Insomnia in Children: Who, What, Consequences, and the Approach to Fixing it!

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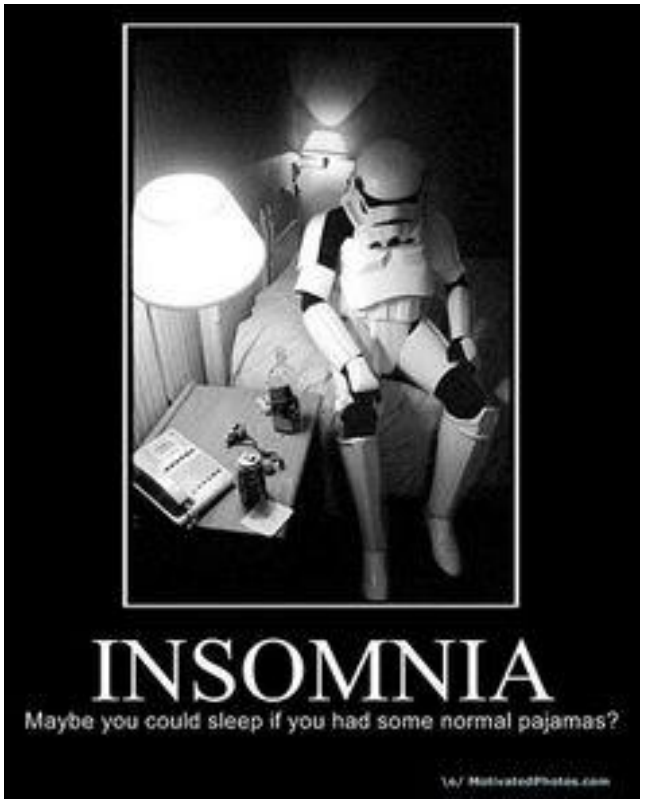
- *The Force Awakens,*

And can't get back to sleep…



Alternate Title

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SLEEP SOCIETY

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Alternate to the second alternate title

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Definitions

- ICSD-3 defines insomnia as "a repeated difficulty with ***sleep initiation, duration, consolidation, or quality*** that occurs despite ***adequate opportunity*** and circumstances for sleep, and results in some form of ***daytime impairment***."
- This is no different for toddlers, teens, parents

"Soon will I rest, yes, forever sleep. Earned it I have."

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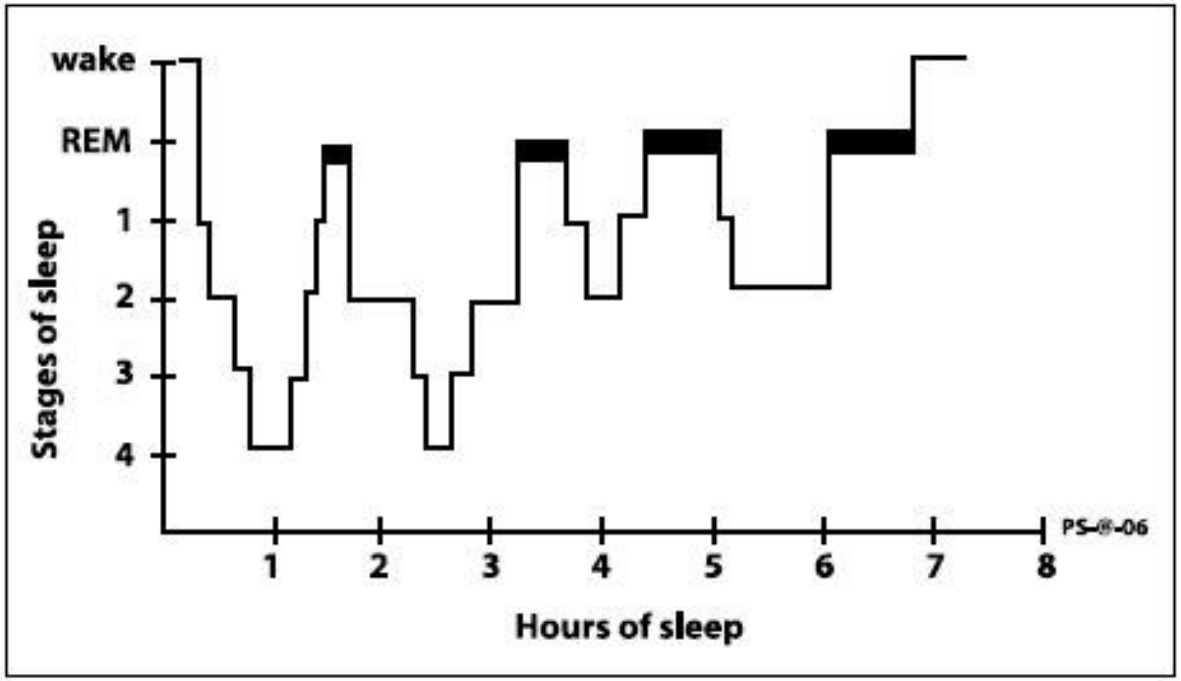
Sleep is not a “passive” state



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2 Components of normal sleep

- Non-REM:
  - Non-Dream Sleep
  - "Front-loaded"
  - Restorative Function
    - Metabolic
    - Growth Hormone
    - Heart rate/O2 use
    - Brain/Body Rest

- REM:
- Dream sleep
  - "Back-loaded"
  - Information Processing
  - Memory
  - ?Creativity
  - Organize/filter/store
    - Heart Rate/O2 use
    - Metabolic activity

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What determines sleep for us?

- Homeostatic Drive (sleep dependent).
  - The "all-nighter", and then sleep.
  - Residency, or now- resident left and I am doing charting..

- Circadian Rhythm (non-sleep dependent).
  - Driven by "clock" in suprachiasmatic nucleus of the hypothalamus, it runs longer than 24 hours and we "entrain" sleep/wake with environmental zietgebers- light, traffic noise, roosters, light-sabers..

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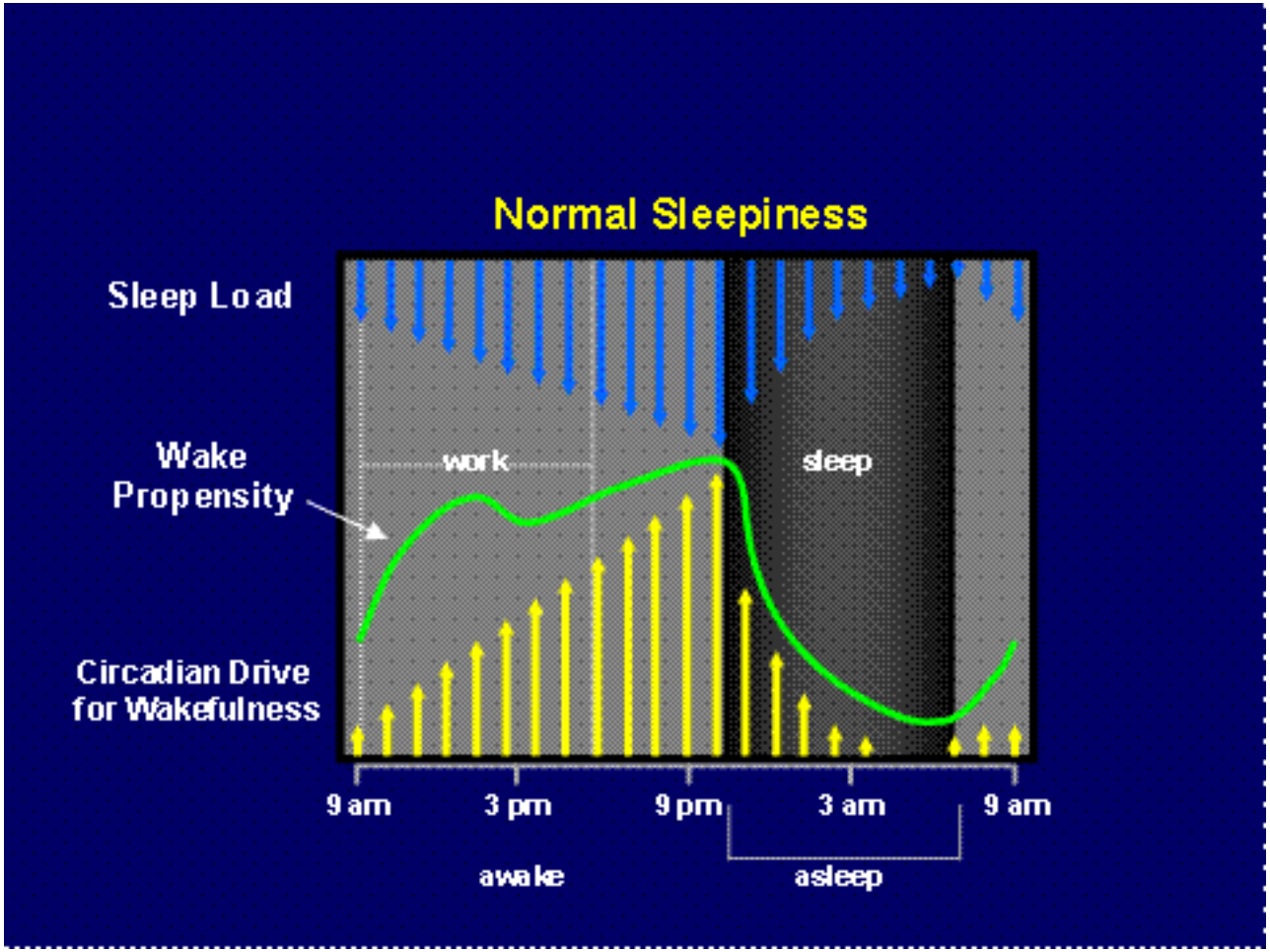

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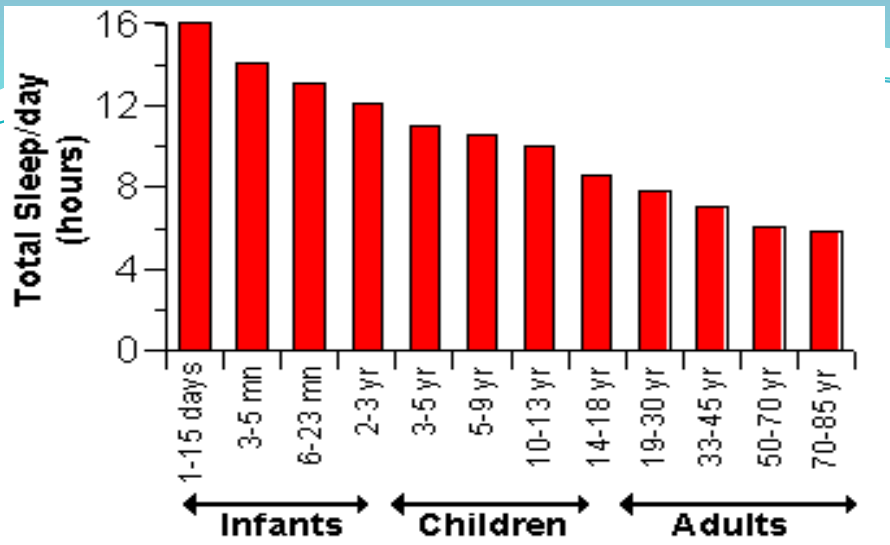
Mammalian Total Daily Sleep Time (in hours)

- Giraffe 1.9
- Asiatic elephant 3.1
- Human 8.0
- Domestic cat 12.5
- Lion 13.5-20
- Wookie 5
- Roe deer 3.09
- Pilot whale 5.3
- Baboon 9.4
- Lab rat 13.0
- Bats 19.9
- Hutt(jabba) 19



This means you! We all have our own sleep need.

How Much Sleep Do You Really Need?	
Age	**Sleep Needs**
Newborns (0-2 months)	12-18 hours
Infants (3 to 11 months)	14 to 15 hours
Toddlers (1-3 years)	12 to 14 hours
Preschoolers (3-5 years)	11 to 13 hours
School-age children (5-10 years)	10 to 11 hours
Teens (10-17)	8.5-9.25 hours
Adults	7-9 hours

Source: National Sleep Foundation

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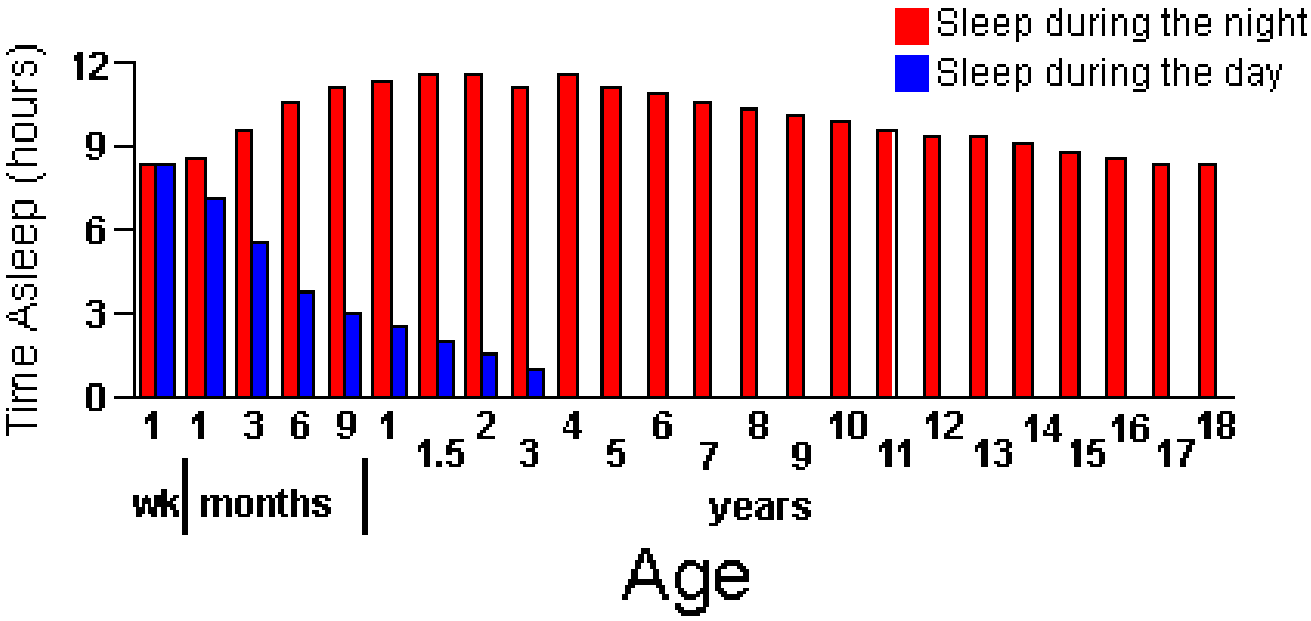
How much sleep do kids need?



Parents, providers often get STUCK on shooting for a predetermined sleep amount. Individuals are all different.

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Sleep Disorders in Children

- ~25% of children will suffer some type of sleep problem at some point during childhood
- Complaints range from bedtime resistance and anxiety to primary sleep disorders, such as OSA and narcolepsy
- Research is remarkably consistent, with parents reporting 50% of preschool children, 30% of school aged children, and 40% of adolescents as having sleep difficulties
- Self-report among adolescents reveals 14 – 33% complaining of frequent or extended nighttime awakenings, EDS, unrefreshing sleep, early insomnia, and a subjective need for more sleep

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Insomnia in Pediatrics: Prevalence - Lit Review, Office-Based Diagnoses & Drug Use

Carolyn McCloskey, MD, MPH & Amarilys Vega, MD, MPH
FDA/CDER/Office of Postmarketing Drug Risk Assessment

Pediatric Advisory Subcommittee Meeting

November 16, 1999

Insomnia - Literature Review Prevalence Rates

Sleep Problem	Age	Prevalence	Med
Chronic Poor Sleepers[1]	12-18 yo	12%	4.6%
Poor sleep[2]	15-20 yo	13%M 10%F	17%
Sleeping poorly[3]	8-10 yo	14%	4%
Sleep difficulties[3]	8-10 yo	43%	--
Sleep disturbance[4]	high sch	40.8%	--

[1] Levy 1986, [2] Patois 1993, [3] Kahn 1989, [4] Vignau 1997

Numbers

- A cross-sectional study was conducted on patients aged ≤17 years with sleep difficulties from 1993–2004
- During 1993 to 2004, approximately 18.6 million visits occurred for sleep related difficulty in children. The highest percentage of visits were by school-aged children (6 to 12 years). Pediatricians saw 35% of patients, psychiatrists saw 24%, and general/family practice physicians saw 13% of the patients. **Eighty-one percent of visits among children with sleep difficulties resulted in a prescription for a medication**
- Sleep. 2007 Aug 1; 30(8): 1013–1017.
- PMCID: PMC1978388
- **Trends in Medication Prescribing for Pediatric Sleep Difficulties in US Outpatient Settings**

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Classification

- Insomnia(ICSD-3)
  - Chronic Insomnia
    - Primary, Psychophysiologic, due to mental or medical disorder, drug related, etc.
  - Short term
  - Other
  - Isolated symptoms and other
- Pediatrics
  - Can divide into:
  - Infant/Toddler
  - Older child/Adolescent

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Infant/toddler

- Behavioral Insomnia of Childhood
- There are 2 subtypes of behavioral insomnia syndromes:
  - Sleep-onset association type
  - Limit-setting type.

These are sort of siblings..

Sleep Onset Association Disorder

- Difficulty falling asleep and returning to sleep when specific environmental conditions are not present (i.e. bottle, pacifier, music, being rocked)
- Perceived by parents as being a problem when:
  - Sleep onset delayed- it takes hours, he ALMOST get there, then wakes as we put him down
  - Frequent attention needed to help child fall asleep
  - Child's daytime mood or attention suffers
  - **Parents are losing sleep**!
  - He is unable to sleep alone- ever. We have tried.

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Limit Setting Sleep Disorder

- Exclusively a childhood sleep disorder
- Characterized by:
  - **Stalling behaviors or refusal to go to bed** at the desired time(curtain calls)
  - Associated with inadequate parental limit setting for a child's behaviors
  - Consequence often co-sleeping

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Case Study

Precocious toddler, BF, who is three years old.
Healthy, thriving, and actually quite ahead of himself in regards to using advanced
Technology(weaponry).
Parent(single), notes he has NEVER been able to sleep in his own bed through the night.
He typically gets ready for bed at 7, 7:30. Takes a bath- which is a struggle.
He puts on PJs, brushes teeth.
In his toddler bed- alone- with favorite show on TV with a timer.
Sometimes, falls asleep with parent, then moved to bed.
He fights sleep, but after 30-45 minutes - finds his way to sleep.
Wakes at 9- almost like clockwork—screaming!
Parent tries to console him, with little success, but finally he wakes up and Immediately falls asleep in Dad's arms. Back to bed.
His dad is able to see him in room via video, he seems fitful.
He usually wakes at least once more- but clearly awake
And demands Dad- or simply goes to Dad's bed. Sometimes Dad is not even aware, but regardless will sleep there until start day at 7:30. IF he has a rough night, he may nap at daycare which is from 8-4.
This repeats nightly, and benadryl, clonidine, melatonin, Have no effect. Help.

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Technology

- https://youtu.be/ajFd_Tf7D1M

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Treatment

Remember, there are only two things that make you, me, him, go to sleep!

Homeostatic Drive

Circadian Drive

- Help me Obi Wan, you're my only hope!

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Treatment Plan

- 2 week plan to normalize sleep-weekends included.
- You need to have 2 weeks to devote to this- during which you(and toddler), may have very rough nights, and days to start.
- Who is helping? Grandparent- help or not?
- This is NOT forever.
- Disavow false beliefs about being able to sleep solo, or need and usefulness of technology.
- We will moderately restrict sleep time, and we will set up a strong "circadian" environment to help him sleep.
- Once successful, you can slowly move sleep onset time earlier.

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Details

- Start sleep routine at 8, 8:30, 9 (not 7).
- Ritualized- maybe with storyboard (PJs, teeth, get his blankie, then to bed).
- He is IN bed, you sit next to him.
- No discussions of the force, the Empire, Jedis.
- Dim light, and picture book he can look at after story time.
- White noise(fan, not Figrin D'an and the Modal Nodes)
- Once asleep- however long it takes- you leave.
- He MUST stay in bedroom. This can be a gate, closed door, or you as bouncer.

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Details

- He wakes- you have two options.
  - Gradual Extinction
  - One Stop shopping
- NO naps.
- Exercise plan- something if there is nothing beyond tablet, tv.
- Daytime- daycare must know, and you are aware it will be "worse before better".
- ONCE sleep established- nap, or slow move to earlier sleep onset time is fine.
- CO-morbid medical issues(OSA, reflux, pain).
- Mood/behavior- any primary issues? Is there a role for more structured behavioral, family therapy?

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Genetics

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Insomnia in older child/adolescent

- More closely resembles adult disorders
  - Insufficient sleep
  - Delayed Sleep Phase Syndrome
  - Primary Insomnia, see Han Solo's insights on tech.
- Often due to **extrinsic** factors
  - Stress
  - Anxiety/Mood
  - MANY distractions, social pressures, technology intrusions

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3 P's of Acute Insomnia

- Predisposition
  - Anxiety, depression, **family hx**, Rett, Angelman,etc.
- Precipitation
  - Sudden changes, high school(start time?), got first phone, tablet, admitted, pain crisis, new medication was started, or stopped.
  - Homework after yearbook, soccer, and classes at Jedi academy.
- Perpetuation
  - Poor sleep hygiene, pattern formation(binging on weekend)
  - Parental fears, anxieties lead to inaction?
  - Series of steps leads to the chronic condition and consequences.

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Insufficient Sleep

- **Most common cause of sleepiness at all ages!**

- Homework, television, and after-school employment and activities compete with the need for sleep
- Parental influence on bedtime hour decreases from 50% at 10 years to <20% at 13 years*
- Despite decreasing total sleep time, adolescents often need more sleep than do younger children

*Carskadon MA: Patterns of sleep and sleepiness in adolescents. Pediatrician 17:5, 1992

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Mood Disorders: Epidemiology

- 2/3 of depressed children have early & middle insomnia and 50% report late insomnia
- Up to 88% of depressed adolescents report sleep disturbances (primarily insomnia) with up to 25% of these reporting hypersomnia
  - Approximately 10% experience continual insomnia after the depression has lifted
  - Genetics a real player!
- One study of bipolar children found 40% had a dramatically reduced need for sleep (vs. controls and those with ADHD)

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Anxiety Disorders: Epidemiology

- Anxiety and insomnia are intimately tied in childhood
- Sleep problems by age 4 are correlated with later onset depression and anxiety by 15
- Nighttime fears are common (up to 75% report)
- Sleep problems typically follow for those children with DSM-V anxiety disorders (PTSD, OCD, school refusal, etc.)
- Genetics
- Treating associated mood disorders critical, and will lead to success more often.

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Typical Teen

- Erratic sleep, with element of primary insomnia and subsequent disrupted, fragmented insufficient sleep.
- Case

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Case 2

- 17 yr. old teenager, KR, presents with poor, erratic sleep. Seeing us due to extreme behavior issues, urgent issues regarding school absences.
- Patient states he has been this way for years, and never was a good sleeper. Apart from occasional unpleasant dreams, his sleep- when it occurs, is notable for moderate snoring, and somewhat fitful.
- He is otherwise healthy, but does seem- well, rather moody and irritable, with a tendency to fly off the handle at any moment..

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Sleep history:

He goes to bed late, usually 11-12, and will get in bed with his tablet, or his Iphone. It is dark, very dark. Also quiet. Sleep comes after an hour or so, and he will sleep for a few hours. He often wakes, and if he cannot fall asleep quickly- will either go to phone, or turn on laptop. He wakes to an alarm at 6:30,

But hits snooze- getting up closer to 7.

IF he has a bad night, he may skip school, sleep in till 10.

Weekends- up until 3 on computer, sleep until 10, 11, or so.

His day – apart from school, is mostly by himself, and he states he is a "loner".

He likes online reality games. Often first person shooter games.

He does not routinely nap.

No real exercise as part of his routine. In past some martial arts.

He does not drink coffee, but does drink energy drinks- often several a day.

There is a lot of friction in his home, but he is close to his grandfather.

Has tried lots of medications, none work.

Treatment

Remember, there are only two things that make you, me, him, go to sleep!

Homeostatic Drive

Circadian Drive

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Sleep Restriction

REMIND patient and parent at start—this is a 2 week pledge to each other!

NOT a month long process to succeed

- Use homeostatic force to our advantage
- Estimate the time actually asleep then limit bedtime to that amount, but no less than 5 hours!
- Add time in bed gradually once the patient sleeps consistently.
- MUST move clock back slowly(fifteen minutes, a few days fifteen minutes, a few days).

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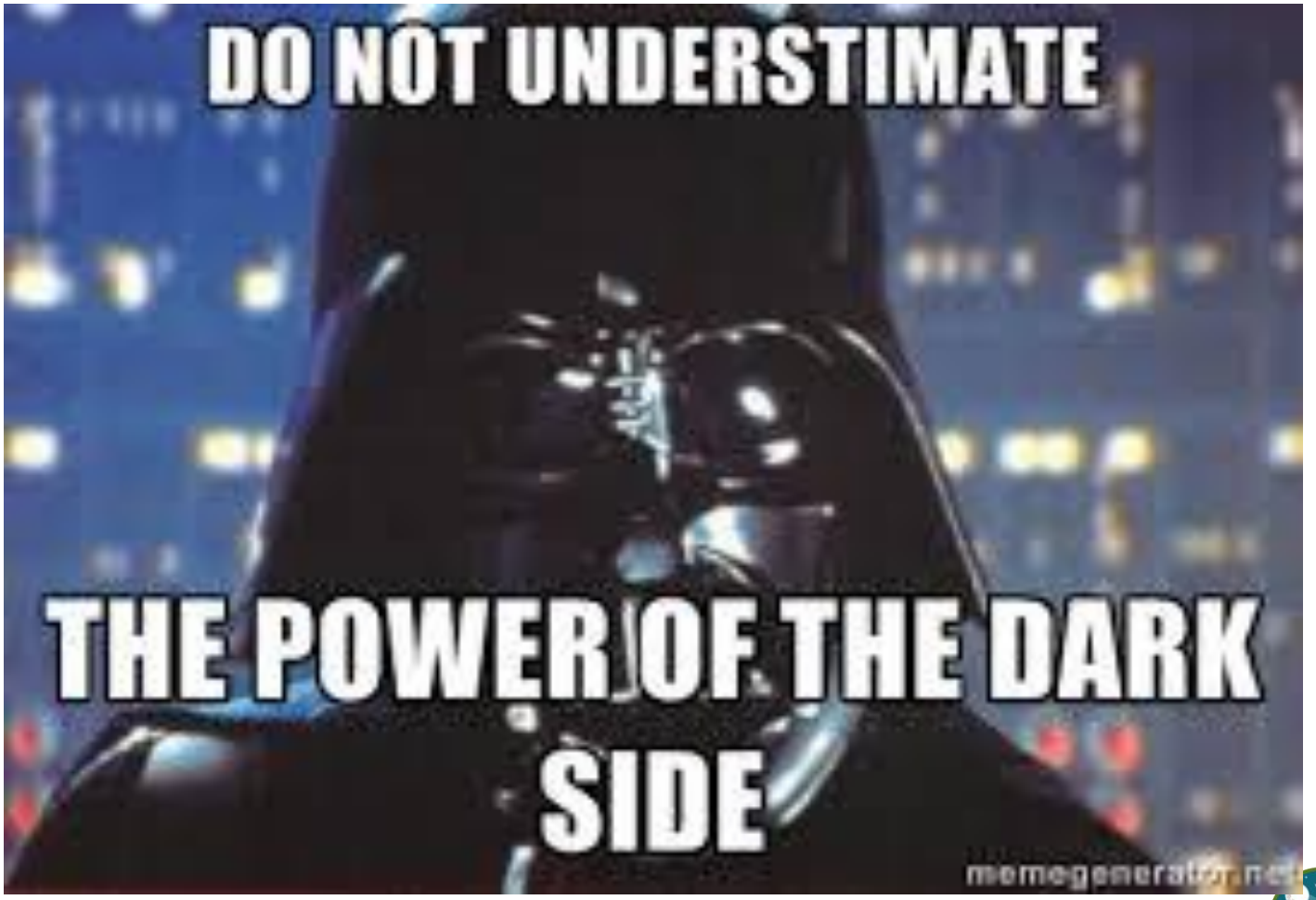
Light, or not



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Sleep Hygiene

- Exercise earlier during the day, and no more than 4-6 hours before sleep
- Keep bedroom dark, BUT --DO have nightlight so you can read. No clocks to be seen.
- White noise
- Bedroom- limit social time there. Is parent aware?
- Avoid naps—for INSOMNIA*
- Avoid stimulus or stimulating activities before sleep or in bed—NO TECHNOLOGY
- Light snack before bedtime is ok
- Read- this means a book with pages, no tablet!
- For some- more concrete CBT is a strong positive!
- ***IF you have a sleepy patient, naps may be fine, but ? Why sleepy**

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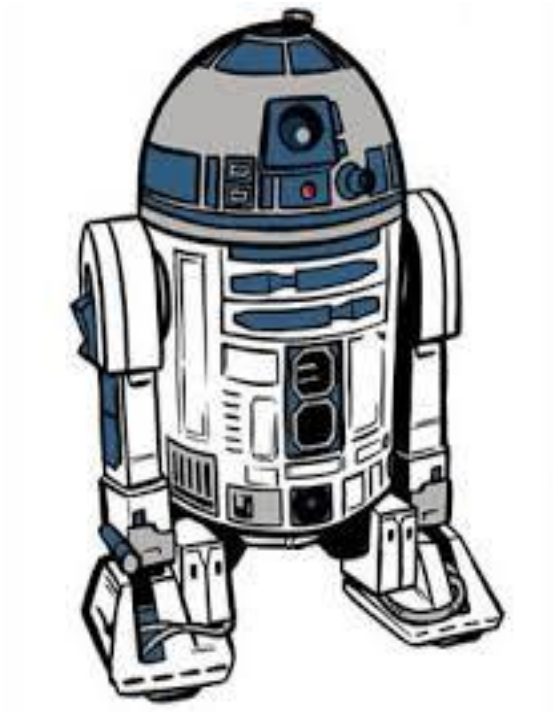
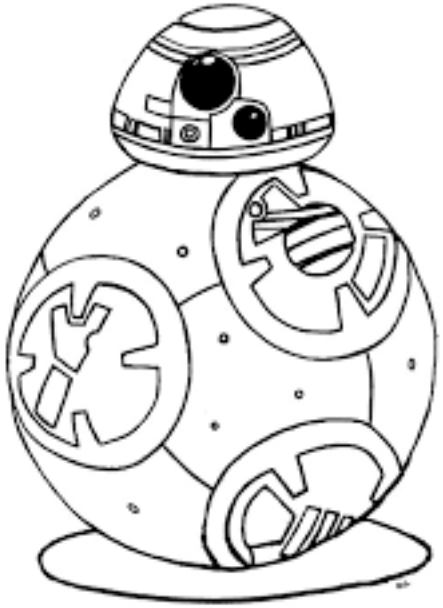
Technology





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White Noise

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How I say this-Mantra

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How I say this

- Check schedule- when do you have 2 weeks to do exactly what we plan(parent and child)?
- OK, there are only 2 things that make us sleep- all of us.(tell them)
- You now go to bed at 11, but sleep is more like 1-2 am, and you wake often- frustrated, on phone, then wake at 6:30, snooze, get to school late – assuming you go. You nap in history(so boring), and you spend the day on computer. You might also take a nap.
- We can make this much better. Is it worth it for you?
- You don't have SOLs, or a podrace soon, right?
- Here is the plan..
- By the way, for our audience—is it worth it for you??

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OSA

This is easy to ask, and easy to sort out—PSG is gold standard, and History, exam is pretty darn inaccurate. Just do it! This is another one for our Listeners…

Our patient

2 weeks of our plan has been helpful, as well as other suggestions.

He turns off all devices, and in bed at 12.

Reading something boring to a nightlight, and with a fan going in background. If he wakes, resumes reading. No clocks.

Up at 7, with bright light, TV turned on.

He seems to be getting along at school.

Sleep study, quite severe OSA, but with CPAP trial he did great- actually LOVES the mask.

Counselor useful, and he is participating in soccer.

Unfortunately, he recently lost his Dad.

DSPS, or Up all night?

- Inadequate sleep secondary to poor sleep hygiene.
- Teens "clock" normally shifts (melatonin).
- Normal for them- sleep onset 10:30-11 pm.
- Social and technology pressures/distractions.
- Job, Sports, TV, cell phone, Ipad, etc…
- Caffeine use, nicotine.
- School times– often 7:15!
- Teen brain needs 9 -9.5 hours of sleep!
- NOT primary insomnia, behavior-genetics-and if your patient is really really sleepy—maybe asking "why" again..

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Delayed Sleep Phase Syndrome

- Some genetic predisposition (like insomniacs)-genes and starwars.
- "Constitutive Expression of the *CIRCADIAN CLOCK ASSOCIATED 1* (*CCA1*) Gene Disrupts Circadian Rhythms and Suppresses Its Own Expression"
- Teens who cannot get to sleep until 2-3 am on any night.
- Wake time- noon?
- BUT, this can be very messy. Need to sort out what is real, what is not, and mood issues are huge.

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Treatment

- **Must** differentiate (big GRAY zone) from school avoidance.
- Chronotherapy?
- Light box therapy (advance sleep phase).
- Melatonin(low dose) 5.5 hours prior to intended sleep time.
- May also use as soporific agent just prior to sleep.
- **Must** have buy in by all players!

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CBT

- Longest lasting improvements, assuming the precipitating cause is dealt with
- Insomnia in kids often has similar mood disorder connections. Like in mom or dad?
- "counseling" or "talk through" therapy for thoughts and attitudes that may be leading to the sleep disturbances
- Identifying distorted attitudes or thinking that makes the patient anxious or stressed and replacing with more realistic or rational ones
- You must be able to "sell" this.

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Insomnia questionnaire

- ❑ I have real difficulty falling asleep.
- ❑ Thoughts race through my mind and this prevents me from sleeping.
- ❑ I wake during the night and can't go back to sleep.
- ❑ I wake up earlier in the morning than I would like to.
- ❑ I'll lie awake for half an hour or more before I fall asleep.
- ❑ I anticipate a problem with sleep almost every night

If you checked three or more boxes, you show symptoms of insomnia, a persistent inability to fall asleep or stay asleep.

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Pediatrician asks

- Does he snore?
- BUT,
- How about
  - Does she go to sleep at a set time in her own bed?
  - Does she sleep though the night?
  - Does she wake too early, often?
  - Does she seem rested when she wakes?
  - Does she nap?
  - TRUE Hypersomnia, another talk.

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Hey, what about medicine?

Treatment of Insomnia: Medication

- No FDA approved treatments
- Sedatives are short-term solutions
- A shorter half-life is typically preferred
  - Sedating antihistamines (diphenhydramine, hydroxyzine, cyproheptadine)
  - Alpha-2 agonists (clonidine, guanfacine)
  - Sedating antidepressants (Trazodone, Serzone, Remeron, TCAs,)
  - Benzodiazepines and similar agents (Sonata, Ambien, Lunesta, Rozarem) preferred over barbiturates
    - Tolerance to somnolent effects of Benzos develops in about 4 weeks (not anxiolytic effects)
  - HM/DS: Melatonin, Kava, Valerian, L-tryptophan, chamomile, passion flower, lavender, etc

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Top 10 Drugs Mentioned with All Types of Sleep Problems (0-16 Years of Age)

IMS HEALTH NDTI™ 1993-1998

• *Diphenhydramine*	20%
• Chloral Hydrate	13%
• Imipramine	10%
• Promethazine	8%
• Hydroxyzine	8%
• *Temazepam*	6%
• *Clonidine*	6%
• Zolpidem	4%
• *Amitriptyline*	4%
• Sertraline	4%

We can add, trazadone, newer antipsychotics, melatonin

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ASD

- Pediatrics
- November 2012, VOLUME 130 / ISSUE Supplement 2
- A Practice Pathway for the Identification, Evaluation, and Management of Insomnia in Children and Adolescents With Autism Spectrum Disorders
- Beth A. Malow, Kelly Byars, Kyle Johnson, Shelly Weiss, Pilar Bernal, Suzanne E. Goldman, Rebecca Panzer, Daniel L. Coury, Dan G. Glaze

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Medicines

- We have a large bucket of medicines at our disposal
- Short-term use, in combination with the more important program you sell using homeostatic and circadian forces, is appropriate.
- But, I do NOT use medicines in almost all of my patients with insomnia and they succeed
- I DO use them, short-term, and often in the family where there is great fear, or a belief system that medicines must be used.
- Melatonin easy
- Clonidine, Zoloft, etc. What am I targeting with this?
- Once successful, we may get rid of them

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May the Force be with you

- Insomnia in children(and adults) is not uncommon, but often not recognized or investigated by us.
- ALL pediatricians, primary care providers, can ask those simple, few questions about sleep.
- Sleep providers should be awesome at this!
- Homeostatic and Circadian forces drive sleep.
- Technology (and sometimes naps) bad. Exercise good.
- Medications- help with onset, in short term, but do not sustain sleep, nor do they work well (alone)over time. Be honest about this.
- You should address sleep in an environment conducive to success- could you come back with Leia next week and we can discuss this? I know we can make it better.
- IF this is you, there is reason for a New Hope..

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May the Force be with You

- Infants, young children have 2 primary insomnia issues.
- Teens have typical and common insomnia issues as well.
- Buy in is essential.
- Time to do this must be adequate- weeks- and family needs to decide when they can put the plan in place.
- You need to follow up, reassure, encourage.
- Do NOT BLAME parents. Educate. Be compassionate.
- Genetics plays a pretty big role in insomnia.
- DO consider co-morbid issues primarily related to sleep(OSA), and not related to sleep(mood, pain, social)
- Medicines used appropriately, as a part of a larger plan make sense sometimes, but need to be truthful about use.
- THANKYOU!

- Michael.strunc@chkd.org

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