenaline levels
  - Excessive activity in wake-promoting systems on functional neuroimaging
- Hyperarousal causes diminished sleepiness around the clock meaning chronic insomnia is not just a sleep disorder, but a 24-hour disorder
- Hyperarousal is reversible!

*Ong & Smith, Curr Sleep Med Rep, 2018; Kalmbach et al, Nat Sci Sleep, 2018; Bonnet & Arand, Sleep Med Review, 2010*

# Evaluating the problem

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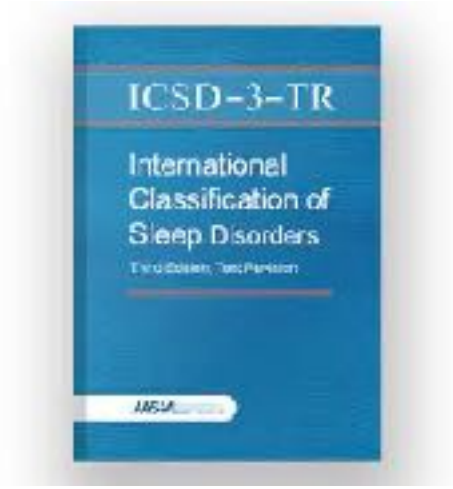
# Taking an insomnia history

- Is the patient experiencing sleep onset difficulty, sleep maintenance difficulty, and/or early morning awakenings?
- When did the insomnia start?
- How many nights/week is it happening?

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# Obtain the 24-hour schedule

- Ask about their sleep schedule over 24 hours, including naps
  - Bedtime
  - Time to fall asleep (estimated)
  - Number of awakenings (and what wakes them up)
  - Time to fall back asleep
  - Wake time (with/without an alarm)
  - Time out of bed
- Find out what they do when they can't sleep
- **Daytime: activity, naps, caffeine, medications - and timing**

# Evaluate for other sleep disorders


## Remember that insomnia can be a symptom of other sleep disorders!

### Obstructive sleep apnea

- Obstructive events at the sleep-wake transition can lead to sleep onset insomnia, and can trigger frequent awakenings

### Circadian rhythm disorders

- Insomnia ***plus*** morning or evening sleepiness
- Circadian dysregulation is common following TBI, theorized to be related to altered melatonin production or changes in melatonin receptors

### Restless legs syndrome (often seen with periodic limb movements)

- Sleep onset (and sometimes maintenance) insomnia can arise from sensations in the legs that are worse at night and at rest
- Symptoms are often worse at the beginning of the night

### Nightmares

- May be associated with the injury and with post-traumatic stress disorder
- Often causes a fear of sleep (not insomnia!)
- Can and SHOULD be treated if possible

*Wickwire et al, J Neurotrauma, 2018; Collen et al, Chest, 2012*

# Review medical/neurologic/psychiatric comorbidities

**Medical/neurologic:**

- Arthritis, asthma, autoimmune disorders, benign prostatic hypertrophy, COPD, dementia, hyperthyroidism, menopause, musculoskeletal pain, pregnancy, reflux, stroke

**Psychiatric:**

- Depression, anxiety, PTSD, schizophrenia
- Bipolar disorder: “I can’t sleep and I’m not tired” = mania/hypomania, NOT insomnia
- PTSD: “I’m afraid to sleep (because of nightmares, hypervigilance, not feeling safe to sleep) = NOT insomnia

# Review medications and substances

- **Biggest culprits:**
  - Alcohol (typically during withdrawal overnight)
  - Antidepressants
  - Beta blockers (suppress melatonin)
  - Bronchodilators
  - Caffeine (including in chocolate, OTC analgesics, tea, suppleme has a mean half-life of 5-6 hours
  - Decongestants
  - Diuretics
  - Glucocorticoids (prednisone)
  - Stimulants (prescribed and illicit)
  - Thyroid replacement
- Find out when they take medications and substances

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# “Insomnia logic”

- Many of the things insomnia sufferers do to try to get sleep actually make the problem worse
- Listen for these perpetuating factors in your insomnia evaluations!

| Action | What they expect | What actually happens |
|---|---|---|
| “I go to bed earlier so I’ll get more sleep.” “I make sure I spend at least 10 hours in bed so I can sleep at least 8 hours” | Will get more sleep | They lie awake longer -> conditioned association with bed and wakefulness |
| “When I finally crash in the morning, I turn off my alarm and sleep in – I’ll take any sleep I can get!” | Will get more sleep | Delays the circadian clock and reduces homeostatic pressure |
| “I nap so I can get through the day” | Will get more sleep | Reduces homeostatic pressure |
| “If I go to sleep now, I’ll get 5 hours of sleep...4 hours...3 hours...” (clock watching) | Reassurance | Increases anxiety |
| “If I don’t get sleep, [insert catastrophic consequence]” | Worrying will somehow solve the problem | Worrying in bed makes insomnia worse |
| “I can’t sleep without [medication of choice]” | Instant fix | Increases psychological dependence and lowers confidence in their ability to sleep without it |

# History of treatment

- Find out what they have done to treat their insomnia in the past (and present), including:
  - Behavioral changes (many of which may have perpetuated their insomnia)
  - Over the counter sleep aids
  - Prescription sleep aids
  - Sleep hygiene
  - Cognitive-behavioral therapy for insomnia (CBT-I)
- This promotes a dialogue about what has/has not worked, and their goals of treatment

# Returning to your case

- You ask your patient a few more questions about his sleep history.
- He typically goes to bed around 9pm. He takes Zzquil and melatonin around that time too. Then he lies awake for several hours. Once he gets to sleep, he wakes up several times, sometimes with nightmares, or with need to use the bathroom, and again lies awake in bed for a while. He wakes up around 7am, often with a headache, and gets out of bed at that time to take pain medication. He drinks coffee throughout the day to fight fatigue. Sometimes he naps in the afternoon for 1-2 hours because he is so tired.
- You ask about other sleep-related symptoms. He snores loudly according to his wife, and since the accident he sometimes thrashes around in bed. They are now sleeping in separate rooms as a result.

# Managing the problem

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# Address precipitating factors

- Address precipitating factors when possible
  - Refer or encourage treatment of depression, anxiety, substance use disorders, chronic pain, etc.
  - Identify and treat sleep disorders such as OSA, RLS, and nightmares
  - Discuss medications and substances (and their timing) that could be contributing to insomnia

# Pharmacologic treatment considerations with TBI

- Medications are commonly prescribed for chronic insomnia (despite these guidelines), however this may be more of an issue in specific populations such as individuals with TBI
- Adverse effects of common sedative-hypnotic medications can exacerbate symptoms of TBI
  - Daytime sleepiness/morning grogginess
  - Fatigue
  - Mental slowing
  - Attentional and memory difficulties
  - Dizziness
  - Headache
- Long-term use of hypnotics may also be associated with increased risk for dementia with TBI patients

*Dietch & Furst, 2020; Chiu et al, Eur Neuropsychopharmacol, 2015*

# Set expectations and goals

- The patient may present their sleep problem with some urgency, and you may also feel their urgency to treat it *right away*
- It's important to realize that the insomnia patient's anxiety and worry about sleep is part of the problem
- It likely took some time for this problem to develop, and with appropriate treatment it will take some time for the problem to resolve
- What are specific and realistic goals for treatment?
  - If the patient gets 4-5 hours of sleep per night, would 6 hours be an improvement?
  - If the patient takes 3 hours to get to sleep, would getting to sleep in 1 hour be an improvement?

# Foundations: sleep hygiene

- Sleep hygiene is just “the basics” of good sleep habits:
  - Avoid caffeine after 2pm
  - Don’t nap
  - Avoid bright light, electronics, and anything stimulating close to bedtime
  - Establish a bedtime routine to wind down before sleep
  - Make the bed environment conducive to sleep: safe, dark, quiet, cool
  - Do not do anything in bed other than sleep and sex
  - Avoid watching the clock
- Sleep hygiene does *not* treat chronic insomnia, but can reduce precipitating factors
- One study of inpatient rehabilitation patients with enforced bedtime, morning light therapy, restricted caffeine after noon, and 30-minute nap limit did find benefit in actigraphic sleep metrics

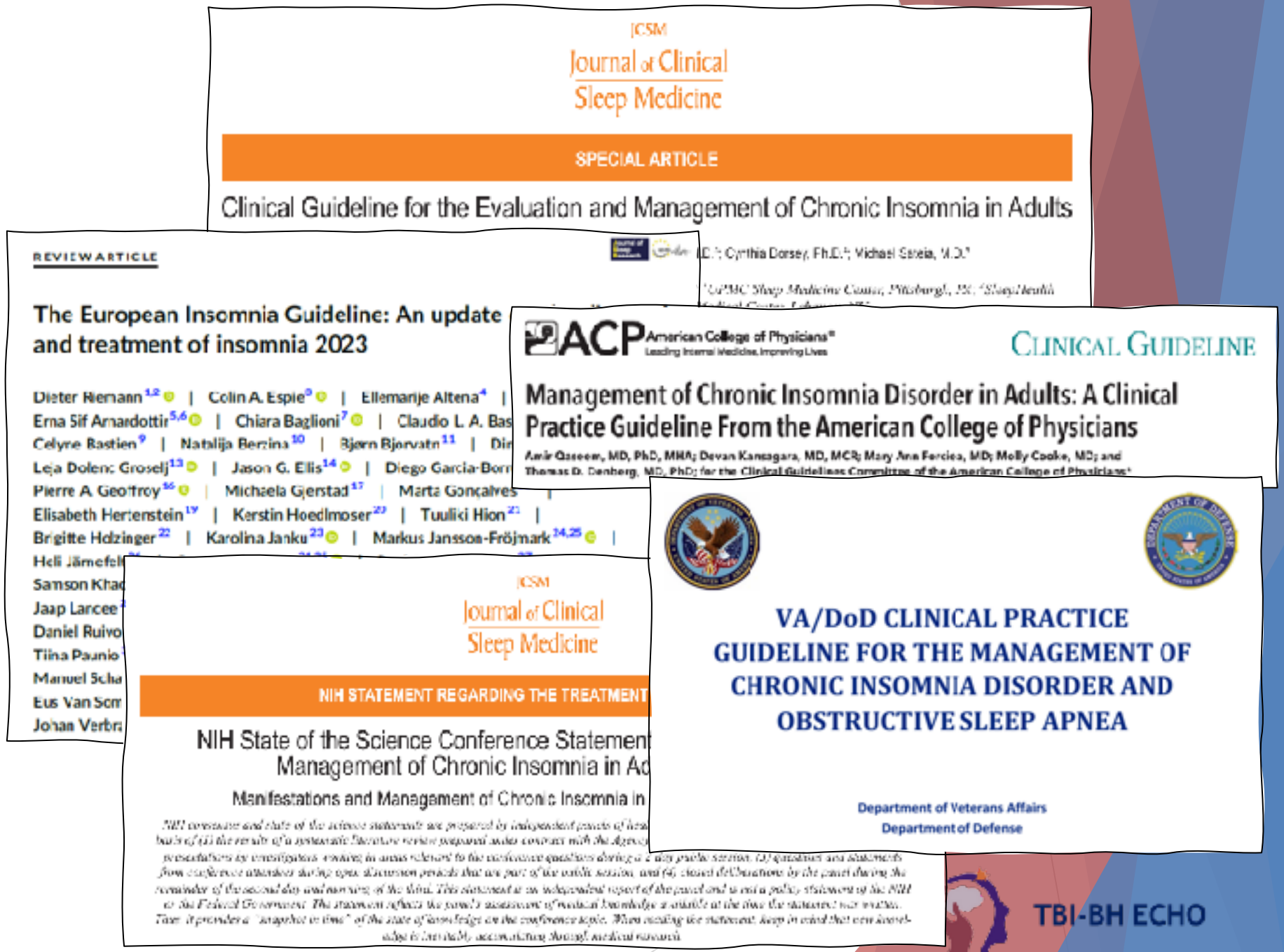
*Makley et al, Neurorehabil Neural Repair, 2020*

# The gold standard insomnia treatment: cognitive-behavioral therapy for insomnia (CBT-I)

- Designed to reverse the processes that perpetuate chronic insomnia
- As effective as pharmacotherapy in the short term, without adverse effects
- Remains more effective in the long term than pharmacotherapy
- Numerous studies have been done showing benefits of CBT-I in various populations and with various comorbidities, including TBI
- 70-80% of patients with chronic insomnia experience benefit from CBT-I, with 50% going into remission

*Smith et al, Am J Psychiatry, 2002; Van der Zweerde et al, Sleep Med Rev, 2019; Riemann & Perlis, Sleep Med Rev, 2009; Buscemi et al, J Gen Intern Med, 2007; Dietch & Furst, 2020. Image: Jacobs et al, JAMA Int Med, 2004*

CBT-I is the recommended first-line treatment for chronic insomnia by numerous organizations



# Benefits of CBT-I with TBI

- Limited studies with individuals who have mild to severe TBI have found that treating insomnia using CBT-I improves (but not consistently!):
  - Insomnia severity
  - Sleep onset latency
  - Wakefulness after sleep onset
  - Sleep efficiency
  - Sleep quality
  - Daytime fatigue
  - Depression
  - Anxiety

*Ouellet & Morin, Arch Phys Med Rehabil, 2007; Sullivan et al, J Neurotrauma, 2018; Nguyen et al, Arch Phys Med Rehab, 2017; Dietch & Furst, 2020; Ford et al, Sleep Med Rev, 2020; Lu et al, Neurorehabil, 2016; Matsuura et al, Front Sleep, 2023*

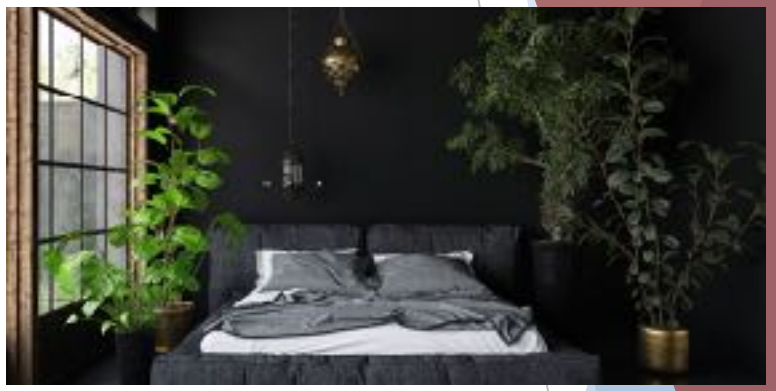
# What is CBT-I?

- Utilizes cognitive and behavioral strategies to treat insomnia over 6-8 sessions
- CBT-I is *not* sleep hygiene

| Technique | Goal |
|---|---|
| Challenging maladaptive thinking | Manage expectations and reduce catastrophizing about lost sleep |
| Stimulus control | "Retrain" the brain to recognize the bed as a place for sleep, not worry |
| Sleep restriction | Enhance the homeostatic drive by consolidating sleep time to a single window |
| Keeping a regular schedule | Enhance the circadian entrainment to a set sleep time |
| Mindfulness/meditation | Reduce hyperarousal interfering with the recognition of sleepiness |

# Stimulus control

- Rewrites the conditioned association between the bed and being awake/anxious to an association between the bed and quickly falling sleep
  - Use the bedroom only for sleep and sex
  - Go to bed only when sleepy
  - Leave the bed if you are unable to sleep for 15-20 minutes
  - If you find yourself ruminating, gently let go of the worrisome thoughts or write them down in a worry journal to think about later



# Sleep restriction

Note: Proceed with caution for patients with history of seizure or bipolar disorder

- Increased wake time in bed worsens insomnia and can lead to “spreading out” of sleep episodes
- Sleep restriction (bed restriction) reduces the opportunity to spend time awake in bed to a specified window
- Helps reduce middle-of-the-night awakenings
- Over time, as the patient is sleeping a greater proportion of time in bed, you can gradually extend the sleep opportunity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# Gather data

Have the patient fill out a sleep diary for two weeks

*AASM sleep diary (grid format)*

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 (|) 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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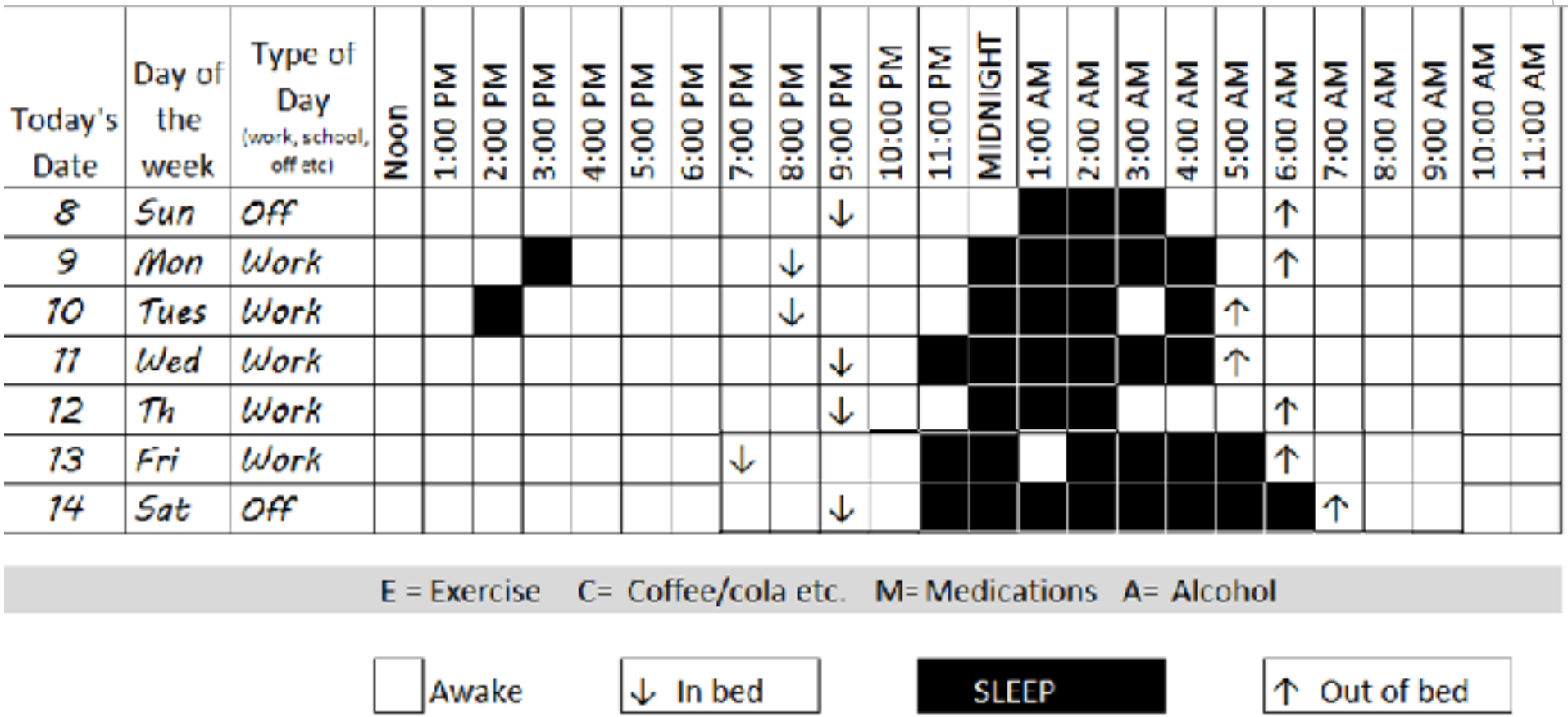
week 1 / week 2

*Consensus sleep diary (table format)*

**Consensus Sleep Diary-Core** ID/Name: _____

| | Sample | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Today's date | 4/5/11 | | | | | | | |
| 1. What time did you get into bed? | 10:15 p.m. | | | | | | | |
| 2. What time did you try to go to sleep? | 11:30 p.m. | | | | | | | |
| 3. How long did it take you to fall asleep? | 55 min. | | | | | | | |
| 4. How many times did you wake up, not counting your final awakening? | 3 times | | | | | | | |
| 5. In total, how long did these awakenings last? | 1 hour 10 min. | | | | | | | |
| 6. What time was your final awakening? | 6:35 a.m. | | | | | | | |
| 7. What time did you get out of bed for the day? | 7:20 a.m. | | | | | | | |
| 8. How would you rate the quality of your sleep? | ☐ Very poor ☒ Poor ☐ Fair ☐ Good ☐ Very good | ☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Very good | ☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Very good | ☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Very good | ☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Very good | ☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Very good | ☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Very good | ☐ Very poor ☐ Poor ☐ Fair ☐ Good ☐ Very good |
| 9. Comments (if applicable) | I have a cold | | | | | | | |

# Calculate the sleep efficiency




Hours asleep = 35
Hours in bed = 66

Mean TST ≈ 5 h/n

**Sleep efficiency:** 53%

**Goal is ≥85%**

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# Give a sleep “prescription”

| Today's Date | Day of the week | Type of Day (work, school, off etc) | Noon | 1:00 PM | 2:00 PM | 3:00 PM | 4:00 PM | 5:00 PM | 6:00 PM | 7:00 PM | 8:00 PM | 9:00 PM | 10:00 PM | 11:00 PM | MIDNIGHT | 1:00 AM | 2:00 AM | 3:00 AM | 4:00 AM | 5:00 AM | 6:00 AM | 7:00 AM | 8:00 AM | 9:00 AM | 10:00 AM | 11:00 AM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Sun | Off | | | | | | | | | | ↓ | | | | | | | | | ↑ | | | | | |
| 9 | Mon | Work | | | | ■ | | | | | ↓ | | | | ■ | | | | | | ↑ | | | | | |
| 10 | Tues | Work | | | ■ | | | | | | ↓ | | | | ■ | | | | | ↑ | | | | | | |
| 11 | Wed | Work | | | | | | | | | | ↓ | | ■ | ■ | | | | | ↑ | | | | | | |
| 12 | Th | Work | | | | | | | | | | ↓ | | | ■ | | | | | | ↑ | | | | | |
| 13 | Fri | Work | | | | | | | | ↓ | | | | ■ | ■ | | | | | | ↑ | | | | | |
| 14 | Sat | Off | | | | | | | | | | ↓ | | ■ | ■ | | | | | ■ | | ↑ | | | | |

E = Exercise C= Coffee/cola etc. M= Medications A= Alcohol

Awake ↓ In bed SLEEP ↑ Out of bed

1. Set a consistent wake time.
2. Calculate a tentative bedtime based on the **current total sleep time + 30 min**, but not <5.5 hours).
3. Get out of bed if not sleeping within ~20 minutes.

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# Manage hyperarousal

- Patients need to learn that chasing sleep does not work – they need to let sleep happen
- To do that, they have to be able to relax
- Recommend daytime practice of mindfulness/ meditation practice
  - Deep breathing
  - Mindfulness imagery
  - Progressive muscle relaxation
- Start a relaxing wind-down routine before sleep
- Keep a "worry" journal

*Ong et al, SLEEP, 2014; Gross et al, Explore (NY), 2011; Ong & Sholtes, J Clin Psychol, 2010*

# Take advantage of telemedicine and self-guided options

- Availability of CBT-I has historically been limited by the number of local providers who are trained to do it
- In recent years, alternative modalities have been extensively studied and found to be effective in the general population:
  - Computerized CBT-I (cCBT-I)
  - Group CBT-I (gCBT-I)
  - Telehealth CBT-I (tCBT-I)
  - Dissemination of CBT-I to non-sleep specialists (brief behavioral therapy for insomnia or BBT-I)

*Simpson & Manber, Sleep, 2021; Seyffert et al, PLoS One, 2016; Kay-Stacey & Attarian, BMJ, 2016; Sharafkhaneh et al, Sleep Med, 2022; Manber et al, JCSM, 2012*

# Computerized and online CBT-I

- There are online and smart phone applications for insomnia treatment:


**Sleepio**

**Insomnia Coach (FREE)**


**CBT-I Coach (to be used with a provider) (FREE)**


**Path to Better Sleep (SleepEZ) (FREE)**

# Challenges in using CBT-I with TBI

1. *Cognitive challenges associated with TBI can make CBT-I difficult.*
   - Patients may struggle from attentional and memory issues that make following behavioral change recommendations challenging
   - CBT-I relies on good adherence to a set schedule and daily logs

   *How to help:*
   - Consider creating simplified handouts
   - All instructions should be written down!
   - Help the patient come up with a good reminder system – this may include using an app such as CBT-I Coach that can alert them to complete their sleep log, stop drinking caffeine, wind down, go to bed, etc. They can even export this data to a CSV file and send it to you, and/or import sleep data from a sleep-tracking device.
   - Enlist a family member or caregiver to help

*Dietch & Furst, Front Neurol, 2020; Matsuura et al, Front Sleep, 2023*

# Challenges in using CBT-I with TBI

2. *Insomnia may occur with other sleep disorders; what do I do first?*
   - If another sleep disorder is present (such as OSA or a circadian rhythm disorder), insomnia symptoms will likely persist after CBT-I

*How to help:*

- Screen for sleep disorders – consider this standard practice
- Refer to sleep medicine for a full evaluation if needed, or for diagnostic testing for disorders such as OSA

*Dietch & Furst, Front Neurol, 2020; Wickwire et al, J Neurotrauma, 2018; Ford et al, Sleep Med Rev, 2020*

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# Challenges in using CBT-I with TBI

3. *Insomnia may occur with daytime sleepiness and fatigue even without another sleep disorder.*

   - Even after other sleep disorders are ruled out, TBI patients may have increased report of daytime sleepiness and fatigue that make treating insomnia challenging

   *How to help:*

   - Consider incorporating daytime behavioral measures for increasing alertness (behavioral activation, planned/scheduled activities, light therapy, caffeine – keeping in mind the effects of light and caffeine later in the day)
   - In particular, light therapy has been the most commonly investigated non-pharmacological approach to fatigue after TBI (make sure to prescribe it after their normal wake time)

*Dietch & Furst, Front Neurol, 2020; Gervais et al, Brain Inj, 2024*

# Challenges in using CBT-I with TBI

4. *Individuals with TBI present with unique cognitive distortions.*
   - Patients might fear that their sleep is “broken” due to their injury

   *How to help:*
   - CBT-I should include some education about the physiological changes that occur with TBI, including unhelpful behaviors and habits that perpetuate insomnia
   - It may be reassuring to know that most patients with chronic insomnia experience hyperarousal and worry about “broken” sleep, even without having a brain injury

# Other studied behavioral/complementary treatments for insomnia with TBI

- A 5-week acupuncture program + sleep hygiene showed similar benefit to actigraphically measured sleep time and improved cognitive function compared to sleep hygiene +/- sleep medication
  - Benefit of this treatment is that it does not require active engagement in a behavioral program, and may be more helpful with more severe cognitive impairment
- A study on the use of a warm footbath round reduced sleep onset latency, but with a difference of only 5 minutes
- A biweekly telephone-based problem-solving treatment showed improved sleep quality, duration, latency, and sleep efficiency after 12 sessions relative to education only (but with no difference at 6-month follow-up)

*Zollman et al, J Head Trauma Rehabil, 2012; Vuletic et al, J Head Trauma Rehabil, 2016; Ford et al, Sleep Med Rev, 2020*

# Update on your patient

- Because your patient has a history of snoring, nocturia, headaches on awakening, restless sleep, and daytime fatigue, you realize he has a high risk of having obstructive sleep apnea. You refer him for a sleep study, which comes back showing moderate OSA. He starts treatment, which helps him stay asleep longer, and he no longer thrashes around in bed. His headaches and nightmares are also better. However, he still has problems getting to sleep.
- You counsel him that ZzQuil can worsen problems like confusion and urinary retention, and also has other unnecessary medications in it. You recommend that he not take that medication.
- You refer him for CBT-I. You help him set up alerts to remind him to complete a sleep diary every day, as well as alerts reminding him of bedtime and wake time for his sleep prescription. By the end of the treatment, he is able to sleep most of the time he is in bed, and feels satisfied with his progress.

# Summary

- TBI survivors should undergo sleep evaluation as a routine component of care
- CBT-I is the first-line option for treatment of chronic insomnia and may significantly benefit recovery from TBI as well as insomnia
- CBT-I can be modified to accommodate challenges TBI patients may have