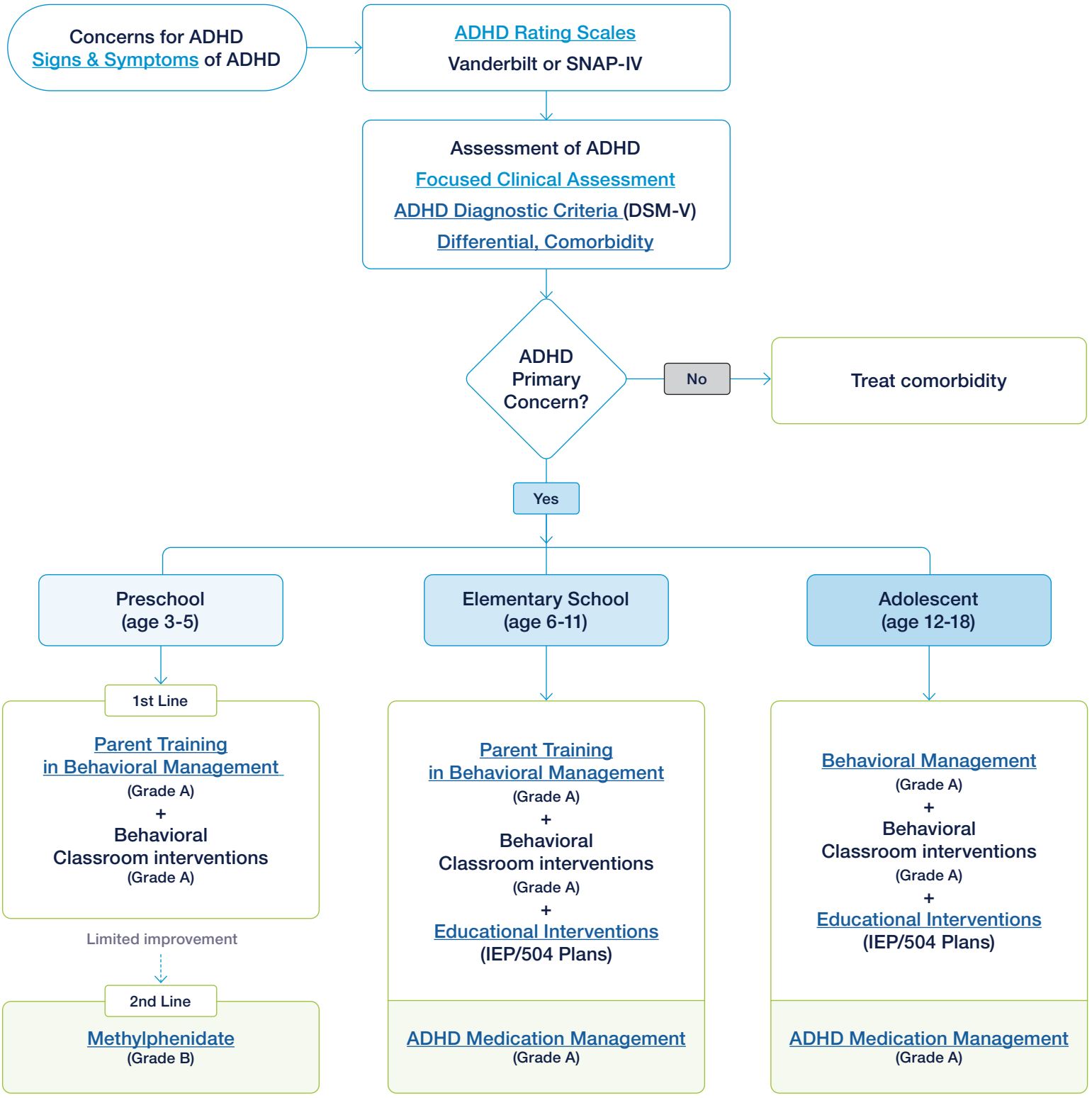
Clinical Work Pathway
ADHD

UCSF Benioff Children's Hospitals | Child & Adolescent Psychiatry Portal



Text only version

AAP rating of evidence and recommendations:

Grade A: Strong recommendation
Grade B: Strong to moderate recommendation

Primary reference:

Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. American Academy of Pediatrics. *Pediatrics*. Volume 144, number 4, October 2019

Concerns for ADHD

Signs and Symptoms

Inattentive symptoms	Hyperactive/Impulsive symptoms
• Fails to give close attention to details • Difficulty sustaining attention • Does not seem to listen when spoken to directly • Difficulty following through on instructions • Difficulty organizing tasks • Avoids or dislikes tasks that require focus • Often loses things • Easily distracted • Often forgetful in daily activities	• Fidgets, taps hands or feet, squirms in seat • Leaves seat without permission • Runs or climbs when inappropriate, feeling restless for teens or adults • Unable to engage in leisure activities quietly • Often "on the go", "driven by a motor" • Talks excessively • Blurts out answers before end of question • Difficulty waiting turns • Interrupts or intrudes

ADHD Rating Scales

ADHD screener – Vanderbilt (age 6-12, free); SNAP-IV (age 6-17, free)

- Vanderbilt, Parent
- Vanderbilt, Teacher
- SNAP-IV

Our rating scales they are displayed here:
https://capp.ucsf.edu/content/adhd-behavioral-challenges

Assessment of ADHD

Focused Clinical Assessment

Collateral history	• Gather collateral from family, teachers, school staff, other care takers, or after-school program • History may be obtained through rating scales, phone-calls, correspondence
Assess for functioning in multiple domains	• Family relationships • Peer relationships • School/Academic functioning; screen for learning disorders
Assess for acute stressors	• Acute stressors: stressors in family life, peer/social relationships, school/academic stressors etc.
Assess for Trauma history, chronic stress	• Neglect, physical, sexual or emotional abuse • Screen for ACES
Longitudinal clinical hx of symptoms	• Onset of symptom presentation, developmental course • Behavioral concerns in earlier childhood years • Screen for developmental concerns (i.e. Developmental delay, Autism Spectrum Disorder)
Consider Differential diagnosis	• ODD, Conduct disorder • Anxiety • Depression • Learning disorder • Autism Spectrum disorders • May use general screeners: PSC-17 to assess for behavioral concerns- internalizing vs externalizing vs attention problems **and/or** • Symptom targeted screeners for ADHD, Depression, Anxiety (see Depression, Anxiety algorithm)

ADHD Diagnostic Criteria DSM-V

Inattentive type	Hyperactive/Impulsive type	Combined Type
Inattentive symptoms ≥ 6	Hyperactive/Impulsive symptoms ≥ 6	Meets both inattentive and hyperactive criteria
Symptoms present prior to age 12		
Symptoms present ≥ 2 settings		
Symptoms interfere with social, academic, occupational functioning		
Symptoms not occur during a psychotic episode or explained by another mental disorder (mood, anxiety, dissociative disorder, personality disorder, substance intoxication or withdrawal)		

Screen for comorbidities

Anxiety
Depression
Oppositional Defiant Disorder
Conduct disorder
Substance Use
Learning disorder
Language disorder
Autism Spectrum Disorder
Physical conditions (sleep apnea)
Tic Disorder
Screen for cardiac risk factors

Consider Differential diagnosis	• ODD, Conduct disorder • Anxiety • Depression • Learning disorder • Autism Spectrum disorders
	• May use general screeners: PSC-17 to assess for behavioral concerns- internalizing vs externalizing vs attention problems **And/Or** • Symptom targeted screeners for ADHD, Depression, Anxiety (see Depression, Anxiety algorithm)

Common ADHD Comorbidities and Prevalence

- Disruptive Behaviors (Oppositional Defiant Disorder, Conduct disorder): 40%
- Depression
  - Childhood ADHD: 14%
  - Adult ADHD: 47%
- Anxiety
  - Childhood ADHD: 30%
  - Adult ADHD: 53%
- Tic, Tourette's Disorder
  - Clinically tic-disorder comorbidity should not prohibit the initiation, re-trial of stimulant medication in treatment of ADHD
  - ADHD diagnosed child: ~10% prevalence of Tics
  - However, 60% of children with a Tic, Tourette diagnoses have comorbid ADHD
- Learning Disorder
  - ADHD diagnosis: 50% prevalence of Learning disorders

Substance Use

- In context of active substance use, it is generally recommended to treat the substance use disorder first, and then any comorbid ADHD subsequently
- To treat ADHD in active substance users, the non-stimulant atomoxetine or alpha-agonists may be useful.
- Results of 16 year MTA study revealed no significant increase in Substance use disorder in the ADHD group compared to normal control group

Screening for Cardiac Risk factor

Screening for potential cardiac risk factors for sudden death among children

History	Family or personal history (1st, 2nd degree family)	Physical Exam
• Shortness of breath on exertion, without other explanation (eg. asthma, obesity, deconditioning) • Poor exercise tolerance without other explanation (eg asthma, obesity, deconditioning) • Syncope, seizures with exercise, startle or fright • Palpitation on exertion	• Long QT syndrome or arrhythmias • Wolff-Parkinson-White (WPW) syndrome • Cardiomyopathy • Heart Transplant • Pulmonary Hypertension • Unexplained motor vehicle accident, drowning • Implantable defibrillator • SIDS • Sudden cardiac death <35 years	• Hypertension • Organic murmur • Sternotomy incision (or prior cardiac surgery) • Other abnormal cardiac findings

Reference:

Cardiac risk assessment before the use of stimulant medications in children and youth.
Can J Cariol Vol 25 No11, November 2009

- The risk of sudden death in the children with ADHD treated with stimulants is no higher than the sudden death rate in the general population (<2/1,000,000 deaths in stimulant group vs 8/1,000,000 in general population of children)
- ECG and Echocardiography has limited sensitivity and specificity as a general screening test.
- AAP and AHA recommends targeted cardiac history and physical exam to screen for risk factors, and referring to specialist for further evaluation in patients with known cardiac disease, family history, or symptoms concerning for cardiac risk factors.
- (AAP Policy Statement, Warren et al 2009)
- Routine cardiac evaluations (EKG, Echo) is unnecessary prior to starting any stimulant treatment in otherwise healthy individuals

(AAP Policy statement 2011, Biederman et al., 2006)

Parent Training in Behavioral Management, Educational Interventions

Behavioral Management

- **Parent-child interaction therapy (PCIT)**
  PCIT is an evidence-based treatment (EBT) for preschool aged children with disruptive behavioral problems. It is conducted through "coaching" sessions where a therapist observes through a one-way mirror while the parent and child is observed interacting in the playroom. The therapist will be coaching you live on how to manage your child's behaviors from outside the one-way mirror observing you and directing the parent through a "bug-in-the-ear" device.

  - Key components of PCIT treatment
    1. Child Directed Interaction (CDI)
       Goal is building positive attention, warmth in parent-child relationship through specific communication techniques with labeled praises, reflections, behavior descriptions
    2. Parent Directed Interaction (PDI)
       Goal is focusing on increasing compliance through safe, consistent discipline techniques

- **Parent Training in Behavioral management (PTBM) Behavior Modification**
  Use rewarding stimuli (i.e., positive reinforcement) or removal of an aversive stimuli (i.e., negative reinforcement) to increase desirable behavior. Behavior modification targets the ABCs.

  Antecedent (triggers), Behaviors (problematic, undesirable behaviors), Consequences (response).

  Antecedent (What sets off the child?) → **Behaviors** → **Consequences (Things that come after B)**

  Adults are trained to identify the behaviors, explain them in simple terms, identify the triggers or setting the behaviors occur in, modify response/punishment and develop positive strategies to decrease child's undesirable behaviors.

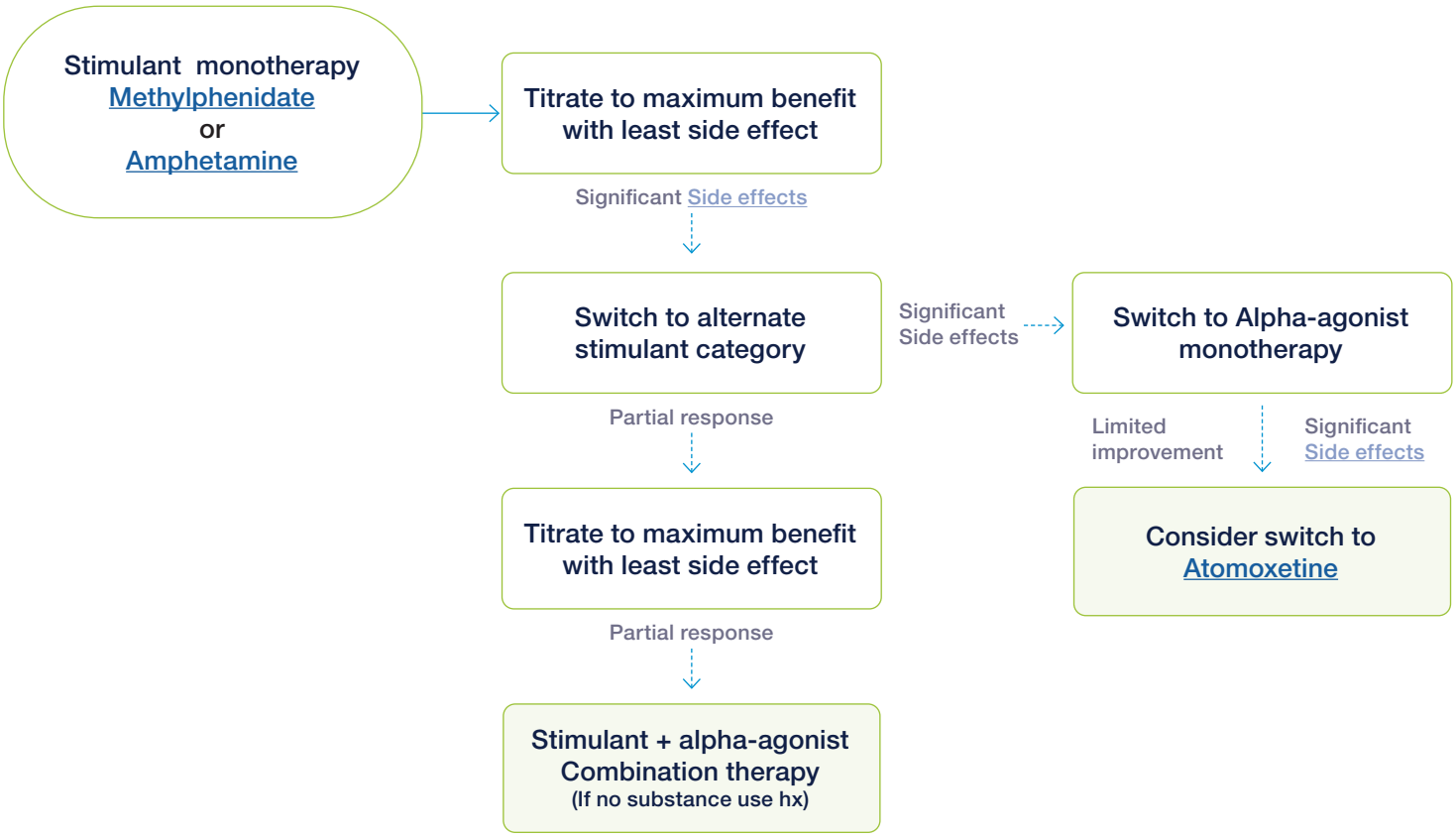
  Adults learn to change the "A" (how they give commands) → change "C" (how parents react when child obeys/disobeys) → change B

  - i. Modify Triggers (Preventive)
    1. Clear, behavioral specific instructions
    2. Consistent and predictable discipline
    3. Daily structured schedule
    4. Use a timer to help complete tasks
  - ii. Modify Consequences
    1. Reward system (ie sticker charts, school-home daily report card)
    2. Praise positive behaviors
    3. Ignore negative attention seeking behaviors

Educational interventions

- Psychoeducational assessments
- 504 Plan, or Individualized Education Plan (IEP) if indicated
- School-Home Daily Report Cards

ADHD Medication Management Algorithm



Text only version

Adapted from: AACAP: "Practice Parameter for the Assessment and Treatment of Children and Adolescents with Attention Deficit/Hyperactivity Disorder". JAACAP 46(7): July 2007:894-921

Jellineck M, Patel BP, Froehle MC eds. (2002): Bright Futures in Practice: Mental Health-Volume 1. Practice Guide. Arlington, VA: National Center for Education in Maternal and Child Health: 203-211

Side Effects of Stimulants and management strategies

Stimulant Side Effect	Management Strategies
Appetite loss	• Assess parenting, meal time routines, and adjust timing of dinner • Assess for other causes of eating disturbance • Administer stimulant after meals • Encourage high caloric, high protein snacks • Consider shorter-acting stimulant or switch stimulant • Consider drug holidays on weekends, and on breaks
Sleep disturbance	• Assess, optimize sleep hygiene, bedtime routines • Assess for other sleep disorders • If using IR form: decrease or eliminate PM dose, or give earlier • If using ER form: Administer earlier in AM, or switch to short-acting form
Headaches **Abdominal pain**	• Encourage adequate hydration, supportive care • Consider switching to a different stimulant, if not able to tolerate

Irritability	• Assess for other causes of emotional problems
	• When is the behavior worse?
	  • During the medicine peak period
	  ◆ Lower dosage
	  ◆ Switch to different stimulant
	  • During medicine wear-off period
	  ◆ Add short-acting dose in PM for booster (to curb crash)
	  ◆ Switch to different formulation of stimulant
	  ◆ Consider longer-acting formulation

Mood changes	• Assess for other causes of mood changes, withdrawal (depression, anxiety) • Consider lowering dose • Consider switching to different stimulant
Tics	• Note that stimulants do NOT exacerbate tics on average • Tics are common and usually transient in children, wax and wane on own • Weigh benefits of improved ADHD vs degree of impairment with tics • Consider lowering dose of stimulant • Consider switching to different stimulant • Consider adding or switching to an alpha-agonist

ADHD Medications

Methylphenidate

Methylphenidate Name	Dosage form (mg)	Dosing Frequency	FDA Max dosage (mg)	Special considerations
Short Acting (3-4 hours)				
Focalin IR (Dexmethylphenidate)	2.5, 5, 10	Daily, BID, (TID)	20	Generic(+)
Methylin (Methylphenidate)	2.5, 5, 10, 20		60	Liquid & Chewable tab Generic(+)
Ritalin® (Methylphenidate)	5, 10, 20		60	*Can be crushed Generic(+)
Intermediate (6-8 hours)				
Metadate CD® (30%IR, 70% ER)	10, 20, 30, 40, 50, 60,	daily in AM	60	Can be sprinkled Generic(+)
Ritalin LA (50%IR, 50% DR)	10, 20, 30, 40, 50, 60,		60	Can be sprinkled Generic(+)
Methylin ER	10, 20		60	Generic(+)
Metadate ER	10, 20		60	Generic(+)
Quillichew ER®	20,30,40		60	Chewable tab
Long acting (10-12 hours)				
Concerta®	8, 27, 36, 54	daily in AM	72	Do not open or chew, osmotic pump cap Generic(+)
Focalin XR® (Dexmethylphenidate 50%IR, 50% ER)	5, 10, 15, 20		30	Can be sprinkled Generic(+)
Quillivant XR® (20% IR, 80% ER)	Liquid 25 mg/5 ml		60	25mg/5ml Liquid (60ml, 120ml, 150ml, 180ml)
Daytrana®	10, 15, 20, 30		30	Transdermal Patch, Remove after 9 hrs lasts 3-5 hrs post removal

ADHD Medications

Amphetamine

Amphetamine Name	Dosage form (mg)	Dosing Frequency	FDA Max dosage (mg)	Special considerations
Short Acting (4-8 hours)				
Adderall® (Amphetamine-Dextroamphetamine)	5, 7.5, 10, 12.5, 15, 20, 30	Daily, BID, (TID) daily in AM	40	Generic(+)
Dexedrine, Dextro Stat® (Dextroamphetamine)	5, 10		40	Generic(+)
Zenzedi®	2.5, 5, 10 15, 20, 30		40	
Evekeo®	5, 10		40	
ProCentra® (Dextroamphetamine)	5mg/5ml		40	Liquid (473 ml/bottle) Generic (+) Duration: 4-8 hour
Long acting (8-12 hours)				
Adderall XR® (Amphetamine-detroamphetamine, 50%IR, 50%ER)	5, 10, 15, 20, 25, 30	daily in AM	30	Can be sprinkled Generic(+)
Vyvanse® (Lisdexamphetamine)	10, 20 30, 40, 50, 60, 70		70	Capsule form & Chewable form
Dexedrine Spansule (Dextroamphetamine)	5, 10, 15		40	*Can be sprinkled Generic(+)
Dyanavel XR®	2.5mg/ml		20	Liquid (464 ml/bottle)
Adzenys XR®	1.25mg/ml		12.5-18.8	Liquid (450 ml/bottle) ODT form

ADHD Medications

Non-stimulant category ADHD Medication

	Name	Dosage form (mg)	Dosing Frequency	Titration tips	Max dosage (mg)	Side effects	Special considerations
α2-agonist	**Guanfacine XR (Intuniv®)***	1, 2, 3, 4	Q daily	1 mg/day Q weekly	Lesser of 4mg/day (6-12yo) or 0.05-0.12 mg/kg/day	Somnolence Fatigue Hypotension Bradycardia Dizziness Dry mouth Rebound hypertension with abrupt discontinuation	*Do not crush or chew Monitor BP, HR Wean off gradually ↑↓Titrate ≤1 mg/day weekly Generic(+)
	Guanfacine (Tenex®)	1, 2	Q daily BID TID	0.5-1 mg/day Q weekly	27-40 kg: 2 mg 40-45 kg: 3 mg >45 kg : 4 mg		
	Clonidine XR (Kapvay®)*	0.1, 0.2	Q daily -BID	0.1 mg/day Q weekly	0.4 mg/day		*Do not crush or chew Monitor BP, HR Wean off gradually ↑↓Titrate ≤1 mg/day weekly Generic(+)
	Clonidine IR (Catapres®)	0.1, 0.2, 0.3	Q daily BID TID QID	0.5-1 mg/day Q weekly	27-40.5 kg: 0.2 mg 40.5-45 kg: 0.3 mg >45 kg: 0.4 mg		
SNRI	**Atomoxetine (Strattera®)**	10, 18, 25, 40, 60, 80, 100	Q daily -BID	↑ ≤ 0.8 mg/kg/day Q weekly	Lesser of 100 mg/day or 1.4mg/kg/day	Headache Somnolence GI symptoms hepatic failure (rare) Increased SI (rare)	Do not crush or chew Generic(+)

References

Mark L. Wolraich, Joseph F. Hagan, Carla Allan et al. Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. American Academy of Pediatrics. *Pediatrics*. 144(4), e20192528; DOI: https://doi.org/10.1542/peds.2019-2528

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James M. Perrin, Richard A. Friedman, Timothy K. Knilans, the Black Box Working Group and the Section on Cardiology and Cardiac Surgery, Cardiovascular Monitoring and Stimulant Drugs for Attention-Deficit/Hyperactivity Disorder. (2008). *Pediatrics*; 122(2) 451-453; DOI: https://doi.org/10.1542/peds.2008-1573

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Dulcan's Textbook of Child and Adolescent Psychiatry 2nd edition. Mina K Dulcan, MD

Nelson Pediatrics Board Review Certification and Recertification. Terry Dean Jr, Louis Bell, MD

Centers for Disease Control and Prevention https://www.cdc.gov/ncbddd/adhd/treatment.html

National Institute for Children's Health Quality https://www.nichq.org/resource/caring-children-adhd-resource-toolkit-clinicians

Text Only Version of Main Flowchart

Title: "Clinical Standard Work Pathway: ADHD"

Top of decision tree begins: "Concerns for ADHD Signs & Symptoms of ADHD"

1. First step is "ADHD Rating Scales Vanderbilt & SNAP-IV"
2. Then "Assessment of ADHD Focused Clinical Assessment ADHD Diagnostic Criteria (DSM-V) Differential, Comorbidity"
3. Then Q: "Is ADHD the Primary Concern?"
   A. If "No" to ADHD Ptrimary Concern, then "Treat Comorbidity"
   B. If "Yes" to then stratify 3 actions steps
      I. Preschool (age 3-5): 1st line of treatment; Parent Training in Behavioral Management (Grade A) along with Behavioral Classroom interventions (Grade A): 2nd line of treatment; Methylphenidate (Grade B)
      II. Elementary School (age 6-11): Parent Training in Behavioral Management (Grade A) along with Behavioral Classroom interventions (Grade A) as well as Educational Interventions (IEP/504 Plans) in addition to ADHD Medication Management (Grade A)
      III. Adolescent (age 12-18): Behavioral Management (Grade A) along with Behavioral Classroom interventions (Grade A) as well as Educational Interventions (IEP/504 Plans) in addition to ADHD Medication Management (Grade A)

NOTES:
AAP rating of evidence and recommendations:

Grade A: Strong recommendation
Grade B: Strong to moderate recommendation

Primary reference:

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Rev. 08/01/21

Text Only Version of ADHD Medication Management Algorithm Flowchart

Title: "ADHD Medication Management Algorithm"

Top of decision tree begins: "**Stimulant monotherapy** Methylphenidate or Amphetamine"

1. First step is "**Titrate to maximum benefit with least side effect**" if significant side effects are experienced continue to next step.
2. Then "**Switch to alternate stimulant category**"
   - A. If partial response is experienced, then:
     - I. Titrate to maximum benefit with least side effect. If only partial response is experienced then:
     - II. Stimulant + alpha-agonist Combination therapy (If no substance use hx)
   - B. If significant side effects are experienced, then:
     - I. Switch to Alpha-agonist monotherapy. If there is limited improvement or significatnt side effects, then:
     - II. Consider switch to Strattera

NOTES:
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Jellineck M, Patel BP, Froehle MC eds. (2002): Bright Futures in Practice: Mental Health-Volume 1. Practice Guide. Arlington, VA: National Center for Education in Maternal and Child Health: 203-211