

ADHD Throughout the Ages

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Disclosures

- We do not have any financial relationships with ineligible companies to disclose
- We intend to discuss the off-label use of a commercial product.

Learning objectives

- Demonstrate appropriate use of screening tools for ADHD symptoms
- Interpret symptoms reported on ADHD assessment
- Formulate appropriate initial treatment plan

Why Do We Care (need to plug and cite stats here)

- Developmental and educational potential
- Comorbid ODD
- Comorbid mood
- Comorbid anxiety
- Negative impact on school
- Impact on social development
- Relative risk of substance abuse
- Morbidity and mortality; accidental death stat
- Car accident stat
- Impact on relationship; divorce stat
- High heritability

DSM-V Criteria

Disorder Class: Neurodevelopmental Disorders

A) persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with function/development; characterized by (1) and/or (2):

1. Inattention: 6 (or more) symptoms, at least 6 months duration, inconsistent with developmental level
For ages 17 or older, 5 (or more) symptoms are required.

2. Hyperactivity-impulsivity: 6 (or more) symptoms, at least 6 months duration, inconsistent with developmental level
For ages 17 or older, 5 (or more) symptoms are required.

B) Symptoms present before age 12 years.

C) Symptoms present in more than one settings

D) Direct impairment; social, school, or work functioning.

E) Symptoms aren't due to other psychiatric disorder

DSM-V Criteria

Inattention:

- a. Poor attention to details/careless mistakes
- b. Poor sustaining attention in work/play
- c. Does not seem to listen when spoken to directly
- d. Poor task completion due to distraction
- e. Difficulty organizing tasks and activities
- f. Poor task initiation when sustained attention is needed
- g. loses things excessively
- h. easily distracted by extraneous stimuli*
- i. forgetful in daily activities

Hyperactivity:

- a. fidgets/taps hands/feet or squirms in seat.
- b. leaves seat despite clear expectations
- c. runs about or climbs in situations where it is inappropriate**
- d. unable to play or take part in leisure activities quietly.
- e. Is often “on the go” acting as if “driven by a motor”
- f. talks excessively.

Impulsivity:

- g. blurts out an answer before a question has been completed
- h. trouble waiting his/her turn
- i. interrupts/intrudes on others

*for older adolescents/adults, may include unrelated thoughts

**In adolescents/adults, may be limited to feeling restless

Vignette

An 8 y/o female presents to clinic with mom due recent academic difficulties. During parent teacher conference the parent learned the patient has several late/missing homework assignments. Teachers report frequent daydreaming and even when she is not daydreaming she is frequently lost when she is called on to read out loud to the class. Mom is not surprised she has missing assignments as the patient has always been a little messy and “kind of a space cadet”. She wouldn’t be surprised if she forgot to put the homework in her backpack when getting ready in the morning. Mornings are always so chaotic it’s a wonder they get out the door!

Assessment

Initial interview

- Identify symptoms, impairment and setting: typically impairment is academic or social
- Setting of impairment can vary by age: daycare, school, home, sports, work
- Screen for confounders
 - hearing deficits
 - absence seizures
 - anxiety
 - depression
 - sleep apnea
 - substance abuse
 - normal for developmental age
- Screen for comorbidity:
 - oppositional defiant disorder
 - tic disorders
 - autism spectrum disorder
 - depression
 - anxiety
- Obtain collateral information (typically from school)
- Psychologic testing: if high suspicion for another comorbid neurodevelopmental disorder

Assessment: Vanderbilt

Symptoms	Never	Occasionally	Often	Very Often
1. Fails to give attention to details or makes careless mistakes in schoolwork	0	1	2	3
2. Has difficulty sustaining attention to tasks or activities	0	1	2	3
3. Does not seem to listen when spoken to directly	0	1	2	3
4. Does not follow through on instructions and fails to finish schoolwork (not due to oppositional behavior or failure to understand)	0	1	2	3
5. Has difficulty organizing tasks and activities	0	1	2	3
6. Avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort	0	1	2	3
7. Loses things necessary for tasks or activities (school assignments, pencils, or books)	0	1	2	3
8. Is easily distracted by extraneous stimuli	0	1	2	3
9. Is forgetful in daily activities	0	1	2	3
10. Fidgets with hands or feet or squirms in seat	0	1	2	3
11. Leaves seat in classroom or in other situations in which remaining seated is expected	0	1	2	3
12. Runs about or climbs excessively in situations in which remaining seated is expected	0	1	2	3
13. Has difficulty playing or engaging in leisure activities quietly	0	1	2	3
14. Is "on the go" or often acts as if "driven by a motor"	0	1	2	3
15. Talks excessively	0	1	2	3
16. Blurts out answers before questions have been completed	0	1	2	3
17. Has difficulty waiting in line	0	1	2	3
18. Interrupts or intrudes on others (eg, butts into conversations/games)	0	1	2	3
19. Loses temper	0	1	2	3
20. Actively defies or refuses to comply with adult's requests or rules	0	1	2	3
21. Is angry or resentful	0	1	2	3
22. Is spiteful and vindictive	0	1	2	3
23. Bullies, threatens, or intimidates others	0	1	2	3
24. Initiates physical fights	0	1	2	3
25. Lies to obtain goods for favors or to avoid obligations (eg, "cons" others)	0	1	2	3
26. Is physically cruel to people	0	1	2	3
27. Has stolen items of nontrivial value	0	1	2	3
28. Deliberately destroys others' property	0	1	2	3
29. Is fearful, anxious, or worried	0	1	2	3
30. Is self-conscious or easily embarrassed	0	1	2	3
31. Is afraid to try new things for fear of making mistakes	0	1	2	3

Symptoms (continued)	Never	Occasionally	Often	Very Often
32. Feels worthless or inferior	0	1	2	3
33. Blames self for problems; feels guilty	0	1	2	3
34. Feels lonely, unwanted, or unloved; complains that "no one loves him or her"	0	1	2	3
35. Is sad, unhappy, or depressed	0	1	2	3

Performance Academic Performance	Excellent	Above Average	Somewhat of a Problem		
			Average	Problematic	
36. Reading	1	2	3	4	5
37. Mathematics	1	2	3	4	5
38. Written expression	1	2	3	4	5

Classroom Behavioral Performance	Excellent	Above Average	Somewhat of a Problem		
			Average	Problematic	
39. Relationship with peers	1	2	3	4	5
40. Following directions	1	2	3	4	5
41. Disrupting class	1	2	3	4	5
42. Assignment completion	1	2	3	4	5
43. Organizational skills	1	2	3	4	5

Parent Assessment Scale	Teacher Assessment Scale
Predominantly Inattentive subtype <ul style="list-style-type: none"> ■ Must score a 2 or 3 on 6 out of 9 items on questions 1–9 AND ■ Score a 4 or 5 on any of the Performance questions 48–55 	Predominantly Inattentive subtype <ul style="list-style-type: none"> ■ Must score a 2 or 3 on 6 out of 9 items on questions 1–9 AND ■ Score a 4 or 5 on any of the Performance questions 36–43
Predominantly Hyperactive/Impulsive subtype <ul style="list-style-type: none"> ■ Must score a 2 or 3 on 6 out of 9 items on questions 10–18 AND ■ Score a 4 or 5 on any of the Performance questions 48–55 	Predominantly Hyperactive/Impulsive subtype <ul style="list-style-type: none"> ■ Must score a 2 or 3 on 6 out of 9 items on questions 10–18 AND ■ Score a 4 or 5 on any of the Performance questions 36–43
ADHD Combined Inattention/Hyperactivity <ul style="list-style-type: none"> ■ Requires the above criteria on both inattention and hyperactivity/impulsivity 	ADHD Combined Inattention/Hyperactivity <ul style="list-style-type: none"> ■ Requires the above criteria on both inattention and hyperactivity/impulsivity
Oppositional-Defiant Disorder Screen <ul style="list-style-type: none"> ■ Must score a 2 or 3 on 4 out of 8 behaviors on questions 19–26 AND ■ Score a 4 or 5 on any of the Performance questions 48–55 	Oppositional-Defiant/Conduct Disorder Screen <ul style="list-style-type: none"> ■ Must score a 2 or 3 on 3 out of 10 items on questions 19–28 AND ■ Score a 4 or 5 on any of the Performance questions 36–43
Conduct Disorder Screen <ul style="list-style-type: none"> ■ Must score a 2 or 3 on 3 out of 14 behaviors on questions 27–40 AND ■ Score a 4 or 5 on any of the Performance questions 48–55 	Anxiety/Depression Screen <ul style="list-style-type: none"> ■ Must score a 2 or 3 on 3 out of 7 items on questions 29–35 AND ■ Score a 4 or 5 on any of the Performance questions 36–43
Anxiety/Depression Screen <ul style="list-style-type: none"> ■ Must score a 2 or 3 on 3 out of 7 behaviors on questions 41–47 AND ■ Score a 4 or 5 on any of the Performance questions 48–55 	

Assessment: Vanderbilt

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Total number of questions scored 2 or 3 in questions 1–9: _____

Total number of questions scored 2 or 3 in questions 10–18: _____

Total Symptom Score for questions 1–18: _____

Total number of questions scored 2 or 3 in questions 19–28: _____

Total number of questions scored 2 or 3 in questions 29–35: _____

Total number of questions scored 4 or 5 in questions 36–43: _____

Average Performance Score: _____

Parent Assessment Scale	Teacher Assessment Scale
<p>Predominantly Inattentive subtype</p> <ul style="list-style-type: none">■ Must score a 2 or 3 on 6 out of 9 items on questions 1–9 <u>AND</u>■ Score a 4 or 5 on any of the Performance questions 48–55 <p>Predominantly Hyperactive/Impulsive subtype</p> <ul style="list-style-type: none">■ Must score a 2 or 3 on 6 out of 9 items on questions 10–18 <u>AND</u>■ Score a 4 or 5 on any of the Performance questions 48–55 <p>ADHD Combined Inattention/Hyperactivity</p> <ul style="list-style-type: none">■ Requires the above criteria on both inattention and hyperactivity/impulsivity <p>Oppositional-Defiant Disorder Screen</p> <ul style="list-style-type: none">■ Must score a 2 or 3 on 4 out of 8 behaviors on questions 19–26 <u>AND</u>■ Score a 4 or 5 on any of the Performance questions 48–55 <p>Conduct Disorder Screen</p> <ul style="list-style-type: none">■ Must score a 2 or 3 on 3 out of 14 behaviors on questions 27–40 <u>AND</u>■ Score a 4 or 5 on any of the Performance questions 48–55 <p>Anxiety/Depression Screen</p> <ul style="list-style-type: none">■ Must score a 2 or 3 on 3 out of 7 behaviors on questions 41–47 <u>AND</u>■ Score a 4 or 5 on any of the Performance questions 48–55	<p>Predominantly Inattentive subtype</p> <ul style="list-style-type: none">■ Must score a 2 or 3 on 6 out of 9 items on questions 1–9 <u>AND</u>■ Score a 4 or 5 on any of the Performance questions 36–43 <p>Predominantly Hyperactive/Impulsive subtype</p> <ul style="list-style-type: none">■ Must score a 2 or 3 on 6 out of 9 items on questions 10–18 <u>AND</u>■ Score a 4 or 5 on any of the Performance questions 36–43 <p>ADHD Combined Inattention/Hyperactivity</p> <ul style="list-style-type: none">■ Requires the above criteria on both inattention and hyperactivity/impulsivity <p>Oppositional-Defiant/Conduct Disorder Screen</p> <ul style="list-style-type: none">■ Must score a 2 or 3 on 3 out of 10 items on questions 19–28 <u>AND</u>■ Score a 4 or 5 on any of the Performance questions 36–43 <p>Anxiety/Depression Screen</p> <ul style="list-style-type: none">■ Must score a 2 or 3 on 3 out of 7 items on questions 29–35 <u>AND</u>■ Score a 4 or 5 on any of the Performance questions 36–43

Vignette

25 y/o male presents with complaint of increased anxiety. He works 2 jobs; seasonally in construction and all year as a line cook. At the restaurant he had a performance review and the head chef expressed frustration with getting timing right for the dishes he preps and noted more mistakes compared to the other line cooks, such as overcooking or even burning a dish. The line is a stressful environment; he worries he will say something without thinking about it and get in trouble. He feels like he always has his foot in his mouth, or just experiencing “word vomit”. At his construction job he feels like he is always making “stupid” mistakes like missing his exit on the highway when going to the jobsite because he was distracted thinking about what he would eat for lunch and didn’t hear the GPS.

Assessment

Initial interview

- Identify symptoms, impairment and setting: typically impairment is work or relationship
- Setting of impairment: school, home, work, relationships
- Screen for confounders
 - depression
 - anxiety
 - bipolar disorder
 - psychosis
 - sleep apnea
 - hyperthyroid
 - substance abuse
 - personality disorder
- Screen for comorbidity:
 - autism spectrum disorder
 - depression
 - anxiety
- Wender Utah rating scale for ADHD, ASRS
- Obtain collateral: (limited compared to child and adolescent) spouse/partners, performance reviews

Assessment: Wender Utah

Questions Associated with ADHD

- 25 of the questions were associated with ADHD as follows:

	As a child I was (or had):
3	Concentration problems, easily distracted
4	Anxious, worrying
5	Nervous, fidgety
6	Inattentive, daydreaming
7	Hot- or short-tempered, low boiling point
9	Temper outbursts, tantrums
10	Trouble with stick-to-it-tiveness, not following through. Failing to finish things started
11	Stubborn, strong-willed
12	Sad or blue, depressed, unhappy
15	Disobedient with parents, rebellious, sassy
16	Low opinion of myself
17	Irritable
20	Moody, ups and downs
21	Angry
24	Acting without thinking, impulsive
25	Tendency to be immature
26	Guilty feelings, regretful
27	Losing control of myself
28	Tendency to be or act irrational
29	Unpopular with other children, didn't keep friends for long, didn't get along with other children
40	Trouble seeing things from someone else's point of view
41	Trouble with authorities, trouble with school, visits to principal's office
	As a child in school I was (or had)
51	Overall a poor student, slow learner
56	Trouble with mathematics or numbers
59	Not achieving up to potential

Interpretation:

- 61 questions answered by the adult patient recalling his or her childhood behavior
- 5 possible responses scored from 0 to 4 points
- Wender Utah rating scale score = _____
- Maximum score 100
- If a cutoff score of 46 was used, 86% of patients with ADHD, 99% of normal persons, and 81% of depressed subjects were correctly classified.
- Wender Utah rating scale subscore = _____ (sum of 25 questions associated with ADHD)
- Minimum score for the 25 questions is 0

Assessment: Wender Utah

Wender Utah Rating Scale for the Attention Deficit Hyperactivity Disorder

Name: _____ Gender: _____ Date: _____

For each of the 61 items, check the box that best describes your behavior:

	As a child I was (or had):	Not at all or very slightly	Mildly	Moderately	Quite a bit	Very much
1	Active, restless, always on the go	0	1	2	3	4
2	Afraid of things	0	1	2	3	4
3	Concentration problems, easily distracted	0	1	2	3	4
4	Anxious, worrying	0	1	2	3	4
5	Nervous, fidgety	0	1	2	3	4
6	Inattentive, daydreaming	0	1	2	3	4
7	Hot- or short-tempered, low boiling point	0	1	2	3	4
8	Shy, sensitive	0	1	2	3	4
9	Temper outbursts, tantrums	0	1	2	3	4
10	Trouble with stick-to-it-tiveness, not following through. Failing to finish things started	0	1	2	3	4
11	Stubborn, strong-willed	0	1	2	3	4
12	Sad or blue, depressed, unhappy	0	1	2	3	4
13	Incautious, dare-devilish, involved in pranks	0	1	2	3	4
14	Not getting a kick out of things, dissatisfied with life	0	1	2	3	4
15	Disobedient with parents, rebellious, sassy	0	1	2	3	4
16	Low opinion of myself	0	1	2	3	4
17	Irritable	0	1	2	3	4
18	Outgoing, friendly, enjoyed company of people	0	1	2	3	4
19	Sloppy, disorganized	0	1	2	3	4
20	Moody, ups and downs	0	1	2	3	4
21	Angry	0	1	2	3	4
22	Friends, popular	0	1	2	3	4
23	Well-organized, tidy, neat	0	1	2	3	4
24	Acting without thinking, impulsive	0	1	2	3	4
25	Tendency to be immature	0	1	2	3	4
26	Guilty feelings, regretful	0	1	2	3	4
27	Losing control of myself	0	1	2	3	4
28	Tendency to be or act irrational	0	1	2	3	4
29	Unpopular with other children, didn't keep friends for long, didn't get along with other children	0	1	2	3	4
30	Poorly coordinated, did not participate in sports	0	1	2	3	4
31	Afraid of losing control of self	0	1	2	3	4
32	Well-coordinated, picked first in games	0	1	2	3	4
33	Tomboyish (for women only)	0	1	2	3	4
34	Running away from home	0	1	2	3	4
35	Getting into fights	0	1	2	3	4
36	Teasing other children	0	1	2	3	4
37	Leader, bossy	0	1	2	3	4
38	Difficulty getting awake	0	1	2	3	4

Ward MF, Wender PH, Reimherr FW. The Wender Utah Rating Scale: An aid in the retrospective diagnosis of childhood Attention Deficit Hyperactivity Disorder. Am J Psychiatry. 1993; 150: 885-890.

39	Follower, led around too much	0	1	2	3	4
40	Trouble seeing things from someone else's point of view	0	1	2	3	4
41	Trouble with authorities, trouble with school, visits to principal's office	0	1	2	3	4
42	Trouble with police, booked convicted	0	1	2	3	4

	Medical problems as a child	Not at all or very slightly	Mildly	Moderately	Quite a bit	Very much
43	Headaches	0	1	2	3	4
44	Stomachaches	0	1	2	3	4
45	Constipation	0	1	2	3	4
46	Diarrhea	0	1	2	3	4
47	Food allergies	0	1	2	3	4
48	Other allergies	0	1	2	3	4
49	Bedwetting	0	1	2	3	4

	As a child in school I was (or had)	Not at all or very slightly	Mildly	Moderately	Quite a bit	Very much
50	Overall a good student, fast	0	1	2	3	4
51	Overall a poor student, slow learner	0	1	2	3	4
52	Slow in learning to read	0	1	2	3	4
53	Slow reader	0	1	2	3	4
54	Trouble reversing letters	0	1	2	3	4
55	Problems with spelling	0	1	2	3	4
56	Trouble with mathematics or numbers	0	1	2	3	4
57	Bad handwriting	0	1	2	3	4
58	Able to read pretty well but never really enjoyed reading	0	1	2	3	4
59	Not achieving up to potential	0	1	2	3	4
60	Repeating grades	0	1	2	3	4
61	Suspended or expelled	0	1	2	3	4

Ward MF, Wender PH, Reimherr FW. The Wender Utah Rating Scale: An aid in the retrospective diagnosis of childhood Attention Deficit Hyperactivity Disorder.

Stimulants

Work by increasing norepinephrine (NE) and dopamine (DA) in brain regions associated with ADHD (Dorsolateral prefrontal cortex, basal ganglia)

- Studied and used since 1930's
- 75-80% response rate for amphetamine or methylphenidate
- 90% response rate if both have been tried
- 25% may respond to one but not both stimulant types

Amphetamine (FDA ages 3 and older)

- Reuptake inhibition of NE and DA
- Facilitating release of NE and DA
- Inhibits Monoamine oxidase breakdown of NE and DA

Methylphenidate (FDA ages 6 and older)

- Reuptake inhibition of NE and DA

Stimulants Methylphenidate

Methylphenidate Formulations – Long Acting, Oral** (Capsules and tablets in this section are shown at actual size)																		
Concerta®†	6-12 Yrs: 18-54mg; SD: 18mg 13-17 Yrs: 18-72mg; SD: 18mg >18 Yrs: 18-72mg; SD: 18mg or 36mg	G		G		G		G		Relexxii® (bioequivalent to corresponding Concerta dosing)	G		G		G			
Focalin® XR‡	6-17 Yrs: 5-30mg; SD: 5mg 18 Yrs-Adult: 10-40mg; SD: 10mg (biphasic – 50/50)	G			G		G		G		G		G		G		G	
Cotempla XR-ODT§	6-17 Yrs: 8.6-51.8mg; SD: 17.3mg																	
Aptensio® XR‡	6 Yrs-Adult: 10-60mg; SD: 10mg (biphasic – 40/60)	G		G		G		G		G		G		G				
Quillivant XR®	25mg/5mL (5mg/mL) (banana flavor)																	
QuilliChew ER®§	6 Yrs-Adult: 20-60mg; SD: 20mg (biphasic – 30/70)																	
Ritalin® LA‡	6-12 Yrs: 10-60mg; SD: 20mg (biphasic – 50/50)	G			G		G		G									
Metadate® CD‡	6-17 Yrs: 10-60mg; SD: 20mg (biphasic – 30/70)	G†			G†		G†		G†		G†		G†					

Methylphenidate Formulations - Long Acting, Transdermal

Daytrana®	6-17 Yrs: 10-30mg; SD: 10mg (Patches are shown at 100% actual size. The color border around each patch reflects the color of the packaging, not the patch itself.)	G																
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Methylphenidate Pro-Drug Formulations - Long Acting, Oral** (Medications in this section are shown at actual size)

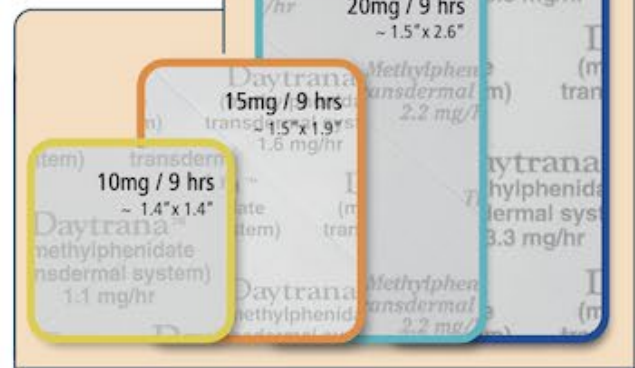
Azstarys®? (dexmethylphenidate + serdexmethylphenidate)	6-12 Yrs: 26.1/5.2 – 52.3/10.4; SD: 39.2/7.8 mg; 13 Yrs – Adult: 39.2/7.8 – 52.3/10.4; SD: 39.2/7.8mg																	
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Methylphenidate Formulations – Long Acting/Delayed Onset, Oral** (Medications in this section are shown at actual size)

Jornay PM®‡	6 Yrs-Adults: 20-100mg (dosed in the evening); SD: 20mg																	
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Methylphenidate Formulations – Short Acting, Oral** (Medications in this section are shown at actual size)

Focalin® (dexmethylphenidate)	6-17 Yrs: Daily: 5-20mg, divided BID; SD: 2.5mg BID																	
Ritalin®	6-12 Yrs: Daily: 10-60mg; divided BID or TID; SD: 5mg BID Adults: Daily: 10-60mg, divided BID or TID																	
Methylin 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†		G†		G†												
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																	



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 apple sauce
- ? Can open capsule and sprinkle medication into water or onto apple sauce
- Can open capsule and mix with apple sauce or yogurt
- G Indicates a generic formulation is also available; generic products are not shown
- G† Indicates a generic (but NOT a branded) formulation is available

Stimulants: Amphetamine

Amphetamine Formulations – Long Acting, Oral** (Medications in this section are shown at actual size)																
Dyanavel [®] XR§ (d- & l-amphetamine sulfate) (bubblegum flavor)	6 Yrs–Adults: 2.5–20mg; SD: 2.5 or 5mg		5mg			10mg			15mg		20mg					
Dyanavel [®] XR (d- & l-amphetamine sulfate) 2.5mg/mL (bubblegum flavor)	6 Yrs–Adults: 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							
Adzenys XR-ODT [®] ¶ (d- & l-amphetamine) (orange flavor)	6–12 Yrs: 3.1–18.8mg; SD: 6.3mg 13–17 Yrs: 3.1–12.5mg; SD: 6.3mg Adults: 12.5mg		3.1mg		6.3mg		9.4mg		12.5mg		15.7mg		18.8mg			
Adderall XR [®] ‡ (mixed amphetamine salts)	6–17 Yrs: 5–30mg; SD: 10mg Adults: 5–30mg; SD: 20mg (biphasic – 50/50)		5mg		10mg		15mg		20mg		25mg		30mg			
Dexedrine Spansule [®] (d-amphetamine sulfate)	6–17 Yrs: 10–60mg; SD: 5mg 1-2x/day		5mg		10mg		15mg									
Amphetamine Pro-Drug Formulations – Long Acting, Oral** (Medications in this section are shown at actual size)																
Vyvanse [®] V (capsules) (lisdexamfetamine)	6 Yrs–Adults: 10–70mg; SD: 30mg	10mg	20mg	30mg	40mg	50mg	60mg	70mg								
Vyvanse [®] S (chewables) (lisdexamfetamine) (strawberry flavor)	6 Yrs–Adults: 10–70mg; SD: 30mg	10mg	20mg	30mg	40mg	50mg	60mg									
Amphetamine Formulations – Short Acting, Oral** (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										
Evekeo [®] ODT (d- & l-amphetamine sulfate)	6–17 Yrs: 5–40mg divided BID; SD: 5mg 1-2x/day	2.5mg	5mg			10mg		15mg		20mg						
Zenzedi [®] (d-amphetamine sulfate)	3–5 Yrs: SD: 2.5mg 1x/day 6–16 Yrs: 5–40mg divided BID; SD: 5mg 1-2x/day	2.5mg	5mg		7.5mg		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		5mg		7.5mg		10mg		12.5mg		15mg		20mg		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		5mg/5mL													

Amphetamine Formulations - Long Acting, Transdermal

Xelstrym[™] (d-amphetamine)
 6-17 Yrs: 4.5–18mg; SD: 4.5mg
 Adults: 9–18mg; SD: 9mg

(The color border of the patches reflects the color of the packaging, not the patch itself.)

Non-Stimulants

Alpha-2 agonists (FDA ages 6-17)

















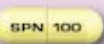
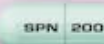

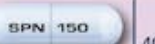
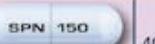
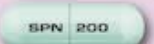


Works on pre and postsynaptic alpha-2 adrenergic receptors (NE modulation)

- Clonidine ER (IR is off label)
 - more sedating
 - off label use for nightmares & hyperarousal
- Guanfacine ER (IR is off label)

NRI's (FDA ages 6 and older)

Works by reuptake inhibition of NE

- Atomoxetine
 - weight-based target dose of 1.2 mg/kg for kids under 70 kg
 - CYP450 2d6 substrate (look out for interactions)
 - DO NOT OPEN THE CAPSULE
- Viloxazine
 - glucuronidation
 - can open capsule just don't chew

Non-Stimulants** (Medications in this section are shown at actual size)									
Onyda™ XR (clonidine, extended release) (orange flavor)	6-17 Yrs: 0.1-0.4mg; SD: 0.1mg (dosed at bedtime)	0.1mg/1mL 	0.2mg/2mL 	0.3mg/3mL 	0.4mg/4mL 				
Kapvay®† (clonidine, extended release)	6-17 Yrs: 0.1-0.2mg BID; SD: 0.1mg qHS	 0.1mg							
Intuniv®† (guanfacine, extended release)	6-12 Yrs: 1-4mg; SD: 1mg 13-17 Yrs: 1-7mg; SD: 1mg Weight-based dosing: SD: 0.05-0.08 mg/kg/day; may increase to 0.12 mg/kg/day	 1mg	 2mg	 3mg	 4mg				
Strattera®† (atomoxetine)	≤70kg: 0.5mg/kg x ≥3days, then 1.2mg/kg (max:1.4mg/kg, not to exceed 100mg) >70 kg: 40mg x ≥3days, then 80mg (max:100mg)	 10mg	 18mg	 25mg	 40mg	 60mg	 80mg	 100mg	
Qelbree®‡ (viloxazine)	6-11 Yrs: 100-400mg; SD: 100mg 12-17 Yrs: 200-400mg; SD: 200mg Adults: 200-600mg; SD: 200mg	 100mg	 200mg	 300mg	 150mg +  150mg	 200mg	 200mg +  200mg		

Side effects

Stimulant

- **Decreased appetite**
- **Headache**
- **Insomnia**
- **Abdominal discomfort**
- **Irritability/anxiety**
- Decreased growth velocity (by 1-2 cm in first 3 years, catch up in adulthood)
- Increased HR (1-2 bpm)
- Increased BP (1-4 mmHg)
- High doses can worsen tics
- Black box warning for abuse potential

NRI's

- Decreased appetite
- Headache
- **Insomnia or sedation**
- **Abdominal discomfort**
- Irritability
- Similar decreased growth velocity
- Similar transient increases in HR and BP
- Black box warning for suicide (14 studies for black box warning; no completed suicides in the studies)

Alpha-2 agonist

- **Sedation**
- **Lightheadedness**
- Headache
- Abdominal discomfort
- Exacerbate constipation
- Decreased HR
- Decreased BP
- Rebound hypertension with abrupt discontinuation

Considerations

Stimulant

- Appetite suppression is problematic
- Younger kids may need IR form dosed multiple times a day due to metabolism
- Long acting preferred for improved duration of symptom coverage and lower abuse potential
- Works fast and works well
- Like a light switch
- Can take “holidays”

NRI's

- Similar potential side effect profile but comparatively less profound than stimulants
- Weight based dosing and delay of full benefit of 4-6 weeks (or longer)
- Works slower but 24-hour coverage
- More like a dimmer switch
- More robust effect if trialed before stimulants
- Must take daily for efficacy

Alpha-2 agonist

- Appetite sparing typically
- Could help with sleep and anxiety (off label)
- BP and sedation tend to be what limits dosing
- Need daily compliance at higher doses to avoid medical complications of rapid discontinuation
- Less robust response compared to the other two classes
- Less helpful for inattention

Considerations

Stimulant

- First line
- Great evidence base across all ages
- Works fast
- Periods of uncontrolled symptoms in morning and evening
- Can have a crash effect
- Least conservative

NRI's

- Second line
- Still good evidence base across all ages
- Need patience
- Theoretically 24-hour coverage

Alpha-2 agonist

- Second to third line
- Efficacy has only been established for children
- Need patience
- Theoretically 24-hour coverage
- Most conservative

Non-pharmacologic Interventions make a vendiagram?

- Child and adolescent
 - CBT can be effective for core or comorbid symptoms
 - Parent training
 - Behavioral modification
 - PCIT for comorbid ODD
- Adult
 - No single therapeutic approach is superior
 - DBT can be effective for emotional impulsivity
- All ages
 - Organizational skills: list keeping, alarms, timers, schedules, calendars
 - Exercise attention like you would exercise your body
 - physical activity and healthy diet benefit everyone

For Clinicians

- Routinely monitor vitals and growth curve
- EKG/cardiology referral is not necessary unless there is a cardiovascular history (developmental or otherwise)
- Use periodic assessment tools to monitor symptom control for child and adolescent population
- Develop benchmarks you can track for the adult population
- Pick a “go to” stimulant from both subclasses
- Don’t be afraid to try non stimulant options first

Reference