ADHD MEDICATIONS

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9/19/2019

GOALS

- Review AAP clinical practice guidelines and recommended ADHD medication algorithm
- Review med specifics
- Stay practical – with quick scenarios

AAP CLINICAL PRACTICE GUIDELINES

Age	Recommendation
Preschool (age 4-5)	1. Behavioral therapy and environmental adjustments 2. Methylphenidate *safety not established for nonstimulants
Elementary school (age 6-11)	1. Behavioral therapy, school environment adjustments, and Stimulants 2. Non stimulants
Adolescents (age 12-18)	1. Behavioral therapy, school environment adjustments, and Stimulants 2. Non stimulants

Clinical Practice Guideline. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of ADHD in Children and Adolescents. Subcommittee on ADHD, Steering committee on quality improvement and management. PEDIATRICS. Vol 128 No 5. Nov 2011.

AAP CLINICAL PRACTICE GUIDELINES MEDICATION ALGORITHM

1. STIMULANT

   - Methylphenidate or Amphetamine derivative titrated to effect or max weight-based dose

   - Stimulant effect size (either): 1.0

2. OTHER STIMULANT

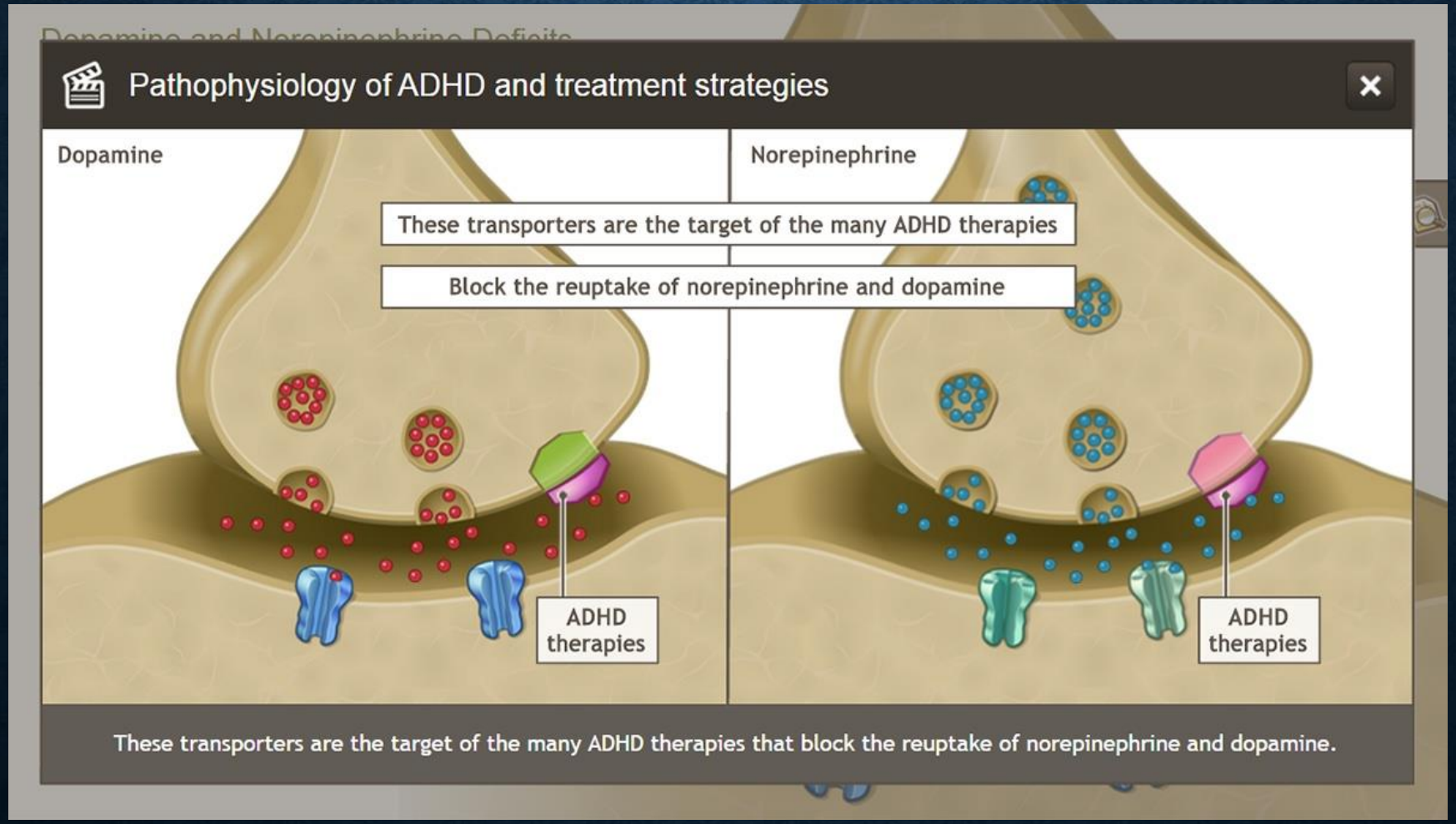
3. NON-STIMULANT

   - Alpha agonist or Atomoxetine titrated to effect or max weight-based dose

   - Nonstimulant effect size (either): 0.7

4. OTHER NON-STIMULANT

STIMULANTS: DOPAMINE REUPTAKE INHIBITION



PRIOR TO STARTING

Baseline Vital signs : BP, HR, weight, height

History:

- Patient history of palpitations, syncope, or chest pain.
- Family history of sudden death or cardiac disease in children and young adults
- (Concern for long QT syndrome, Wolf-Parkinson-White syndrome, hypertrophic cardiomyopathy)
- Any concern: EKG

SIDE EFFECTS

Stimulant Side Effect	Management
Gastrointestinal Distress	Typically self-resolves, Symptomatic care Ensure taking after a meal
Headache	Typically self-resolves, Symptomatic care
Appetite suppression	Counsel on high-protein, high-calorie nutrition and frequent snacks (ie, make up lunch/2nd dinner)
Elevated HR (ave 3-5 bpm) and BP (ave 2-5 mmHg)	No action if within age-appropriate norms and asymptomatic. Discontinue if outside norms.
Tics (*not caused, but may uncover or exacerbate and underlying tic disorder)	If no impairment; no action If distressing, discontinue or trial low dose, consider augmentation or replacement with alpha agonist
Transient growth effects (ultimate adult height not compromised)	No action
Irritability	Lower dose, alternative
Hyperfocus "zombie"	Lower dose

ADHD Medication Guide*

Revised: March 2019

Methylphenidate Derivatives – Long Acting/Extended Release**

(Capsules and tablets in this section are shown at 90% of actual size)

Cotempla XR-ODT™§ (grape flavor)	6-17 Yrs: 8.6–51.8mg; SD: 17.3mg	8.6mg	T1			17.3mg	T2	25.9mg	T3	34.6mg	T2 +	T2		51.8mg	T3 +	T3			
Aptensio® XR‡	6 Yrs–Adult: 10–60mg; SD: 10mg	10mg		15mg		20mg		30mg		40mg		50mg		60mg					
Concerta®†	6-12 Yrs: 18-54mg; SD: 18mg 13-17 Yrs: 18-72mg; SD: 18mg ≥18 Yrs: 18-72mg; SD: 18mg or 36mg	G 18mg		G 27mg		G 36mg		G 54mg		G 72mg	+								
Quillivant XR® 25mg/5mL (5mg/mL) (banana flavor)	6 Yrs–Adult: 20–60mg; SD: 20mg	10mg 2mL	1 Bottle: 300mg 60mL			20mg 4mL	1 Bottle: 600mg 120mL	30mg 6mL	1 Bottle: 900mg 180mL	40mg 8mL	2 Bottles: 600mg 120mL	50mg 10mL	2 Bottles: 750mg 150mL	60mg 12mL	2 Bottles: 900mg 180mL				
Quillichew ER™§ (cherry flavor)	6 Yrs–Adult: 20–60mg; SD: 20mg					20mg		30mg		40mg									
Focalin® XR‡ (dexmethylphenidate)	6-17 Yrs: 5–30mg; SD: 5mg 18 Yrs-Adult: 5–30mg; SD: 5mg	G 5mg				G 10mg		G 15mg		G 20mg		G 25mg		G 30mg		G 35mg		G 40mg	
Ritalin® LA‡	6-12 Yrs: 10–60mg; SD: 20mg	G 10mg				G 20mg		G 30mg		G 40mg				G♦ 60mg					
Metadate® CD‡	6-17 Yrs: 10–60mg; SD: 20mg	G 10mg				G 20mg		G 30mg		G♦ 40mg		G 50mg		G♦ 60mg					
Metadate® ER†	6 Yrs-Adult: 20–60mg; SD: 20mg	G♦ 10mg				G 20mg													

Daytrana®

6-17 Yrs: 10–30mg; SD: 10mg

(Patches are shown at 60% of actual size)

Methylphenidate Derivatives – Short Acting/Immediate Release**

(Medications in this section are shown at actual size)

Focalin® (dexmethylphenidate)	6–17 Yrs: Daily: 5–20mg, divided BID; SD: 2.5mg BID		G 2.5mg	G 5mg	G 10mg
Ritalin®	6–12 Yrs: Daily: 10–60mg; divided BID or TID; SD: 5mg BID Adults: Daily: 10–60mg, divided BID or TID		G 5mg	G 10mg	G♦ 20mg
Methylphenidate Chewable§ (grape flavor)	6–12 Yrs: Daily: 10–60mg; divided BID or TID; SD: 5mg BID Adults: Daily: 10–60mg, divided BID or TID	G♦ 2.5mg	G♦ 5mg	G♦ 10mg	
Methylin® Solution (grape flavor)	6–12 Yrs: Daily: 10–60mg; divided BID or TID; SD: 5mg BID Adults: Daily: 10–60mg, divided BID or TID		G 5mg/5mL	G 10mg/5mL	

G indicates a generic formulation is also available; generic products are not shown

G indicates a generic (but NOT a branded) formulation is available

Administration Key:

¶ Orally disintegrating tablet
† Must be swallowed whole
§ Chewable
¥ Can be mixed with yogurt, orange juice, or water
‡ Can open capsule and sprinkle medication on applesauce

**Important Information: The age-specific dosing information listed for each medication reflects the FDA-approved prescribing information. "SD" refers to the FDA-recommended starting dose, which sometimes varies by age. Practitioners should refer to the full prescribing information for each medication.

Please note: medications have been arranged on the ADHD Medication Guide for ease of display and comparison; dosing equivalence cannot be assumed.

*Disclaimer: The ADHD Medication Guide was created by Dr. Andrew Adesman of Northwell Health, Inc. Northwell Health is not affiliated with the owner of any of the brands referenced in this Guide.

The ADHD Medication Guide is a visual aid for professionals caring for individuals with ADHD. The Guide includes only medications indicated by the FDA for the treatment of ADHD. In clinical practice, this guide may be used to assist patients in identifying medications previously tried, and may allow clinicians to identify ADHD medication options for the future. Medications have been arranged on the card for ease of display and comparison, but dosing equivalence cannot be assumed. Practitioners should refer to the FDA-approved product information to learn more about each medication. Although every effort has been made to depict the size and color of each medication, we cannot guarantee that there are not minor distortions in the final image.

This Guide should not be used as an exclusive basis for decision-making. The user understands and accepts that if Northwell Health were to accept the risk of harm to the user from use of this Guide, it would not be able to make the Guide available because the cost to cover the risk of harm to all users would be too great. Thus, use of this ADHD Medication Guide is strictly voluntary and at the user's sole risk.

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ADHD Medication Guide*

Revised: March 2019

Amphetamine Derivatives – Long Acting/Extended Release**

(Medications in this section are shown at actual size)

Adzenys XR-ODT®¶ (d- & l-amphetamine) (orange flavor)	6–12 Yrs: 3.1–18.8mg; SD: 6.3mg 12–17 Yrs: 3.1–12.5mg; SD: 6.3mg Adults: 12.5mg		3.1mg	6.3mg	9.4mg	12.5mg	15.7mg	18.8mg	
Adzenys ER® (d- & l-amphetamine) 1.25mg/mL (orange flavor)	6–12 Yrs: 6.3–18.8mg; SD: 6.3mg 12–17 Yrs: 6.3–12.5mg; SD: 6.3mg Adults: 12.5mg		3.1mg 2.5mL	6.3mg 5mL	9.4mg 7.5mL	12.5mg 10mL	15.7mg 12.5mL	18.8mg 15mL	
Adderall XR®‡ (mixed amphetamine salts)	6–17 Yrs: 5–30mg; SD: 10mg Adults: 5-30mg; SD: 20mg		G 5mg	G 10mg	G 15mg	G 20mg	G 25mg	G 30mg	
Vyvanse®‡ (capsules) (lisdexamfetamine)	6 Yrs–Adults: 10–70mg; SD: 30mg	10mg	20mg	30mg	40mg	50mg	60mg	70mg	
Vyvanse®‡ (chewables) (lisdexamfetamine) (strawberry flavor)	6 Yrs–Adults: 10–60mg; SD: 30mg	10mg	20mg	30mg	40mg	50mg	60mg		
Dyanavel® XR (d- & l-amphetamine sulfate) 2.5mg/mL (bubblegum flavor)	6–17 Yrs: 2.5–20mg; SD: 2.5 or 5mg	2.5mg 1mL	5mg 2mL	7.5mg 3mL	10mg 4mL	12.5mg 5mL	15mg 6mL	17.5mg 7mL	20mg 8mL
Mydayis™‡ (mixed amphetamine salts)	13–17 Yrs: 12.5–25mg; SD: 12.5mg Adults: 12.5-50mg; SD: 12.5mg	12.5mg		25mg		37.5mg		50mg	
Dexedrine Spansule® (d-amphetamine sulfate)	6-17 Yrs: 10–60mg; SD: 5mg 1-2x/day		G♦ 5mg	G♦ 10mg	G 15mg				

Amphetamine Derivatives – Short Acting/Immediate Release**

(Medications in this section are shown at actual size)

Evekeo® (d- & l- amphetamine sulfate)	3–5 Yrs: SD: 2.5mg 1x/day 6–17 Yrs: 5-40mg divided BID; SD: 5mg 1-2x/day		5mg		10mg				
Zenzedi® (d-amphetamine sulfate)	3–5 Yrs: SD: 2.5mg 1x/day 6–17 Yrs: 5-40mg divided BID; SD: 5mg 1-2x/day	2.5mg	G 5mg	7.5mg	G 10mg		15mg	20mg	30mg
Adderall® (mixed amphetamine salts)	3–5 Yrs: SD: 2.5mg 1x/day 6–17 Yrs: 5-40mg divided BID; SD: 5mg 1-2x/day		G 5mg	G 7.5mg	G 10mg	G 12.5mg	G 15mg	G 20mg	G 30mg
ProCentra® (d-amphetamine sulfate) (bubblegum flavor)	3–5 Yrs: SD: 2.5mg 1x/day 6–17 Yrs: 5-40mg divided BID; SD: 5mg 1-2x/day		G 5mg/5mL						

Non-Stimulants**

(Medications in this section are shown at actual size)

Intuniv®† (guanfacine, extended release)	6–12 Yrs: 1-4mg; SD: 1mg 13–17 Yrs: 1-7mg; SD: 1mg Target dose is weight-based: .05-0.12mg/kg/day	G 1mg	G 2mg	G 3mg	G 4mg			
Kapvay®† (clonidine, extended release)	6–17 Yrs: 0.1-0.2mg BID; SD: 0.1mg qHS	G 0.1mg	(only in dose pack) 0.2mg					
Strattera®† (atomoxetine)	<70kg: 0.5mg/kg x 3d, then 1.2mg/kg (max:1.4mg/kg, not to exceed 100mg) ≥70 kg: 40mg/kg x 3d, then 80mg (max:100mg)	G 10mg	G 18mg	G 25mg	G 40mg	G 60mg	G 80mg	G 100mg

♦ **Discontinued ADHD Medications:** The following FDA-approved proprietary formulations are no longer available (though, in some cases, branded or generic equivalents are still available): Ritalin LA capsule (60mg); Metadate CD capsules (40mg, 60mg); Metadate ER tablet (10mg); Ritalin SR tablets (20mg); Methylin Chewable tablets (2.5mg, 5mg, 10mg); Dexedrine Spansules (5mg, 10mg); Dexedrine tablets (5mg, 10mg); DextroStat tablets (5mg, 10mg); LiquADD solution (5mg/5mL), and Cylert (pemoline).

- Updated versions of the ADHD Medication Guide can be viewed at www.ADHDMedicationGuide.com
- Laminated copies of the ADHD Medication Guide can be obtained at: www.ADDWarehouse.com
- Contact Dr. Andrew Adesman with any comments or suggestions: ADHDMedGuide@Northwell.edu

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IRRITABILITY DIFFERENTIAL

- RULE OUT UNDERLYING MOOD, ANXIETY, OR TRAUMATIC DISORDER
- Assess timing:
  - While stimulant is active: due to stimulant (more likely in younger pts, ASD)
  - As stimulant is wearing off: rebound vs hunger (tx: cheesestick vs short-acting stimulant)
  - After stimulant wears off: hunger, fatigue, underlying mood/anxiety disorder, untreated ADHD (all)

DO STIMULANTS MAKE ANXIETY WORSE?

- Multimodal Treatment for ADHD:
  - Comorbid ADHD/anxiety had equally positive result compared to ADHD alone
  - But more pronounced improvement with behavioral therapy
  - Recommendation: ensure CBT

ARE STIMULANTS GATEWAY DRUGS?

- MTA long term: Did not increase or decrease risk
  - Molina et al. Adolescent Substance Use in the Mulimodal Treatment Study of ADHD (MTA) as a function of childrenood ADHD, random assignment to childhood treatments, and subsequent medication. JAACAP Vol 52 No 3 2013
- Analysis of substance-related ED visits: Less substance related ED visits in pts with ADHD treated with stimulants
  - Quinn et al. ADHD medication and substance related problems. Am J Psych 174:9. 2017

REASONS TO NOT USE A STIMULANT

- Concern for substance use (Diversion and ?diagnosis)
- Poor sleep hygiene confounding the diagnosis
- Side effects/Failed trials
- Patient preference

ALPHA AGONISTS

- Guanfacine ER (Intuniv)
- Clonidine ER (Kapvay) – more sedation (often used for insomnia) due to less selective for alpha 2a receptors
- Theory: central actions on postsynaptic alpha 2A receptors in the PFC
- FDA - approved for monotherapy and as augmentation of stimulants in ADHD
  - Wilens et al. A controlled Trial of Extended Release Guanfacine and Psychostimulants for ADHD. JAACAP. Vol 51 No 1. 2012.
- 1-2 weeks for full effect
- Must be taken daily and tapered down if discontinuing therapy
- Intuniv has some evidence (1 small trial) for PTSD in children and adolescents and is recommended for use in tics
- Efficacy : 24 hours

	Initial Dose	Titration	Max recommended dose
Intuniv	1 mg qam	1 mg/week	0.05 – 0.12 mg/kg Age 6-12: 4 mg Age 13 – 17: 7 mg
Kapvay	0.1 mg qhs	0.1 mg	0.2 mg BID

ALPHA AGONIST SIDE EFFECTS

- GI distress (typically self resolves)
- Headache (typically self resolves)
- Decreased BP/HR (dizziness), monitor, decrease if symptomatic
- Sedation (trial at night for guanfacine)

STRATTERA (ATOMOXETINE)

- Norepinephrine reuptake inhibitor
- 2-6 weeks for full effect, must be tapered and taken daily
- Evidence for improvement in anxiety
- Could trial BID split dosing (may reduce GI side effects)
- *slower titrations with CYP2D6 inhibitors (Prozac, abilify)

Initial dose	Titration	Max recommended dose	Dosage forms
0.5 mg/kg or 40 mg	1.2 mg/kg or 80 mg	1.4 mg/kg or 100 mg	10, 18, 24, 40, 60, 80, 100 mg tabs (must be swallowed)

STRATTERA SIDE EFFECTS

Common:

- GI upset (typically self resolves)
- Headache (typically self resolves)
- Sedation – change administration to bedtime

Rare:

- Suicidal ideation
- Hepatotoxicity
- Priapism

7 yo M with ADHD (weight 25 kg) was started on Ritalin LA 10 mg. Teachers and parents do not notice any effect.

Ritalin LA was increased to 20 mg. Teachers note improvement throughout the school day in attention, ability to sit still, and need for redirection. Over the course of the month he moves up several reading levels.

Parents note an increase in irritability in the evenings.

7 yo F with ADHD and functional impairment. Does not swallow pills.

11 yo F with ADHD and functional impairment was started on Concerta 18 mg and titrated up to 54 mg. She and parents note significant functional improvement at school, however she notes more difficulty with sleep initiation.

8 yo M (weight 30 kg) has had moderate improvement on Focalin XR 30 mg. He has decreased appetite during lunch, but eats a good breakfast and dinner and has gained weight appropriately. The Focalin XR lasts until approximately 4 pm. He is able to get most of his homework done before 4 pm but still struggles to complete the work at times. Parents note significant increase in hyperactivity after 4 pm, they feel that they can manage this behavior using techniques they learned in PMT, however they note ongoing difficulty with sleep initiation despite appropriate sleep hygiene, because he just can't "be still enough to fall asleep."

An 8 yo F (30 kg) with ADHD and functional impairment tried Concerta 36 mg and had no effect. At Concerta 54 mg she was irritable throughout the day.

RESOURCES

Pediatric Psychopharmacology for treatment of ADHD, Depression, and Anxiety. Pediatrics. Vol 136 no 2 August 2015

Longterm Effects of Stimulant Treatment for ADHD: What Can We Tell Our Patients? Curr Dev. Disor Rep. Jan 2015

Using Stimulants to Treat ADHD-Related Emotional Lability. Hulvershorn et al. Curr Psychiatry Rep 2014.

ADHD: Clinical Practice Guidelines for the Diagnosis, Evaluation, and Treatment of ADHD in Children and Adolescents. AAP subcommittee on ADHD. 2011.