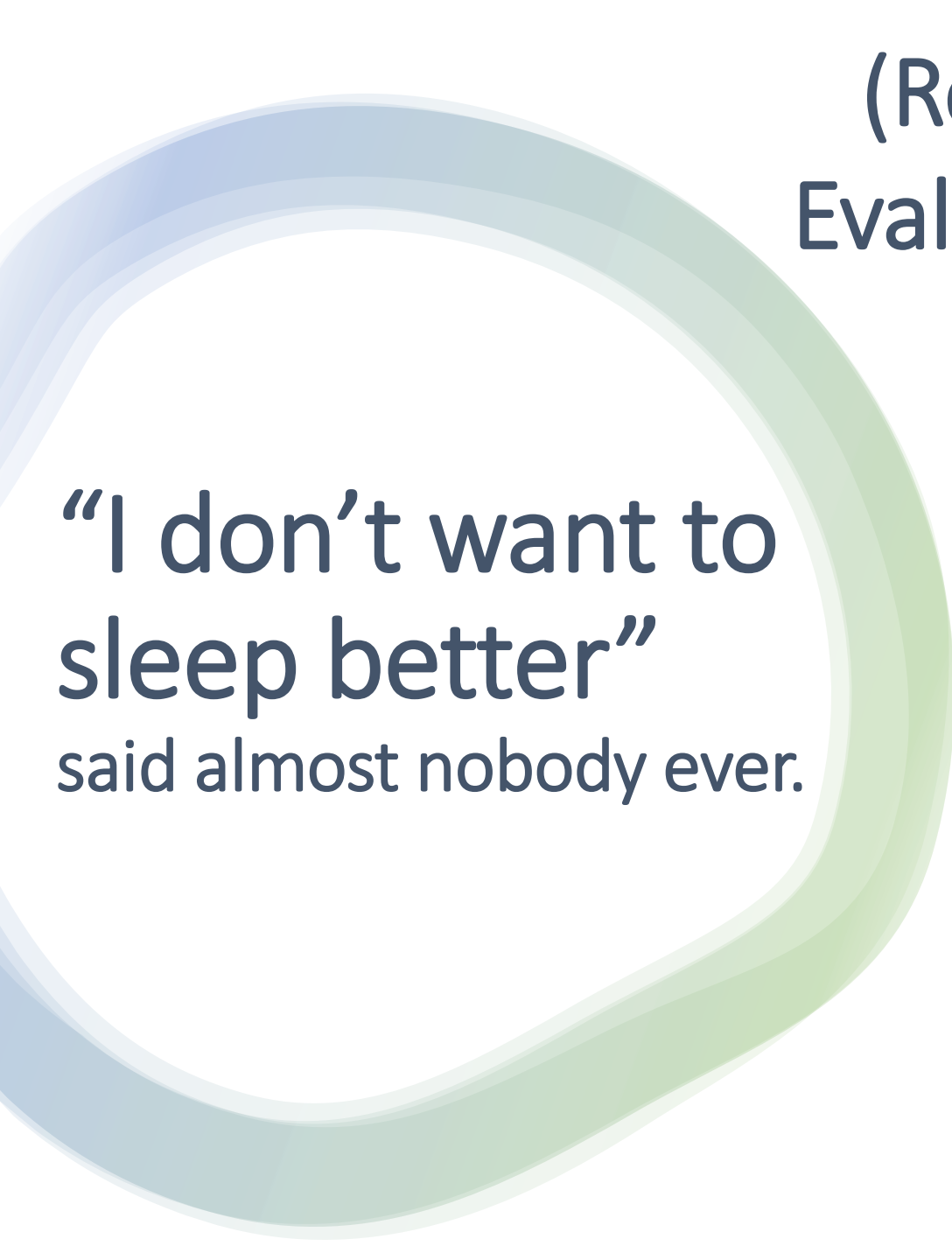


# (Reducing Psychosis Risk Through Evaluation and Treatment of Sleep)



“I don’t want to  
sleep better”  
said almost nobody ever.

Benjamin Biller, MA QMHP  
(he/him/él)  
May 29th, 2025

# DISCLOSURES

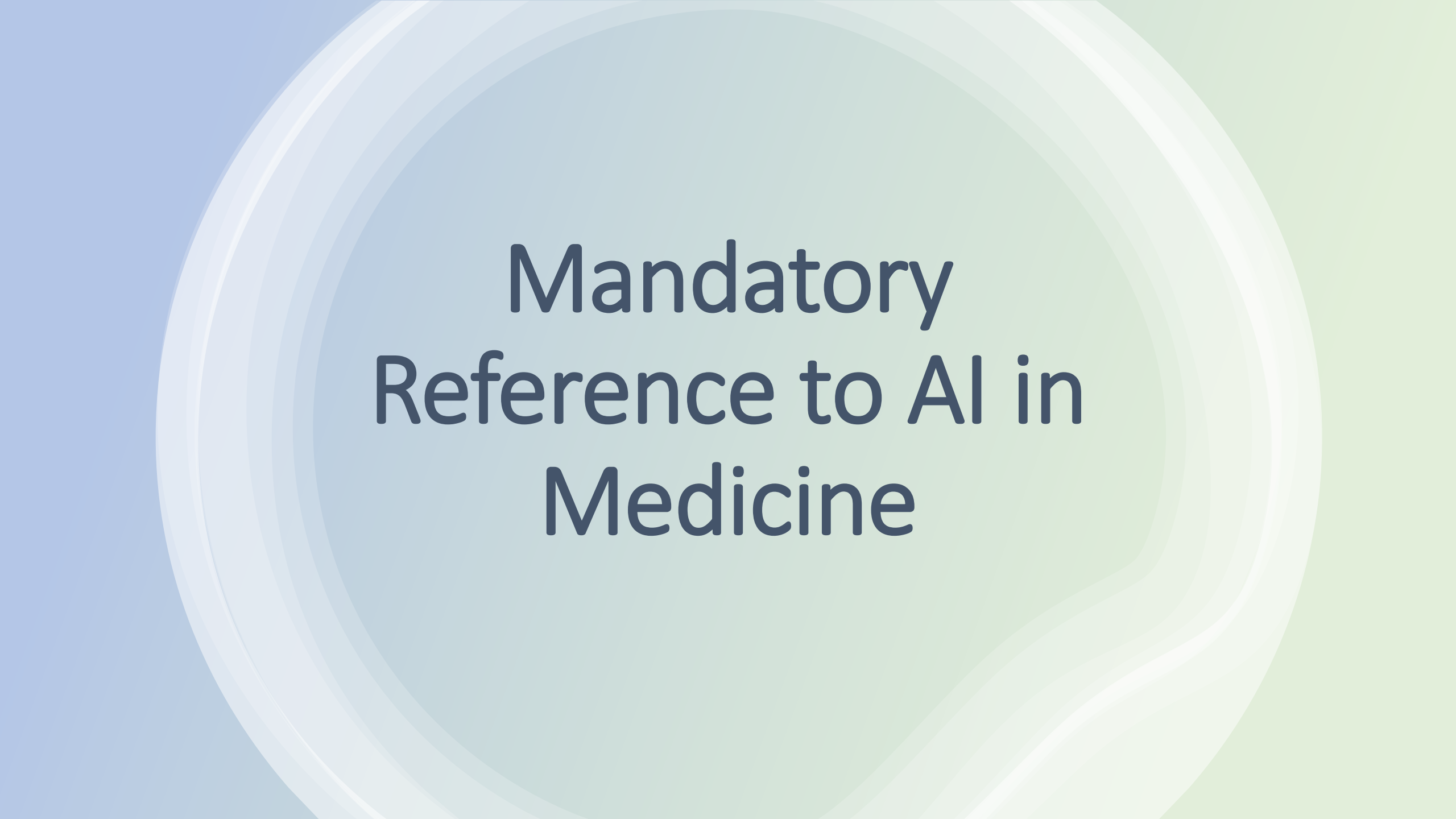
- Actually, I'm asleep right now
- I'm very biased because I love sleeping
- No other disclosures to report



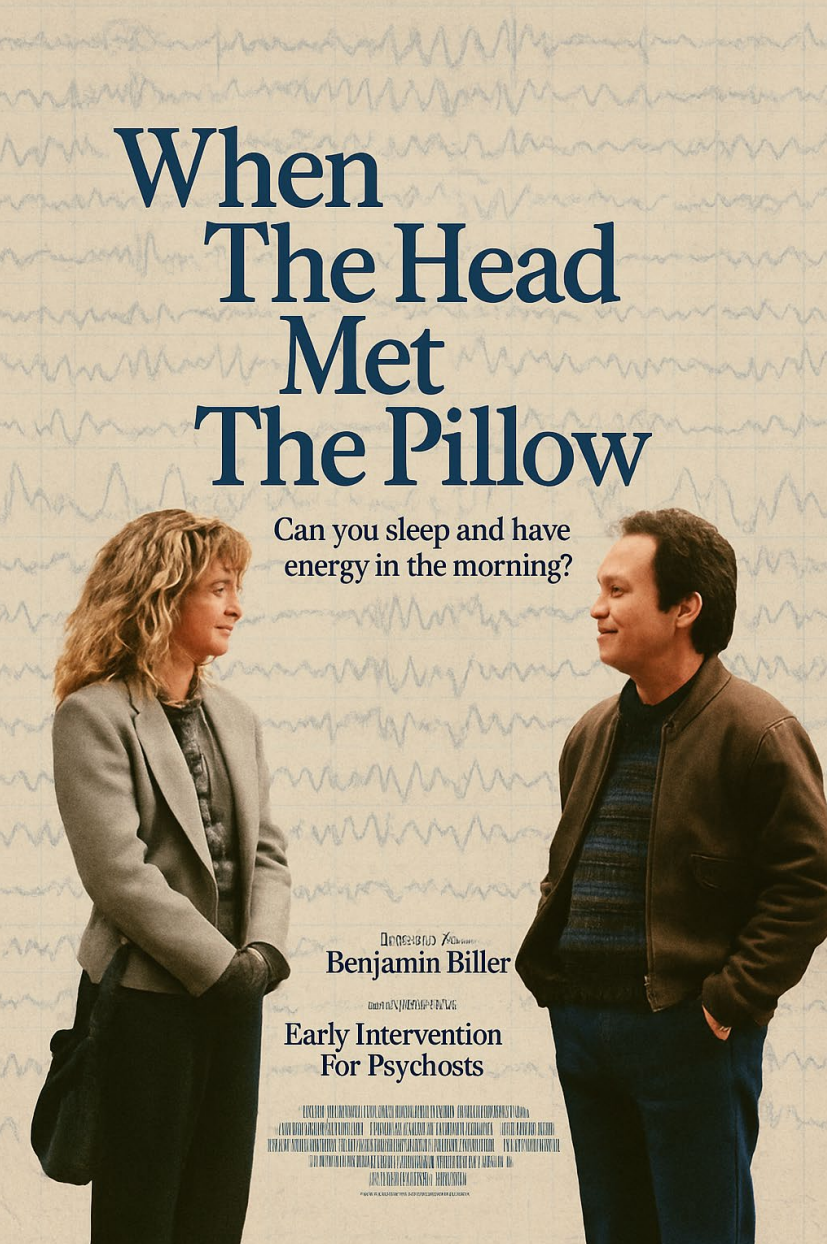
*"I'm so tired, I'll be asleep the minute my head hits the pillow, then awake again every hour filled with existential dread."*

# Breaking it Up

- Part 1: What can we do for ourselves (Learning from Sleep Well from Oxford - Modified CBT-I for psychosis – and other experts
- Part 2: Clinical assessment and research integration regarding sleep and psychosis
- Part 3: So What!? Why should I care? There's nothing WE can do about it



# Mandatory Reference to AI in Medicine

[illegible]

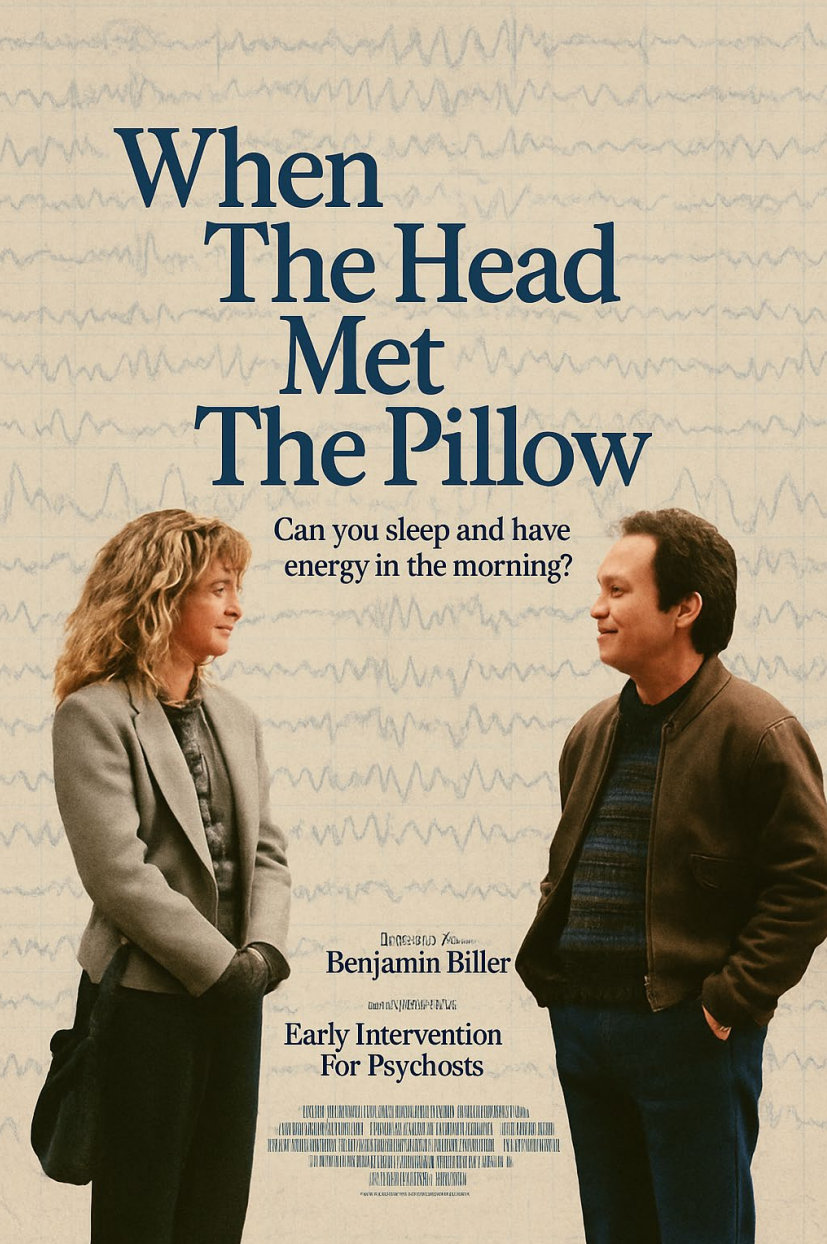
When  
The Head  
Met  
The Pillow

Can you sleep and have  
energy in the morning?

Directed by Benjamin Biller

Early Intervention  
For Psychosists

CASTING BY JESSICA HARRIS  
COSTUME DESIGNER JESSICA HARRIS  
HAIR BY JESSICA HARRIS  
MAKEUP BY JESSICA HARRIS  
PRODUCTION DESIGNER JESSICA HARRIS  
EXECUTIVE PRODUCERS JESSICA HARRIS  
PRODUCED BY JESSICA HARRIS  
WRITTEN BY JESSICA HARRIS  
DIRECTED BY BENJAMIN BILLER



When  
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Met  
The Pillow

Can you sleep and have  
energy in the morning?

Original Screenplay  
Benjamin Biller

Directed by BENJAMIN BILLER

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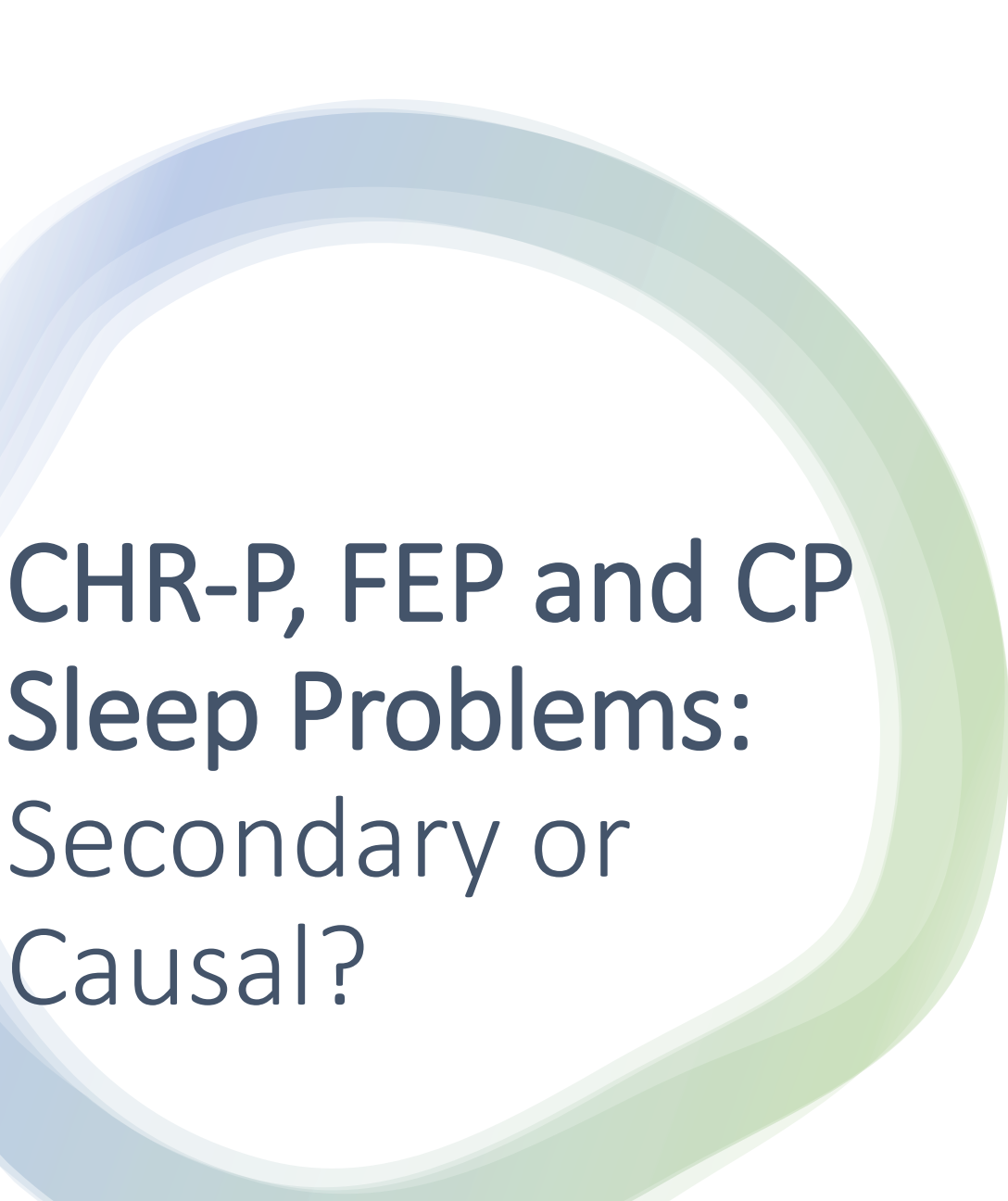
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DIRECTED BY JESSICA HARRIS



# CHR-P, FEP and CP Sleep Problems: Secondary or Causal?

[Frontiers | The Experience of Sleep Problems and Their Treatment in Young People at Ultra-High Risk of Psychosis: A Thematic Analysis](#)

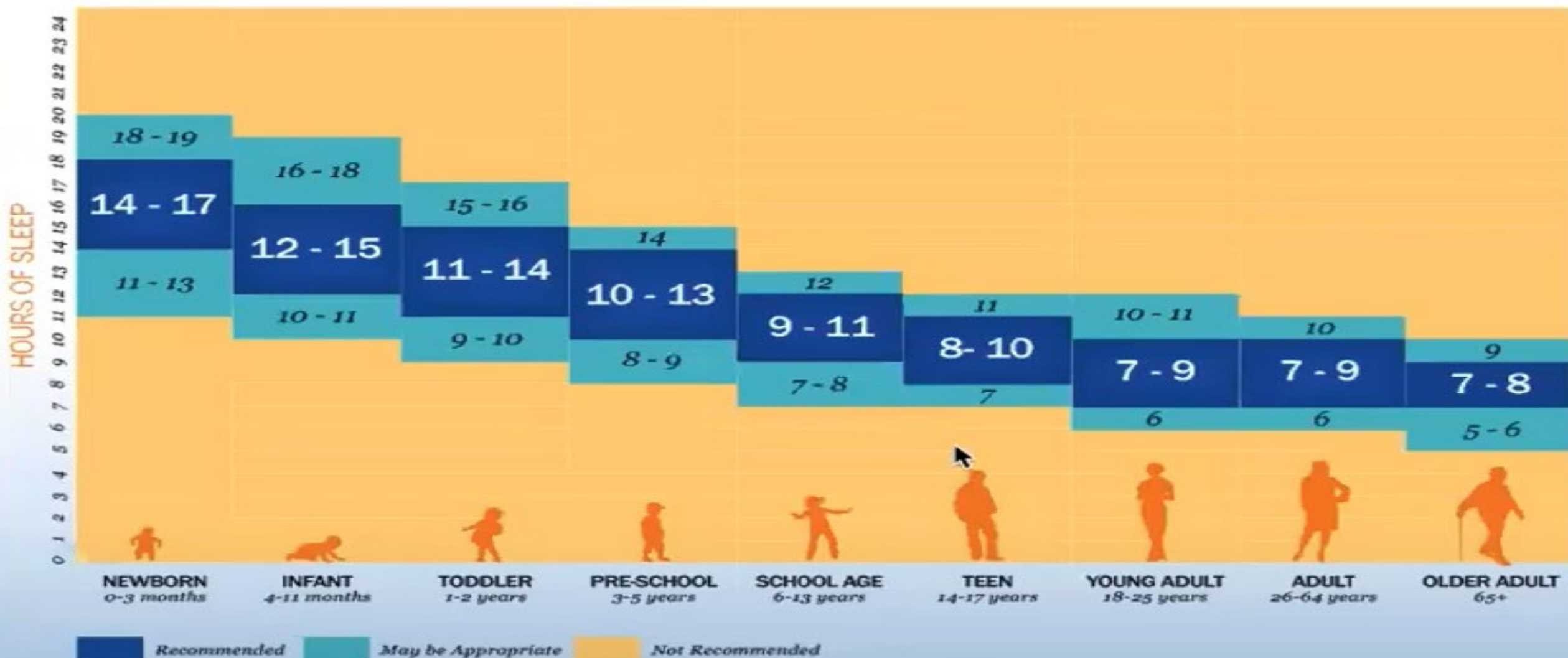
Oxford University, Sleep Well  
Researchers:

- Effective sleep intervention provides great impact on symptoms and quality of life
- Some case studies evident that sleep problems were primary driver of psychosis
- Arose in the context of both limited data on CBT-I for people experiencing psychosis and anecdotal data that CBT-I was insufficient

[Adapted CBT to Stabilize Sleep on Psychiatric Wards: a Transdiagnostic Treatment Approach | Behavioural and Cognitive Psychotherapy | Cambridge Core](#)



# SLEEP DURATION RECOMMENDATIONS



# Restful Sleep

*Sleep is your natural medicine.  
Optimize its impact.*



## Activity

- ☐ **Start your day strong!** Get out of bed right away and jump into an activity (Lose the snooze button)
- ☐ **Movement:** Participate in at least one activity daily that increases your heart rate to 120bpm for a minimum of five 5 minutes
- ☐ **Skip the nap** If you need to nap, keep it under 20 minutes and before 4 p.m. Stay active all day.
- ☐ **Bed is only for sleep** or sexual activity

## Circadian Rhythm

- ☐ **Set a sleep window!** Wake up at the same time every day; keep bedtime within a set window
- ☐ Talk with your doctor about how to **manage light and dark exposure**
- ☐ Use meals to **anchor your body's schedule** - earlier meal for earlier sleep, later meals for later sleep

## Wind Down

- ☐ Start your **wind down routine** two hours before bedtime (or at least 30 minutes prior)
- ☐ Reduce/**eliminate screen time**
- ☐ Keep your bedroom **quiet, dark, cool & relaxing** (60-67°), using earplugs or white noise if needed
- ☐ **Timing of medication** matters; discuss best timing with your provider
- ☐ THC, alcohol, caffeine, nicotine, supplements, drugs and other **substances can impact your sleep**



# Sueño Reparador

*El sueño es tu medicina natural.  
Optimiza su impacto.*



## Actividad

- ☐ **¡Empieza tu día fuerte!** Sal de la cama inmediatamente y empieza una actividad (no use el botón de repetición)
- ☐ **Movimiento:** Participa en por lo menos una actividad diaria cual aumente el latido del corazón a 120bpm por un mínimo de 5 minutos
- ☐ **No te tomes la siesta** Si la necesitas, que sea menos de 20 minutos y antes de las 4 p.m. Mantente activo todo el día
- ☐ **Usa la cama solo para dormir o actividad sexual**

## Ritmo Circadiano

- ☐ **Establece una ventana de tiempo para dormir.** Levántate a la misma hora diario; mantén tus horas de dormir dentro de cierto periodo
- ☐ Habla con tu doctor sobre manejar **la exposición a la luz y oscuridad**
- ☐ Usa comidas como **ancla para el reloj biológico del cuerpo** - Comidas más tempranas para dormir más temprano, comidas más tarde para dormir más tarde.

## Relajarse

- ☐ Empieza tu **rutina de relajación** 2 horas antes de la hora de dormir (o por lo menos 30 minutos antes)
- ☐ Reduce/**elimina tiempo de pantalla**
- ☐ Mantén tu recamara **tranquila, oscura, fresca & calmada** (60-67°F), usa tapones para los oídos o máquina de ruido blanco si es necesario
- ☐ El **horario de medicina** importa; habla con tu proveedor sobre el horario
- ☐ THC, alcohol, cafeína, nicotina, suplementos, drogas y otras **sustancias pueden impactar tu sueño.**

# Activity

HE'S BACK, IN BED

## LAST ACTION HERO 2

### ACTIVITY DECLINE

DIRECTED BY BENJAMIN BILLER

PRODUCED BY EASA

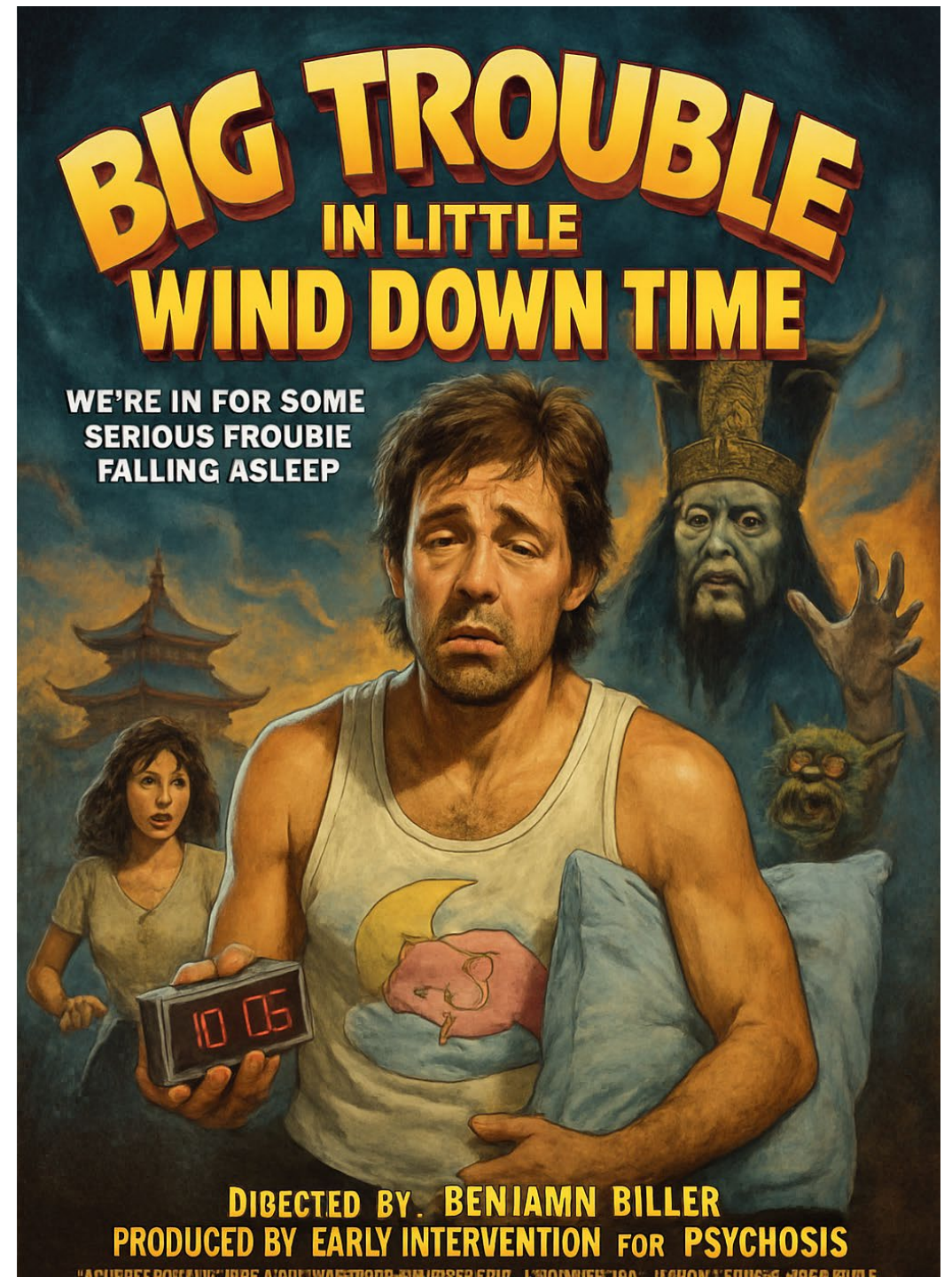
JOSÉPH WILLIAMS · WALLER BUTOAN/O VIGSI ØRGEN · CARY CAMPRÉLL  
KEEBILLTATA COPU · ANSSHICLL CIREMT · DITTEDO · JONSSAE CLITBØ ABFRAN FATA JEM  
SEFIND AYOPPAL DLOWMDIO · FMIMOR LAI · DOREKT LUCAS CLAIORIO, NIII CCH

# Activity

- **Give yourself a reason to get up**, rise up for an active day even if that is video games and candy. Wake up at the same time every day and don't hit the snooze button.
- **Exercise:** Heart Rate at 120bpm or above sustained for at least five minutes, everyday (from TIPPes) is best. Any movement is great!
- **Avoid napping**, if not avoidable don't nap past 4pm and don't nap more than 20 minutes (less likely to interfere with nighttime sleep)
- **Work/social/hobby/volunteering/school**
- **Bed is for sleep! (even better if bedroom is for sleep)**



# Wind Down



# Wind Down



**Wind down starts two hours prior (at least 30 minutes prior) to head on pillow with eyes closed**



**Reducing/eliminating screen time** (at least 30 minutes, 1 hour much better, 2 hours best). Nighttime mode on device/orange glasses *may* be helpful (like a filter on a cigarette) AND doesn't decrease arousal from stimuli, especially social



**Targeting anxiety:** sensory interventions, worry journal, worry windows during the day (not during wind down time)



**Relaxing activity:** any activity that does not include screens, intense exercise or big meals: walking, playing with pets, painting, drawing, dancing, singing, listening to music, cooking, cleaning, reading (watchout for overstimulating material) – NOT IN BED (chair/bean bag next to bed is ok, another room is better)



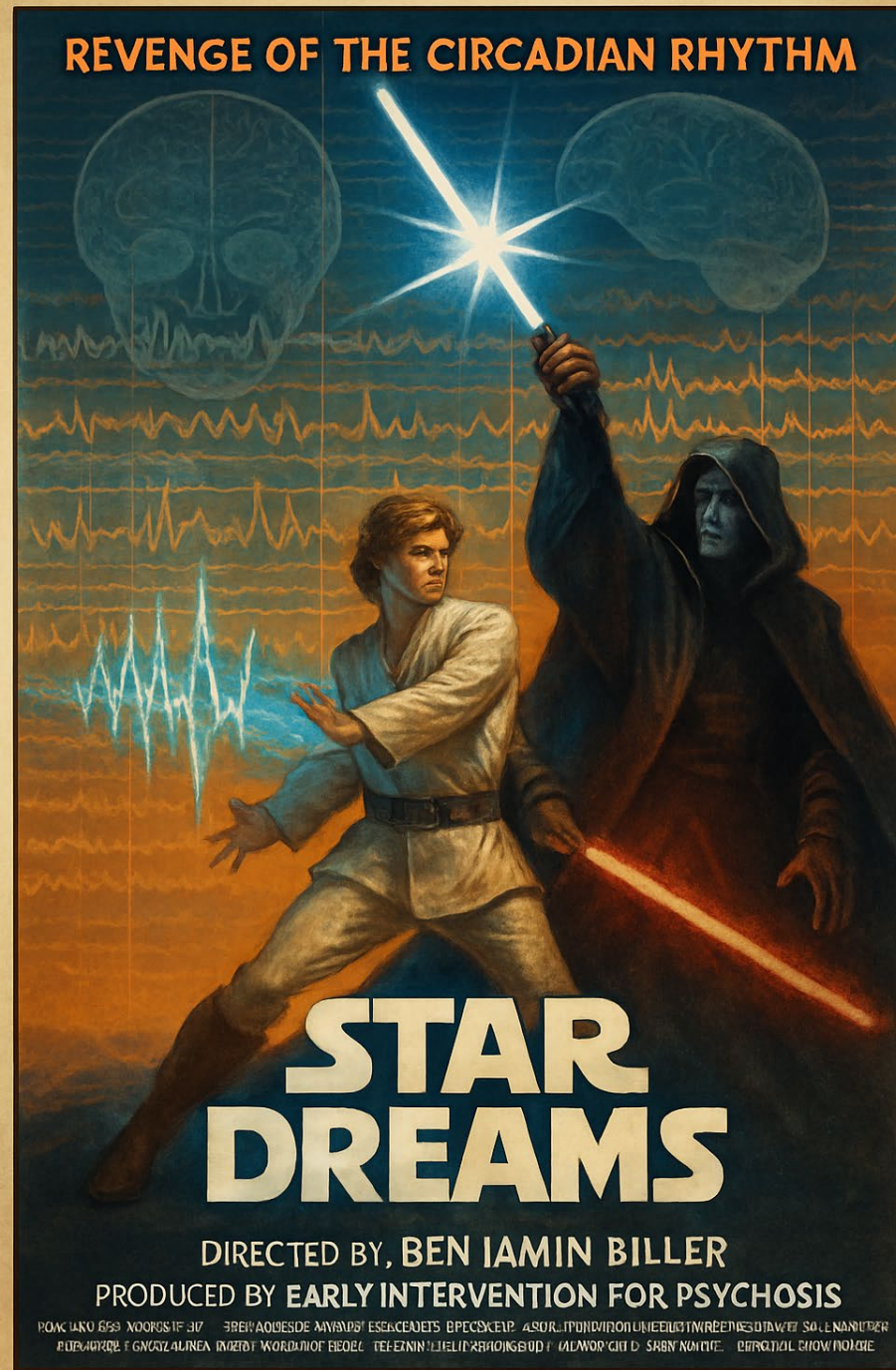
**Room is safe, cool, quiet and dark:** Providers can recommend controlling light with blackout blinds or mask (watch for increasing depression or worsening circadian rhythm and hypersomnia)



**Preparing for sleep:** Re-playing dream scripting, visualization



# Circadian Rhythm



**Natural  
endogenous  
shifts during  
lifespan:**

**Delayed during  
adolescence/puberty  
and advanced in  
middle age(50s +/-)**



# HOW TO RESET/MAINTAIN CIRCADIAN RHYTHM?

## Take Care of Your S.E.L.F!

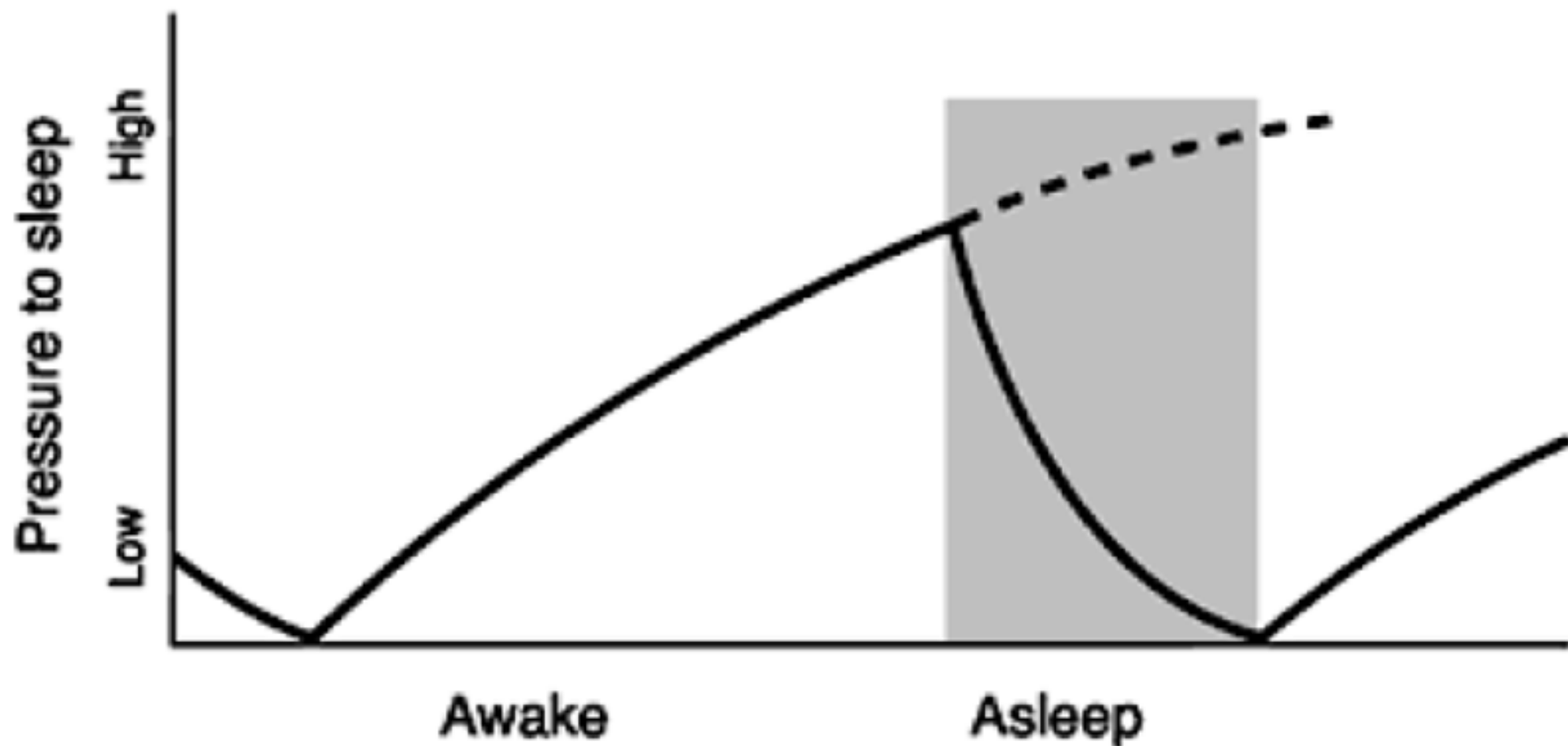
- **Social, Exercise, Light, Food**
- **Light in the AM is most important.** Should be waking to light and falling asleep to darkness. Light exposure is most important 1<sup>st</sup> hour after waking for setting circadian rhythm and decreasing light most effective two hours before bedtime.
- **Meals are anchors (e.g. nocturnal vs. diurnal mammals):**
  - eat anything within an hour of waking, no big (or any) meals during wind down time.
  - For those going to bed late, the last meal will be late and they tend to be skipping breakfast.
  - Going to sleep with choosing to have eaten less, a client can increase hunger in the morning to anchor earlier wake up time
- **Expectation:** “you are going to do this for a couple of weeks”

# Leverage Light Exposure!

- Light is the most powerful influencer of circadian rhythm
- Changes in daylight hours over the course of the year is important to recognize
- Light therapy should be prescribed by MD secondary to risks associated with mis-application/misuse (specifically triggering of manic episode and worsening of circadian rhythm disorders)
- Morning light: may reduce depression, possibly by naturally increasing serotonin levels and shown to reduce symptoms of chronic pain

• Pelayo and Okorie, 2023; <https://stanford.cloud-cme.com/course/courseoverview?p=5&eid=45748>

# Sleep Pressure





# Brief Behavioral Treatment for Insomnia

## 4 Rules:

Reduce time in bed (only for sleep, no other activity)

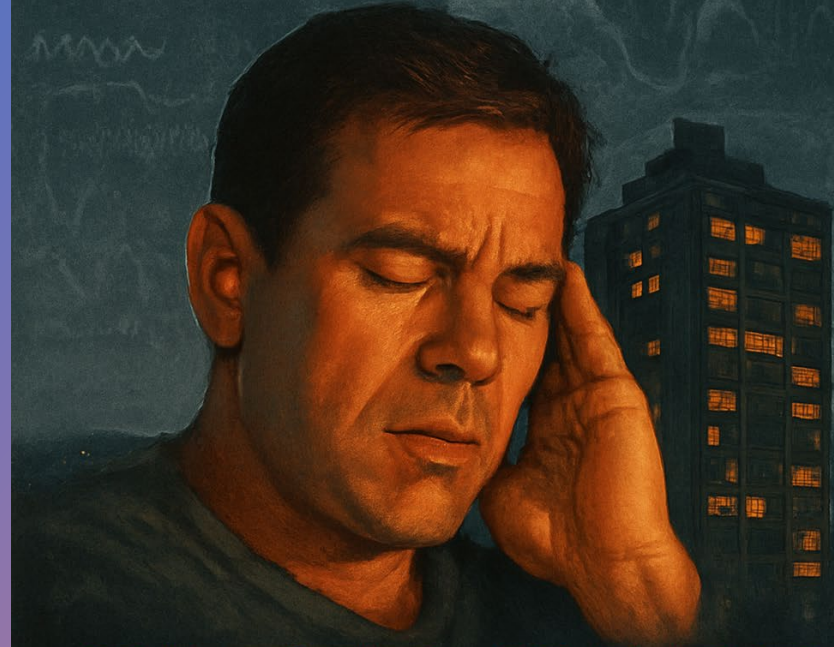
Anchor consistent wake up time

Got to bed only when “sleepy tired”

Get out of bed when not sleeping within 15-30 minutes, only return when “sleepy tired”



HIGH ABOVE THE CITY OF L.A.  
THE JASDS ARE MODIVE LOYS OF NOISE AND PLAVING TERRIBLE  
MIDUGTTIER THEY RELERS TO LANY CLEYE! EVEN THOUGH  
THEY HAVE BBIEEN ASKED A BUNCH OF TIMES.  
ONE MAN HAS MANAGED TO SHUT HIS EYES. ....



# SLEEP HARD

AN OFF DUTY COP WITH HIS OSPARTNENT-ISSUED EARPILIGS.....  
HE'S ALORE .....HE'S OVERILBED AND THE ONLY CHANCE  
TO NOT FEEL ROTTEN TOMORROW

GEETTENCY ON BENLAVON BILLER    PRETUCUSED BY  
EARLY INTERVENTION FOR PSYCHOSIS, ROINT RALONTSUMENTZ  
PALK, BRAN BONEAY    AMY JEINGEN, JASK CENOGENS, JANE BEBUCKSTER

# YAWN

THE TIRING MOTION PICTURE FROM  
THAT BOOK YOU JAST CAN'T READ MORE THAN  
ONE PAGE OF

Fox 19

FO D



DIRICTED BY BENJAMIN BILLER

PRODUCED BY EARLY INTERVENTION FOR PSYCHOSIS

ALICIA WRIGHT , BOUISIASTWEELEY    HERRDY BERNAROD

MARUGE STORE    MARREIA SOLANO

SCOTT ADDIGSON    GANETT HUNL



# Clinical Assessment and Treatment



*"It's all about the energy in the room. The louder you clap,  
the more you're going to enjoy my diagnosis."*

# Mental Health and Associated Sleep Problems

- 50-75% comorbidity: clinically significant sleep disorder with psychiatric diagnoses per traditional measurements and polysomnogram:
  - Hypersomnia (e.g. depression)
  - Circadian rhythm disorders (e.g. ASD, OCD and eating disorders)
  - Nightmares (e.g PTSD)
  - Nocturnal panic attacks (e.g. anxiety disorders)
  - Abnormal Sleep Architecture (e.g. MDD)
  - Insomnia (e.g. PTSD)
  - Nighttime awakenings (e.g. alcohol use disorder)
- And identified by high density EEG:
  - Deep Sleep (N3) Deprivation (e.g. cannabis use disorder, MDD, PTSD, CHR-P, FEP, CP)
  - Epileptiform events during deep sleep (N3) (e.g. ASD, CP (1))
  - Disruption to Sleep Spindle Power (e.g ASD, CP)

(1) [Schizophrenia Associated with Epileptiform Discharges without Seizures Successfully Treated with Levetiracetam - PMC](#)



# Just Ask!

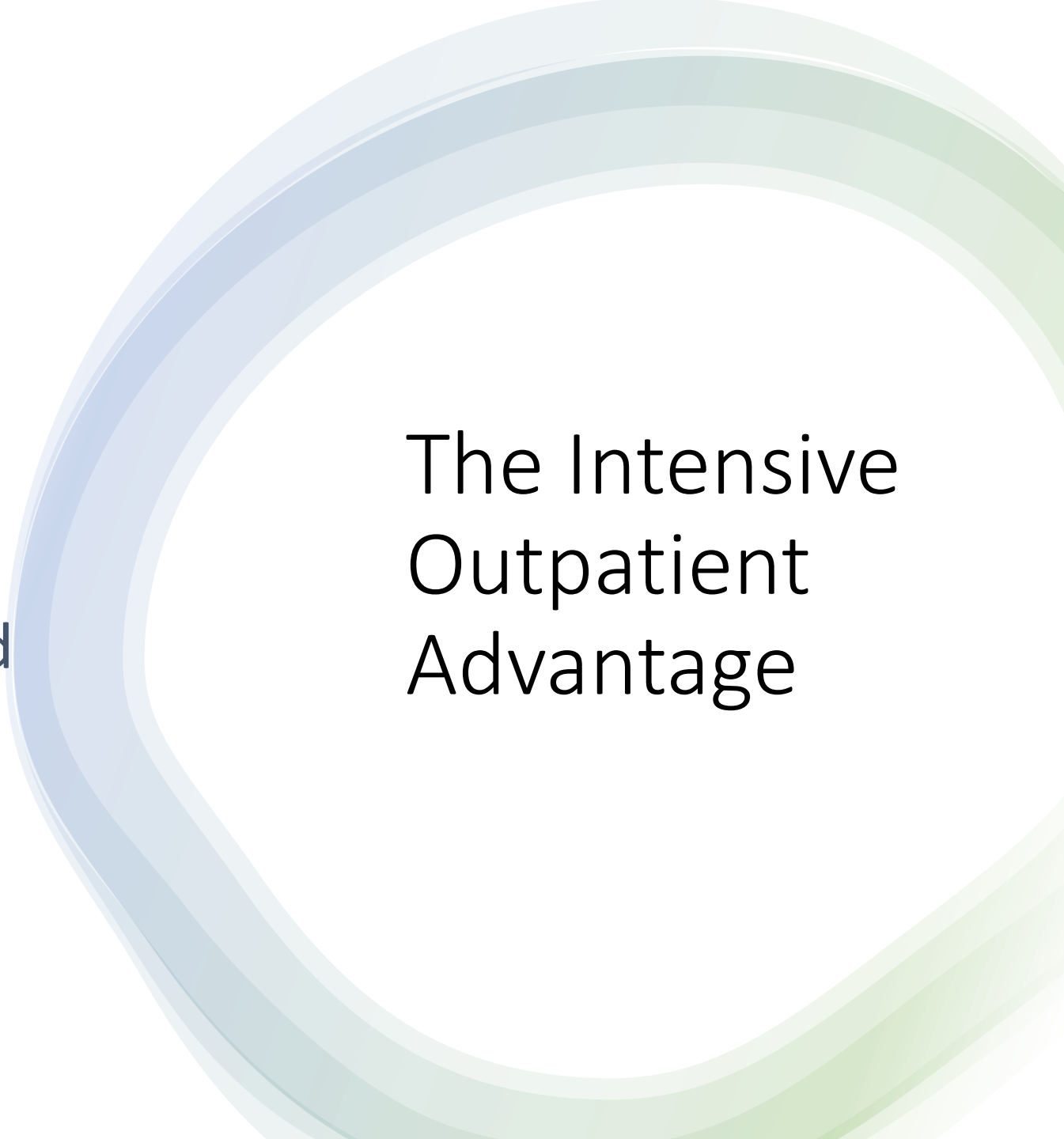
Ask about snoring and headaches (esp. morning) Observed apneas, gasping during sleep, dry mouth in the morning, history of orthodontics and pallet expanders, family history of sleep problems, chronotypes

Talk through a typical/recent 24 hours period:

- What happens in the evening?
- What time do you go to bed
- What time do you turn out the light?
- How long does it take to fall asleep?
- What runs through your mind (what do you think about if you aren't falling asleep?)
- How do you feel when you are in bed?
- What happens next?
- When you get to sleep, do you sleep through, or do you typically wake up during the night?
- What wakes you up?
- When do you finally wake up for the day?
- What time do you get up out of bed?
- What is your morning routine?
- How do you spend your day?
- Do you take naps?



- **Seeing the person's bedroom and where the person sleeps**
  - Ask the question: How many hours do you spend awake and how many hours do you spend asleep in your bed/bedroom



The Intensive  
Outpatient  
Advantage

# Sleep Tracking



Consider looking at the patient's sleep-tracking device data – 30% of adults use a wearable device, any smart phone also provides helpful data for adolescents

“Ok” at measuring sleep versus being awake (only one device on the market is close to clinical accuracy for total sleep time (hint: not this one))

It's still better than self-report! (“I have had NO sleep the past week!” or “I slept ALL weekend.”)

# Treatment As Usual: “The List”

## Tips for Better Sleep:

1. Be consistent. **Get up at the same time** each morning, including on the weekends.
2. Go to bed when you're sleepy, but not before a certain time (**don't go to bed too early**)
3. Avoid daytime napping (especially in late afternoon, early evening)  
Make sure your bedroom is **quiet, dark, relaxing**, and at a comfortable temperature
4. **Remove electronic devices**, such as TVs, computers, and smart phones, from the bedroom
5. **Avoid** large meals, caffeine, THC and alcohol **before bedtime**
6. **Get some exercise**. Being physically active during the day can help you fall asleep more easily at night.
7. Keep a **Calm Down Routine**: repeat a few soothing activities before bedtime, in the same sequence, to cue your body it's bedtime
8. Ask your doctor if Omega Fatty Acids or weighted blankets could help your sleep
9. Tell your providers if you are snoring



# Restful Sleep

*Sleep is your natural medicine.  
Optimize its impact.*



## Activity


- ☐ **Start your day strong!** Get out of bed right away and jump into an activity (Lose the snooze button)
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- ☐ **Timing of medication** matters; discuss best timing with your provider
- ☐ THC, alcohol, caffeine, nicotine, supplements, drugs and other **substances can impact your sleep**



# Delayed Sleep Phase Syndrome

Defined by sleep onset and wake up time being more than two hours difference, often difficulty falling asleep

Once asleep (if not awakened) will achieve typical duration

Commonly includes depression

Not responding to anti-depressants even though they are describing depression

“Left to their own devices” they will sleep fine and symptoms improve (summer)

When sleep improves, mood improves (as well as other mental health symptoms)



# Delayed Sleep Phase Syndrome Continued:

- Difficult to differentiate from depression secondary to trauma or MDD
- Common cause of depressive symptoms in adolescents, suicidality and psychosis secondary to depressive symptoms

# Obstructive Sleep Apnea (OSA)

- Study conducted with 317 Mclean Patients
  - 74% diagnosed with OSA
  - Traditional risk factors were not supported
  - Standard screening tools not shown to be effective with psychiatric population
  - Treated with CPAP, nearly 100% effective with compliance
  - However, CPAP compliance in overall population less than 50% compliance after one year and less than 20% compliance after five years

Lucas, 2018

[McLean Videos | Lecture – Sleep Matters – Translational Efforts to Examine Connections Between Sleep and Mental Health \(mcleanhospital.org\)](https://www.mcleanhospital.org/lecture-sleep-matters-translationaleffortsexamineconnectionsbeetweensleepandmentalhealth)

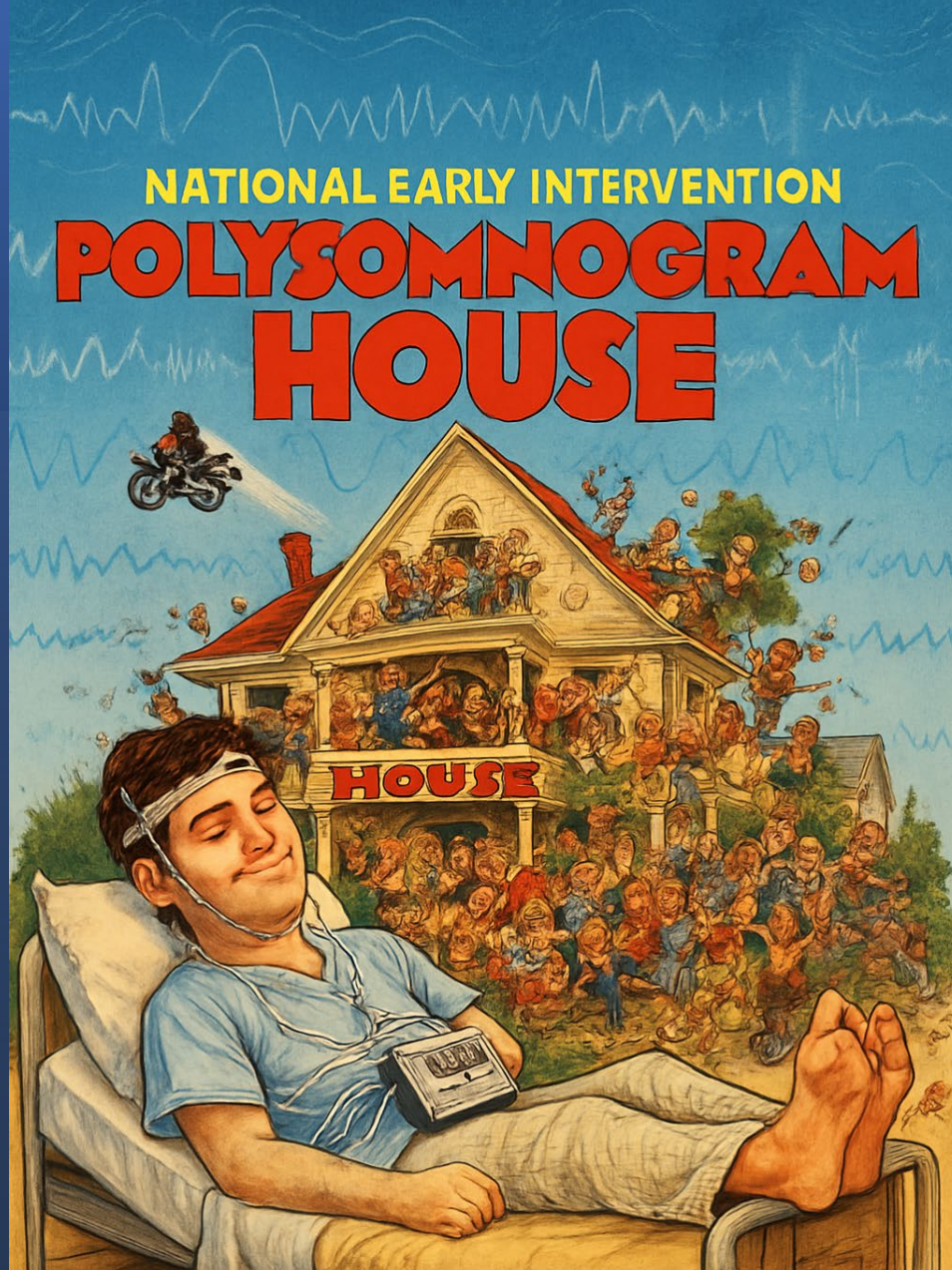
# Nighttime Waking and Nightmares

- **Pets frequently disrupt sleep.** They have a different sleep schedule and move around during the night
- **Sleep Apnea/Pediatric Sleep Apnea**
  - being aware of dreams can occur with mild sleep apnea, clients are more aware of content of dreams
- **Fragmented sleep** leads to increased memory of dreams
- **SSRIs** (most) suppress dreaming, possible effect on hyperarousal during sleep
- **Prazosin** suppresses blood pressure and nervous system sympathetic rise, decreasing chances that dreams turn to nightmares
- **Scripting and imaginative rehearsal for nightmares:** “Dreams are like Art, like paintings, can change your paintings”
- **“15 Minute Rule”:** Get out of bed after 15 minutes if not falling back asleep, wait until “sleepy tired” before getting back into bed. Maximize conditioning that BED=SLEEP

# Hypnagogic/Hypnopompic Hallucinations and Sleep Paralysis

- Occurring right before falling asleep or right after waking
- Not psychosis, this is a sleep problem
- Often occurring preceding onset of increasing attenuated psychosis or psychotic symptoms as both may be secondary to sleep problem
- Will be positive on SIPS without detailed investigation
- Often involves compound hallucinations, frequently most distressing for clients of all symptoms
- Some medications and cannabinoids can induce onset or worsen





DIRECTED BY **BENJAMIN BILLER** PRO EASA

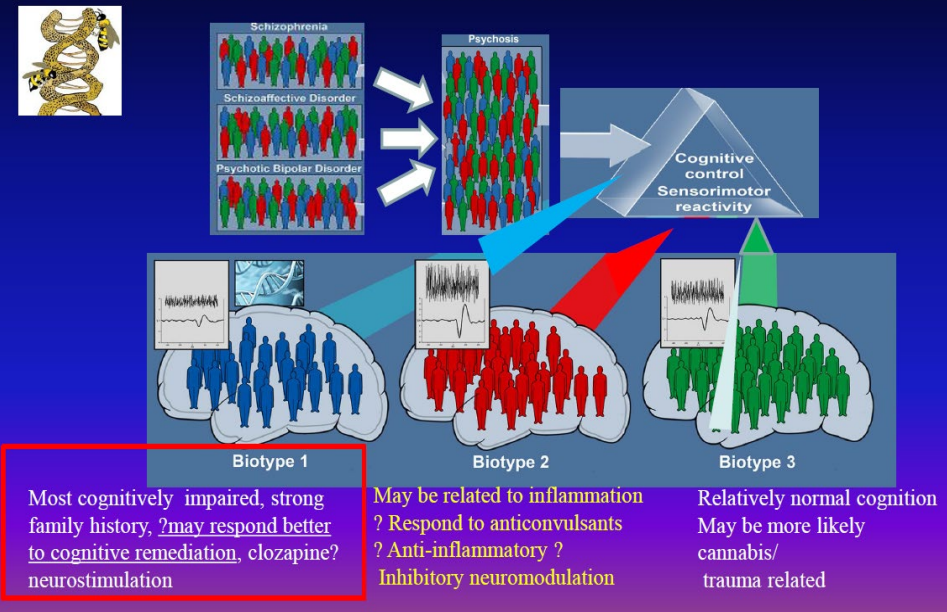
ON BEHALF OF THE NATIONAL EARLY INTERVENTION CENTER  
OF THE UNIVERSITY OF CALIFORNIA, SAN DIEGO  
"THE POLYSOMNOGRAM HOUSE" IS A FILM BY BENJAMIN BILLER  
PRODUCED BY EASA



**Ben \*not at the beach in Cape Cod  
and “Psychosis sub-types”**

DSM diagnoses are based on symptom groupings, not on biology

BSNIP STUDY, n=2000 Keshavan et al Schiz Res 2013; Clementz et al Am J Psychiatry 2016



- What in the world!?!?
- Sleep spindle differences associated with negative/cognitive symptoms
- First degree relatives commonly have measurable sleep spindle abnormality even in the absence of presentation of psychosis
- Eszopiclone and Transcranial Slow Oscillatory Stimulation (so-tDCS) shown to decrease negative symptoms \*further research needed

[\(1\) Altered Sleep Oscillations as Neurophysiological Biomarkers of Schizophrenia - PubMed](#)

[Sleep spindles in people with schizophrenia, schizoaffective disorders or bipolar disorders: a pilot study in a general population-based cohort - PubMed](#)

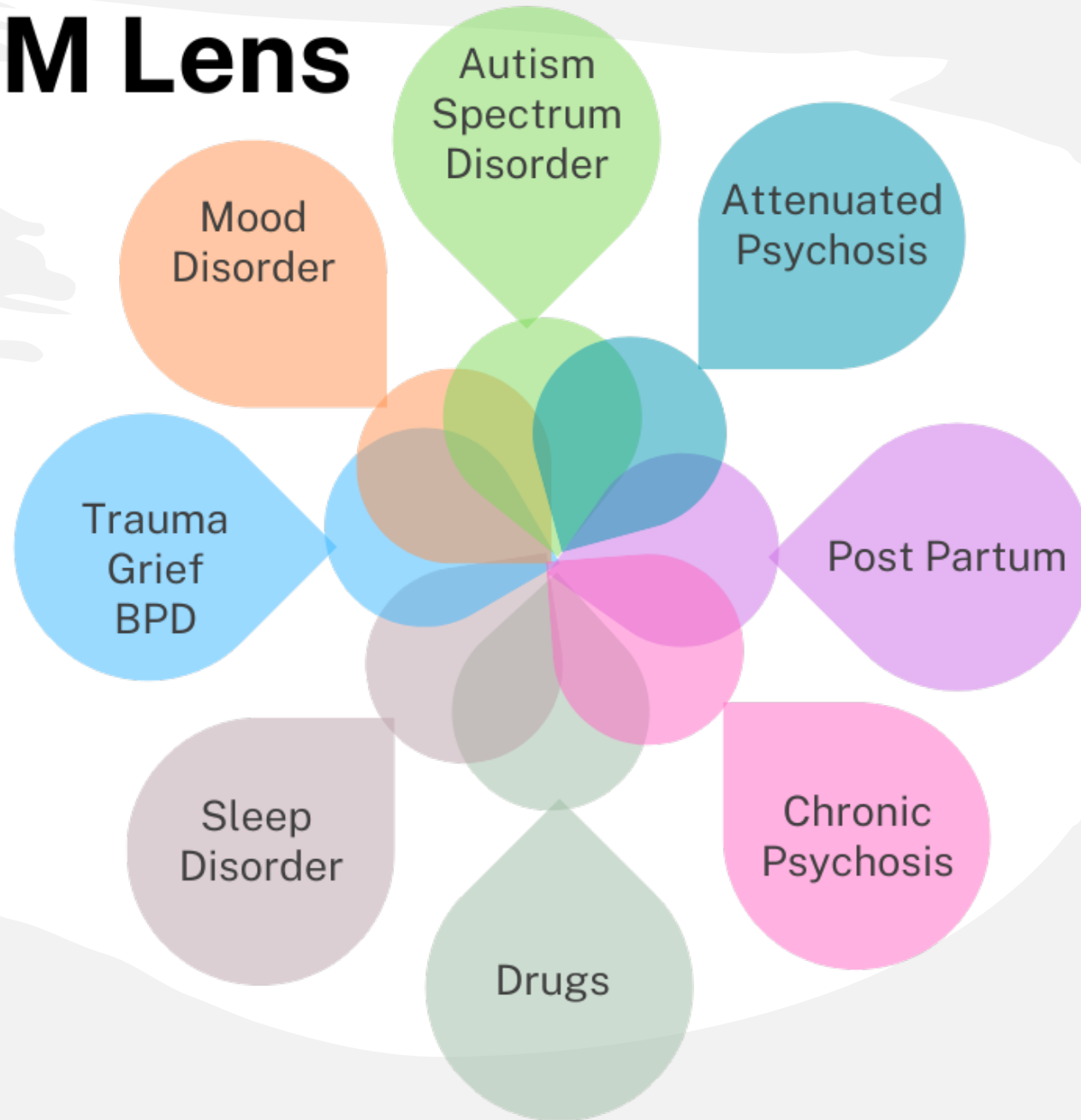
[A spectrum of altered non-rapid eye movement sleep in schizophrenia - PMC](#)

[Sleep in schizophrenia: A systematic review and meta-analysis of polysomnographic findings in case-control studies - PubMed](#)

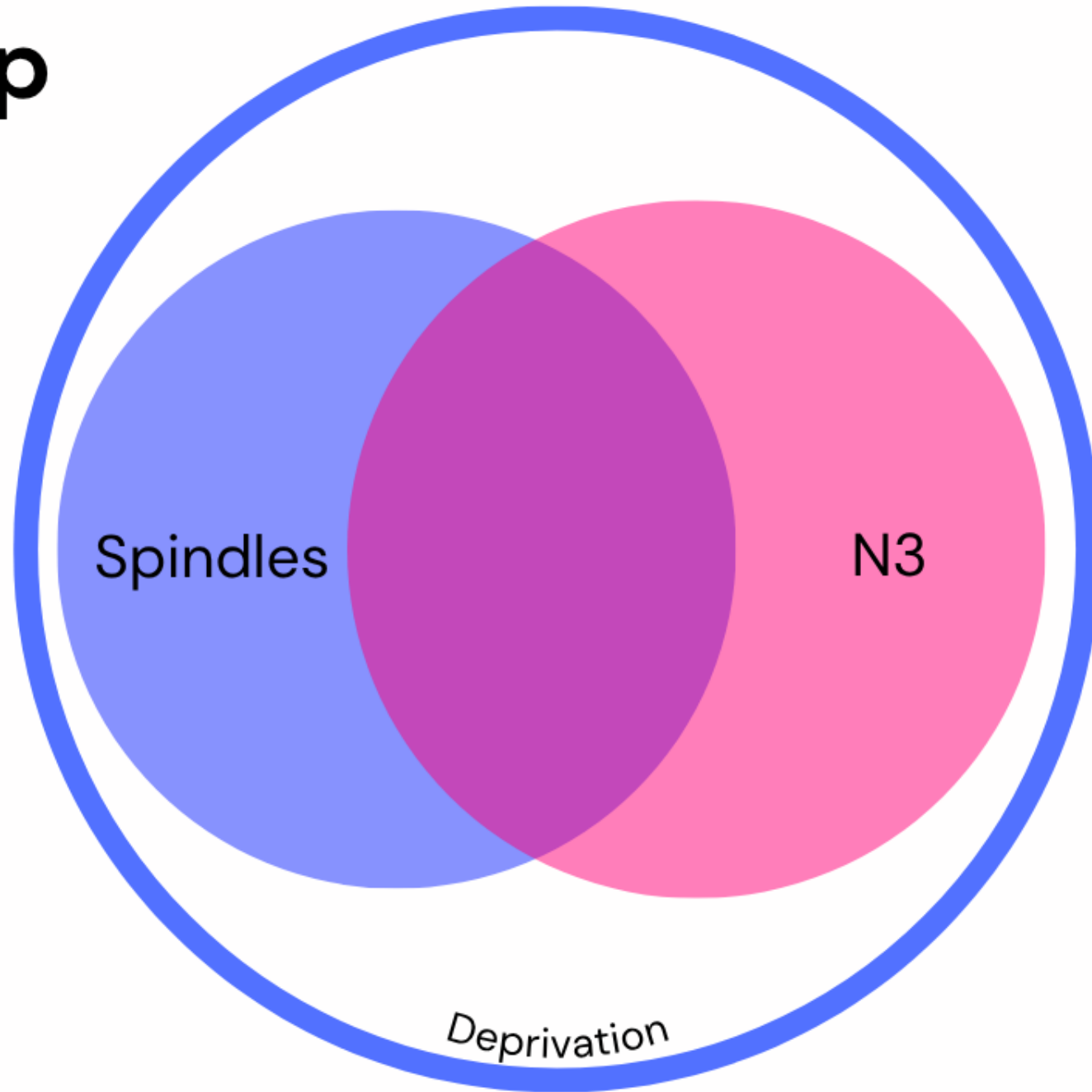
[Sleep spindle deficits in antipsychotic-naïve early course schizophrenia and in non-psychotic first-degree relatives - PubMed](#)

[Altered Sleep Oscillations as Neurophysiological Biomarkers of Schizophrenia | SpringerLink](#)

# The DSM Lens



# The Sleep Lens



# Polysomnogram: Sleep Architecture



Note: photo accredited to Lucas, 2018  
[McLean Videos | Lecture – Sleep Matters – Translational Efforts to Examine Connections Between Sleep and Mental Health \(mcleanhospital.org\)](#)



# Sleep architecture

Sleep stage

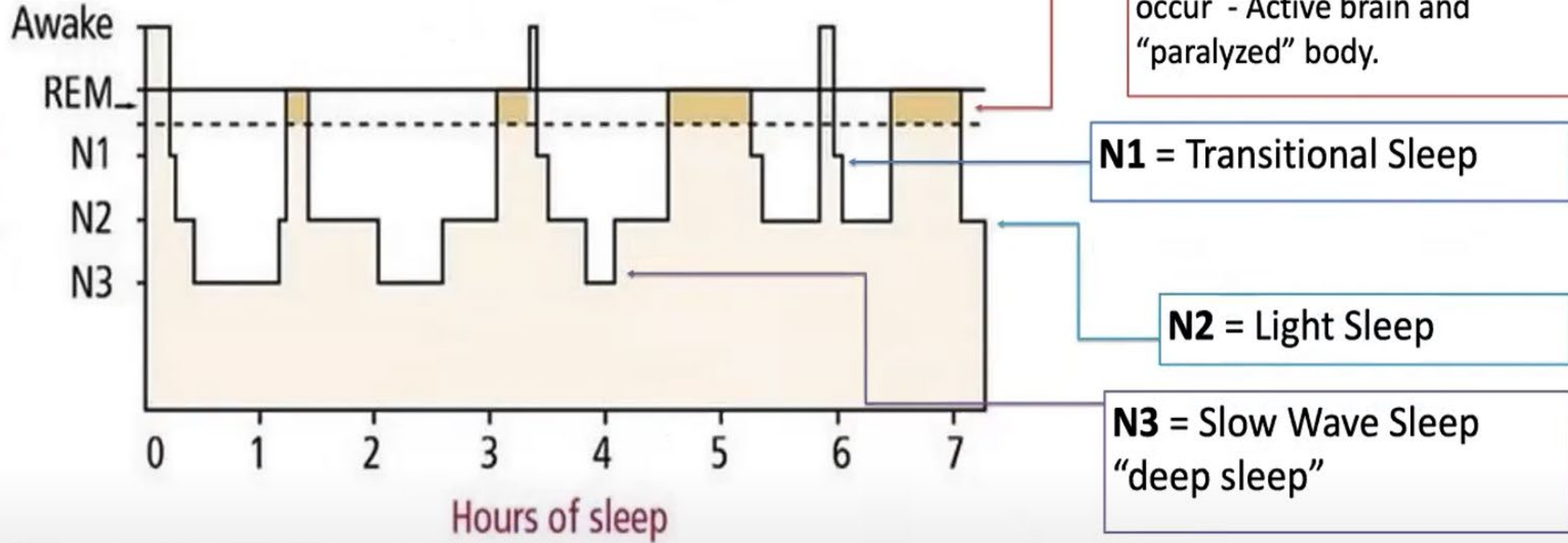
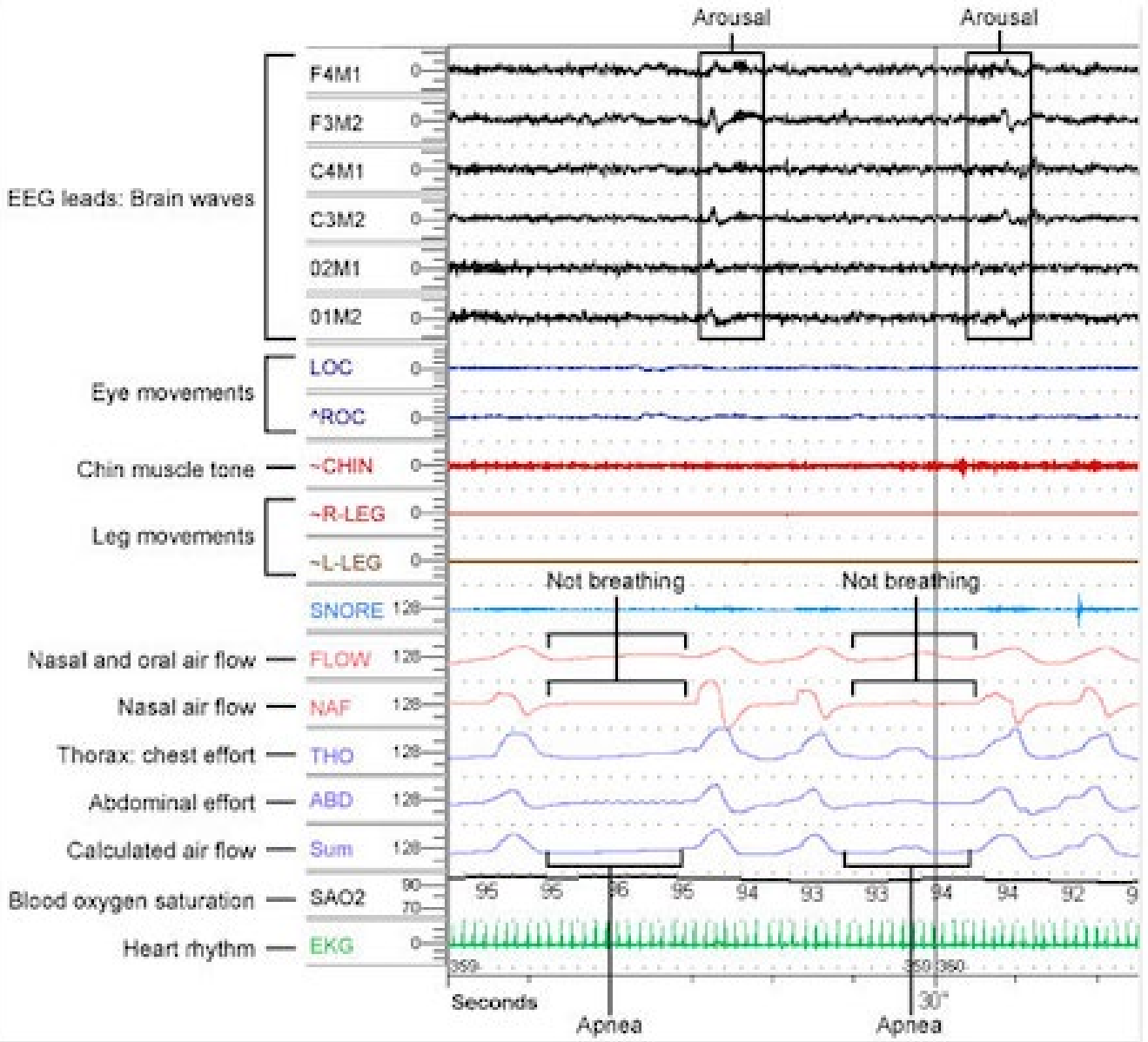


Image credit: <https://ericroth.org/portfolio/sleep-tight/>

More N3 sleep in the first part of the night  
More REM sleep in the later part of the night.



# Standard Polysomnogram

[Image credit: Division of Sleep Medicine Harvard Medical School](#)  
[Testing | Sleep Medicine](#)

When the McAllisters went on vacation,  
mineculously for the 9th time they forgot one  
little detail, an oxcraight EEG had heen  
scheduled two weeks ago



# HOME ALONe9

**HIGH DENSITY EEG HIJINKS**

Directed by **BENJAMIN BILLER**

Produced by **EASA**

JAVES FOLLAAD   REGAMION MAINE.   PRITE MEATH   MICHELL DAVIS



*Figure 2. Whole head sensor net distribution of 256 electrodes.*

# High (er) Density EEG

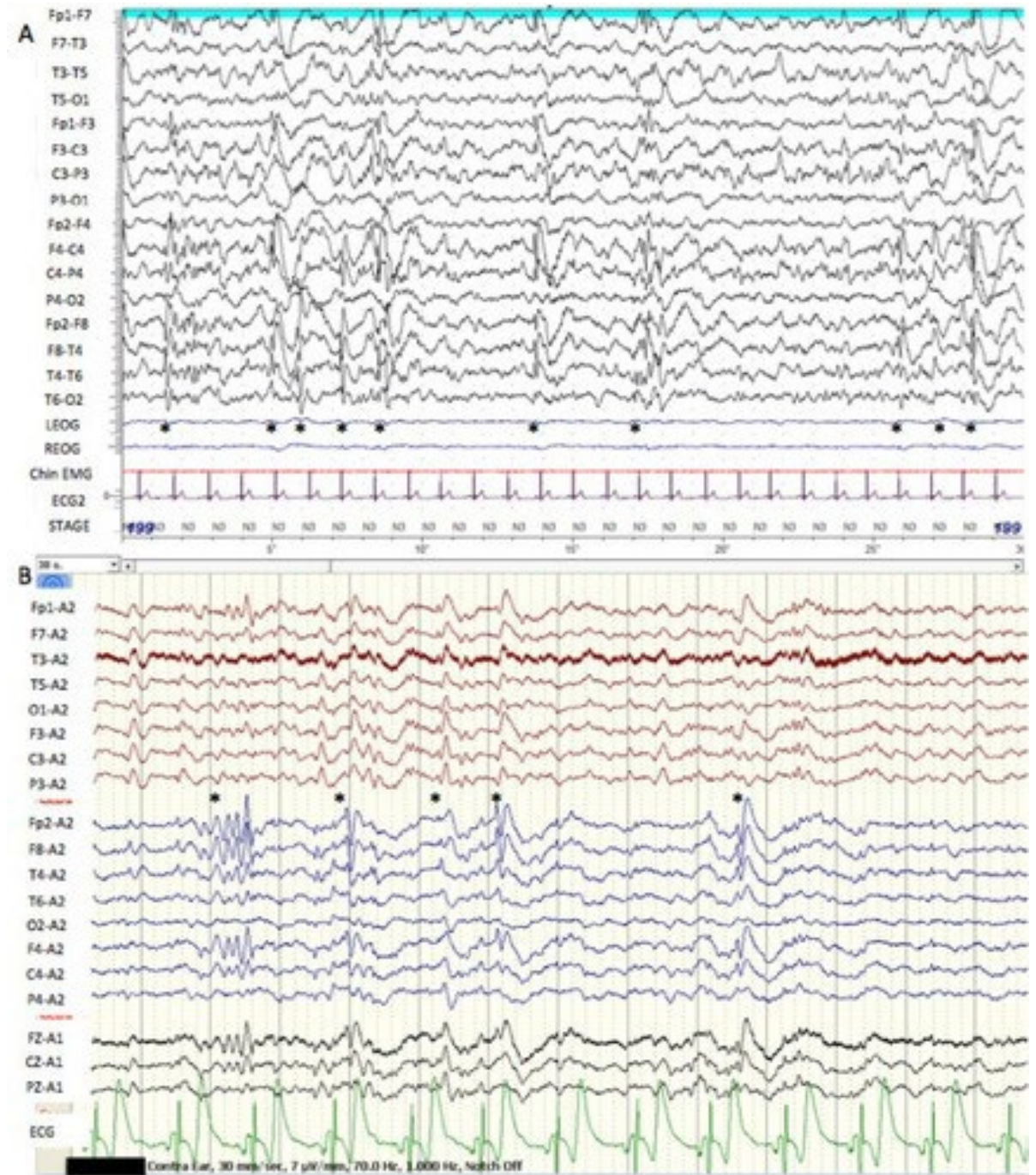
[Phillips.com](https://www.phillips.com)



# High (er) Density (HD, High Resolution) EEG in Polysomnogram

- High Density (HD) EEG, can be dozens, even hundreds of channels
- Brain waves through time and space with high resolution

[Epileptiform Discharges During Slow Wave Sleep on Polysomnogram | Journal of Clinical Sleep Medicine](#)





# Non-REM 3<sup>rd</sup> Stage Sleep (N3)

---

## SLOW WAVES



### SEARCHING FOR THAT PERFECT WAVE

DIRECTED BY BENJAMIN BELLER

PRODUCED BY RARLY INTERVENTION & PSYCHOSIS

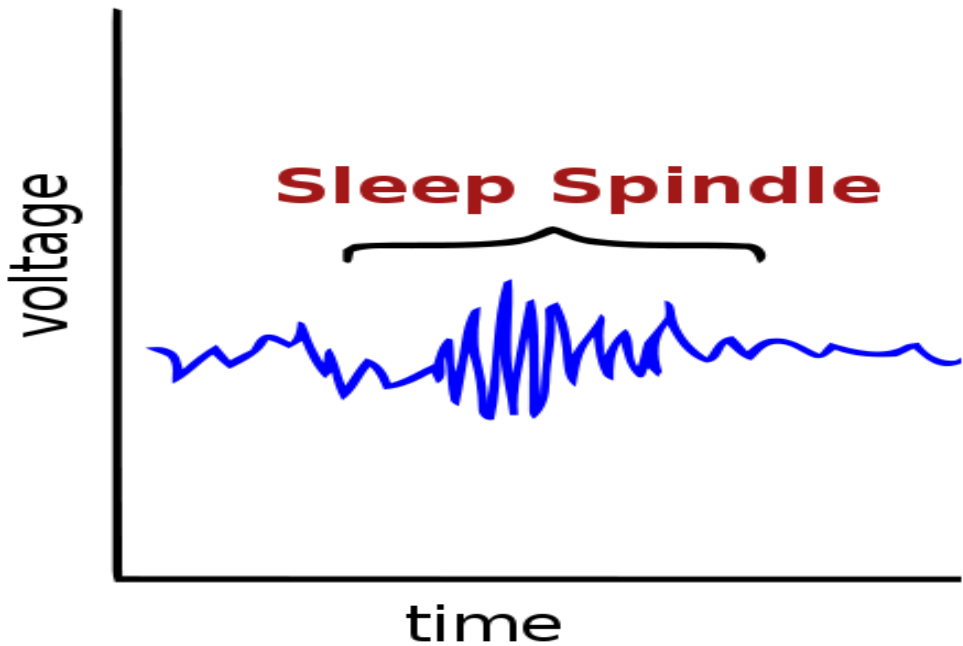
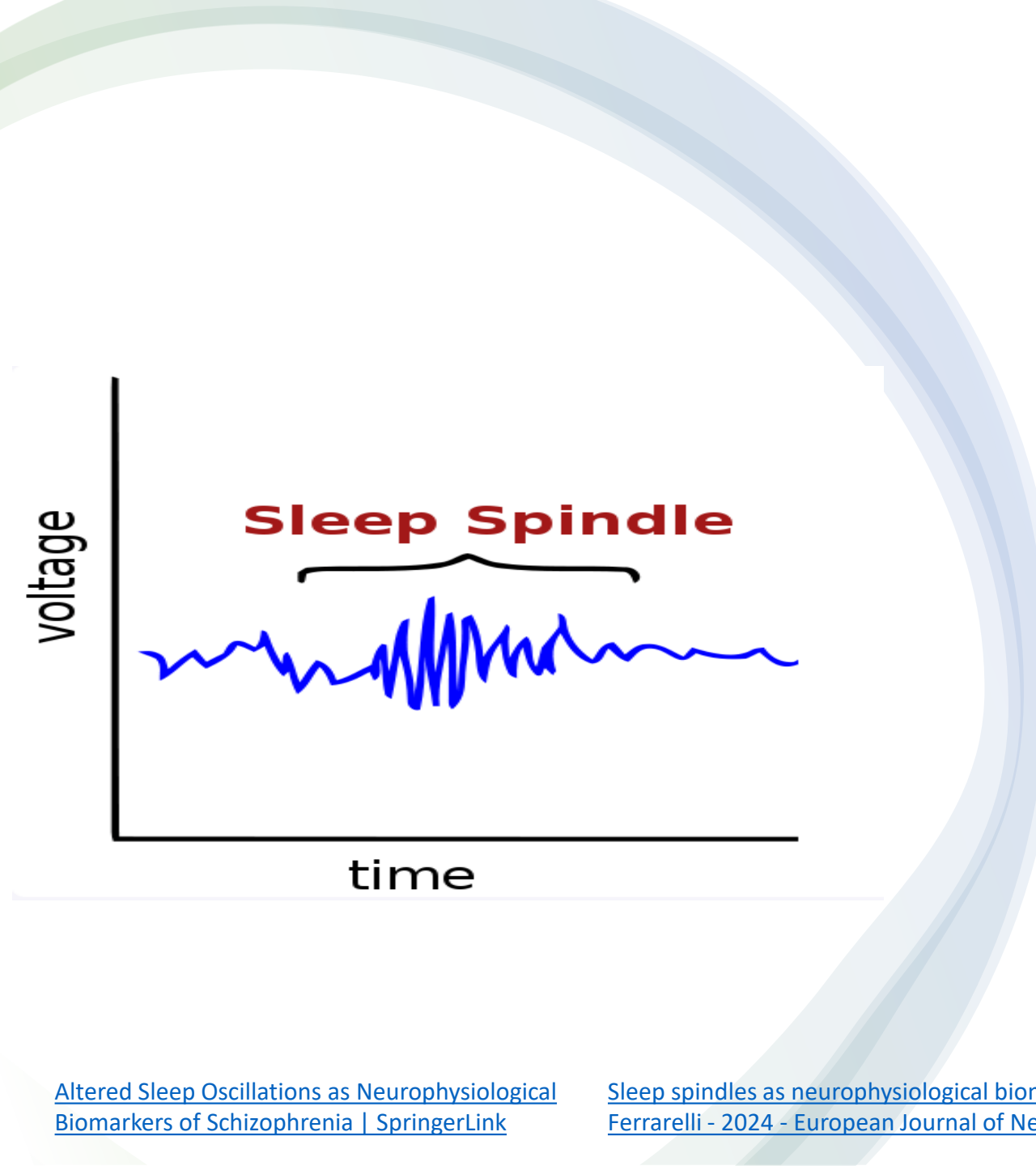
RICHARD DONOVAN WHIFFTH ACKERMAN & CHAGL ARTHUR

HERRY COOPER AS JONATHAN HERRY COOPER

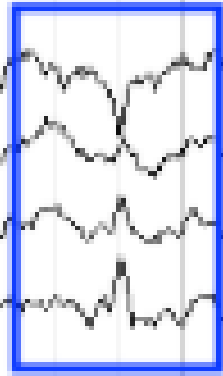
CIRENN FOGARTY & DAVID WHEELER

# N3 Sleep

- Normally reduced duration during adolescence, paralleling synaptic pruning
- “traveling waves” originate in various brain regions primarily from frontal to posterior regions
- Slow wave differences correlated with differences in cortical dopamine, serotonin, and glutamate systems

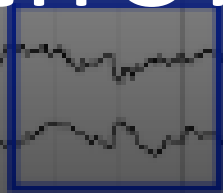


- Involved in memory consolidation and plasticity, may represent functioning of **thalamocortical circuits**, GABAergic and glutamatergic systems and cortical synchronization.
- Linked to the transfer/integration of memory traces from hippocampus to neocortex
- Spindle density increases in N2 sleep after learning, network area specific to type of learning (motor sequence vs. word etc.)



Left temporal spike, F7 max

# Epileptiform Events



# Sleep and CHR (Clinical High Risk for Psychosis)

- Higher rates of conversion tied with N3 differences
- Evidence that sleep spindle duration and frequency is less in some folks with CHR (but spindle density seems to be retained in contrast to participants identified in the FEP and CP groups) (1)
- Spindle deficit associated with prediction to conversion to FEP/CP)
- N3 also shown to have differences in CHR (i) and across FEP and CP, slow wave differences associated with higher ratings of psychosis symptoms (positive symptoms)

[Abnormal Sleep Spindles, Memory Consolidation, and Schizophrenia - PubMed](#)

[Sleep Abnormalities in Different Clinical Stages of Psychosis: A Systematic Review and Meta-analysis - PubMed](#)

[Neurocognition in clinical high risk young adults who did or did not convert to a first schizophrenic psychosis: a meta-analysis - PubMed](#)

[\(i\)Reduced slow wave density is associated with worse positive symptoms in clinical high risk: an objective readout of symptom severity for early treatment interventions? - PMC](#)

[Sleep spindle alterations relate to working memory deficits in individuals at clinical high-risk for psychosis](#)



# First Episode and Chronic Psychosis

- Sleep spindle difference shown in COS (2)
- High rates of epileptiform events (about 40% in CP)
- Decreased duration of N3 Sleep correlates with acute positive symptoms
- Spindle Deficits in density, amplitude and duration
  - Impaired sleep-dependent memory consolidation
  - Abnormal thalamocortical connectivity, thalamic reticular nucleus (TRN) [gates the relay of sensory information to the cortex]

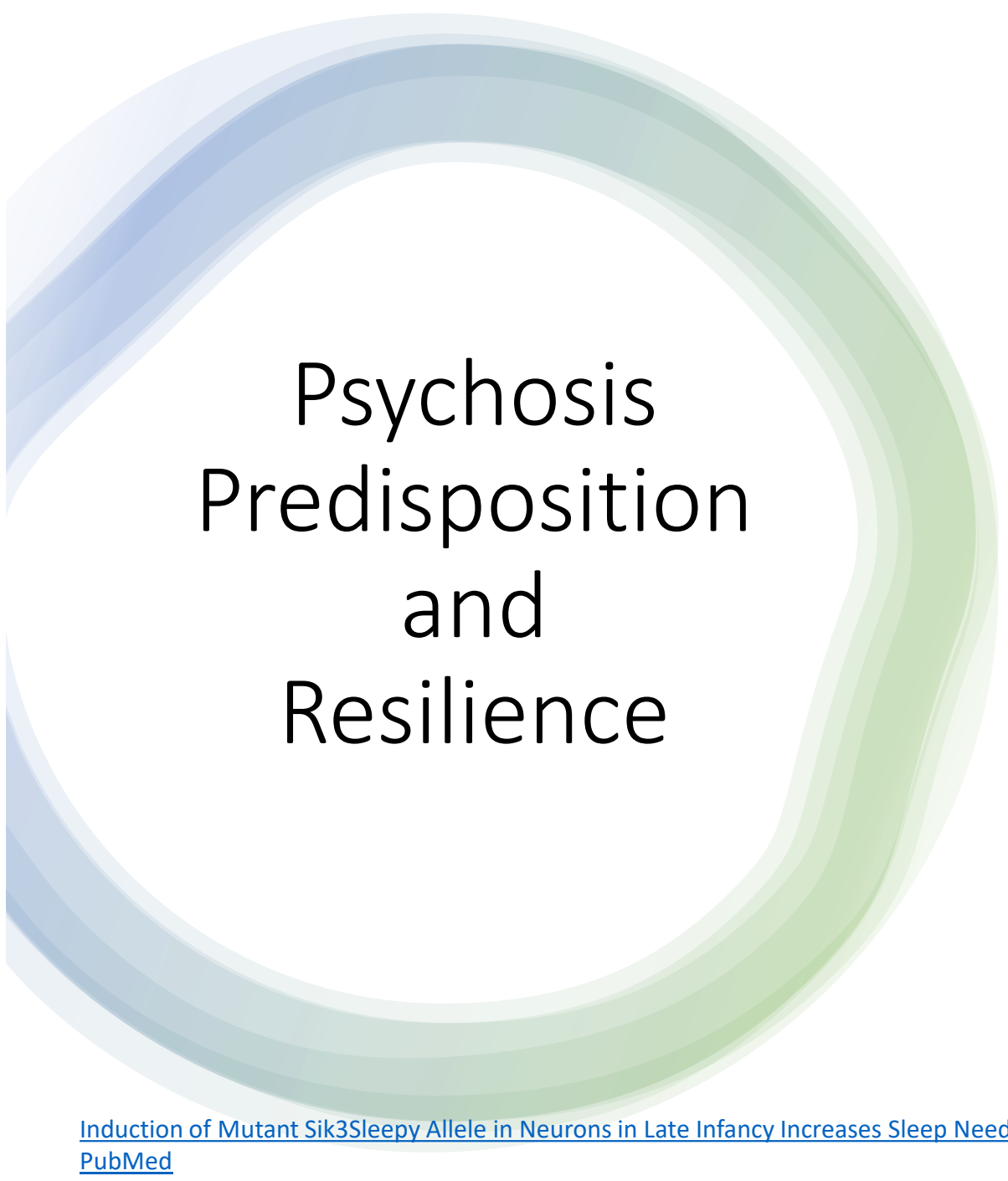
[Sleep in schizophrenia: A systematic review and meta-analysis of polysomnographic findings in case-control studies - PubMed](#)

[Sleep Abnormalities in Different Clinical Stages of Psychosis: A Systematic Review and Meta-analysis - PubMed](#)

[\(3\) Reduced slow wave density is associated with worse positive symptoms in clinical high risk: An objective readout of symptom severity for early treatment interventions? - PubMed](#)

[\(1\) Altered Sleep Oscillations as Neurophysiological Biomarkers of Schizophrenia - PubMed](#)  
[Sleep Spindle Activity in Childhood Onset Schizophrenia: Diminished and Associated with Clinical Symptoms – PMC \(2\)](#)

- [Abnormal Sleep Spindles, Memory Consolidation, and Schizophrenia - PubMed](#)



# Psychosis Predisposition and Resilience

Predisposition to both increase and decrease in N3, both duration and power

Predisposition to N3 differences not only in infancy and childhood but also with changes in adolescence

Predisposition for Spindle differences amongst first degree relatives

# Sleep and ASD

- High rates of epileptiform events during sleep
- Insomnia
- Latency falling asleep
- Sleep fragmentation
- Decreased sleep time
- Circadian Rhythm Disorder
- elevated autistic traits correlate with lower sleep spindle activity
- Overly expressed spindle activity also sometimes observed

[Autistic Traits Are Associated With Decreased Activity of Fast Sleep Spindles During Adolescence | Journal of Clinical Sleep Medicine](#)

[A preliminary study of sleep spindles across non-rapid eye movement sleep stages in children with autism spectrum disorder - PMC](#)

[Sleep, brain development, and Autism Spectrum Disorders: insights from animal models - PMC](#)

[Spindle Chirp and other Sleep Oscillatory Features in Young Children with Autism - PMC](#)

[NREM sleep EEG slow waves in autistic and typically developing children: Morphological characteristics and scalp distribution - PubMed](#)

# ASD, Psychosis and Psychotic-Like

Spindle decrease is associated with a deficit in Thalamic Reticular Nucleus (TRN) Activity:

- Disrupted thalamocortical synchronization
- increased noise in sensory processing
- reduced filtering of irrelevant stimuli (sensory gating, ability to enhance relevant stimuli is diminished)
- sensory flooding
- inability to ignore distractors (attention)
- loose associations

- sleep spindle reduction/over expression and correlated Thalamus Cortex Circuitry Deficit (Which “gates” the relay of sensory information to the cortex)
- Rates of epileptiform events on the same order of magnitude

# Bipolar Disorder, Sleep and Psychosis

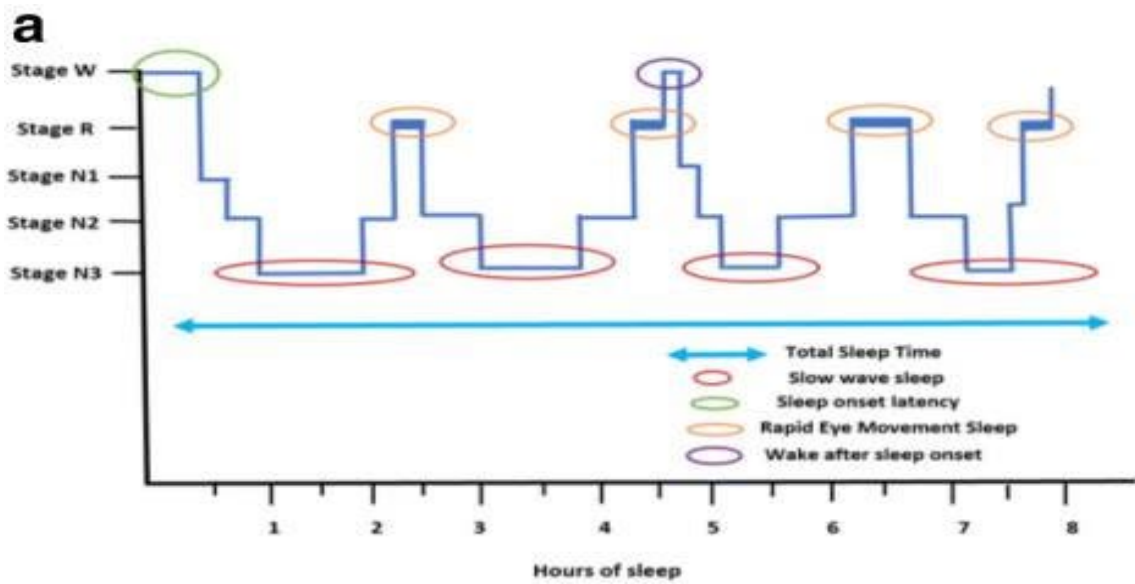
- “Switches” between mood states (mania, depression and euthymia) appear to occur during sleep itself
- Reduced slow wave density even during euthymia
- Not as frequent evidence for differences in sleep spindle power compared to CP found.

[Sleep spindle and slow wave activity in Bipolar Disorder: preliminary observations from a high-density EEG study - PMC](#)

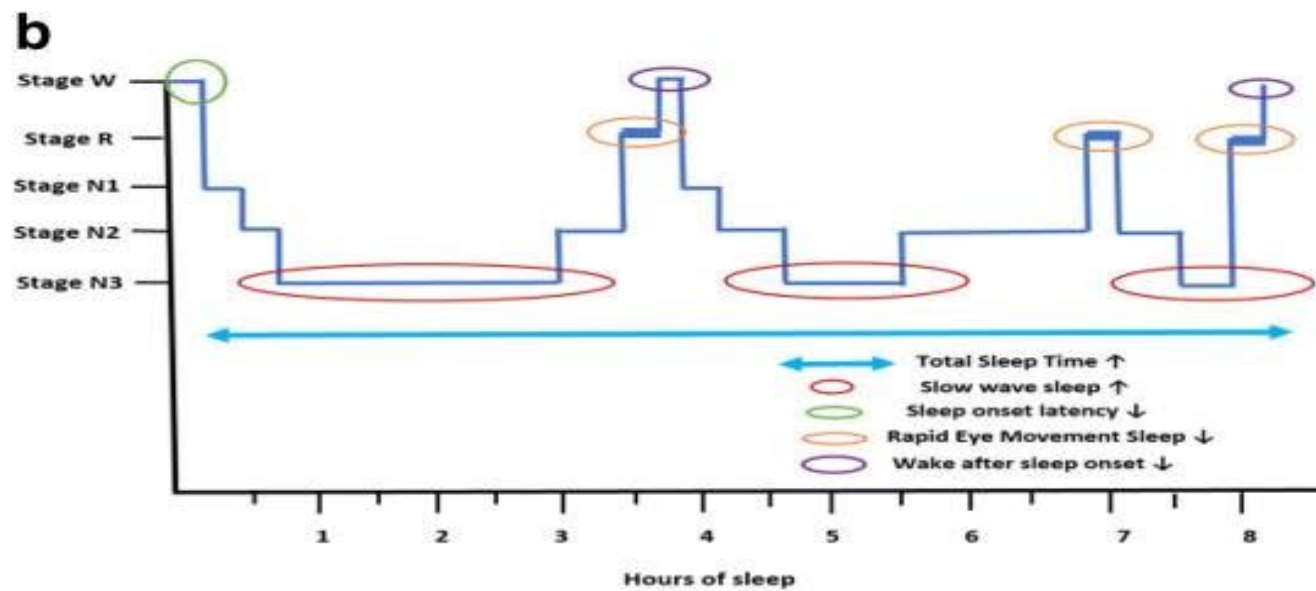


# THC and Sleep

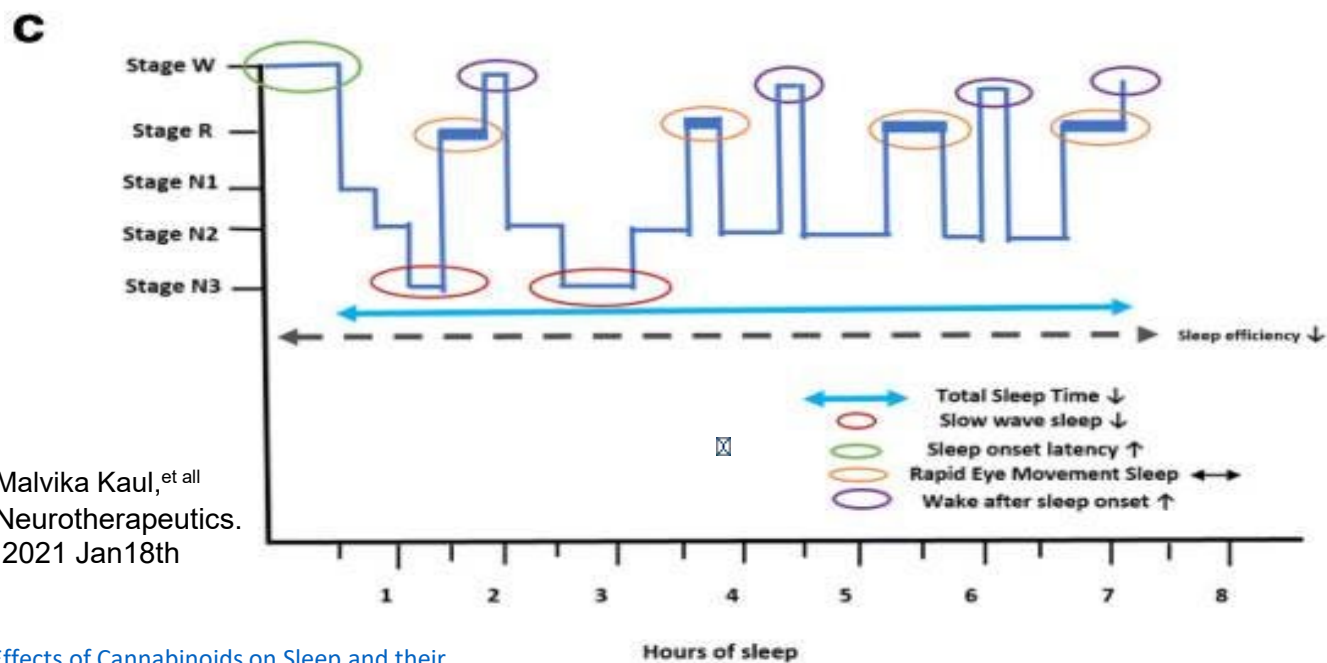
**Frequency, Dose, Duration, Method**



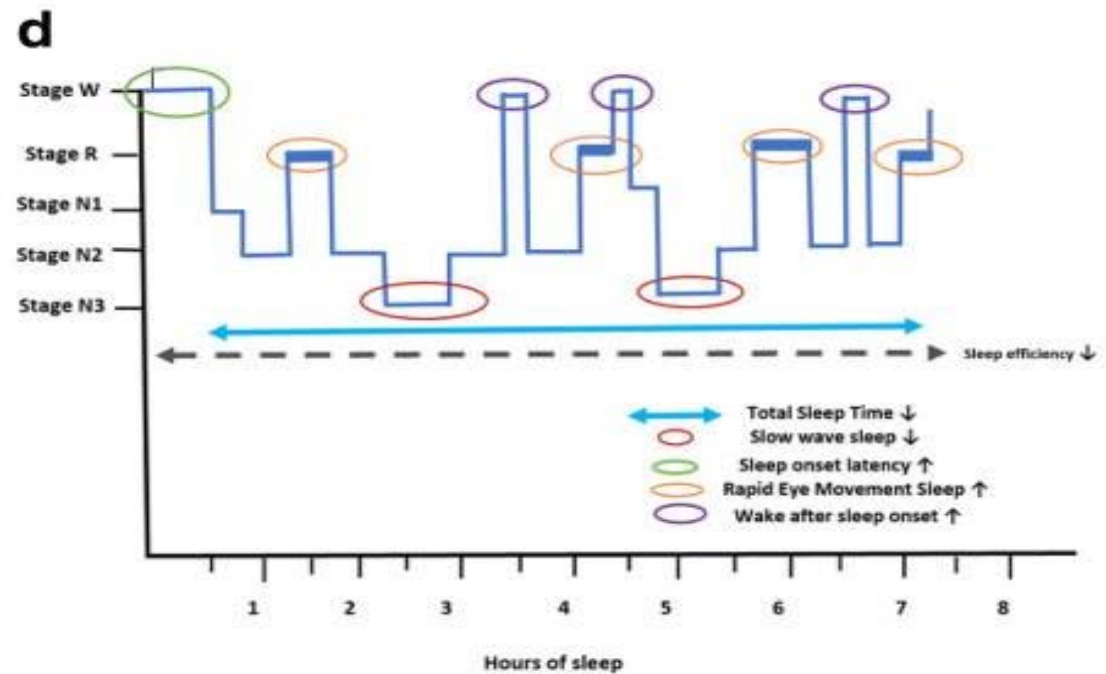
Normal Sleep hypnogram



Short-term effects of cannabis on sleep architecture



Long-term effects of cannabis on sleep architecture



Effects of cannabis withdrawal on sleep architecture

Malvika Kaul, et al  
Neurotherapeutics.  
2021 Jan 18th

[Effects of Cannabinoids on Sleep and their Therapeutic Potential for Sleep Disorders - PMC \(nih.gov\)](https://pubmed.ncbi.nlm.nih.gov/34411111/)

# Trauma/PTSD

Hyperarousal during sleep disrupts the all important N2 and N3, causes nightmares and intense/vivid dreams

And deficit in N3 likely creates conditions for associated psychosis when present

Overall Interrupted sleep architecture (stages overnight)

# Trauma/PTSD and Sleep: in the lab

- Immune activation (in utero and after birth) produces life long sleep disorder in animal studies in the lab
- Anhedonia directly correlates with prolonged REM sleep after exposure to extreme stress/trauma

**Lucas and Carlezon, 2018**

<https://www.mcleanhospital.org/video/lecture-sleep-matters-translational-efforts-examine-connections-between-sleep-and-mental>

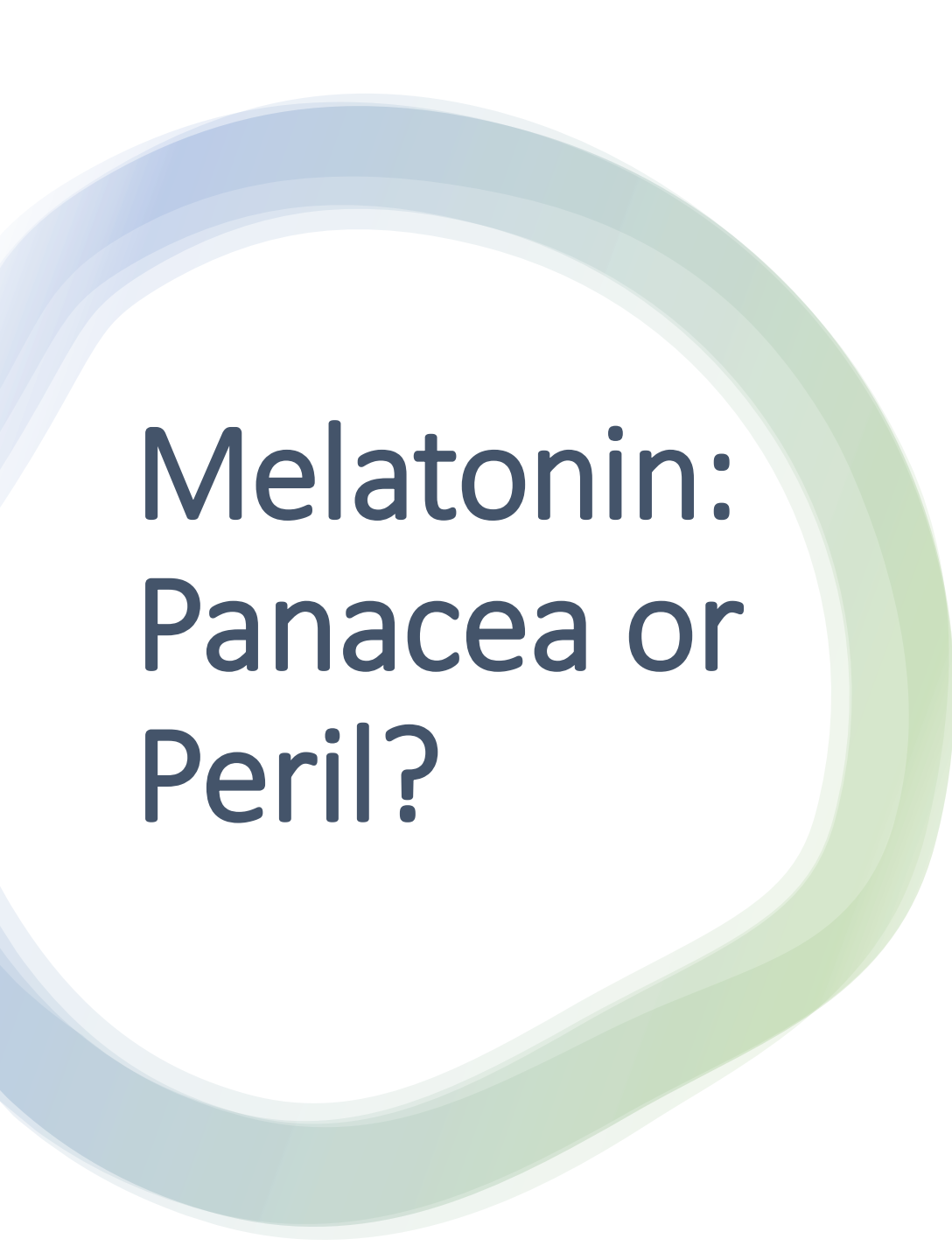
# Borderline Personality Disorder and Sleep





# Medication, Sleep and Psychosis

- Olanzapine, risperidone, lithium, and paliperidone shown to increase slow wave sleep
- Quetiapine may decrease slow wave sleep in some cases (possibly explaining rare buoying effect with mania)
- Muscarinic Receptors (especially M1) shown to be critical for sleep architecture
- benzodiazepines and anti-epileptic medications often used to treat epileptiform events
- Clozapine and Lamotrigine associated with increased GABA activity in the thalamocortical circuitry
- Antidepressants with norepinephrine and dopamine mechanisms of action tend to disturb sleep
- Aripiprazole shown to greatly regulate circadian rhythm



# Melatonin: Panacea or Peril?

- Naturally produced hormone from pineal gland
- Regulates body's internal clock
- When timed deliberately it can:  
Effectively shift the sleep-wake rhythm and endogenous melatonin rhythm in circadian rhythm disorder (or jet lag)

# ASD and Circadian Rhythm: Melatonin/Melatonin Analogues

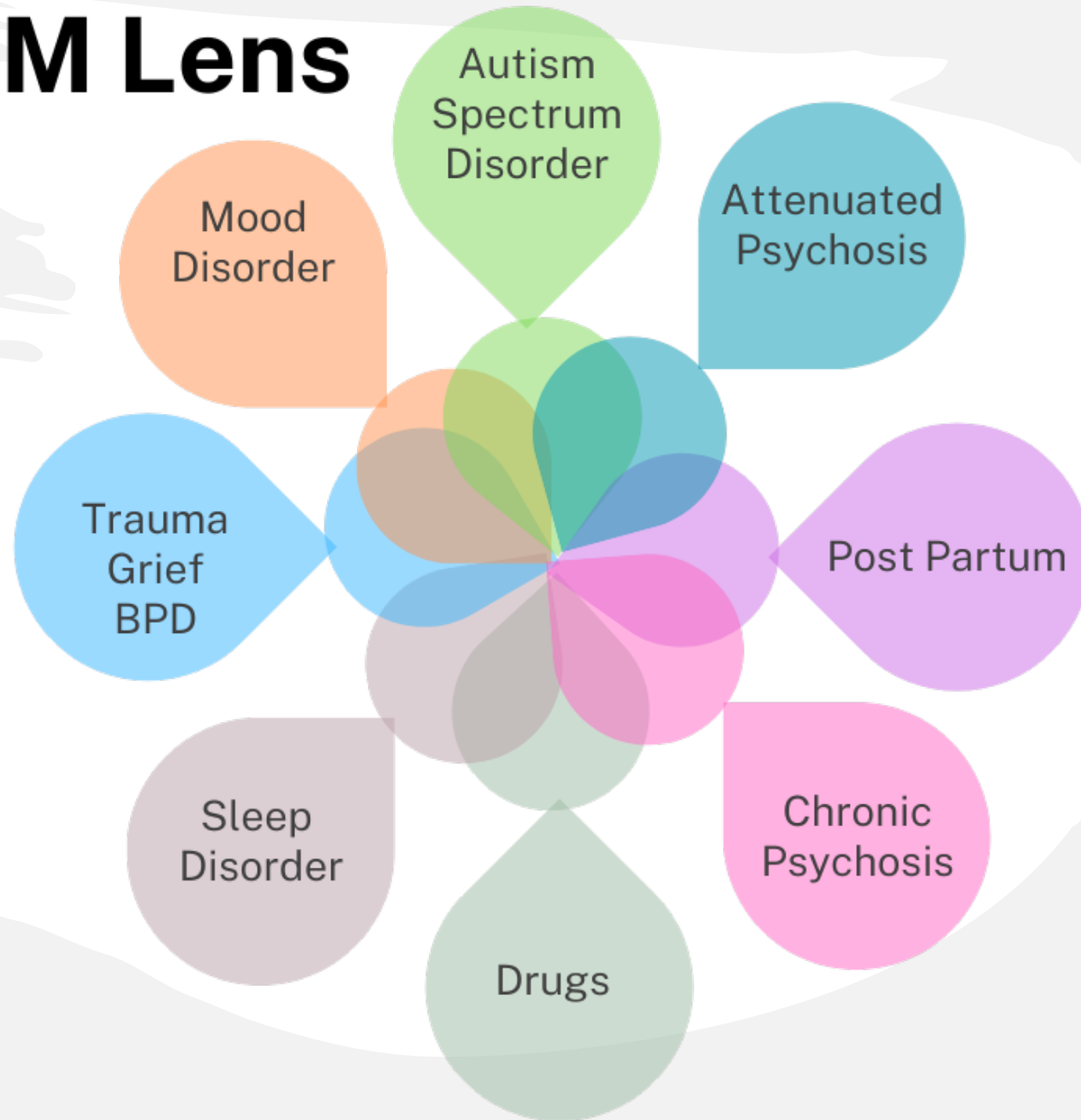
- Circadian rhythm disturbances in 40-86%
  - Increased sleep latency
  - Decreased total sleep duration
  - Nocturnal and early morning awakenings
- Decreased natural nocturnal melatonin secretion
- Melatonin supplementation consensus: 26 clinical trials from 1996-2017 suggesting improvement in all domains collectively
- Research suggests lower melatonin in parents of children with autism – Unclear significance at this time



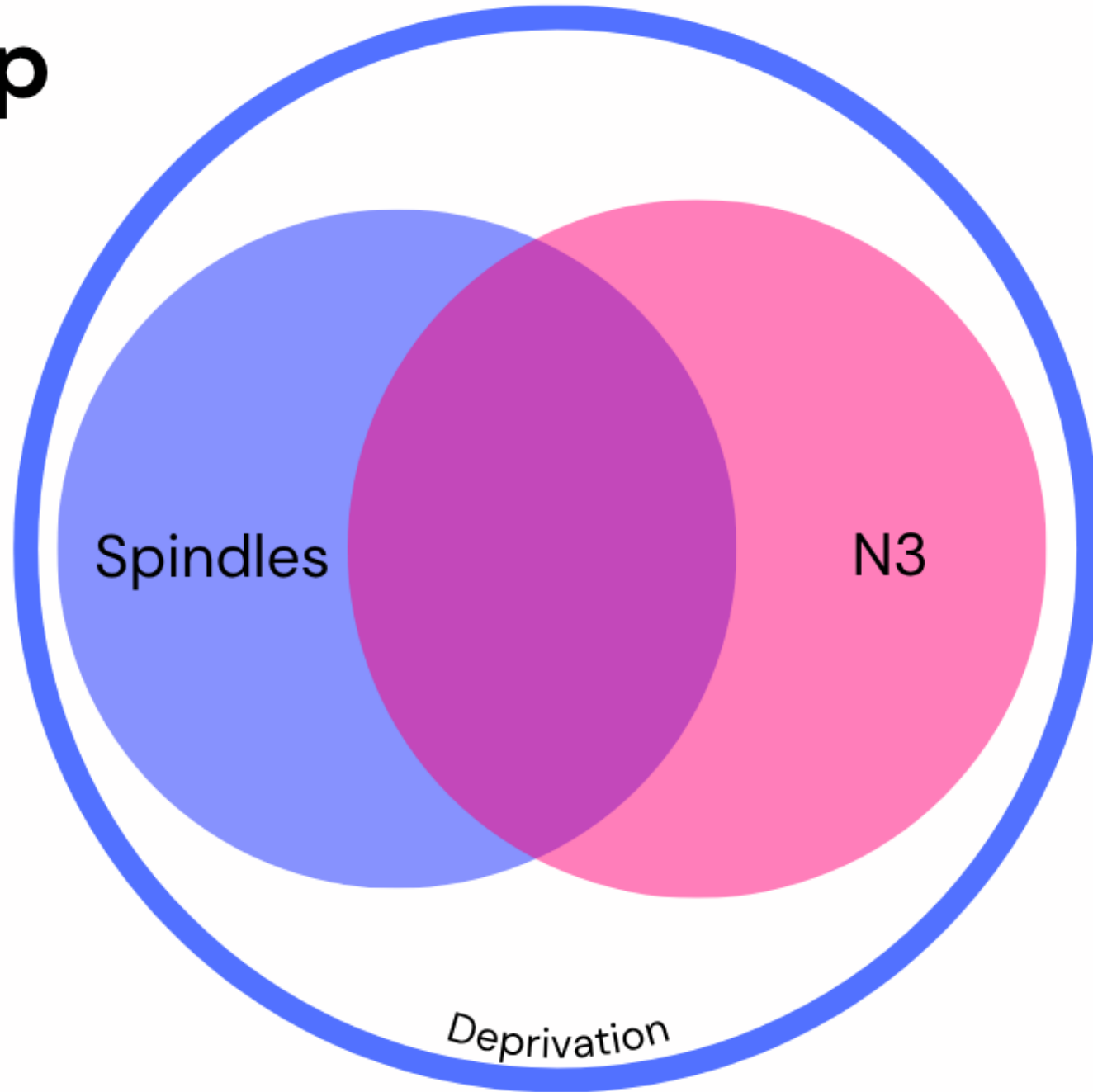
# Refer To Sleep Medicine/Overnight EEG?

- Ask the Dentist! (can catch pediatric OSA risk – need for palate expander, “mouth is too small for braces” etc)
- **Consult with PCP:** Physical exam examining structure, Iron Deficiency, Sleep dysregulation secondary to menstrual cycle, Thyroid disease
- No matter how much sleep, “I’m still tired”
- Concerns with attention, concentration or memory (arguably anyone with concerns for or diagnosed with ADHD)
- Headaches
- Neuropathic pain/fibromyalgia type symptoms
- Idiopathic Hypersomnia/worrisome napping
- Parasomnias (night terrors, sleep walking, talking etc.)
- Which participants accepted for CHR, Extended Screening or FEP?!?

# The DSM Lens



# The Sleep Lens



# What can be done with home based overnight EEG?



[The Wet-EEG Cap: Semi-Dry, Saline & Gel EEG caps | Bitbrain](#)

[Versatile Kids EEG | Pediatrical water-based EEG cap with 16 or 32 channels](#)

- Assess N3
- Assess Sleep Spindle Power
- Assess epileptiform events
- Assist in diagnosis and treatment

\* With sufficient resolution (11-20+ leads), High Density (e.g. 256 leads, likely not necessary for sufficient clinical data)





# Intensive Outpatient and Overnight EEG

- Equipment is about \$40k, able to perform one study per night
- Technician sets up equipment at night/afternoon and removes in AM
- Data needs analyzing, to date University Researchers have offered to assist

# In Hospital Overnight EEG

- Now typically “15 minute checks”. If person appears awake they are marked as awake, if person appears asleep then they are marked asleep
- No insight into sleep quality, assessment of OSA risk (no notation of snoring) – concerning as anecdotal data that 75% of all psychiatric patients have OSA (medication caused or otherwise)



# Sleep, and BC EASA

In the last year five BC EASA ongoing and screening clients have successfully been referred to sleep medicine and completed 4 polysomnogram and one Home Sleep Study: Sleep Apnea (1) and Circadian Rhythm Disorder (1) have been diagnosed

- Samaritan uses a 7 lead EEG which is not sufficient resolution to assess for epileptiform events
- assessing N3 consideration of PTSD, Bipolar Disorder etc.?
- assessing spindle power in the context of psychosis or ASD?
- assessing for markers of PTSD (which may have misdiagnosed as circadian rhythm disorder)?

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Thank You!

Benjamin Biller

benjamin.biller@  
bentoncountyor.org



I DON'T WANT BETTER,  
SAID ALMOST NIBODY EVER.

A RERBA TO NEP OENES CEINES BI DAVIDE GIES SE DEVIER

THE ANNEALVINER **STRANGER** THE UTER JEDINEN  
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