Kids and ADHD

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Outline

- History and prevalence
- Adult concerns
- Etiology/theories
- DSM Criteria and specifiers
- Emotional component
- Co-morbidities
- Mood considerations
- Racial disparities
- AACAP practice parameters
- Testing options
- ADHD study
- Behavioral treatment
- School concerns
- Medication trends
- Neurotransmitters involved
- Stimulant options and common concerns for side effects
- Non-stimulant options
- Triad – ADHD, OCD and TICS

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DSM-5-TR Neurodevelopmental Disorders

- Intellectual Disabilities
- Communication Disorders
- Autism Spectrum Disorder
- **Attention Deficit and Hyperactivity Disorder**
- Specific Learning Disorder
- Motor Disorders

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Prevalence

- US = 8.8% children (4-17 years of age)
- World wide = 5% of school-aged children
- Male : Female ratio is around 9:1 at highest
- U S Adults = 2 - 8%

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DSM-5-TR ADHD criteria

- 6/9 criteria of inattention and hyperactivity/impulsivity symptoms
- Present for at least 6mos
- In at least 2 different settings
- Symptoms present at least before 12yo (whether or not treated)
- Clear interference with social, occupation, or academic function
- Not better explained by another mood/psychotic disorders

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Potential adult consequences

- Relationship difficulties
- Injuries and accidents
- Academic/employment difficulties
- Antisocial and criminal behavior
- Health problems
- Teen pregnancies

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Etiology

- ”Principal cause is genetic"- heritability approximately 76%
  - Associated with chromosomes 5, 4, 6, 8, 11, 16, & 17
- Perinatal stress, low birth weight, traumatic brain injury, maternal smoking during pregnancy, and severe early deprivation
- August is a peak month for births of children with ADHD….however…
  - Maternal "winter" infection during first trimester of pregnancy?
  - Or related to school age cut off?

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Inattentive:

- Avoids tasks requiring sustained mental effort
- Difficulties with organization
- Distractible
- Careless mistakes - difficulties with working memory
- Difficulty listening
- Forgetful especially with daily tasks
- Difficulty with sustaining attention
- Difficulty following through or finishing tasks
- Often loses things

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Hyperactive/ Impulsive

- "On the go" "Driven by a motor"
- Distractible
- Leaves classroom seat
- Fidgets/taps/squirms
- Blurts out answers
- Interruptive
- Runs/climbs not in correct setting; restless
- Difficulty waiting their turn
- Talks excessively

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Emotional dysregulation

"Emotion dysregulation arises when these adaptive processes are impaired, leading to behavior that defeats the individual's interests."

1. Excessive/out of proportion
2. Poorly Controlled
3. Rapid
4. Not always physical aggression (linked more to hyperactivity than inattention)

25-45% of children with ADHD

30-70% of adults with ADHD

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Comorbidities

- 54-84% Opposition Defiant Disorder (ODD) and possible Conduct disorder (CD)
- 25-35% Language or learning problems
- 33% Depression
- 19% Substance use
- 16% Bipolar disorder

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Mood considerations

Emotionally labile, explosive, lack focus – misinterpreted as oppositional behavior

Demoralized / poor self esteem- in reaction to persistent frustration with academic/social difficulties

No longer constantly reprimanded can increase mood and self esteem

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Helpful expectations

- Child may not "voluntarily" exhibit symptoms but is capable of meeting reasonable expectations.
- Typical tasks of maturation help build self-esteem when they develop a sense of mastery. Don't take these chances away.
- They do NOT benefit from being exempted from the requirements and expectations like other children.

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ADHD Racial Disparities

- Racial disparities exist - research observed kindergarten to 8th grade
  - Minority children were less likely than white children to receive diagnosis of ADHD.
    - English speaking, male gender, older mother, & externalizing behaviors increased chance
    - Academic achievement, some attentiveness, & no insurance decreased chance
  - Other times they are misdiagnosed with ODD instead of ADHD
    - Willful or not?
  - Also issues of lack of access to treatment once diagnosed
- Culturally sensitive assessments are required
  - Families may not report history - worried about "label" and further discrimination
- Serious impact
  - Those with ADHD already risk for incarceration, teen pregnancy, substance use, etc.

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AACAP Practice Parameters

1) Screen
2) Evaluate
3)Rule out – examples: lead exposure, hyperthyroidism, head injuries, in utero drug exposure, etc.
4)Look for comorbidities - including substance use
5)Offer medication and behavioral treatment
6)If no academic improvement in 1-2week – psych test looking for specific learning disorders

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Common Behavior Rating Scales Used in the Assessment of ADHD and Monitoring of Treatment

Name of Scale	Reference
Academic Performance Rating Scale (APRS)	The APRS is a 19-item scale for determining a child's academic productivity and accuracy in grades 1Y6 that has 6 scale points; construct, concurrent, and discriminant validity data as well as norms (*n* = 247) available (Barkley, 1990).
ADHD Rating Scale-IV	The ADHD Rating Scale-IV is an 18-item scale using DSM-IV criteria (DuPaul et al., 1998).
Brown ADD Rating Scales for Children, Adolescents, and Adults	Psychological Corporation, San Antonio, TX (*www.drthomasebrown.com/assess_tools/index.html*) (Brown, 2001)
Child Behavior Checklist (CBCL)	Parent-completed CBCL and Teacher-completed Teacher Report Form (TRF) *www.aseba.org/index.html*
Conners Parent Rating ScaleYRevised (CPRS-R)[a]	Parent and adolescent self-report versions available (Conners, 1997)
Conners Teacher Rating ScaleYRevised (CTRS-R)[a]	Conners, 1997
Conners Wells Adolescent Self-Report Scale	Conners and Wells, 1997
Home Situations QuestionnaireYRevised (HSQ-R), School Situations QuestionnaireYRevised (SSQ-R)	The HSQ-R is a 14-item scale designed to assess specific problems with attention and concentration across a variety of home and public situations; it uses a 0–9 scale and has test-retest, internal consistency, construct validity, discriminant validity, concurrent validity, and norms (*n* = 581) available (Barkley, 1990).
Inattention/Overactivity With Aggression (IOWA) Conners Teacher Rating Scale	The IOWA Conners is a 10-item scale developed to separate the inattention and overactivity ratings from oppositional defiance (Loney and Milich, 1982)
Swanson, Nolan, and Pelham (SNAP-IV) and SKAMP Internet site ADHD.NET	The SNAP-IV (Swanson, 1992) is a 26-item scale that contains DSM-IV criteria for ADHD and screens for other DSM diagnoses; the SKAMP (Wigal et al., 1998) is a 10-item scale that measures impairment of functioning at home and at school.
Vanderbilt ADHD Diagnostic Parent and Teacher Scales	Teachers rate 35 symptoms and 8 performance items measuring ADHD symptoms and *common comorbid conditions (Wolraich et al., 2003a). The parent version contains all 18 ADHD symptoms, with items assessing comorbid conditions and performance (Wolraich et al., 2003b).*

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The Multimodal Treatment Study of Children with ADHD (MTA)

- Over 500 participants ages 7-9yo with ADHD 8 follow-ups (2,3,6,8,10,12,14,&16 yr)
- 90% had residual symptoms in adulthood

Also compared treatments:

1. Behavior therapy (Beh)
2. Medication management (Med Mgmt)
3. Combination (Comb) of Beh and Med
4. Self selected community care (Com)

- Results: Comb and Med Mgmt showed greater improvement than the Beh and Com

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Behavioral treatment

- **Parents** - Psychoeducation and parent training
  - decrease negative family dynamics and increase emotion regulation in both
- **Child** - Cognitive behavioral therapy (CBT) recognize and label emotions accurately and challenge emotions which are not in context
  - Group therapy aimed at refining social skills and increasing self-esteem
- **Teachers** - academic organization skills and behavior modification
  - Individual Education Program (IEP)

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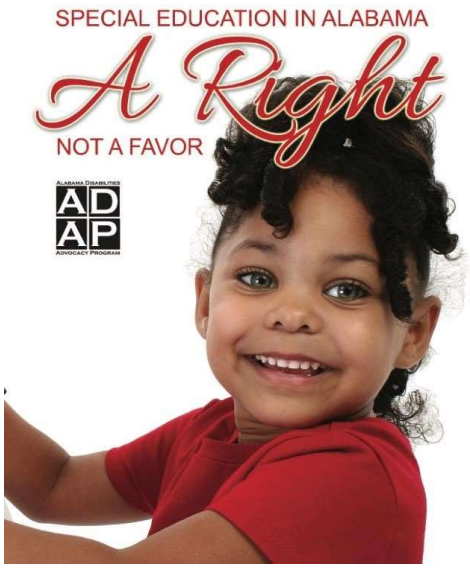
Individual Education Program (IEP)



https://adap.ua.edu/special-education.html

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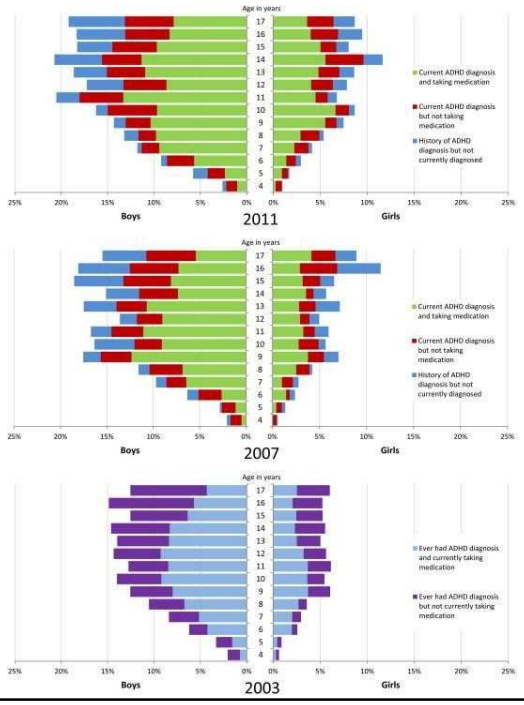
Trends in ADHD medications



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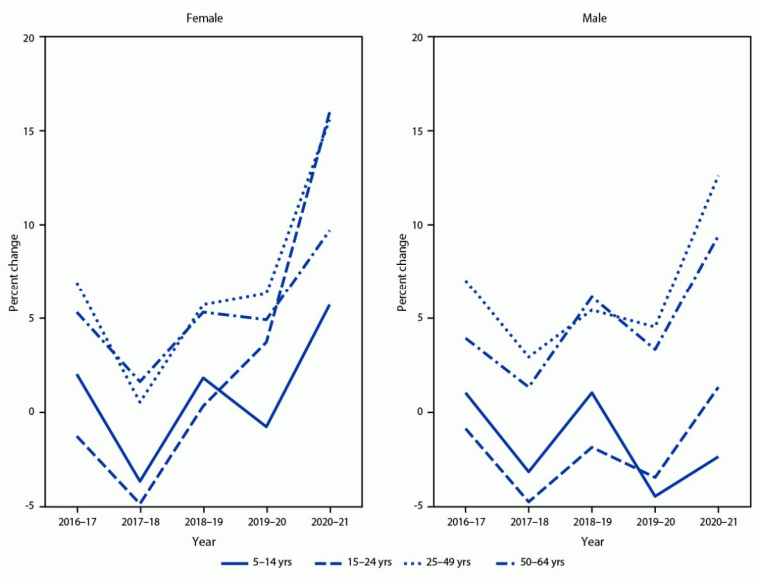
Telehealth - Boom and Bust

Relative annual percent change in percentage of persons aged 5–64 years with at least one stimulant prescription fill, by sex and age group



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Key Neurotransmitter Functions

Dopamine

- Movement
- Memory
- Pleasurable reward and motivation
- Behavior and cognition
- Attention
- Sleep and arousal
- Mood
- Learning

Norepinephrine

- Arousal
- Attention
- Vasoconstrictor - maintains blood pressure
- Sleep wake cycle
- Mood
- Memory

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Pharmacotherapy considerations....

- Do NOT improve any impairments in learning, but when attention is focused, children can learn effectively.
- Central nervous system stimulants are the 1st choice - greatest efficacy with mild side effects.
- Timing of behavior problems – ADHD pattern vs. medication.
- Preschooler dosing must be conservative, otherwise increases further deregulation.

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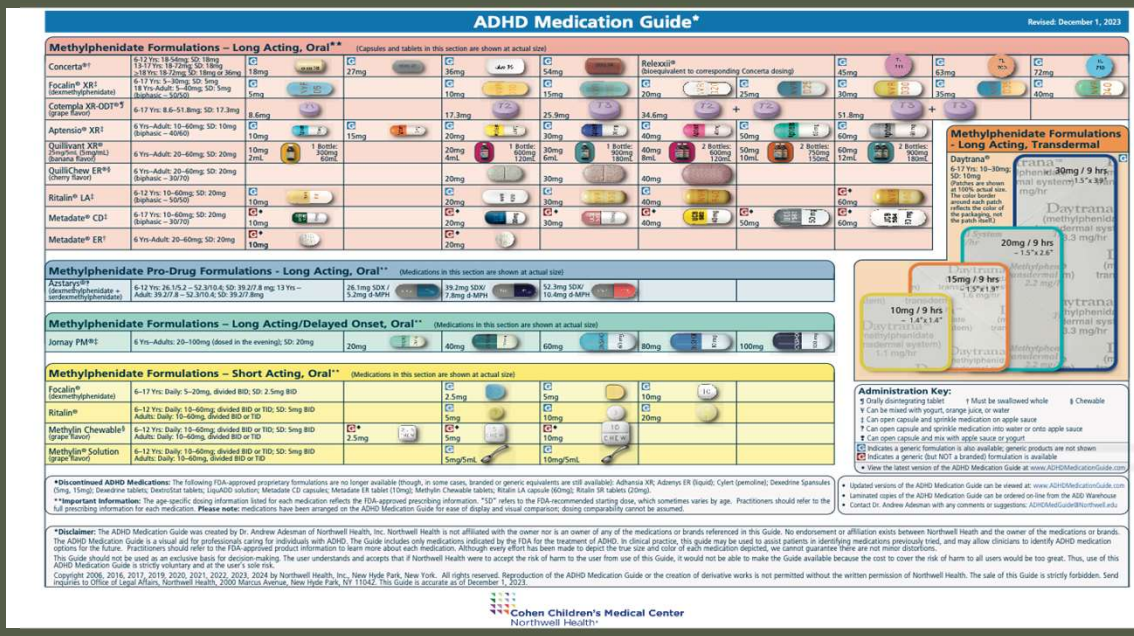

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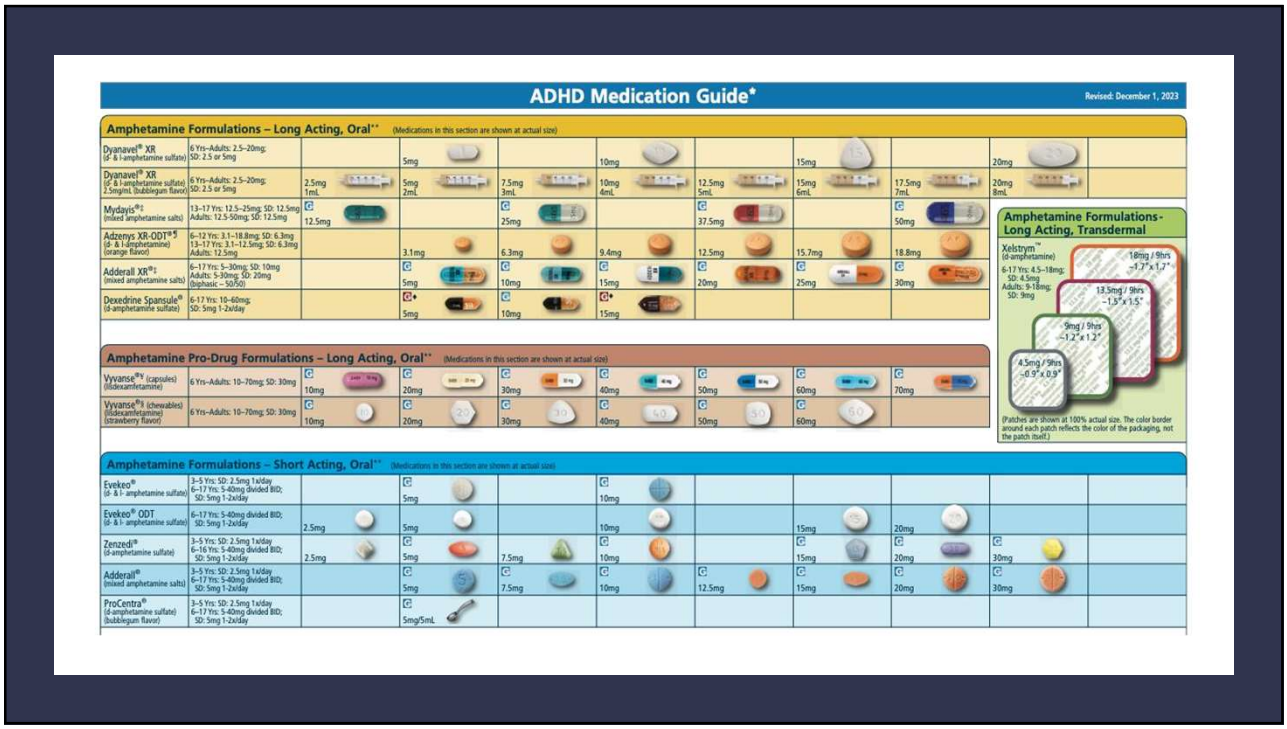

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Common side effect concerns with stimulants

- Growth/weight effects
- Sleep impact
- Cardiac effects
- Tics
- Abuse potential

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Words of Dr. Stephen Stahl…

"Predict side effects in advance (you will look clever and competent to the parents unless you scare them with too much information and cause nocebo effects, in which case you won't look so clever when the patient develops lots of side effects and stops medication; use your judgement here) a balanced but honest presentation is an art rather than a science."

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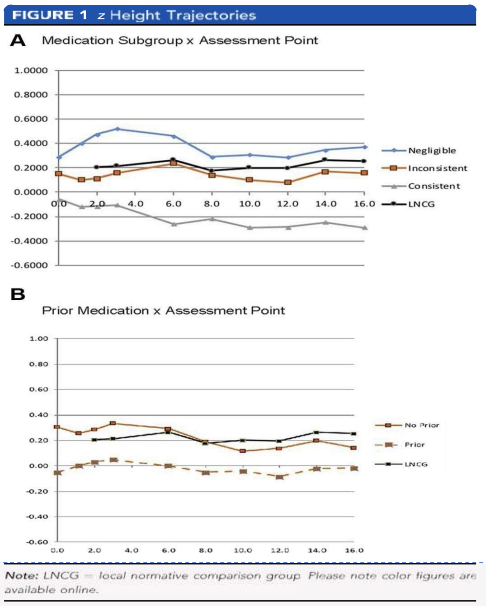
Effects on Height

GREENHILL *et al.*

FIGURE 1 *z* Height Trajectories



Note: LNCG = local normative comparison group. Please note color figures are available online.

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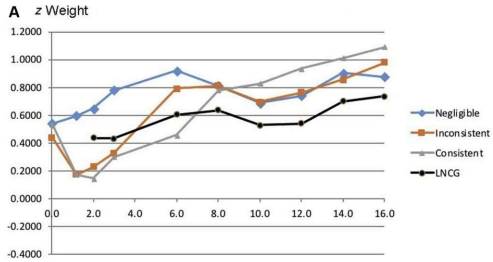
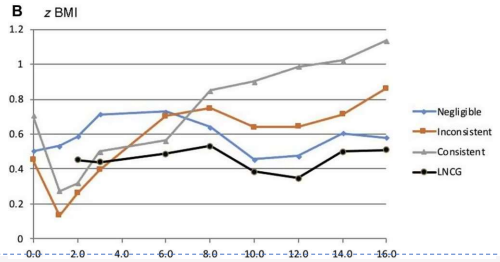
Effects on Weight

FIGURE 2 *z* Weight and *z* Body Mass Index (BMI) Trajectories by Subgroup





Note: LNCG = local normative comparison group. Please note color figures are available online

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Sleep considerations

TABLE 4 Healthy Sleep Practices: Recommended Sleep Amounts in Youths

Age	Hours
Newborns (0–2 months)	12–18
Infants (3–11 months)	14–15
Toddlers (1–3 years)	12–14
Preschoolers (3–5 years)	11–13
School-age children (6–10 years)	10–11
Teens (10–17 years)	8.5–9.25

Note: From http://www.sleepfoundation.org.[58]

TABLE 3 Healthy Sleep Practices:

Recommended	Not Recommended
Goes to bed about the same time	Drinks lots of liquids before bedtime
Goes to bed in the same place	Does things that are alerting
Sleeps alone	Uses bed for things other than sleep
Caffeine and naps a maximum of 4 hours before bedtime	Put to bed after falling asleep
	Stays up past usual bedtime
Has a calming bedtime routine	
Does relaxing things before bedtime	
Gets out of bed at same time in morning	

Note: Selected Items Adapted From the Children's Sleep Hygiene Scale (CSHQ).[29]

1st line - health sleep practices

2nd - low dose Melatonin (5mg or less)

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As many as 70% of kids ADHD have sleep problems; much more than other individuals.

- "Difficulty falling asleep" is most common
- Comorbidities – consider defiance and anxiety
- Medication use/timing
- Substance use – especially marijuana
- Consider Iron levels - >1/3 women under 50yo are iron deficient
  - Low iron can exacerbate restless leg syndrome
- Pilot RCT showed 5-week elimination diet helped

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Cardiac concerns…not much

- Study involving 1,200,438 children and youth aged 2–24 years using methylphenidate

•Cohort members had 81 serious cardiovascular events (3.1/100,000 person-years).

- Event = myocardial infarction, stroke, and death

•Current ADHD medication users had no increased risk for serious cardiovascular events

- Stimulants are contraindicated with known cardiac risks – obtain baseline EKG **IF** family history
- Adrenergic effects can cause increases in BP and pulse rate
  - American Academy of Child and Adolescent Psychiatry (AACAP) recommends BP and pulse checked quarterly

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Tic Disorders

Can be motor or vocal

Tourette's = when person has both

Comprehensive Behavioral Intervention for Tics (CBIT) gold standard treatment – based on habit reversal therapy with 86.9% effectiveness at 6-month follow-up

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Concerns for tics….not really

methylphenidate

Studies with methylphenidate worsening occurred in 20% and 22% who received placebo. No significant difference. **First line with tic concerns**.

amphetamine

One small trial of an amphetamine in children with comorbid tics and ADHD; worsening of tics ONLY when doses higher than 25 mg/day.

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Drugs with abuse potential may reduce risk of abuse….especially when offered to children!

- TRUE - methylphenidate and amphetamine are sometimes abused
- TRUE – the earlier an individual is exposed to substances with abuse potential, the greater the risk of drug abuse
- ALSO TRUE - **stimulant treatment of children and adolescents with ADHD may reduce the risk of later substance abuse**
- "Because those with ADHD are at higher risk for substance abuse, it is urgent that these two perspectives be addressed properly."

Volkow and Swanson (2008) American Journal of Psychiatry

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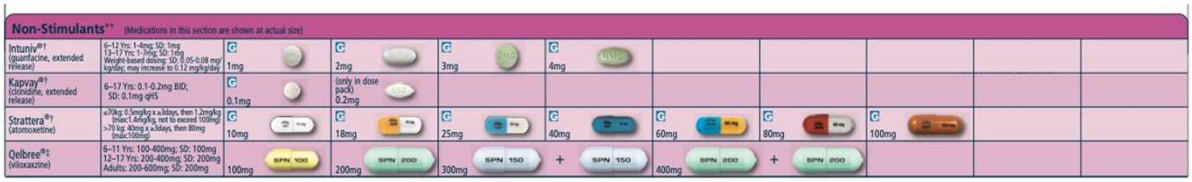
Non-stimulants



Cohen Children's Medical Center
Northwell Health

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Alpha agonists

1) clonidine:

Catapres: short-acting

Kapvay: long-acting

Less selective and helpful with insomnia if offered at bedtime

2) guanfacine:

Tenex: short-acting

Intuniv: long-acting

- BOTH….
  - Mono therapy and adjunct agents – approved for Pediatric ADHD
  - Monitor blood pressure and pulse – do not stop abruptly or risk hypertensive crisis
  - Effective for tics per practice AACAP practice parameters (2013)
  - Common side effects – include sedation, fatigue, nausea, and hypotension

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Non-stimulants

1) Norepinephrine reuptake inhibitor:

atomoxetine **(Strattera):** Pediatric ADHD

- Offers reduction in anxiety
- Option for those with a substance use problem, comorbid anxiety, or tics.

2) Serotonin norepinephrine reuptake inhibitor (SNRI):

viloxazine (**Qelbree**): Pediatric ADHD

- Was marketed in Europe as antidepressant initially

Both have black box warnings.

Sedation and GI complaints are most common side effects.

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Triad: ADHD, Tics and OCD

- 2/3 of kids with Tourette's disorder also have ADHD and OCD
  - Only 15% have uncomplicated Tourette's
- Failure to inhibit intrusive thoughts "obsessions"
- "Compulsions" and tics may be on a continuum

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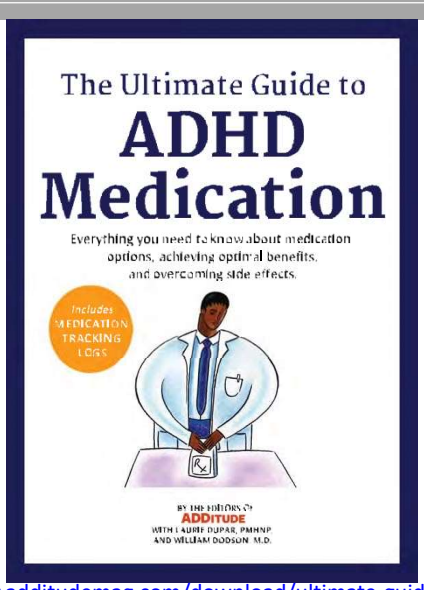

https://www.additudemag.com/download/ultimate-guide-adhd-medications/

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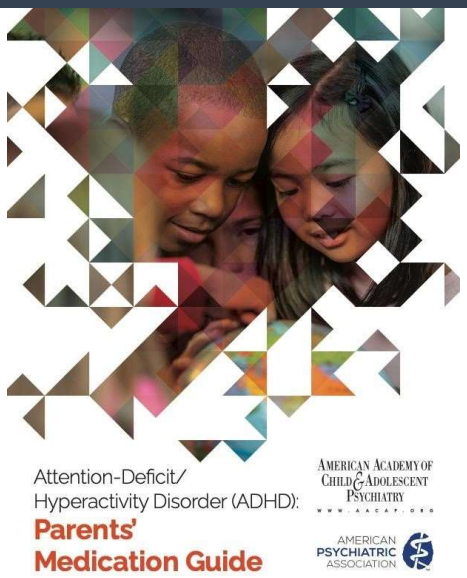

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