

# Management of sleep disturbances

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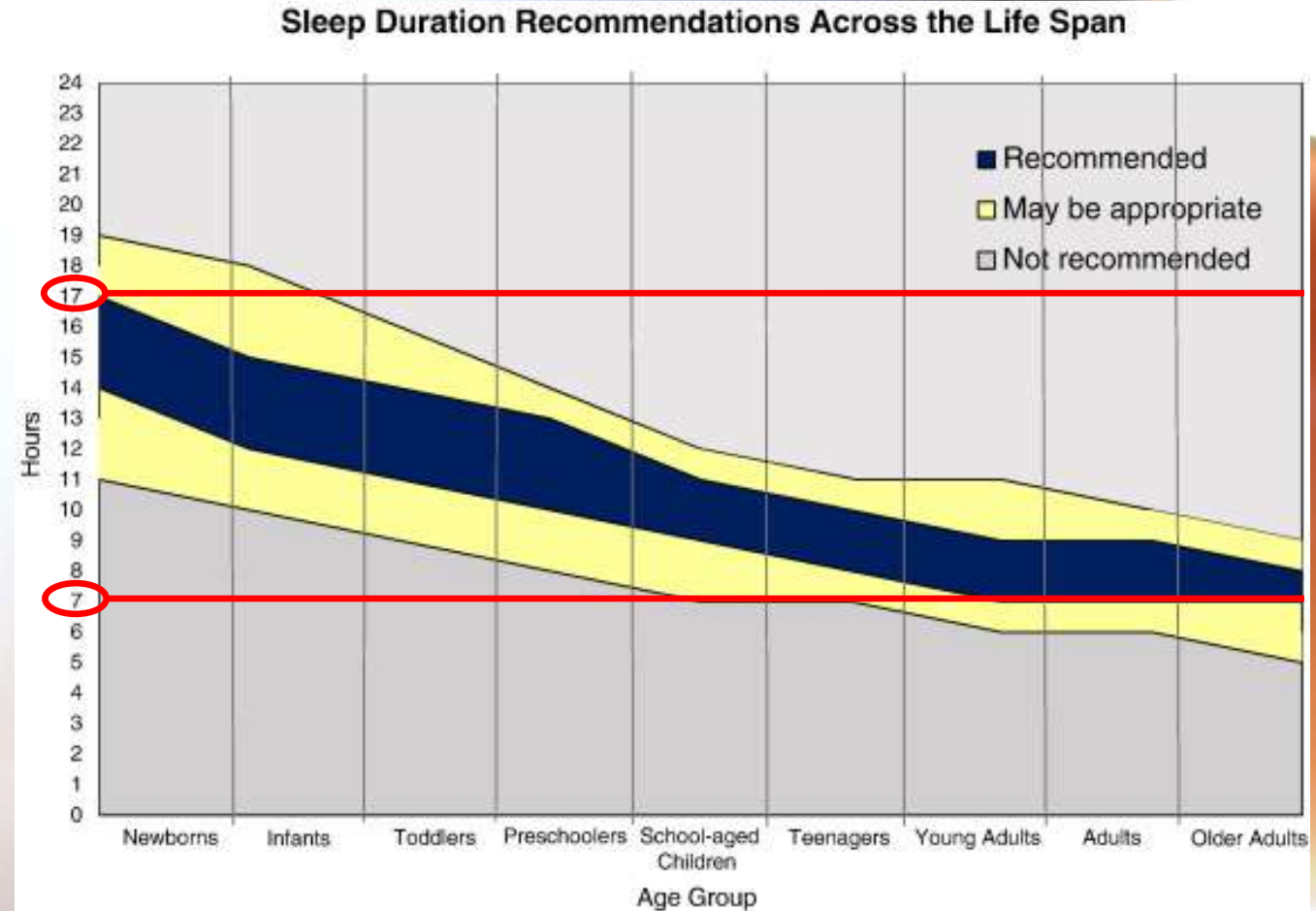


**Healthy sleep**

# Healthy sleep

- **Duration:**

- 0-3 months: 17-14 hours
- 4-11 months: 15-12 hours
- 1-2 years: 14-11 hours
- 3-5 years: 13-10 hours
- 6-13 years: 11-9 hours
- 14-17 years: 10-8 hours
- 18-25 years: 9-7 hours
- 26-64 years: 8-7 hours
- 65+ years: 8-7 hours



# Healthy sleep

- **Sleep continuity:**

- **Latency:**

- ≤15 minutes
    - ≥45 minutes Poor sleep quality

- **Awakenings:**







- ≥ 5 minutes:
    - 0-1 good quality
      - 4 or more poor quality.








- **Wake after sleep onset:**









- ≤ 20 minutes good quality
    - ≥ 51 minutes poor quality







- **Sleep efficiency:**

- ≥ 85% good quality
    - ≤ 74% poor quality

		WAKE AFTER SLEEP ONSET						
AGE CATEGORY		≤10 MINS	11-20 MINS	21-30 MINS	31-40 MINS	41-50 MINS	51-60 MINS	61+ MINS
	PRE-SCHOOLERS							
	SCHOOL-AGED CHILDREN							
	TEENS							
	YOUNG ADULTS							
	ADULTS							
	OLDER ADULTS							

		SLEEP EFFICIENCY				
AGE CATEGORY		>95%	85-94%	75-84%	65-74%	<64%
	INFANTS					
	TODDLERS					
	PRE-SCHOOLERS					
	SCHOOL-AGED CHILDREN					
	TEENS					
	YOUNG ADULTS					
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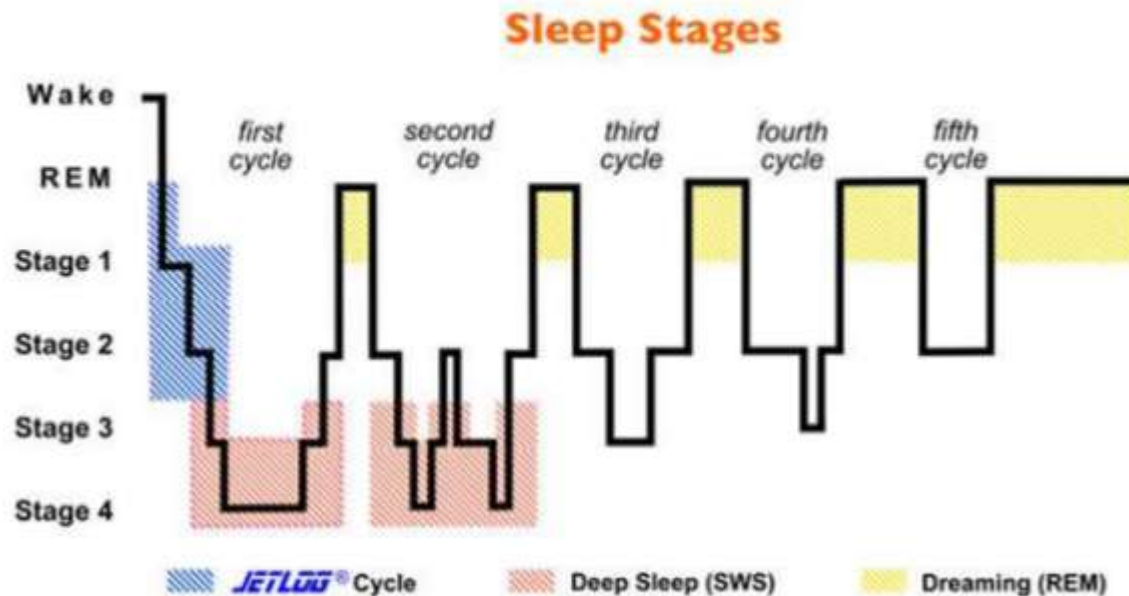


# Healthy sleep

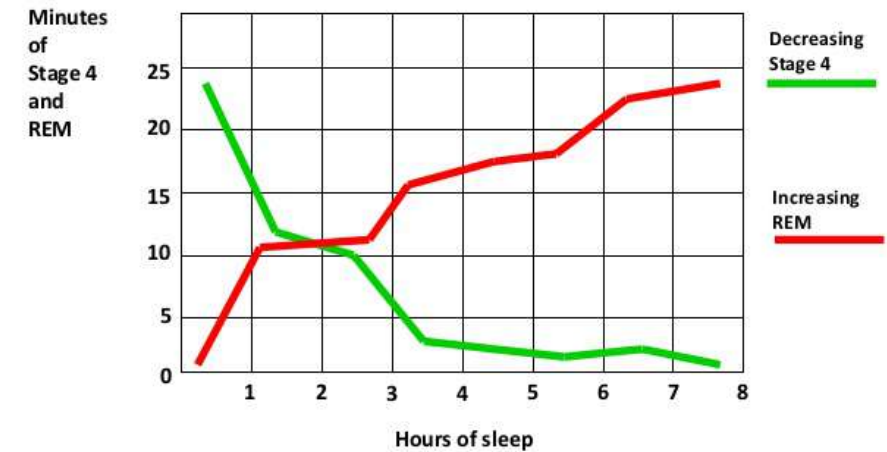
- Sleep architecture:

- N1
- N2
- N3-4
- REM

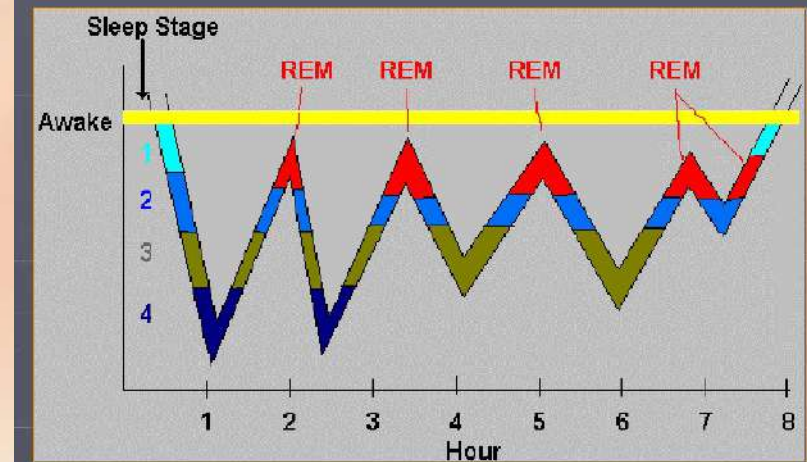
## Normal sleep hypnogram



## Typical Nightly Sleep Stages



## Proportion of sleep stages



# Healthy sleep

## • Naps:

### • Per 24 hours:







- 0-1 Naps healthy
- 3 or more unhealthy




### • Duration:





- $\leq 20$ -30 minutes healthy
- $\geq 100$  unhealthy

### • Frequency:

- 0-2 naps per week

		AGE CATEGORY					
		# OF NAPS					
		0	1	2	3	4	5+
	PRE-SCHOOLERS	Uncertain	Uncertain	Uncertain	Uncertain	Inappropriate	Inappropriate
	SCHOOL-AGED CHILDREN	Appropriate	Uncertain	Inappropriate	Inappropriate	Inappropriate	Inappropriate
	TEENS	Appropriate	Appropriate	Uncertain	Inappropriate	Inappropriate	Inappropriate
	YOUNG ADULTS	Appropriate	Uncertain	Uncertain	Inappropriate	Inappropriate	Inappropriate
	ADULTS	Uncertain	Uncertain	Uncertain	Uncertain	Inappropriate	Inappropriate
	OLDER ADULTS	Uncertain	Uncertain	Uncertain	Uncertain	Inappropriate	Inappropriate

		AGE CATEGORY								
		NAP FREQUENCY (DAYS)								
		0	1	2	3	4	5	6	7	
	SCHOOL-AGED CHILDREN	Uncertain	Uncertain	Uncertain	Inappropriate	Inappropriate	Inappropriate	Inappropriate	Inappropriate	
	TEENS	Appropriate	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain	
	YOUNG ADULTS	Appropriate	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain	

		NAP DURATION (MINS)						
AGE CATEGORY		≤20	21-40	41-60	61-80	81-100	101-120	121+
	TEENS							
	YOUNG ADULTS							
	ADULTS							
	OLDER ADULTS							

An abstract background featuring a white ceramic cup on the right side, partially filled with a vibrant orange liquid. The cup is set against a soft, out-of-focus background of light blue and white, creating a clean and modern aesthetic.

# **Sleep difficulties**

# Sleep difficulties in patients with 22q11DS

- **Common**
- **Many risk factors:**
  - **Airway:** tracheomalacia, laryngomalacia, subglottic stenosis
  - **Palate:** Cleft palate, Velopharyngeal insufficiency & postoperative
  - **Craniofacial features:** Oropharynx & midface hypoplasia, micrognathia
  - **Respiratory:** aspiration
  - **Cardiac:** heart failure, congenital heart disease
  - **Gastrointestinal:** reflux, dysphagia, constipation
  - **Musculoskeletal:** hypotonia, cervical spine anomalies (CSA)
  - **Neurologic:** seizures and epilepsy
  - **Psychiatric:** mood disorders, anxiety, depression, psychosis...
  - **Endocrine:** thyroid disorders, hypoparathyroidism.
  - **Immunologic:** frequent infections.

# Sleep disorders

- **Insomnia disorders**
  - Short term insomnia
  - Chronic insomnia
- **Hypersomnolence disorders**
- **Sleep-related breathing disorders**
  - Obstructive sleep apnoea
  - Central sleep apnoea
- **Circadian rhythm sleep disorders**
  - Delayed sleep-wake phase disorder
  - Advanced sleep-wake phase disorder
  - Irregular sleep-wake rhythm disorder
  - Non-24 hour sleep-wake rhythm disorder
  - Circadian rhythm sleep-wake disorder, shift work type
  - Circadian rhythm sleep-wake disorder, jet lag type
- **Sleep-related movement disorders**
  - Restless legs syndrome
  - Periodic limb movement disorder
  - Sleep-related leg cramps
  - Sleep-related bruxism
  - Sleep-related rhythmic movement disorder
  - Benign sleep myoclonus of infancy
  - Propriospinal myoclonus at sleep onset
  - Sleep-related movement disorder due to a medical condition
  - Sleep-related movement disorder due to a medication or substance
- **Parasomnias**
  - Disorders of arousal from non-REM sleep  
Nightmare disorder
  - Parasomnias related to REM sleep
  - Other parasomnias

# Consequences of poor sleep

- **Short-term**

- Excessive daytime sleepiness, motor vehicle collisions.
- Increased stress responsivity.
- Somatic problems
- Reduced health-related quality of life (HRQoL)
- Emotional distress, mood disorders & other mental health problems.
- Cognition, memory, learning and performance deficits.
- Behaviour problems in otherwise healthy individuals.

- **Long-term**

- Hypertension, dyslipidaemia, Cardiovascular Disease
- Weight-related issues & metabolic syndrome.
- Increase the risk of certain cancers and death.
- Worsen the symptoms of some gastrointestinal disorders.
- Erectile dysfunction
- Early cognitive decline

# When to see a doctor

- Not getting enough sleep.
- Even getting enough sleep, still feel exhausted during the day.
- Falling asleep mid-conversation, at work or during meals.
- Collapse when you laugh or experience other strong emotions.
- Physically enacting dreams, lashing out and injuring yourself or others.
- Others are regularly disturbed by snoring, sleep talking & sleep walking.
- Thrash around a lot while asleep.
- Unexplained damage to the home in the morning, or missing food.
- When starting or changing medication sleep pattern has changed.
- ...



# **Management of sleep difficulties**

# Evaluation of sleep

- **Chief complaint:**

- Tiredness, sleepiness, fatigue, lack of energy

- **Sleep history**

- Patient and bed partner, room mate or family member.
- Behaviour during sleep, Day time mood and cognitive functioning
- Sleep hygiene
- timing of events

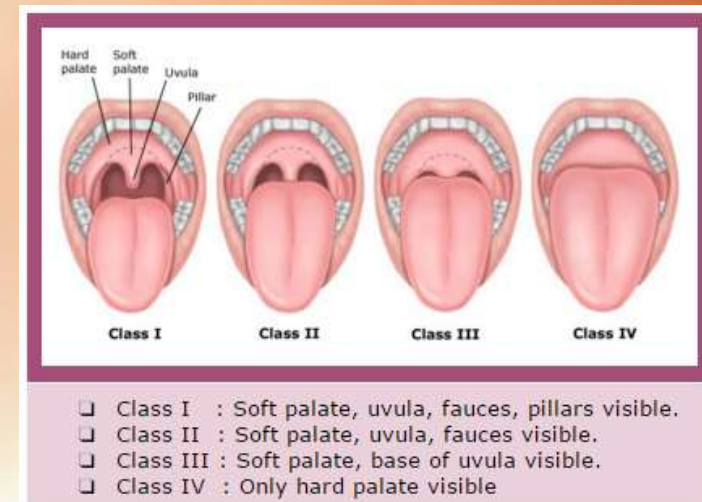
- **Physical examination:**

- BMI, blood pressure, heart rate, auscultation, oedema, neurological.
- Evaluation of the head, neck, facial morphology

- **Judicious use of questionnaires:** PSQ, ESS, diary...

- **Formulation:**

- Characteristics that predispose
- Activities that precipitate
- Attitudes that perpetuate



# Sleep Studies

- **Polysomnography**
  - Multi-professional
  - Cases difficult to diagnose
  - Sleep related breathing disorders
  - Some sleep-related movement disorders
  - Some parasomnias



"OK, Mrs. Tully. We want you to relax, get a good night's sleep, and we'll evaluate any sleep issues that you have."

# Sleep Hygiene

- Sleep-related behaviours that promote effective sleep, good sleep habits.
- Cannot be avoided, is always necessary to implement.
- It could well be is not enough
- We could have to undertake other interventions.
- Sleep hygiene measures need to continue, cannot be stopped.
- Good practice to keep a sleep diary specially when there are changes

**Is necessary but could not be enough**



The image shows a 'TWO WEEK SLEEP DIARY' form. It includes instructions for use, such as 'Write the date, day of the week, and type of bed' and 'Put 'W' for when you have woken up, or 'S' for when you have fallen asleep'. The form is divided into two sections, 'week 1' and 'week 2', each with a grid for recording sleep data over 14 days. The grid has columns for 'Date', 'Time of Day', 'Time of Night', 'Time of Morning', 'Time of Afternoon', 'Time of Evening', 'Time of Night', 'Time of Morning', 'Time of Afternoon', 'Time of Evening', 'Time of Night', 'Time of Morning', 'Time of Afternoon', 'Time of Evening', and 'Time of Night'. The form also includes a section for 'Notes' and a 'Total' column.

# Sleep environment

- **Physical environment & sleeping space**

- **Relaxing/Unexciting:** colour, textures, bed location, electronic devices...
- **Quiet:** no sounds or smells, earplugs, white noise machines...
- **Dark/dim light** (melatonin/anxiety)
- **Comfortable temperature:** better cool and use blanquet
- **Safe:** organisation of furniture, obstacles...
- **Use bed only for sleep and sex**

- **Sleep position**

- Very important, specially: physical disabilities, mechanical contraptions
- Back or side

- **Bedding**

- Mattress (mobility problems, sensory integration difficulties,... )
- Pillows (breathing, hyperhidrosis/impaired sweating...)
- Blankets (sensory integration difficulties, temperature dysregulation...)



## Design a Sleep-Friendly Bedroom

LEARN ABOUT THE IMPORTANCE OF DESIGNING A SLEEP-FRIENDLY BEDROOM ENVIRONMENT FROM THE WORLD'S LEADING EXPERTS IN SLEEP HEALTH, THE NATIONAL SLEEP FOUNDATION.



**Dimming the lights** about an hour before bed will help regulate your body and tell your brain it's time to shift into sleep mode. At home, use room darkening shades and curtains to keep it dark at night and while you sleep.



**Your room should make you relaxed and peaceful**, so choose wall colors and decorations that you love! It's also helpful to keep your room clean and uncluttered, and to make your bed every morning.



**A cool room**, typically between 60 and 67 degrees, makes for the best sleep. Experiment with your room's exact temperature to find what makes you comfortable.



**Choose mattresses, pillows and sheets** that are comfortable to you. Soft or firm mattresses and pillows? That's up to you, but make your decision based on personal preference and your typical sleeping position.



**Reduce noises** in your house and outside of it, with a sound conditioner or fan that creates a consistent and soothing backdrop throughout the night. Keep the TV off while you sleep, as changing tones and volumes can interrupt sleep.



**Surround yourself with scents you like**. For example, lavender may decrease your heart rate and blood pressure. Soothing scents like this can improve your mood and help you relax for bed.

FOR MORE TIPS FOR CREATING A SLEEP FRIENDLY BEDROOM, VISIT  
[sleepfoundation.org/bedroom](https://sleepfoundation.org/bedroom)



# YOUR BEDROOM

## FOR BETTER SLEEP

Simple changes to your sleep environment can make a surprisingly powerful impact on your sleep quality, says Johns Hopkins sleep expert Rachel Salas, M.D.

**KEEP A FLASHLIGHT BESIDE YOUR BED SO YOU WON'T NEED TO TURN ON BRIGHTER LIGHTS DURING NIGHTTIME BATHROOM BREAKS.**

**REMOVE THE TV, COMPUTER AND OTHER MIND-STIMULATING, BLUE-LIGHT-emitting tech from the bedroom—and wind down with an old-fashioned paper book before sleep instead.**

**SET YOUR ALARM CLOCK DISPLAY TO "DIM" OR TURN THE CLOCK AWAY FROM YOUR FACE.**

If your phone is your alarm clock, flip it facedown. Artificial light can disrupt your body's sleep clock.

**TURN DOWN THE THERMOSTAT AT NIGHT.** Most people sleep better in temps around 68 F, though your ideal may fall between 54 F and 75 F.

**USE ROOM-DARKENING BLINDS OR WINDOW COVERINGS TO BLOCK EXTERNAL LIGHT.**

**MAKE YOUR BED EVERY MORNING.** Research shows that people who do may sleep better at night.

**REPLACE THE MATTRESS EVERY 10 YEARS, PILLOWS EVERY 2 YEARS.** This helps with comfort and allergen buildup.

**BED DOWN PETS IN A DIFFERENT ROOM—** or at least keep them out of your bed: Their movements can disrupt sleep and their dander can trigger allergies.

**IF CLUTTER STRESSES YOU, TIDY THE ROOM AND BANISH CLOTHING PILES TO THE CLOSET.**

# Sleep schedule & practices

- Need for sleep may be increased in 22q11: naps and longer sleep.
- Get into a sleeping and waking up routine:
  - No more than 1 hour difference week/weekends/holidays.
- Engage in routine relaxing activities before bedtime.
  - Bath, scents, hot drinks, meditation, deep breathing...
- Avoid exciting activities before bedtime.
- Day time:
  - Avoid naps, exercise,
  - Implement routine & Structure “zeitgebers”.
  - If you have a bad night, continue with your normal activities
- Avoid coffee or stimulants 6-8 hours before bedtime.
- Avoid large meals and alcohol before bedtime.
- Decrease fluid intake.
- Don't go hungry or thirsty, light, carbohydrate rich, meal
- Need to be sleepy, don't stay awake in bed.
- Use common sense



# Sleep hygiene for the caregivers

- Parents don't sleep well because:
  - Child does not sleep well:
    - Woken up.
    - Car rides, meal preparation, taking child to bed, etc.
  - Worried about health of child:
    - Repeatedly checking for seizures, posture, breathing...
    - Taking child to their bed
- Sleep deprived parents usually are helpless, frustrated, anxious, angry, self-blame and negative.
- Parental emotional problems negatively influences:
  - Couple life and relations
  - Child's sleep.



# Non pharmacological interventions

- **Relaxation training**, or progressive muscle relaxation,
  - Teaches to systematically tense and relax muscles in different areas of the body. This helps to calm the body and induce sleep.
- **breathing exercises, mindfulness, meditation techniques, guided imagery.**
  - help you fall asleep and also return to sleep in the middle of the night.
- **Stimulus control**
  - builds an association between the bedroom and sleep by limiting the type of activities allowed in the bedroom, going to bed only when you are sleepy, and getting out of bed if you've been awake for 20 minutes or more.
- **Sleep restriction**
  - involves a strict schedule of bedtimes and wake times and limits time in bed to only when a person is sleeping.
- **Cognitive behavioral therapy (CBT)**
  - Sleep hygiene with cognitive or "thinking" component. Challenge unhealthy beliefs and fears around sleep and teach rational, positive thinking.



# Pharmacological interventions

- Only after, and does not substitute, sleep hygiene and non-pharmacological interventions.
- Determined on a case-by-case basis:
  - Cause of sleep disturbance.
  - Child's medical history and developmental age.
  - Comorbid disorders.
  - The pharmacokinetic properties of the medication.
  - Available efficacy data.
  - Drug interactions.
  - Safety of the agent.
  - Side effect profile.



# Over the counter drugs

- **Iron supplementation**

- If there is poor sleep and low serum ferritin levels can be monitored.
- Try iron supplementation aiming for a serum ferritin level of 30–50 ng/ml
- Dose of 1–2 mg/kg/day of elemental iron (up to 6 mg/kg/day) provides a modest
- Not well tolerated: gastrointestinal S.E. and poor palatability.

- **Over the counter antihistamine drugs**

- diphenhydramine and doxylamine
- Consult with GP/Doctor for side effects and interactions

- **Natural remedies**

- Uncertain efficacy
- Be careful of interactions



# Melatonin

- **Regulatory hormone**, produced by the Pineal gland.
- Controlled by **changes in light**, high levels secreted at night and low levels during the day, and suprachiasmatic nucleus.
- DBRCT showed that melatonin has been shown to synchronize the circadian rhythms, and improve the onset, duration and quality of sleep
- Sleep hygiene + melatonin better than melatonin alone.
- **1-10mg given 30-60 minutes before going to sleep.**
- May also have additive hypnotic effects and effects on anxiety.
- Useful in insomnia, sleep-related breathing disorders, hypersomnolence, circadian rhythm, sleep–wake disorders and parasomnias.
- **SE:** headache, dizziness, nausea, drowsiness.
- Immediate-release and **controlled-release**.

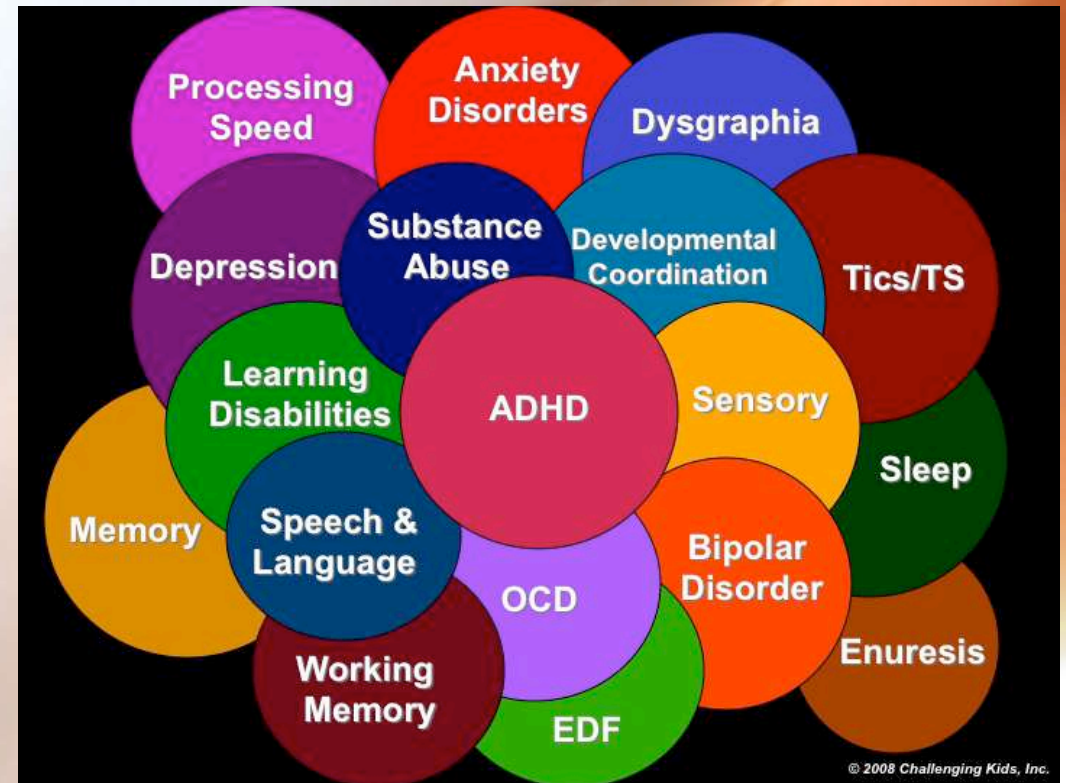
# Prescription drugs



- **Ramelteon**
  - Melatonin agonist with high selectivity and affinity for the MT<sub>1</sub> and MT<sub>2</sub> receptors
- **Clonidine**
  - Centrally acting  $\alpha$ -adrenergic agonist, works presynaptically to inhibit norepinephrine activity, decreasing sympathetic outflow.
  - Antihypertensive drug can cause hypotension and rebound hypertension
- **Gabapentin**
  - Precursor of GABA, easily crosses BBB and increases synaptic GABA.
  - Poor evidence
- **Benzodiazepines (Clonazepam)**
  - Poor sleep architecture, sleepiness. risk of habituation and withdrawal.
- **Non-benzodiazepines: zolpidem, zaleplon, and eszopiclone**
  - Cannot be recommended in children.
- **Trazodone**
  - Sedative antidepressant. 25mg increased by 25mg every 2/52. Poor evidence

# Real life in psychiatric clinics

- Very rarely we see children that their only problem is poor sleep.
- Usually they have some or many associated difficulties:
  - Conduct disorders.
  - Repetitive behaviours
  - Psychotic symptoms
  - Depression, anxiety
  - ADHD...
  - Epilepsy
  - Gastrointestinal problems
  - Cardiac problems...
  - Already on other drugs
- Frequently already on medication



# Day-to-day in a psychiatric clinic

- **Optimise the effects/side effects of the drugs** taking
  - Compliance
  - Dosing
  - Formulation
  - Timing
  - Side effects: activation, ...
- **Consider the side effects and other difficulties**
  - **Risperidone** or ...
    - Very thin
  - **Quetiapine**
    - Hungry
  - **Aripiprazole**
    - Careful monitoring
  - **Mirtazapine** and ...
    - Depressed and ... children
  - **Atomoxetine**
    - At night

Use common sense  
&  
start low and go slow



# Thanks

