Objectives

1. Explain the types of pediatric insomnia
2. Formulate a care management regimen with developmental considerations
3. Interpret the patient data as it relates to sleep schedules
Between 15% and 30% of 2- to 5-year-old children experience regular difficulties falling asleep (i.e., bedtime problems) or sleeping through the night (i.e., night waking).

Turnbull, Reid and Morton, 2013; SLEEP
The Pediatrician and Sleep

- ~ 2 Hours sleep training in medical school/residency
- Essentially no change over the past 30 years
- Limited knowledge about sleep
  - Pediatricians do not feel confident in diagnosing or treatment sleep problems
  - 96% believe it is important and part of their plan of care but only 18% actually asked (Mindell, 2013)
- 3.7% in a large, EMR based review had sleep diagnosis
  - Significant that prevalence is higher in epidemiological studies
  - Long term significance to the child
- **ONLY 5%** of patients with a diagnosis of a sleep related problem were given sleep related treatment recommendations

Meltzer, et al., 2014 JCSM
Parents don’t seek assistance; practitioners don’t ask
Sleep Issues go UNTREATED………
Be Mindful of the Care GAP!
Problem vs Disorder?

• Disorder
  • Falls under the diagnostic criteria (narcolepsy, insomnia, OSA)

• Problem
  • Encompass a variety of sleep issues
    • Bedtime difficulties
    • Night awakeing
    • Poor sleep hygiene

Meltzer et al., JCSM, 2014
Key Take Away

All kids will not JUST GROW OUT OF IT!

Infant sleep problems can persist into early childhood
Definition of Insomnia

- Similar to adults
  - Difficulty in initiating or maintaining sleep
- Age and Developmentally related
  - Normal sleep for age
  - Bedtimes
  - Duration
- Cultural Differences
  - Co-Sleeping
- Chronic Illness
Definition used - ASD Practice Pathway

• Insomnia was defined as “repeated difficulty with sleep initiation, duration, consolidation, or quality that occurs despite age-appropriate time and opportunity for sleep that results in daytime functional impairment for the child and/or family

• Malow, et al.

doi:10.1542/peds.2012-0900I
Negative Impacts

• Concentration and learning, inattention and impulsivity (Beebe, 2011; Gruber, Cassoff, Frenette, Wiebe & Carrier, 2012; Sadeh, Gruber, & Raviv, 2003),

• Poor emotional regulation and increased risk for depression (Gregory & Sadeh, 2011),

• Accidents and risk taking behaviors (McKnight-Eily et al., 2011; O’Brien & Mindell, 2005; Owens, Fernando, & McGuinn, 2005; Pizza et al., 2010).

• Hypertension, hypercholesteremia, insulin resistance and obesity (Flint et al., 2007; Gangwisch et al., 2010; Javaheri, Storfer-Isser, Rosen & Redline, 2008; Javaheri, Storfer-Isser, Rosen & Redline, 2011).

• Parental sleep and daytime functioning
  • Impacts on parent mood
  • marital quality
  • family functioning
  • work performance
  • general parenting
  (Boergers, Hart, Owens, Streisand, & Spirito, 2007; Meltzer & Mindell, 2007; Meltzer & Montgomery-Downs, 2011).

Normal Age Sleep Related Changes
# Quick Review of Age Related Normal’s

## General Range of Total Hours of Sleep in a 24-hour Period for Different Age Groups

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Amount of Sleep</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborns</td>
<td>16 to 20 hours</td>
<td>Sleep periods are typically 1 to 4 hours in length interspersed with 1 to 2 hours of being awake. Amount of daytime sleep equals the amount of nighttime sleep.</td>
</tr>
<tr>
<td>Infants (0 to 1 year)</td>
<td>Sleep periods of 3 to 4 hrs for first 3 months</td>
<td>Day/night differentiation between 6 weeks and 3 months.</td>
</tr>
<tr>
<td>Infants (4 months)</td>
<td>14 to 15 hours</td>
<td>Sleep periods of 6 to 8 hours at 4 to 6 months.</td>
</tr>
<tr>
<td>Infants (6 months)</td>
<td>13 to 14 hours</td>
<td>Naps of 2 to 4 hours in duration at 2 different intervals. 70% to 80% sleep through the night at 9 months.</td>
</tr>
<tr>
<td>Toddlers (1 to 3 years)</td>
<td>12 hours</td>
<td>One nap of 1.5 to 3.5 hours in duration.</td>
</tr>
<tr>
<td>Preschoolers (3 to 6 years)</td>
<td>11 to 12 hours</td>
<td>Napping declines; most stop by 5 years.</td>
</tr>
<tr>
<td>Middle childhood (6 to 12 years)</td>
<td>10 to 11 hours</td>
<td>Low levels of daytime sleepiness.</td>
</tr>
<tr>
<td>Adolescence (&gt; 12 years)</td>
<td>9 hours</td>
<td>Often irregular sleep schedule. After puberty, circadian phase delays with later bedtimes and later rise times.</td>
</tr>
</tbody>
</table>

Adapted from *A Clinical Guide to Pediatric Sleep, Diagnosis and Management of Sleep Problems.*

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*Note:* The table details the general range of total hours of sleep in a 24-hour period for different age groups. The comments provide additional insights into sleep patterns and characteristics specific to each age group.
Developmental Factors
Newborns-6 months

- **Sleep**
  - NB Require 16-18 hours/day; polyphasic, ~equal between night and day; expectation that child awakens
  - ~6 Months 14-16 hours/day; sleep fairly consolidated into night; fewer daytime naps
  - More sensitive to light/dark cues

- **Development**
  - Primarily met by caregiver

- **Communication**
  - Crying
  - Increased mobility

Vriend, et al., 2011; Johnson and Mindel, 2011
Older Infants/Toddlers

- 6-12 months/12-24 months
- TST slightly decreased ~13 hours per day
- 6-9 months, most are sleeping through the night
  - Night wakings are still common (50% waking at least once/week)
  - Night time bottles
- Naps continue, but are shorter
- Development
  - Develops attachment to caregiver---separation anxiety
  - May have learned to fall asleep with caregiver
- Communication
  - Increased mobility and verbalization
- ~20-30% develop BIC SOA

Vriend, et al., 2011; Johnson and Mindel, 2011
Early Childhood

- 2-6 Years
- Transition from crib to bed
- Sleep duration decreases
- Daytime napping decreases/eliminated (<10% 6 year old nap)
- 25-50% have sleep problems
- Increased mobility and language
- Development
  - Initiative and independence
  - Rewards/punishment

Vriend, et al., 2011; Johnson and Mindel, 2011
Middle Childhood

• 6-12 years
• Should be sleeping 9-10 hours per night
  • Highly energetic; EDS should be warning sign
  • Napping rare
  • Night Owl vs Lark emerge
• ~37% have a parent reported bedtime problem

• Development
  • Peer relationships more important
  • More technology usage
  • Possible increased social anxiety
  • Increasing social and school obligations

Vriend, et al., 2011; Johnson and Mindel, 2011
Adolescence

- 12-18 years
- ~ 2 hour bedtime delay
  - Social factors
    - Electronics; work; friends and school activities
  - Biological
- Typically have insufficient sleep during the week; make up for this on weekend
- Increased use of caffeine or energy drinks
- Development
  - Decreased parental influence
  - Moodiness and conflicts-- autonomy

Vriend, et al., 2011; Johnson and Mindel, 2011
Adolescent Sleep Timing

doi:10.1016/j.pcl.2011.03.003
The adolescent dilemma
DSM IV vs DSM V

**DSM IV**
- Primary Insomnia
- Behavioral Insomnia

**DSM V**
- Insomnia Disorder
The DSM-5 classification of sleep-wake disorders is intended for use by general mental health and medical clinicians (those caring for adult, geriatric, and pediatric patients). Sleep-wake disorders encompass 10 disorders or disorder groups: insomnia disorder.

**Note.** The diagnosis of insomnia disorder is given whether it occurs as an independent condition or is comorbid with another mental disorder (e.g., major depressive disorder), medical condition (e.g., pain), or another sleep disorder (e.g., a breathing-related sleep disorder). For instance, insomnia may develop its own course with some anxiety and depression.

Difficulties initiating and maintaining sleep can also occur in children and adolescents, but there are more limited data on prevalence, risk factors, and comorbidity during these developmental phases of the lifespan. Sleep difficulties in childhood can result from conditioning factors (e.g., a child who does not learn to fall asleep or return to sleep without the presence of a parent) or from the absence of consistent sleep schedules and bedtime routines. Insomnia in adolescence is often triggered or exacerbated by irregular sleep schedules (e.g., phase delay). In both children and adolescents, psychological and medical factors can contribute to insomnia.

**Insomnia Disorder**

<table>
<thead>
<tr>
<th>Diagnostic Criteria</th>
<th>DSM-5.52 (G47.00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. A predominant complaint of dissatisfaction with sleep quantity or quality, associated with one (or more) of the following symptoms:</td>
<td></td>
</tr>
<tr>
<td>1. Difficulty initiating sleep. (In children, this may manifest as difficulty initiating sleep without caregiver intervention.)</td>
<td></td>
</tr>
<tr>
<td>2. Difficulty maintaining sleep, characterized by frequent awakenings or problems returning to sleep after awakenings. (In children, this may manifest as difficulty returning to sleep without caregiver intervention.)</td>
<td></td>
</tr>
<tr>
<td>3. Early-morning awakening with inability to return to sleep.</td>
<td></td>
</tr>
<tr>
<td>B. The sleep disturbance causes clinically significant distress or impairment in social, occupational, educational, academic, behavioral, or other important areas of functioning.</td>
<td></td>
</tr>
<tr>
<td>C. The sleep difficulty occurs at least 3 nights per week.</td>
<td></td>
</tr>
<tr>
<td>D. The sleep difficulty is present for at least 3 months.</td>
<td></td>
</tr>
<tr>
<td>E. The sleep difficulty occurs despite adequate opportunity for sleep.</td>
<td></td>
</tr>
<tr>
<td>F. The insomnia is not better explained by and does not occur exclusively during the course of another sleep-wake disorder (e.g., narcolepsy, a breathing-related sleep disorder, a circadian rhythm sleep-wake disorder, a parasomnia).</td>
<td></td>
</tr>
<tr>
<td>G. The insomnia is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication).</td>
<td></td>
</tr>
<tr>
<td>H. Coexisting mental disorders and medical conditions do not adequately explain the predominant complaint of insomnia.</td>
<td></td>
</tr>
</tbody>
</table>

Specify if:
- With non-sleep disorder mental comorbidity, including substance use disorders
- With other medical comorbidity
- With other sleep disorder

Coding note: The code 780.52 (G47.00) applies to all three specifications. Code also the relevant associated mental disorder, medical condition, or other sleep disorder immediately after the code for insomnia disorder in order to indicate the association.

http://books.google.com/books?hl=en&lr=&id=_VzzAgAAQBAJ&oi=fnd&pg=PT2&dq=DSM+V&ots=oTYnobOZYu&sig=XlOplCx-8ClfQHyKEztqX_uIU#v=onepage&q=pediatric%20insomnia&f=false
Behavioral Insomnia of Childhood

- Three types (International Classification)
  - BIC sleep-onset association type (BIC-SOA)
  - BIC limit-setting type (BIC-LST)
  - BIC combined type

- Psychophysiological
  - Adolescent
Risk Factors-General

- Parental presence during sleep onset
- Intentional co-sleeping
- Feeding child to sleep
- Insecure parents/parenting styles
- Maternal depression

- Biologic-environmental-culture
BIC-SOA

- **Presentation**
  - Frequent and/or prolonged night wakings
  - Diagnosis usually made after 6 months
  - Requires caregiver intervention or assistance to fall asleep
  - Inability to self-soothe

- **Diagnostic Criteria**
  - Prolonged sleep onset that requires a particular condition
  - Demanding sleep onset conditions
  - Significant delay of sleep in the absence of the conditions
  - Caregiver intervention is required

Owens and Mindell, 2011; Pediatric Clinics of North America
Concept of Self-Soothing

- Developed over the first 12 weeks of life
- An infant’s ability to regulate states of arousal; for example, calming from crying to quiet wakefulness without parental assistance (Burnham et al., 2005)

- May be associated with temperament/characteristics (Wientraub et al., 2012)

- Parental perception of the baby i.e. fussy, hyperactive, hypoactive etc....
Transactional Approach to Self Soothing
BIC LST

- Typically pre-school age and older
- Non-compliant bedtime behaviors
- Trouble initiating or maintaining sleep
  - Mismatch with circadian influences
- Stalling or refusing to go to sleep at bedtime
  - Bedtime fears; imagination; anxiety
  - Increased autonomy
- Lack of parental control
  - Do not set limits
  - Permissive
  - Conflicting parenting styles

Owens & Mindell, 2011
BIC-Combined

• Bedtime resistance
• Frequent and problematic night time wakings

• Require the presence of a negative sleep association to fall and return to sleep
Psychophysiological

• Prevalence ~ 11%; 35% up to a couple of times per month
• Combination of learned sleep-preventing behaviors
• Heightened physiologic arousal
• Excessive worry about sleep
• Worry about impact of daytime functioning

• Predisposing Factors
  • Genetic, medical or psychiatric issues, acute stress and social (caffeine, poor sleep habits, technology)
Medical Conditions

- Asthma
- Diabetes
- Sickle Cell Anemia
- Cancer
- Juvenile Rheumatoid Arthritis
Medical Conditions

- Increased pain
- Anxiety
- Breathing
Psychiatric Disorders

- ADHD

- Autism Spectrum Disorder (AAP)
  - 1/110 children fulfill DSM IV criteria
  - Sleep disturbances 53-78%
  - Multifactorial
  - Prone to more severe comorbid behavioral disturbances
  - Medications

- Anxiety/mood Disorders
ASD and Insomnia

- Recommendations for a practice pathway (American Academy of Pediatrics)
  - All children with ASD should be screened for sleep disorders and should include any other medical problems
  - The need for therapeutic intervention should be determined
  - Interventions should begin with parental education in the use of behavioral techniques as first line
  - Pharmacologic intervention may be indicated
  - Follow-up after ANY intervention to evaluate effectiveness and tolerability of the intervention
Practice Pathway (Malow, et al., 2012)
Assessment Tools

- **B**-Bedtime Problems
- **E**-Excessive Daytime Sleepiness
- **A**-Awakenings during the night
- **R**-Regularity and duration of Sleep
- **S**-Snoring

- Questions and responses are age related
- Questions may be parentally based or child-directed
Good sleep is important for the health and happiness of every person, no matter how old or young. Without getting enough sleep, it can be hard to stay awake, pay attention, and enjoy the day.

Questionnaires

- Children's Sleep Habits Questionnaire (Owens)
  - 35 item/8 domains
  - Parent report screening survey
    - Not diagnostic
- The CSHQ is a useful sleep screening instrument to identify both behaviorally based and medically based sleep problems in school-aged children
Specific Questions to Ask

• Where do they sleep?
• Who else is in the room or in the bed with them (including pets)?
• How big is the bed?
• Restless legs?
• How close is the room to the parents room?
• Is it noisy, can they hear the TV, parents talking etc…?
• Are they scared of anything?
• TV in the room?
Approaches to treatment

• Pharmacological

• Behavioral

• Combination Approach
Behavioral Options

• Sleep Hygiene

• Bedroom Environment
  • Quiet, dark and cool
  • Create a “sleep sanctuary”
  • No technology
  • Consistent sleep schedule
  • Avoid stimulating activities
Pharmacological

• Pharmacokinetics (absorption, distribution, metabolism and excretion) should be considered with regard to the age and condition of the child

• Alpha agonists
  • Clonidine and guanfacine (used for ADHD)

• Antidepressants
  • SSRI; Tricyclic and atypical (mirtazapine, nefazodone)

• Antihistamines
  • Familiarity/OTC
Pharmacological

• Benzodiazapines
  • Zaleplon (Sonata)
  • Zolpidem (Ambien)

• Melatonin
  • Hormone secreted by the pineal gland
  • Some studies in ADHD have shown efficacy in reducing sleep latency
  • Treatment of circadian rhythm disorders, neurodevelopmental needs

• Melatonin Receptor Agonists
  • Ramelteon

• Other
  • Anticonvulsants, antipsychotics
80% of children who presented with a sleep disorder were prescribed medication. 

Stojanovski et al., Sleep 2007
Extinction and other methods

• Extinction
  • Extinction: Putting the child to bed; not returning i.e. let them “cry it out”
  • Gradual Extinction: returns to bedroom, attends to child, gradually longer periods

• Fading

• Positive Routines

• Improvements typically within 1-2 weeks
Graduated Extinction!
Bedtime Routines and Consistency

- Dose dependent outcomes
- Regular routines have been demonstrated successful
  - earlier bedtimes, shorter sleep onset latency,
  - reduced night wakings, and
  - increased sleep duration

Mindell, et al. Sleep 2014
Do these techniques work?

- According to the Society of Behavioral Sleep Medicine, YES!

- Most improvements are noticed within 1-2 Weeks!

- The course of therapy (i.e. sessions) takes about 2-6
Parent Education

• Early post-natal education (moms)
  • May have some value; data are mixed
• Improved infant sleep
• Improved parental interaction
• Reduce maternal depression
Benefits of Therapy

• Improved
  • Daytime cognitive function
  • Behavior
    • Regulation of affect
    • Attention

• Health Outcomes
• Quality of Life
• Parent and family functioning
Summary

• A clinical GAP exists
  • Pediatrician knowledge (including diagnosis and appropriate therapy)
  • Parental reports focus on the daytime behavioral problems; not necessarily sleep problems

• Childhood insomnia is a very common phenomena
  • It is more common and more difficult to treat in kids with medical and/or psychiatric disorders

• Behavioral techniques work
  • Requires parental training, education and clinical support

• Pharmacologic approaches are prevalent
  • Most drugs are NOT FDA approved for children
If emailing, please put Focus Fall 2017 and Peds