Fraser Health LTC and AL Rounds

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👵 Geriatric Sleep Disorders

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ℹ️ Presenter Disclosures & Conflicts of Interest

- No relationship with financial sponsors

ℹ️ Mitigating Potential Bias

- Content and recommendations provided will be evidence- and/or guideline-based
- Any off-label medication use will be indicated
- The planning committee will review evaluations of the program and address (with the speaker/presenter) should any bias have been introduced as indicated by the participants


Off-label

Outline

Learning Objectives

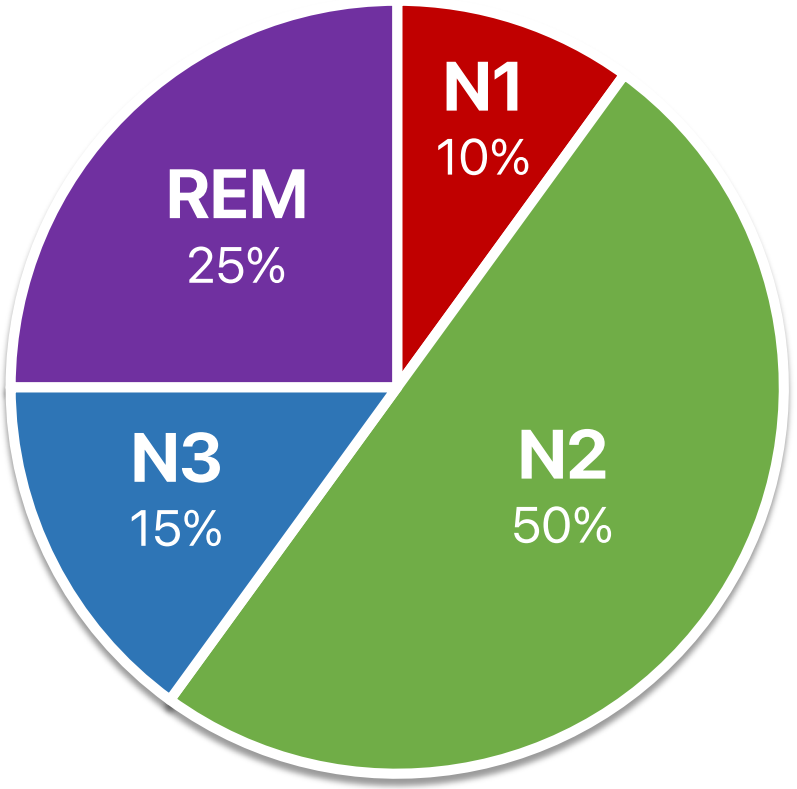
1. Review **normal sleep physiology** and how **sleep changes with ageing**
2. Develop an approach to diagnose **sleep disorders** in the older adult
3. Review **treatment and management of sleep disorders**, with a focus on long-term care and assisted living populations

Normal Sleep Physiology

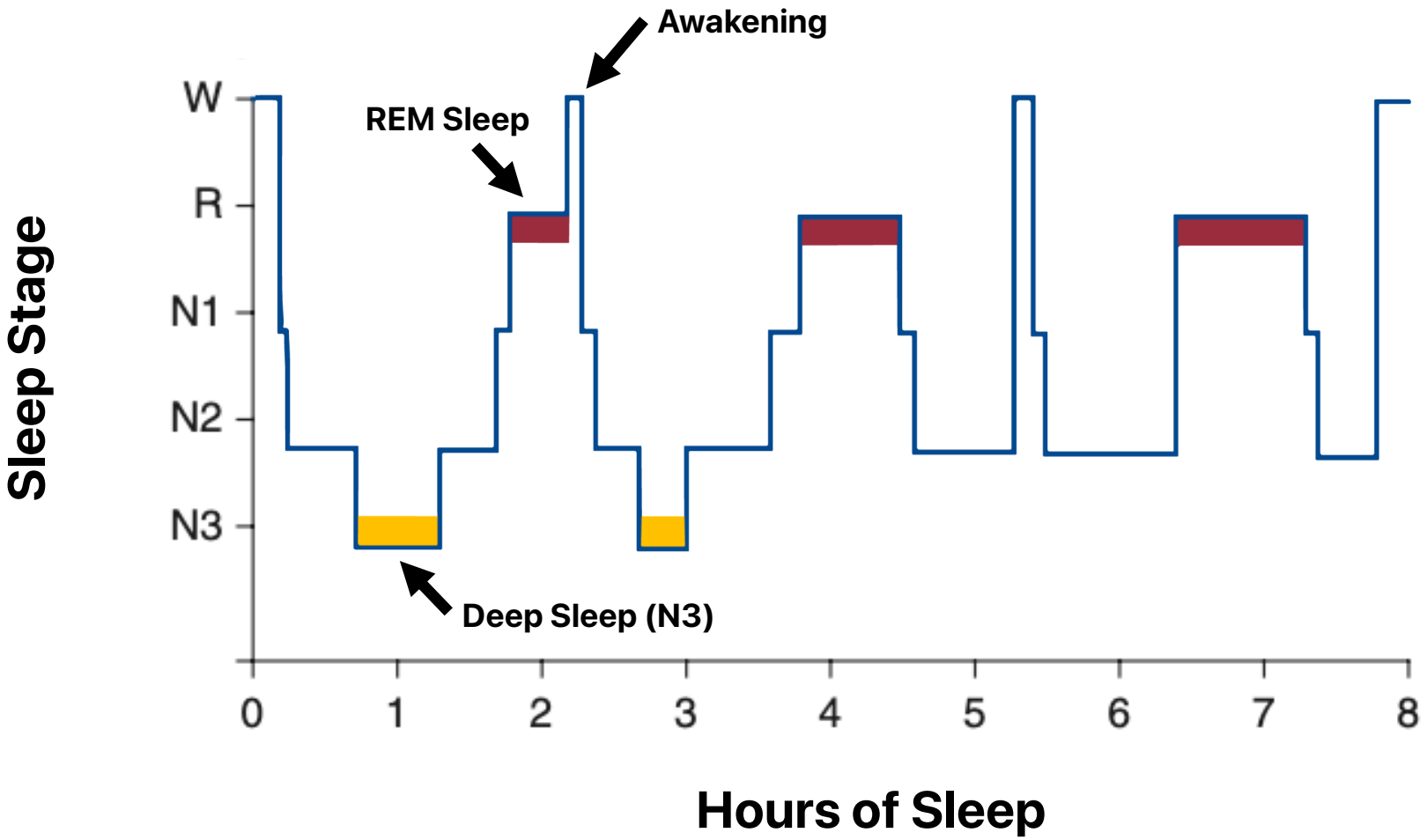
Normal Sleep Physiology

Sleep States

- Humans and mammals are known to exist in 3 primary states of being:
  1. **Wakefulness**
  2. **Non–rapid eye movement (NREM) sleep**
     1. N1 (“light sleep”)
     2. N2 (“light sleep”)
     3. N3 (“deep sleep”)
  3. **Rapid eye movement (REM) sleep**



Normal Sleep Stages



A Two-Process Model of Sleep

Your sleep is regulated by two key interacting processes

😴 Process "S"

(AKA Sleep Drive)

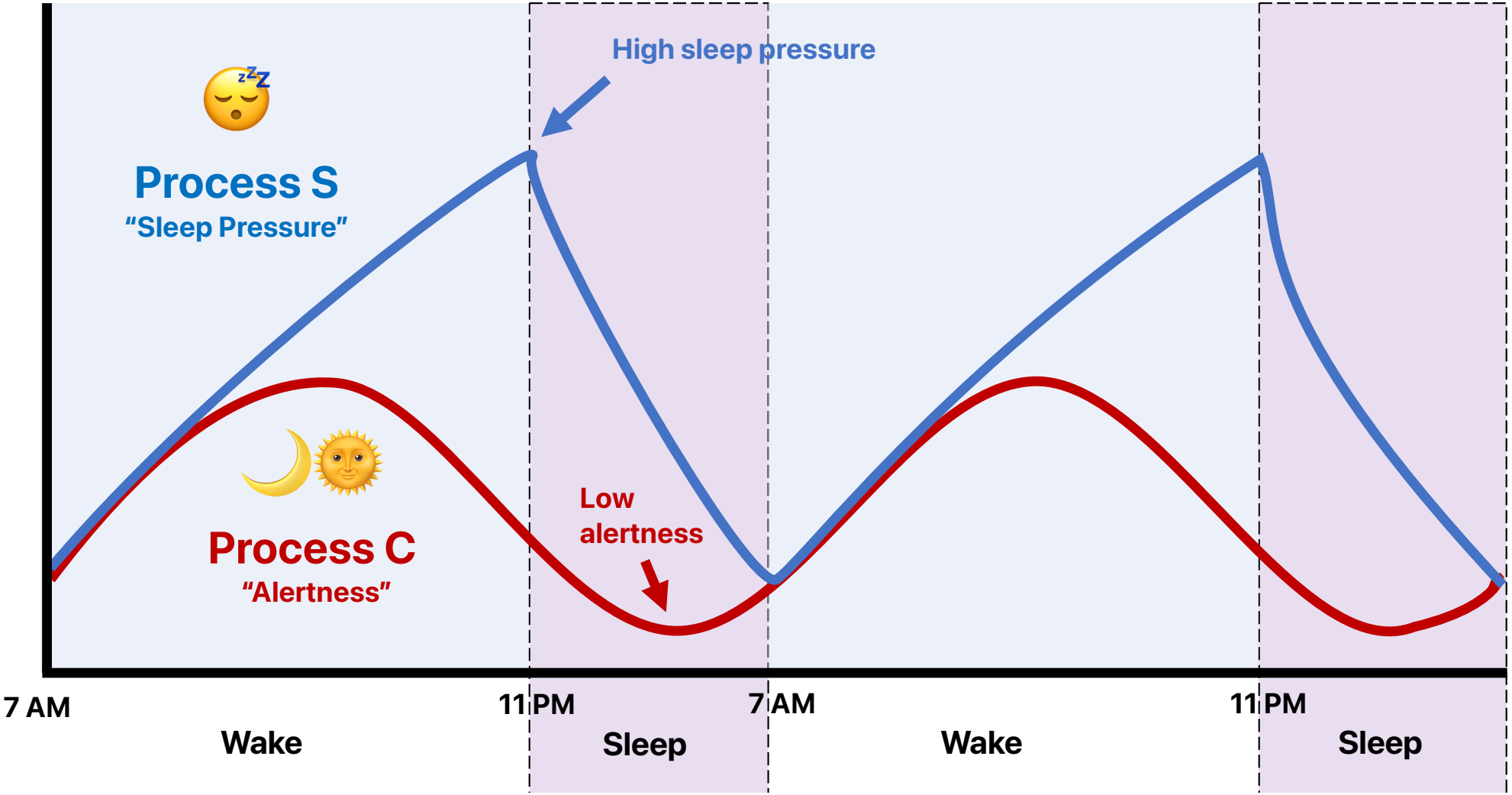
- The longer you stay awake, the sleepier you get
- Once you sleep, this quenches the thirst to sleep
- Build up of adenosine during day builds your sleep drive

🌙🌞 Process "C"

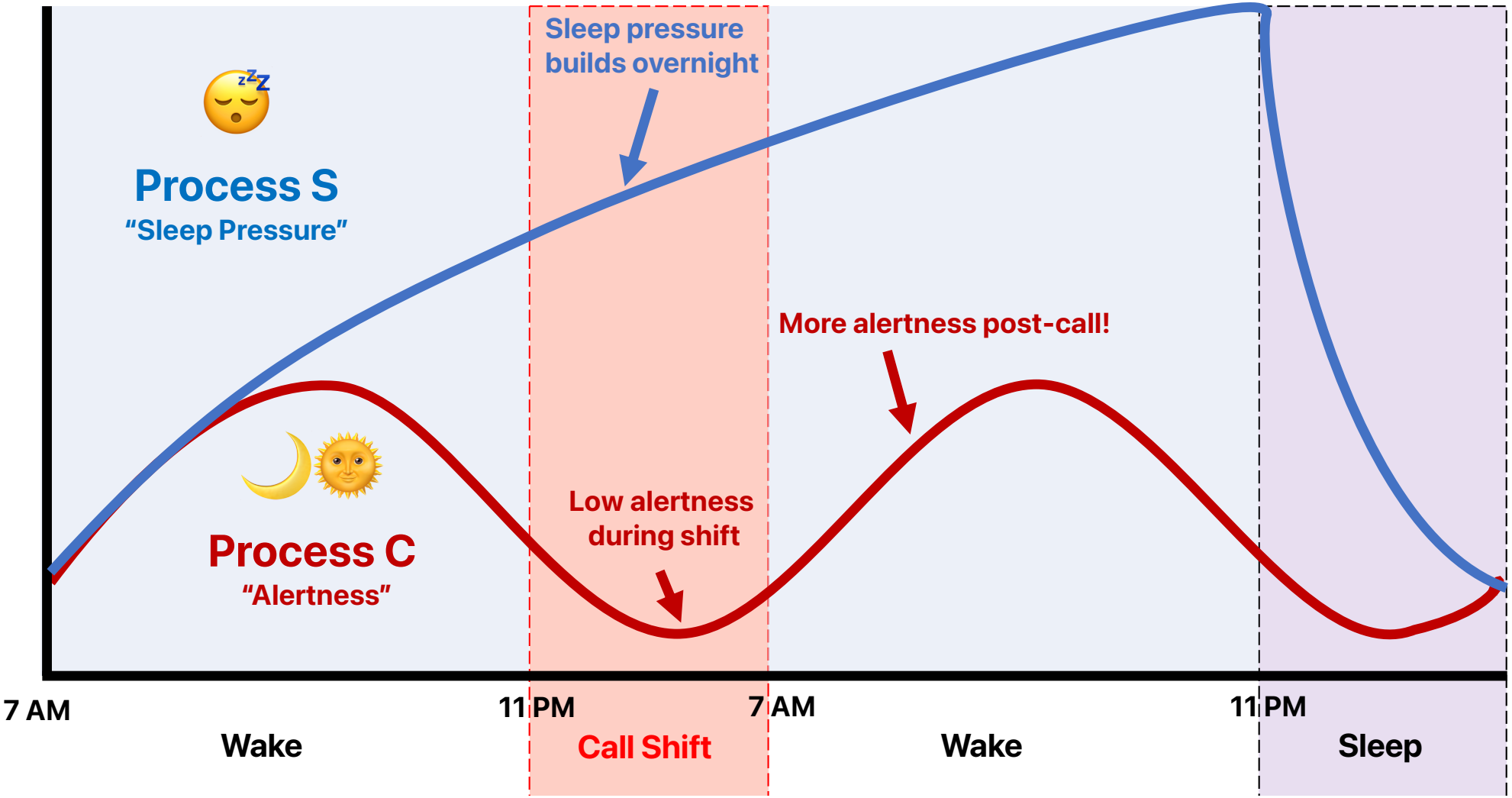
(AKA Circadian Rhythm)

- Body's internal 24-hour clock ("pacemaker")
- Controlled by the suprachiasmatic nucleus
- Resets daily via *zeitgebers* ("time givers"):
  - **Natural light** (in the AM)
  - **Melatonin** (at HS)
  - **Other environmental cues** (meals, exercise, temperature)

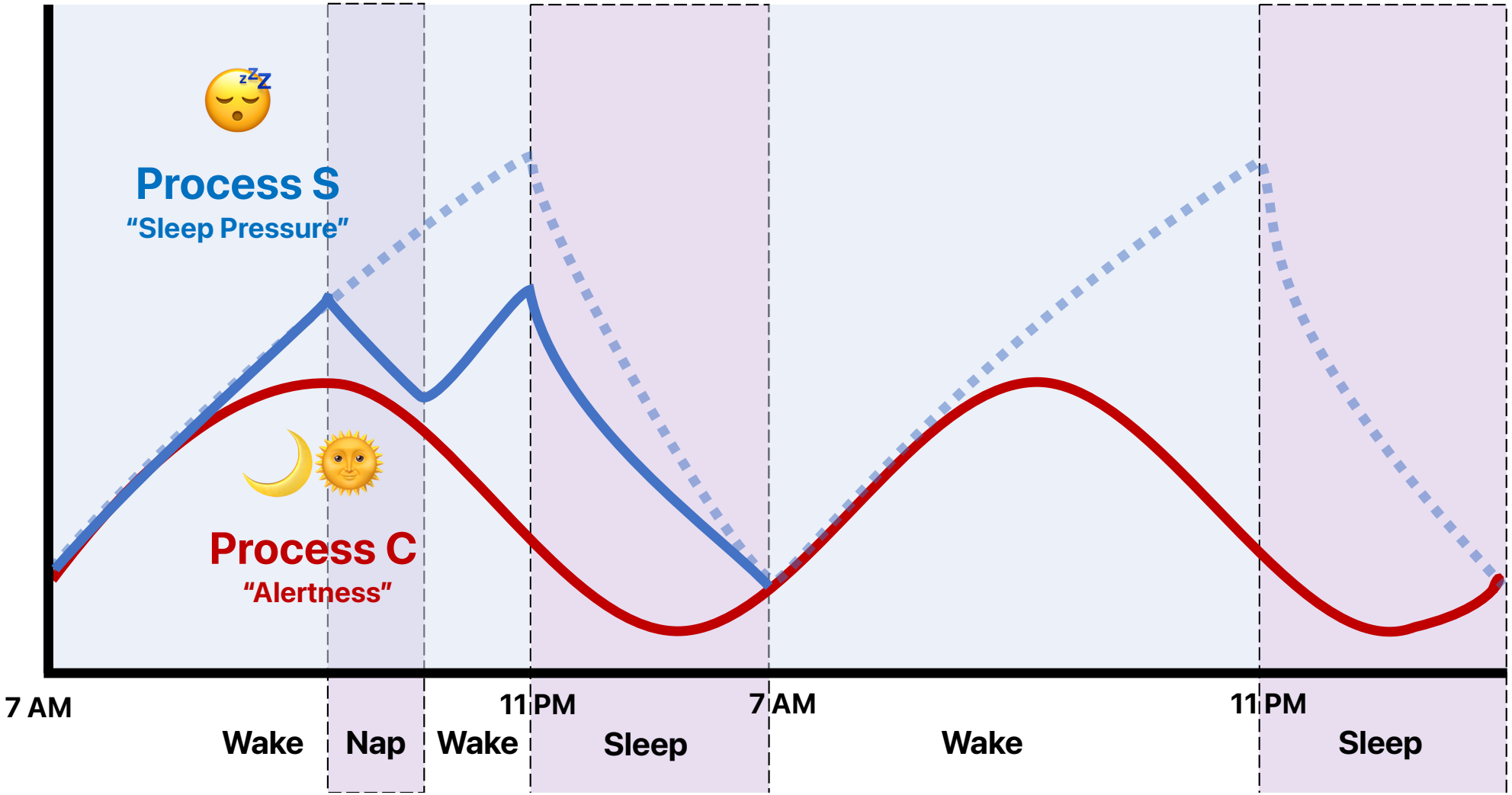
Normal Sleep Cycle



Overnight Call Shift



Napping


Process S
"Sleep Pressure"
Process C
"Alertness"
7 AM
11 PM
7 AM
11 PM
Wake
Nap
Wake
Sleep
Wake
Sleep

Ageing and Sleep

Ageing and Sleep

Normal Changes in Sleep Physiology

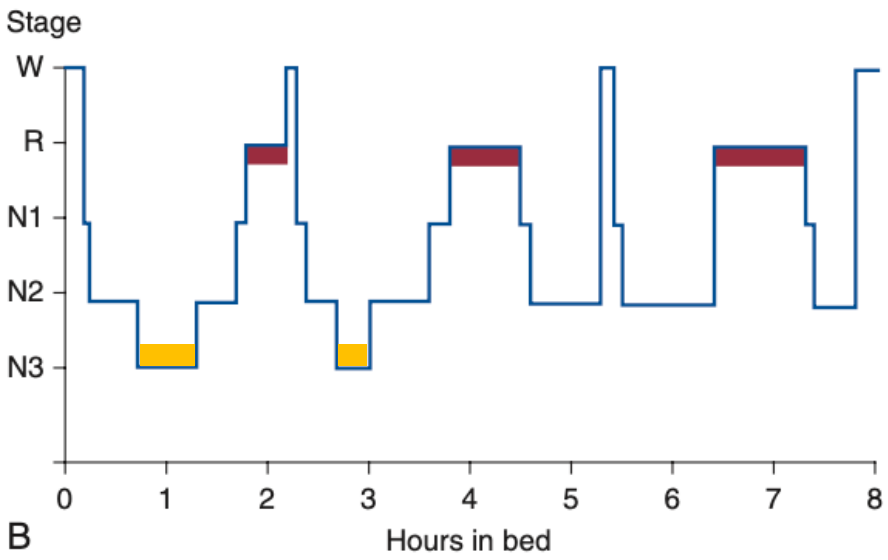
- **"↑ Bad Sleep"**
  - **↑ Light sleep (N1, N2)**
  - **↑ Sleep latency** ("time to fall asleep once you get in bed")
  - **↑ Middle-of-night awakenings**
    - Caused or exacerbated by medical comorbidities (e.g., menopause, prostatic hypertrophy, sleep apnea)
  - **↑ Napping during the day**
- **"↓ Good Sleep"**
  - **↓ Deep sleep (N3)**
  - **↓ REM sleep**
  - **↓ Total sleep time**
  - **↓ Sleep efficiency** ("% of time actually spent sleeping in bed")

Li, J., Vitiello, M. V., & Gooneratne, N. S. (2018). Sleep in Normal Aging. *Sleep medicine clinics*, *13*(1), 1–11.

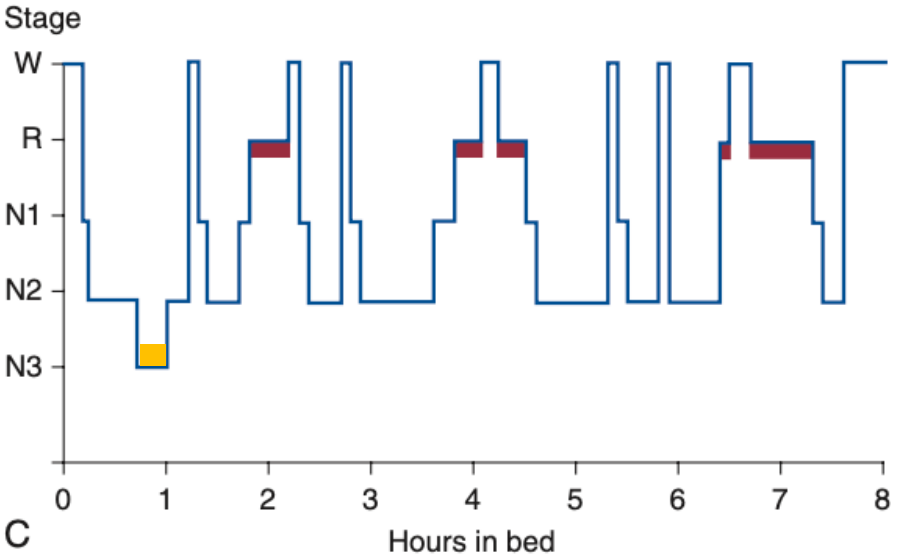
Sleep Pattern Changes With Ageing

Less Deep Sleep, Less REM Sleep, More Awakenings

Adults



Older Adults (65+)



Ageing and Sleep

Sleep Disorders Are Common With Ageing

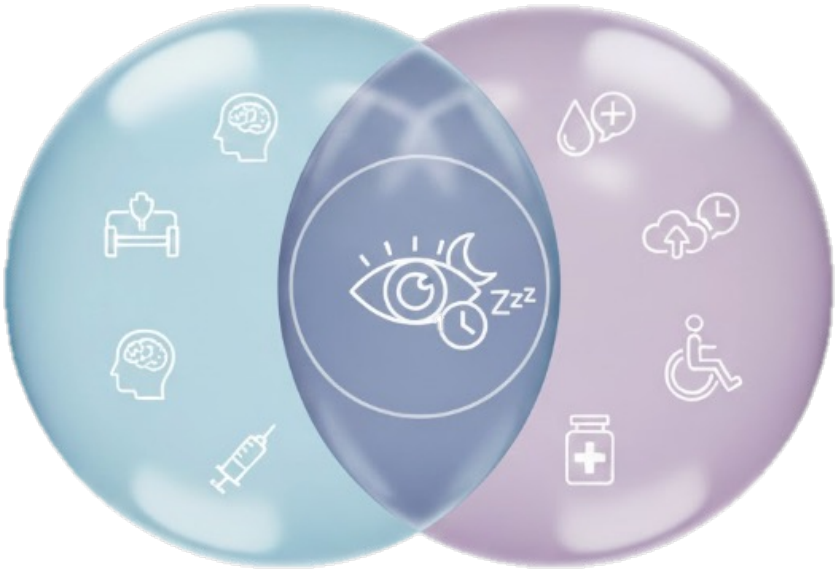
- Between **40% to 70%** of older adults have chronic sleep problems
  - Chronic insomnia
  - Advanced sleep phase
  - Obstructive sleep apnea
  - REM sleep behaviour disorder
  - Restless legs syndrome
  - Excessive daytime sleepiness
- Up to **50%** of sleep disorders in the elderly may be undiagnosed
- Sleep complaints are common among all neurodegenerative disorders

Foley, D. J., Monjan, A. A., Brown, S. L., Simonsick, E. M., Wallace, R. B., & Blazer, D. G. (1995). Sleep complaints among elderly persons: an epidemiologic study of three communities. *Sleep*, *18*(6), 425-432.
Spira, A. P., Kaufmann, C. N., Kasper, J. D., Ohayon, M. M., Rebok, G. W., Skidmore, E., ... & Reynolds III, C. F. (2014). Association between insomnia symptoms and functional status in US older adults. Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 69(Suppl_1), S35-S41.

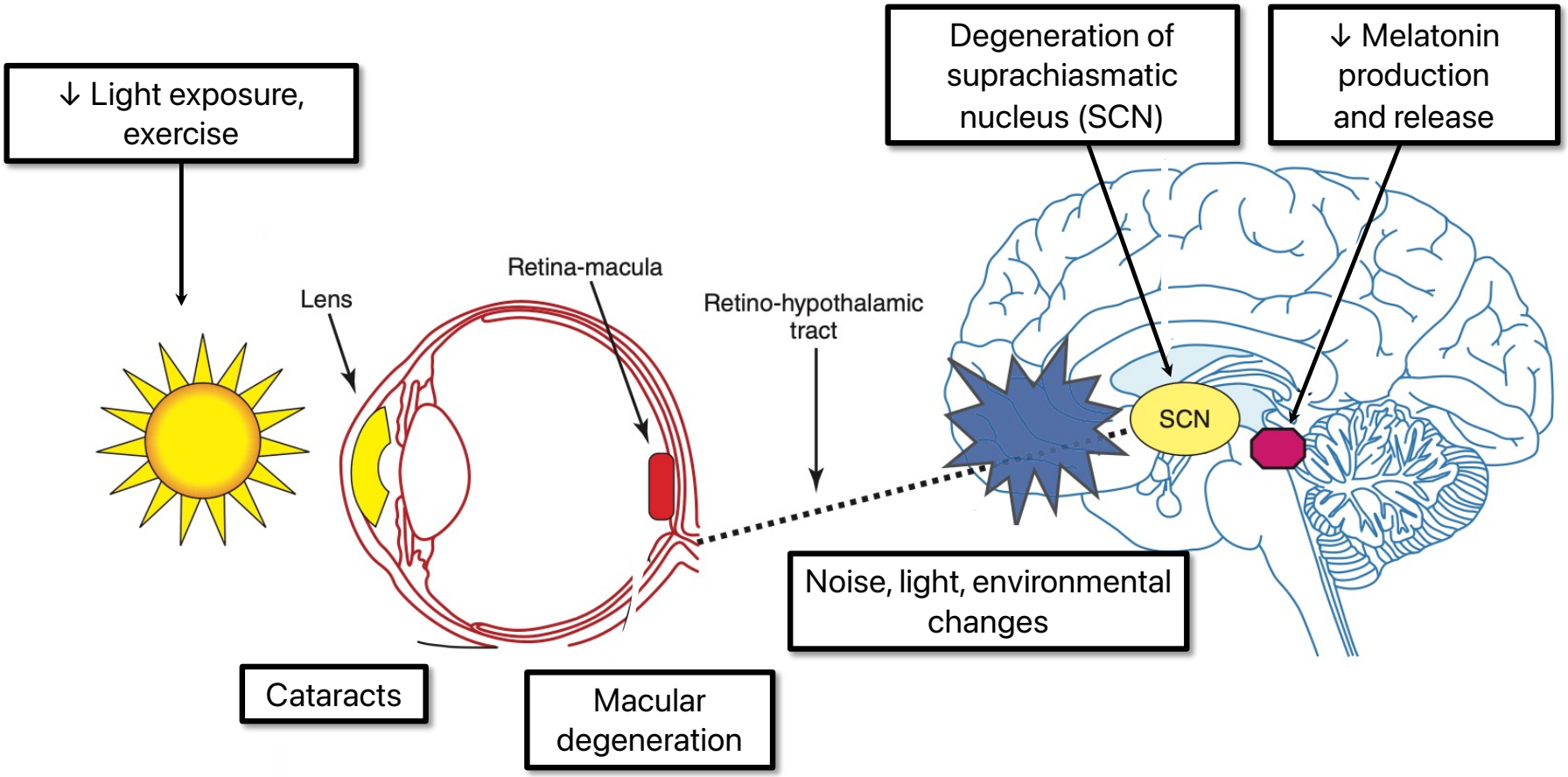
Geriatric Insomnia: Comorbidity is the Rule

Not the Exception!

- Insomnia in the elderly is highly comorbid with other conditions:
  - **Comorbid sleep disorders**
    - Sleep disordered breathing
    - Restless legs
    - REM sleep behaviour disorder
  - **Comorbid psychiatric disorders**
    - Behavioural symptoms of dementia
    - Depressive disorders
    - Anxiety disorder
  - **Comorbid physical health issues**
    - Chronic pain
    - Genitourinary/GI
    - Etc...
  - **Sex-specific**
    - Peri-/postmenopause



Multifactorial Changes in Ageing



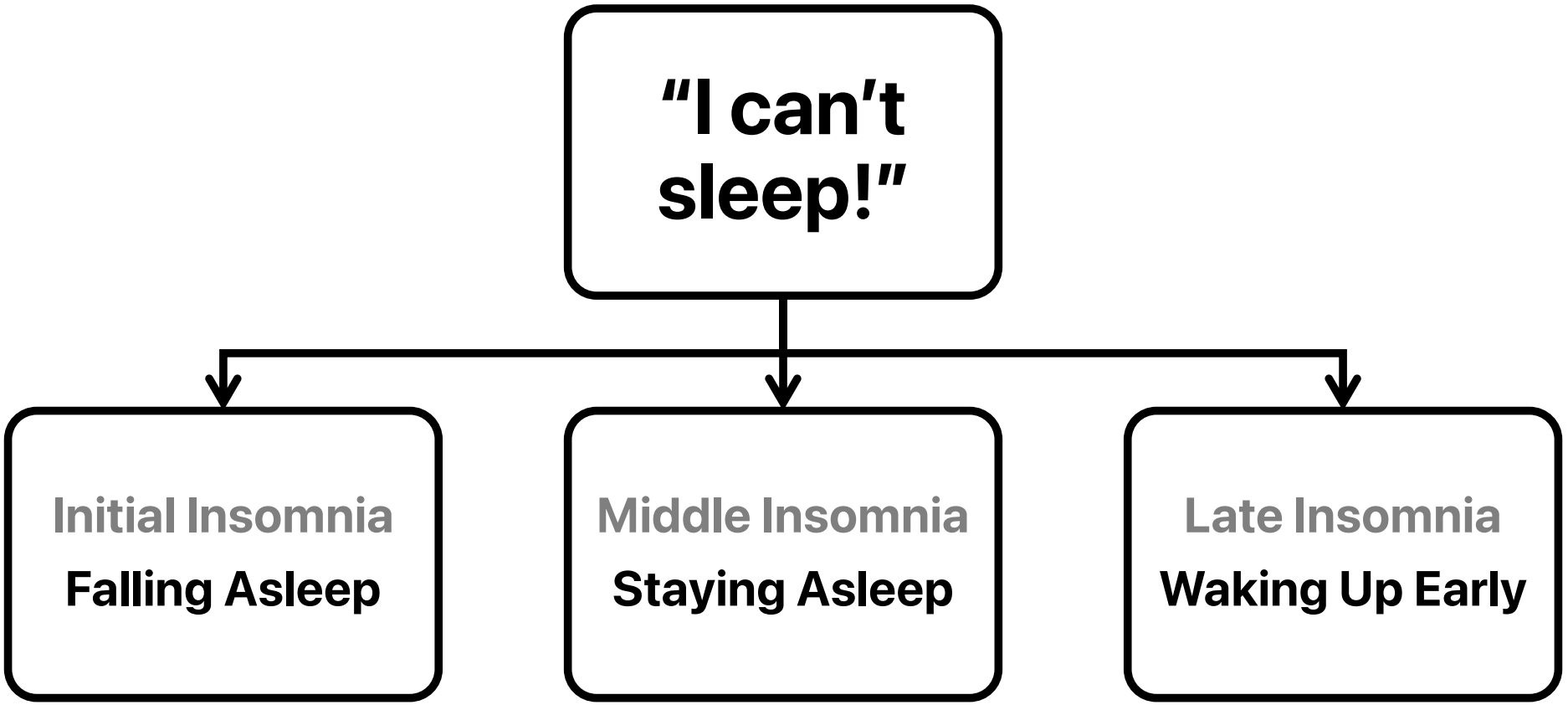
Is Napping Good or Bad?

Depends!

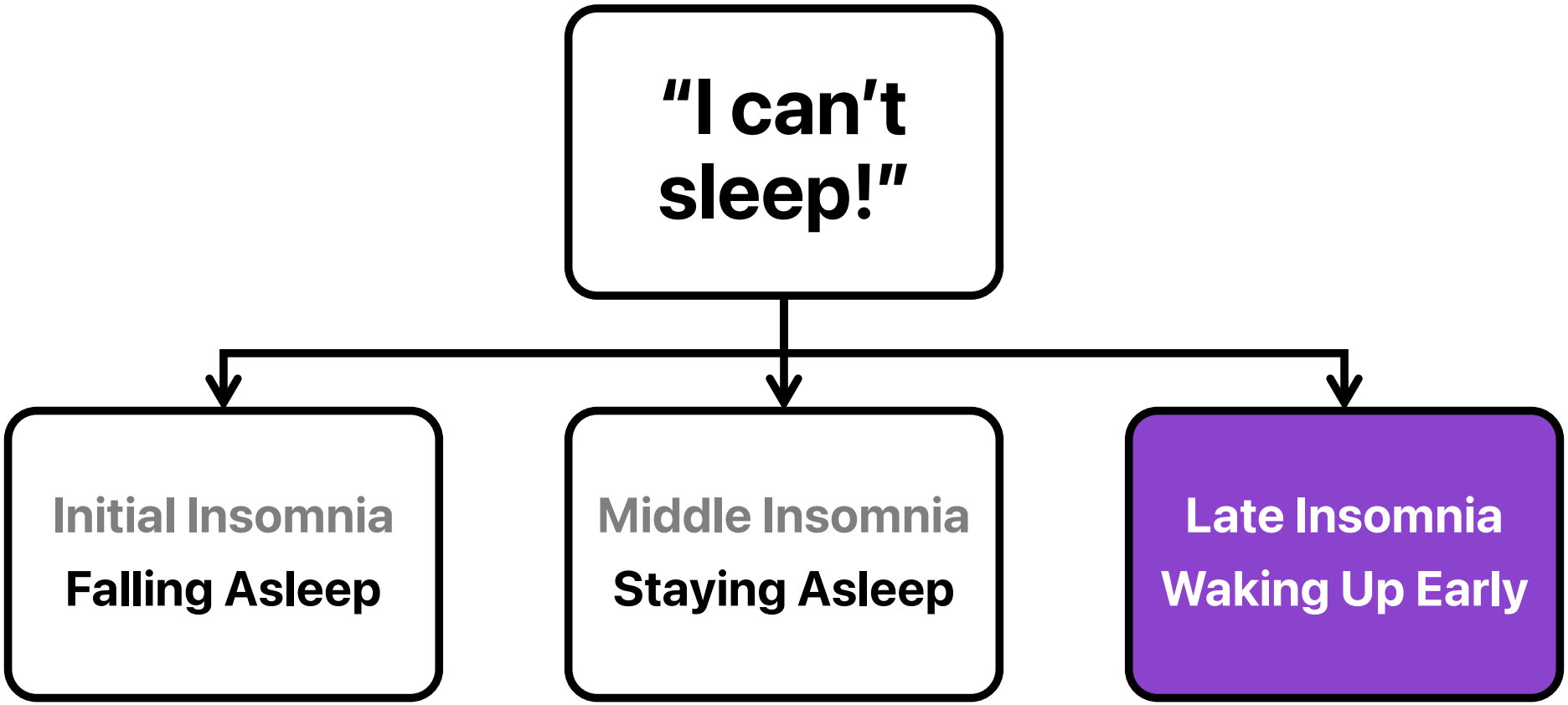
- It is common for the elderly to have a mid-afternoon nap for a period of about **1 hour**
  - Estimated prevalence ranges from 25-75% (depending on studies)
- Napping may be an adaptive, "natural" response to the fragmented and less restorative sleep that occurs
  - Not inherently a "problem," if there is no insomnia or negative consequences
- **When is napping a problem?**
  - If napping is from **boredom** (not enough stimulation)
  - Is it really "napping" or really a medical issue or medication-related effects?



Insomnia as a Symptom



Insomnia as a Symptom



🌅 Late Insomnia

Most Common Causes

1. Advanced Sleep Phase (“Early Bird”)
2. Irregular Sleep-Wake Rhythm Disorder
3. Melancholic Depression ("Early Morning Awakenings")

🌅 Late Insomnia

Most Common Causes

1. **Advanced Sleep Phase (“Early Bird”)**
2. **Irregular Sleep-Wake Rhythm Disorder**
3. **Melancholic Depression ("Early Morning Awakenings")**

Advanced Sleep Phase Disorder

Common in Older Adults

- Most common age-related sleep change
- Individuals **sleep earlier** and **wake up earlier** than desired
  - Example: sleeping earlier at **7:00 PM** and waking up too early at **3:00 AM**
  - Staying in bed **until the socially desired** waking time (e.g., **8:00 AM**) ends up as the prolonged time awake and “insomnia”
  - The individual realistically cannot sleep any more!
- Education about the **actual amount of achievable sleep** is important
  - Most individuals 65+ may realistically only get closer to 6 to 7 hours of sleep



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1. Advanced Sleep Phase (“Early Bird”)
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Irregular Sleep-Wake Rhythm Disorder

Common Amongst All Neurodegenerative Disorders

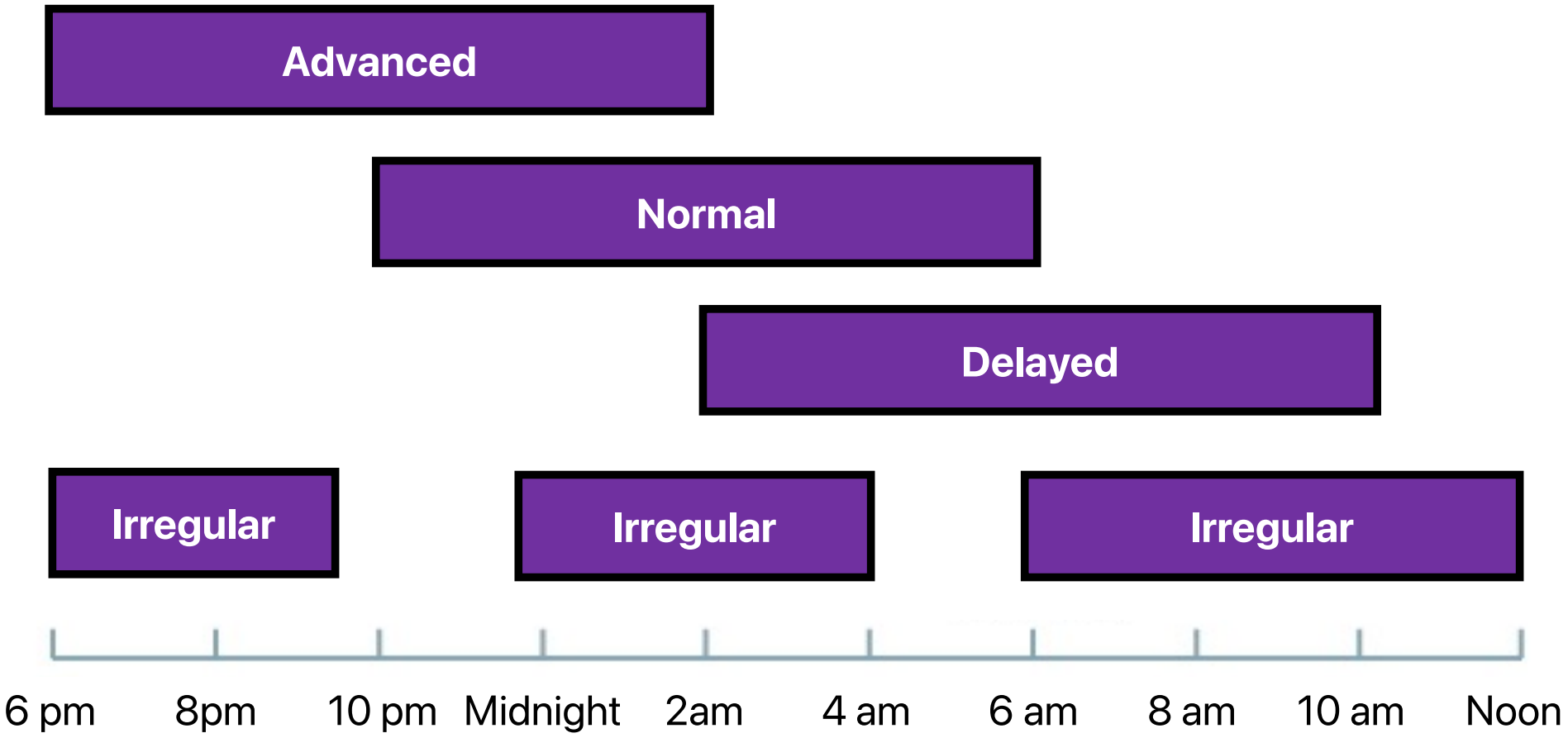
- Common in all dementias including Alzheimer's dementia, vascular dementia, Parkinson's disease dementia
- Individuals have **multiple sleep episodes throughout the day** and a **lack consistent nighttime sleep patterns**
  - Though sleep is erratic, the **total hours** of sleep over 24 hours is usually normal (7-8 hours)
- The sleep and wake periods do **not align at all with a normal 24-hour day-night rhythm**
- **Risk factor for institutionalization to LTC**



Irregular Sleep-Wake Rhythm Disorder

Common Amongst All Neurodegenerative Disorders

- As dementias progress, individuals may experience:
  - ↑ daytime sleepiness
  - ↑ irregular sleep-wake rhythm changes
- Sleep disturbance severity and cognitive impairment severity are highly correlated
  - **“Sundowning”:** become more susceptible to nocturnal exacerbations of behavioural and psychological symptoms of dementia (BPSD)


Advanced
Normal
Delayed
Irregular
Irregular
Irregular
6 pm
8pm
10 pm
Midnight
2am
4 am
6 am
8 am
10 am
Noon

🌙🌞 Process "C"

(AKA Circadian Rhythm)

- Body's internal 24-hour clock ("pacemaker")
- Controlled by the suprachiasmatic nucleus
- Resets daily via *zeitgebers* ("time givers"):
  - **Natural light** (in the AM)
  - **Melatonin** (at night)
  - **Other environmental cues** (meals, exercise, temperature)

🌅 Light Therapy

Indications, Dosing, and Contraindications

⏰ Zeitgeber

- **Advanced sleep phase disorder**
  - **10,000 lux** for **30 minutes nightly** (7:00 PM to 9:00 PM)
  - **Effect:** Delay bedtime (sleep later and wake up later)
- **Irregular sleep-wake rhythm disorder**
  - **5,000 lux** for **1-2 hours** at **awakening** (8:00 AM to 11:00 AM)
  - **Effect:** Synchronizes wakefulness with light, decreases behavioural agitation at night
- Individual should be faced ~3 feet away from lamp
- **Side Effects**
  - Discomfort/glaring light, distraction from habitual evening activities
- **Contraindications**
  - Photosensitivity, macular degeneration, diabetic retinopathy



SAD Lamp

Gulia, K. K., & Kumar, V. M. (2018). Sleep disorders in the elderly: a growing challenge. *Psychogeriatrics*, *18*(3), 155-165.

🌅 Light Therapy

Environmental Considerations

- **Individual SAD lamps** may be difficult to keep in front of the person for the required duration of time
- **Long-Term Care Settings**
  - **Overhead lighting** in group or communal rooms may be more effective where most of residents spend their day
  - **Automated dusk-to-dawn simulations ("circadian lighting")** in individual rooms

⏰ Zeitgeber



SAD Lamp



Circadian Lighting

🏥 Light Exposure in LTC

(In)adequate Light Exposure

- Patients with progressive vision loss have more sleep disturbances than those with normal vision
- **↑ daytime light = ↑ nocturnal melatonin secretion**
  - Improves sleep initiation and consolidation
- **↑ light exposure + evening melatonin** may reduce cognitive decline in dementia, improve sleep quality, and mood
  - Limited research but promising area



🏥 Temperature in LTC

Zeitgeber

Sleep and Temperature

- **Physiologic changes with ageing:**
  - ↓ thermosensitivity and poorer sleep quality as one gets older
- **Recommended ambient temperature**
  - **20°C to 25°C:** sleep is most efficient and restful
  - **25°C to 30°C:** 5–10 % drop in sleep efficiency



Baniassadi, A., Manor, B., Yu, W., Travison, T., & Lipsitz, L. (2023). Nighttime ambient temperature and sleep in community-dwelling older adults. Science of The Total Environment, 899, 165623.

🏥 Exercise in LTC

⏰ Zeitgeber

Physical Activity Improves Sleep Parameters

- Limited studies have shown that aerobic or resistance training at (>4 times a week) improves sleep
  - ↓ Sleep onset time
  - ↑ Total sleep time
- **Resistance training** has a more robust effect on:
  - ↑ Sleep efficiency
  - ↓ Sleep onset time
  - ↑ Sleep duration
- **Aerobic training** can improve sleep quality but to a lesser degree



Gupta, S., Bansal, K., & Saxena, P. (2022). A clinical trial to compare the effects of aerobic training and resistance training on sleep quality and quality of life in older adults with sleep disturbance. *Sleep Science*, *15*(02), 188-195.

Melatonin

Indications

- Commonly prescribed off-label for insomnia
  - No better than placebo in non-geriatric populations
  - More evidence for insomnia in age 55+ population*
- Melatonin does have **sedating** (*soporific*) properties that may help insomnia
- However, it is best used as a **timekeeper** for circadian rhythm disorders:
  - **Delayed sleep phase**
  - **Irregular sleep-wake rhythm disorder**



* **Off-label**

* Riemann, Dieter, et al. "The European Insomnia Guideline: An update on the diagnosis and treatment of insomnia 2023." *Journal of sleep research* 32.6 (2023): e14035.

Melatonin

Zeitgeber

Dosing

- Physiologic levels of melatonin = **0.1–0.3 mg**
  - Doses of **0.1–0.3 mg** appear to be as effective or even more effective than higher pharmacologic doses in promoting circadian rhythm
- Practically, however, doses between 1 mg to 15 mg are prescribed
  - **Should be taken at suppertime, or around ~2 hours before ideal bedtime**



* Off-label

Melatonin

Zeitgeber

Considerations

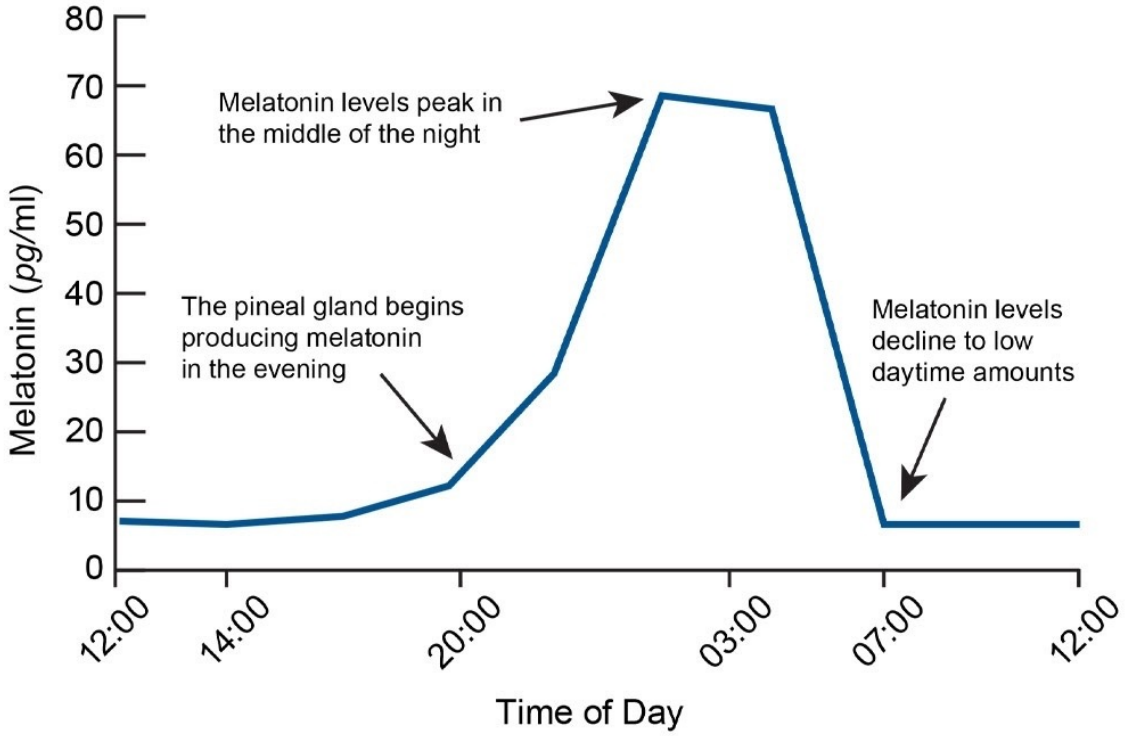
- Melatonin has a **rapid half-life** (45–60 min) and physiological doses of melatonin may wash out before their desired action is completed
  - Controlled release formulations of melatonin available, but may also overshoot and stay too long in the system
- **Risks/Side Effects**
  - Daytime sedation, vivid dreams, falls risk, cognitive impairment
- **Favorable profile for geriatric population**
  - Low risk for falls or exacerbating cognitive impairment



* Off-label

Melatonin Timing

Normal Melatonin Release Begins Early In the Evening



Wright KP, Frey DJ. Age-related changes in sleep and circadian physiology: from brain mechanisms to sleep behavior. In: Avidan AY, Alessi C, eds. Geriatric Sleep Medicine. New York: Informa Healthcare; 2008

Melatonin Content

What You See Is Not What You Get!

- 2017 University of Guelph Study
  - 30 commercially-sold melatonin supplements in Canada tested
  - Actual melatonin content ranged from **–83%** to **+478%** of the marketed and labeled dose
  - Variability in melatonin content **(up to 465%)** seen in different lots of the **same product**
  - Serotonin was found in 8 of the tested samples



Erland, L. A., & Saxena, P. K. (2017). Melatonin natural health products and supplements: presence of serotonin and significant variability of melatonin content. *Journal of Clinical Sleep Medicine*, *13*(2), 275-281.

🌅 Late Insomnia

Most Common Causes

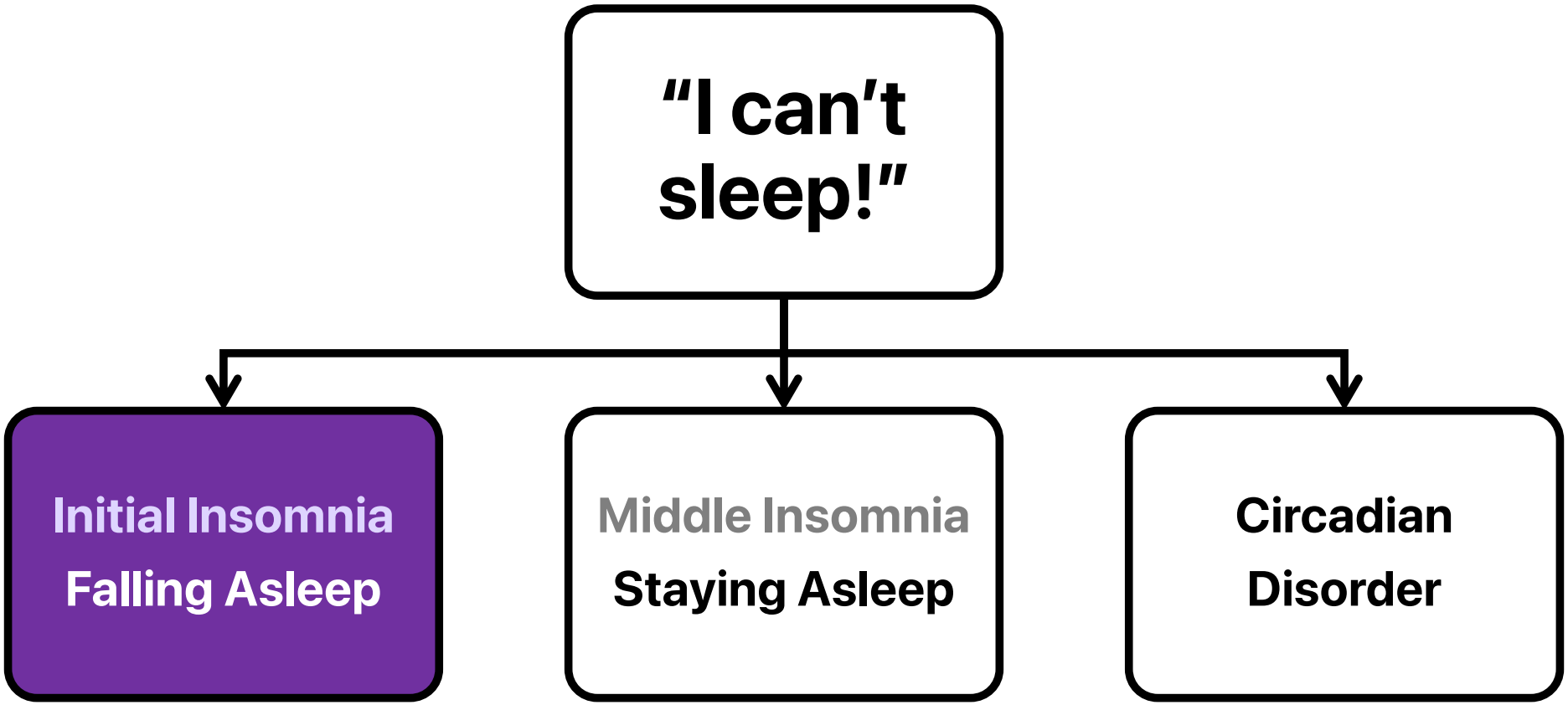
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🌅 Late Insomnia

Most Common Causes

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Insomnia as a Symptom



🥱 Initial Insomnia

Most Common Causes

1. Substances
2. Medications
3. Psychiatric/Cognitive
4. Sleep
5. Medical

🥱 Initial Insomnia

Most Common Causes

1. **Substances**
2. **Medications**
3. **Psychiatric/Cognitive**
4. **Sleep**
5. **Medical**

🥱 Initial Insomnia

Substances

- **Caffeine**
  - At night?
  - Chocolate?
- **Nicotine**
- **Withdrawal/Rebound Insomnia**
  - Alcohol
  - Cannabis



🥱 Initial Insomnia

Most Common Causes

1. Substances
2. Medications
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4. Sleep
5. Medical

🥱 Initial Insomnia

Medications (Non-Exhaustive List with Example Medications)

- **Central nervous system stimulants** (amphetamines, methylphenidate)
- **Antihypertensives** (alpha blockers, beta blockers)
- **Respiratory medications** (albuterol, theophylline)
- **Decongestants** (phenylephrine, pseudoephedrine)
- **Hormones** (corticosteroids, thyroid medications)
- **Antidepressants** (SSRIs, SNRIs, NDRIs)
- **Diuretics** (hydrochlorothiazide)
- **Cholinesterase inhibitors** (donepezil)
- **Statins** (atorvastatin)
- **Antiepileptic drugs** (lamotrigine)
- **Dopaminergic drugs** (levodopa, rotigotine)

🥱 Initial Insomnia

Most Common Causes

1. Substances
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🥱 Initial Insomnia

Psychiatric and Cognitive

- Treat the **primary psychiatric disorder**, and sleep will improve
- Most common geriatric psychiatry disorders:
  - Major depressive disorder
  - Generalized anxiety disorder
  - Behavioural symptoms of dementia
    - Behavioural and care supports



🥱 Initial Insomnia

Psychiatric and Cognitive

- **Canadian Geriatric Psychiatry Guidelines**
  - Geriatric Depression
  - Geriatric Anxiety
  - Behavioural and Psychological Symptoms of Dementia
  - Substance Use Disorders
    - Alcohol
    - Cannabis
    - Benzodiazepines
    - Opioids
- Quick reference **clinician pocket cards** on website



CCSMH
Canadian Coalition for Seniors' Mental Health
Connecting People, Ideas and Resources

www.ccsmh.ca/areas-of-focus/

🥱 Initial Insomnia

Most Common Causes

1. Substances
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4. Sleep
5. Medical

🥱 Initial Insomnia

Sleep Disorders - Restless Legs Syndrome (RLS)

Restless legs syndrome (U-R-G-E)

- **U** - Urge to move legs/lower limbs
  - “Creeping/crawling sensation”
  - RLS is **NOT** painful
- **R** – Rest-induced
- **G** - Gets better with activity and movement
- **E** - Evening and night accentuation



🥱 Initial Insomnia

Sleep Disorders - Restless Legs Syndrome (RLS)

Non-Pharmacological

- Aim for ferritin level between 75 to 100 mcg/L
  - If less than this, recommend oral or IV iron supplementation
- **Avoid carbohydrates, alcohol, caffeine, antihistaminergic, serotonergic, antidopaminergic medications**
- Hot/warm showers, massage guns to help reduce symptoms



🥱 Initial Insomnia

Sleep Disorders - Restless Legs Syndrome (RLS)

Pharmacological (Geriatric Dosing)

- Gabapentin* 100 mg PO qHS
  - Effective dose: 1200 to 1800 mg PO qHS
- Pregabalin* 50 mg PO qHS
  - Effective dose: 150 to 450 mg PO qHS
- Take 1-2 hours before symptom onset
- Dopamine agonists are no longer first line!
  - **Do not prescribe levodopa due to risk of augmentation (i.e., worsening RLS)**



* **Off-label & Beer's List**

🥱 Initial Insomnia

Most Common Causes

1. Substances
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Initial Insomnia

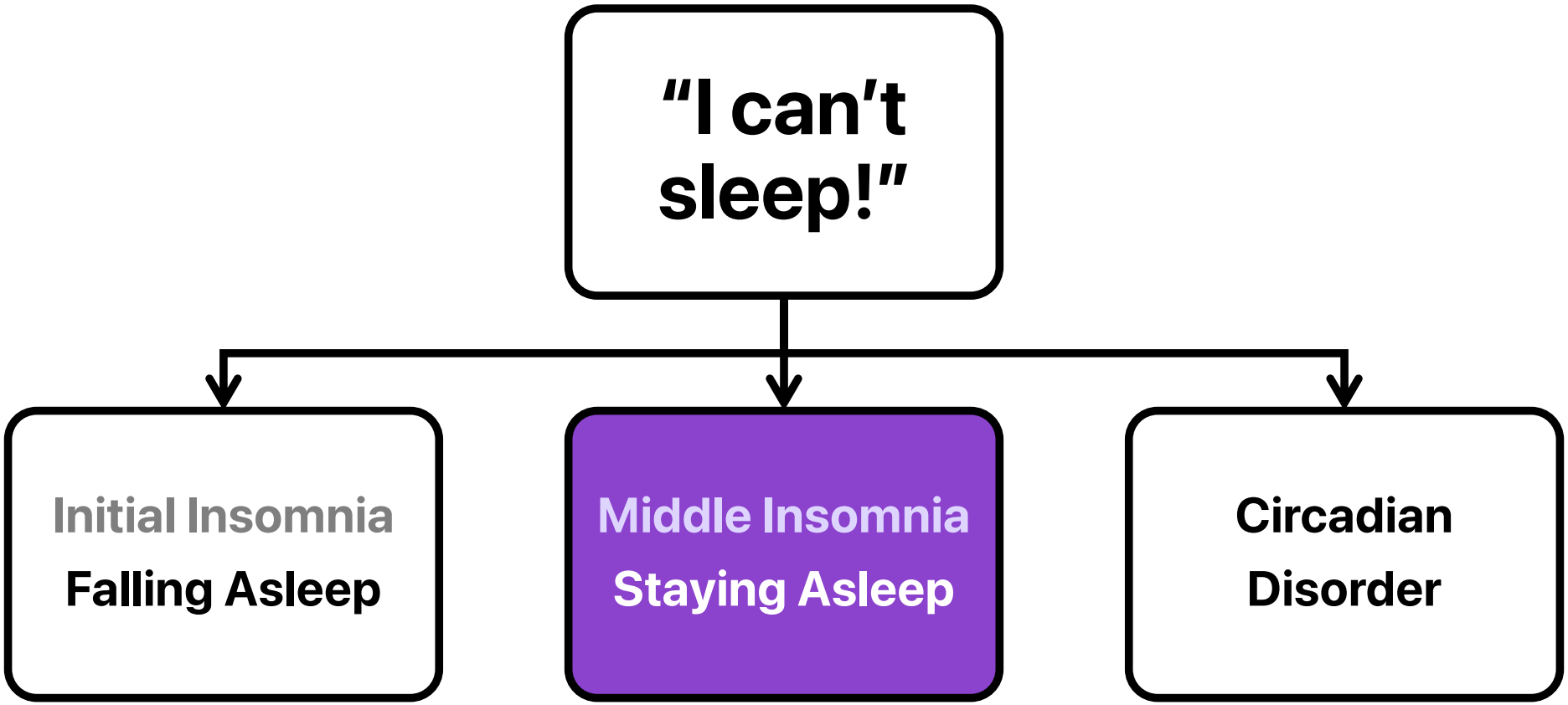
Medical (Non-Exhaustive)

- **Endocrine**
  - Thyroid disorders
  - Menopause
  - Diabetes
- **Cardiac**
  - Atrial fibrillation
  - Hypertension
- **Neurologic**
  - Parkinson's
  - Migraines
- **Chronic and acute pain**
  - Fibromyalgia
  - Arthritis
  - Chronic back pain
- **Renal**
  - Chronic kidney disease
  - Benign prostatic hypertrophy
  - Urge incontinence
- **Gastrointestinal**
  - Irritable bowel syndrome
  - Gastroesophageal reflux

🧪 **Consider bloodwork for:**

- **B12**
- **TSH**
- **Ferritin**

Assessing Insomnia



🛌 Middle Insomnia

Most Common Causes

1. **Obstructive Sleep Apnea**
2. **REM Sleep Behaviour Disorder**

Sleep Disordered Breathing

Obstructive Sleep Apnea

Obstructive Sleep Apnea (OSA)

Sleep Apnea and Cognition

- Treating OSA with CPAP may help long-term cognition function
  - **3 months of CPAP therapy**: ↑ memory, ↑ executive function; correlated with gray matter volume increases in the hippocampus and frontal cortex
  - **12 months of CPAP therapy** : ↑ memory, ↑ attention, ↑ executive function; improvements in white matter integrity



1. Stranks EK, Crow SF. The cognitive effects of obstructive sleep apnea: an updated meta-analysis. Arch Clin Neuropsychol. 2016;31(2):186-193.
2. Canessa N, Castronovo V, Cappa SF, et al. Obstructive sleep apnea: brain structural changes and neurocognitive function before and after treatment. Am J Respir Crit Care Med. 2011;183(10):1419-1426.
3. Castronovo V, Scifo P, Casellano A, et al. White matter integrity in obstructive sleep apnea before and after treatment. Sleep. 2014;37(9):1465-1475.

🛌 Middle Insomnia

Most Common Causes

1. **Obstructive Sleep Apnea**
2. **REM Sleep Behaviour Disorder**

REM Sleep Behaviour Disorder (RBD)



Rapid Eye Movement (REM) Sleep Behavior Disorder

Schenck, C. H., Bundlie, S. R., Patterson, A. L., & Mahowald, M. W. (1987). Rapid eye movement sleep behavior disorder: A treatable parasomnia affecting older adults. JAMA, 257(13), 1786-1789.

🛌 Middle Insomnia

REM Sleep Behaviour Disorder

- Parasomnia that involves acting out dreams violently
- Often reported by bed partners
  - Individual may not be aware of severity; may have full or limited recollection of dreams
- Can be caused/exacerbated by medications or sleep disorders
- Early marker for neurodegeneration
- **Refer directly for in-lab polysomnogram**



REM Sleep Behaviour Disorder

Differential Diagnosis

- **Idiopathic/isolated RBD**
  - Highly associated with future development of alpha synucleinopathies (Parkinson's disease, dementia with Lewy bodies, multiple system atrophy)
- **Non-pathological dream enactment**
  - Dream enactment with limb movement *can* also occur in healthy people, particularly during heightened emotional states or withdrawal from alcohol or sedatives
- **Secondary RBD**
  - Untreated obstructive sleep apnea (**pseudo-RBD**)
  - Posttraumatic stress disorder (PTSD)
  - **Medication-induced RBD**
    - MAOIs, TCAs, SSRIs, NaSSAs
    - Bupropion is the ***only*** antidepressant that has no risk for secondary RBD
    - Ask about any temporal association with change or increase in dose of the medication
  - **Substance-induced RBD**
    - Caffeine intoxication (but not withdrawal)
    - Alcohol withdrawal
  - **Diet-induced RBD**
    - Excessive chocolate (caffeine) intake
  - **IgLON5***

REM Sleep Behaviour Disorder

Differential Diagnosis

- Dream enactment with limb movement *can* also occur in healthy individuals
- During **heightened emotional states** (acute stress) or **withdrawal** from alcohol or benzodiazepines



REM Sleep Behaviour Disorder

Management

1. **Safety**
   - **Bedroom safety!**
   - Lower bed, remove nightstands, move lamps/loose objects
   - Have bed partner sleep in a separate room (partners have been seriously injured)
2. **Discontinue offending agents**
   - If discontinuing medications, you should wait at least 2-3 months for full resolution
3. **Assess for co-morbid conditions** including OSA and consider the differential diagnosis



* Off-label

REM Sleep Behaviour Disorder

Medications

- **Melatonin*** 5 to 15 mg PO qHS
- **Clonazepam*** 0.25 mg to 3 mg PO qHS
- **Pramipexole*** 0.25 mg to 1 mg PO qHS
  - Or rotigotine patch
- **Rivastigmine*** 4.6 mg/24 hours for 3 weeks
- **Donepezil*** 5 to 10 mg PO q daily
- **Trazodone*** 50 to 100 mg PO qHS

Matar E, McCarter SJ, St Louis EK, Lewis SJG. Current Concepts and Controversies in the Management of REM Sleep Behavior Disorder. Neurotherapeutics. 2021 Jan;18(1):107-123. doi: 10.1007/s13311-020-00983-7. Epub 2021 Jan 6. PMID: 33410105; PMCID: PMC8116413.

* Off-label

🛌 Middle Insomnia

Most Common Causes

1. **Obstructive Sleep Apnea**
2. **REM Sleep Behaviour Disorder**

Sleeping Medications

Quick Takes

Always use lowest possible doses in the geriatric population

OK To Try

- **Melatonin*** can be tried in doses between 1 to 10 mg PO qHS (take at dinner time) but there is wide variation in quality between brands
- **Lemborexant, daridorexant** may have a better safety profile, and ↓ risk for falls and cognitive impairment, but it is a new drug class + long-term safety data is ongoing

Maybe Try

- **Doxepin*** at low doses (<6mg)
- **Trazodone*** is used clinically, but evidence base is poor
- **Mirtazapine*** if comorbid depression symptoms

Try To Avoid

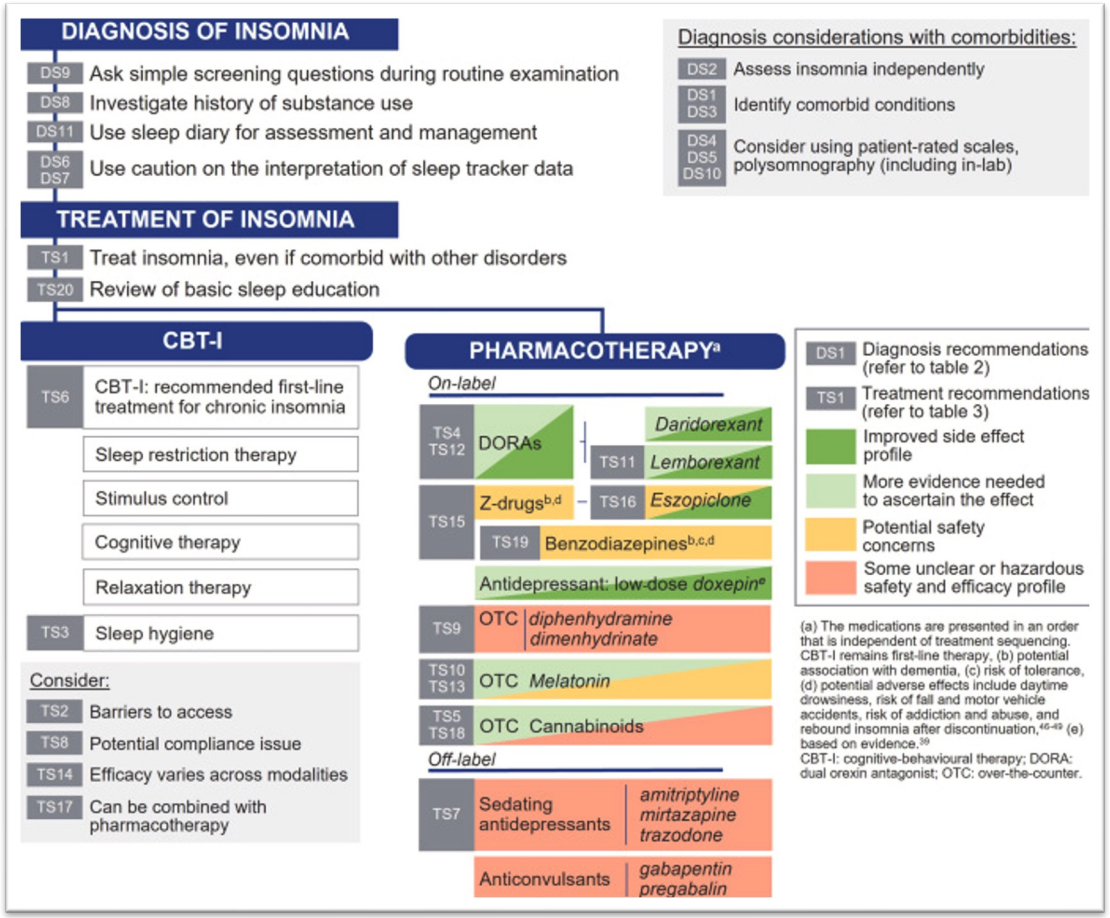
- **Z-drugs** and **benzodiazepines*** due to risk for cognitive impairment, falls, delirium
  - If must use, pick **Z-drug** over **benzodiazepine**
- **Antipsychotics*** due to metabolic side effects, risk for extrapyramidal symptoms, and ↑ mortality risk in dementia

* **Off-label**

➡️ Who To Refer To For Geriatric Sleep Issues?

- **Routine sleep disorders**
  - → Sleep Clinics with Polysomnography
    - UBC Sleep Disorders Clinic
    - Surrey Sleep Clinic and Laboratory
    - Abbotsford Regional Hospital
    - See CPSBC Full List

- **Insomnia with multimorbidity (dementia, geriatric giants, polypharmacy…)**
  - → Providence Health Elder Care Clinics (SPH, MSJ)
    - Geriatric Medicine, Geriatric Psychiatry, Occupational Therapy
  - → Vancouver General Hospital Geriatric Rapid Access Clinic
    - Geriatric Medicine
  - → Island Health Seniors Outpatient Clinics



Delphi consensus recommendations for the management of chronic insomnia in Canada

Morin, C. M., Khullar, A., Robillard, R., Desautels, A., Mak, M. S., Dang-Vu, T. T., ... & Carney, C. E. (2024). Delphi consensus recommendations for the management of chronic insomnia in Canada. Sleep Medicine, 124, 598-605.