The Treatment of ADHD

Diane Bloomfield MD

Associate Division Chief, Clinical Affairs, Academic General Pediatrics
Medical Director, Family Care Center, Pediatrics
Children's Hospital at Montefiore

Disclosures

Neither I nor my spouse/partner have
a relevant financial relationship with a commercial interest to disclose

ADHD
Rule of Threes

- 3 Main Symptoms
  - Inattention, Impulsivity, Hyperactivity
- Impacts 3 Basic Functions
  - Focus, Motivation, Planning/Organization
- 3 Mainstays of Treatment
  - Pharmacotherapy, Behavioral therapy, Accommodations

Evidence-Based PharmacotherapyTreatment

- First Line: Stimulants
- Stimulants have 70-90% response rate
- May require trials with various formulations to get optimal response
- 65-70% respond to one class; up to 90% respond to either
- Side effects profile similar
- Difference in preparations primarily in duration of action
- Evidence provided by MTA Study

Evidence Based Treatment

The M.T.A study:

- 1) medication alone – methylphenidate
- 2) medication and behavior therapy
- 3) behavior therapy alone
- 4) treatment as usual

Results:

1)MTA style medication management alone – very good outcome

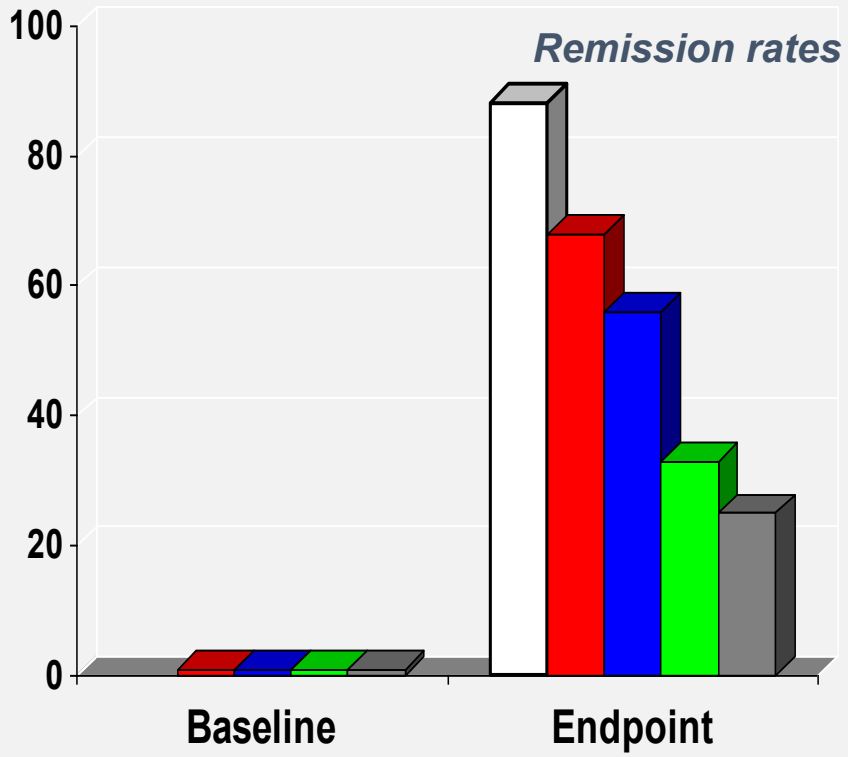
2)Combined with behavioral therapy – even better, 10% advantage , especially for anxious kids

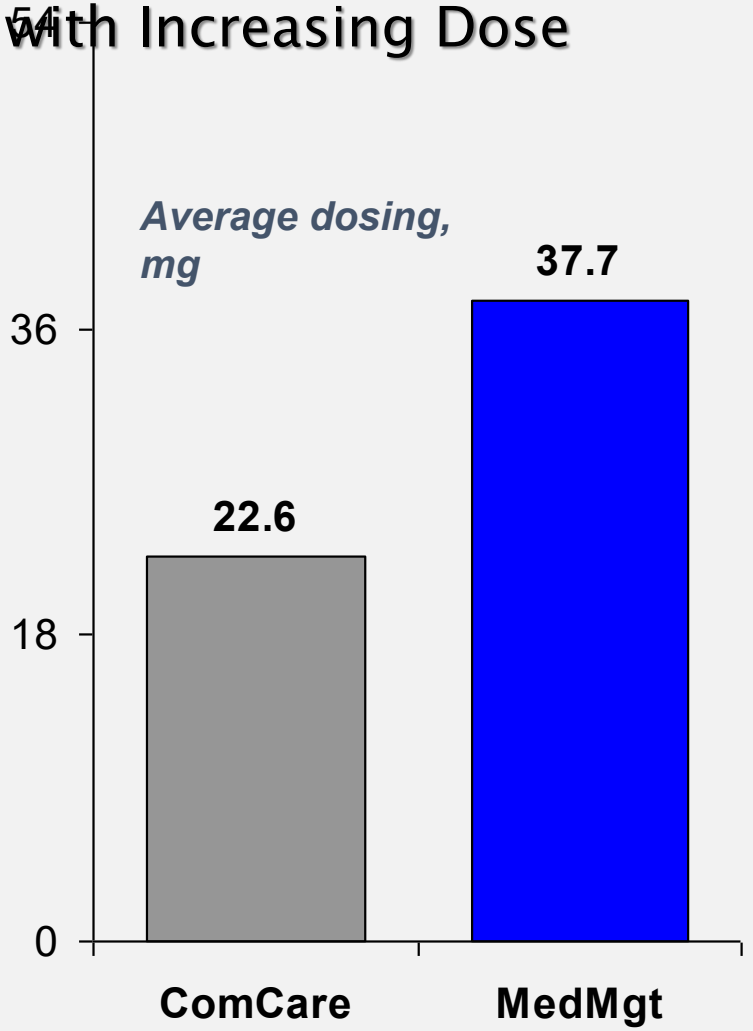
3)Behavior therapy alone - little benefit

4)Community care: Treatment as usual – poor outcome

MTA Study:

Remission Rate Increased with Increasing Dose





ADHD Medication

- How did the MTA trial achieve high-rates of remission?
  - Higher stimulant doses
  - Better coverage in the evenings
  - Follow-up visits monthly for 30 minutes
  - Active contact with school and support network
  - Follow-up Vanderbilts from home and school at each visit

    Use rating scale data to determine place of optimum response and duration of action of AM dose

Dose Effect Time of Stimulant Preparations (hours)

- Methylphenidate
  - Ritalin/Focalin 4
  - Ritalin LA/Metadate CD/ 6-8
  - Focalin XR 8
  - Concerta MPH 10-12
- Amphetamine
  - Dextro/Levo amphetamine (Adderall) 6
  - Adderall XR 8-12
  - Vyvanse 10-12

**Different charts say different things and people are variable!

Side Effects

- Common
  - Appetite suppression
  - Sleep disturbance
  - Headache
  - GI upset
- Less common
  - Tic exacerbation
  - Rebound
  - Irritability/Emotional lability/Social withdrawal
  - Reduction in growth velocity
  - Hypertension/Tachycardia/Arrhythmia
- Rare
  - Psychosis
  - Abuse potential/Diversion

Titration and Follow-Up

- Benefits and side effects occur right away
- Seeking maximum effect with minimum side effects.
- Treat for remission — Improvement is not enough!
- Follow up in one week by phone or in–person
- Follow rating scales and side effects
  - Physical exam: height, weight, bp, pulse.
- Follow-up a few days after dose change.
- When initially stable see monthly as multimodal plan is put in place then every three months.
- Reassess every new school year

Alternative to Stimulants

Norepinephrine Reuptake Inhibitor

Atomoxetine (Strattera)

Viloxazine (Qelbree)

Alpha 2-Agonists

Clonidine (Catapres,Kapvay)

Guanfacine (Tenex, Intuniv)

- Although there is evidence to support their relative effectiveness compared to placebo, the gold standard is the stimulants due to a much larger **effect size**

Atomoxetine

- Dosing based on weight
- Common AEs: irritability, sedation or insomnia, decreased appetite, GI
- Rare accounts of liver damage, suicidal ideation: boxed warning
- Advantages:
  - Once Daily dosing (max 10 Hours)
  - Little abuse potential (adolescents)
  - No apparent effects on growth
  - Does not seem to exacerbate tics
- Disadvantages:
  - Delayed onset (takes 3-6 weeks)
  - Generally not as effective

Atomoxetine Dosing

- 1. Starting dose 0.5mg/kg for first 4 days
- 2. Advance to TARGET dose as close to 1.2 to 1.4mg/kg as you can get. (typical max is 100mg)
- 3. Can be given ONCE or TWICE a day
- 4. Stay at target dose for a month

How supplied: 10, 18, 25, 40, 60, 80, 100mg

Viloxazine (Qelbree)

Dosing for children 6 to 11

- 100mg week 1
- 200mg week 2
- 300mg week 3
- 400mg week 4

Supplied as 100, 150, 300 & 400 capsules
Can be sprinkled on soft food.

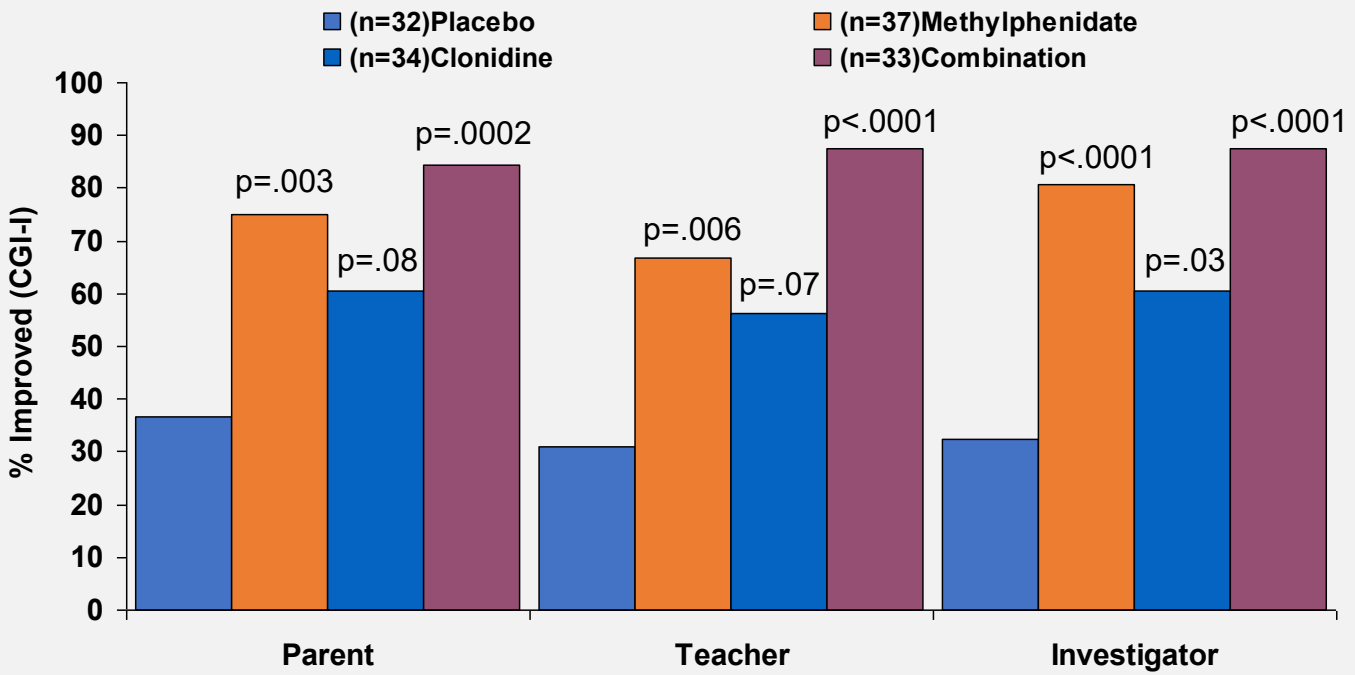
Dosing for Adolescents 12 to 17

- 200mg week 1
- 400 mg week 2
- Can go to 600mg week 3

Alpha-2-Adrenergic Agonists

- Guanfacine - start at 0.5mg once or twice a day, 6mg max
- Intuniv (Guanfacine ER) start at 1mg daily- advance weekly, max of 6mg
- Clonidine- start at 0.05mg once at bedtime, advance weekly, 0.4mg max
- Side effects: sedation, lower BP therefore MUST taper when stopping and daily compliance is a safety issue
- Advantages
  - Sedating (sleep difficulties)
  - LA forms given once daily (Kapvay may need BID)
  - Better for hyperactivity and impulsivity than inattention
  - Adjuncts for children with partial response to stimulant

Clonidine Added to Stimulants to Treat ADHD: Efficacy



Clonidine mean daily dose: 0.25 mg (alone) and 0.28 mg (combination)
Methylphenidate mean daily dose: 25.7 mg (alone) and 26.1 mg (combination)

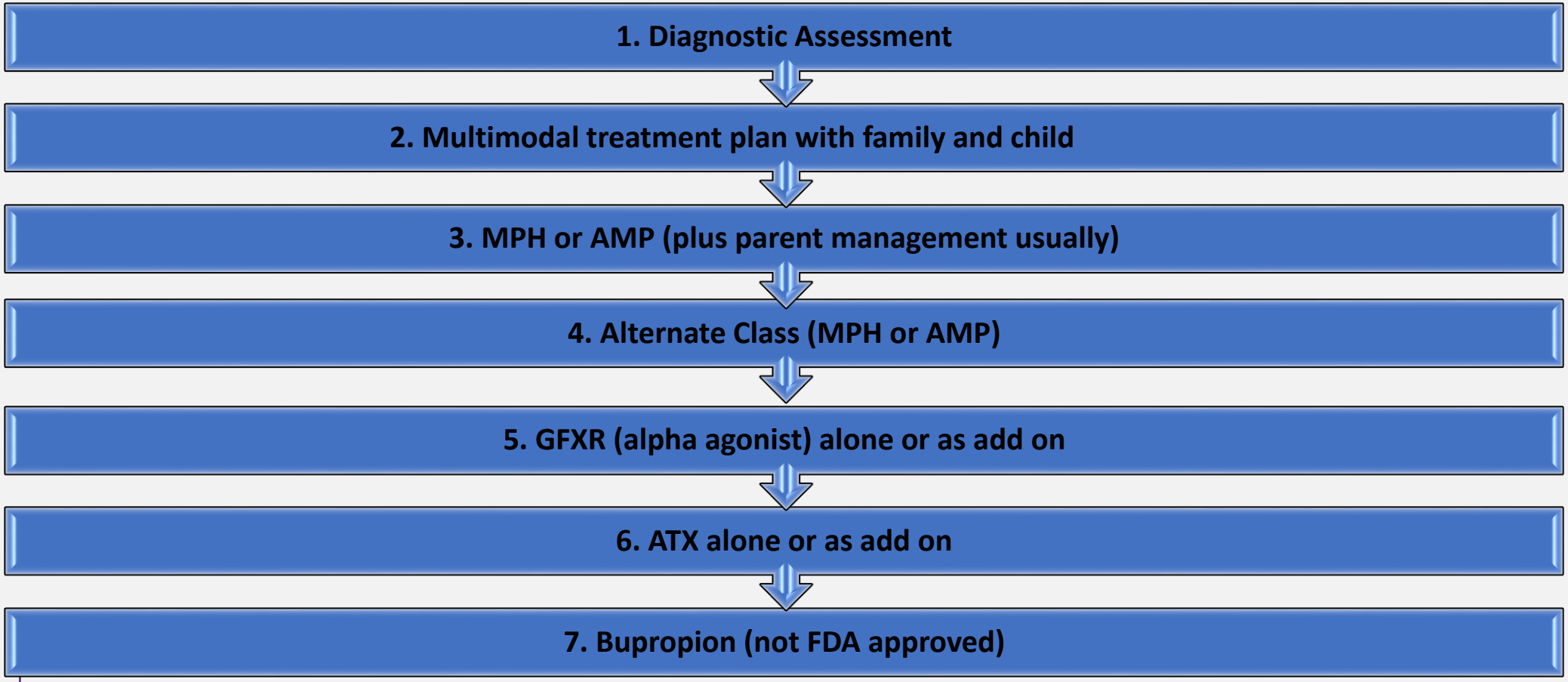
Tourette's Syndrome Study Group. Neurology 2002.

Medication Treatment Responsive Groups

- Children
- Teenagers
- Adults
- Preschoolers (Short et al . 2004, Greenhill et al., 2007)
- Individuals with Intellectual Handicaps (Pearson et al.2004)

- ADHD co-morbid with Other Diagnoses
  - Tourette's Disorder
  - Autism Spectrum Disorder
  - Anxiety/Mood Disorder
  - Conduct Disorder
  - Oppositional Defiant Disorder
  - Substance Abuse Disorder

Garden Variety ADHD



ADHD + Anxiety/Depression

1. Diagnostic Assessment
2. Multimodal treatment plan with family and child
3. Psychosocial tx + MPH or AMP
4. Alternate Class (MPH or AMP)
5. ATX alternate as first line
6. If residual anxiety, add SSRI

Principles of Behavior Therapy

- Positive reinforcement is much better than negative reinforcement
- Motivation can be improved with pairing preferred and non-preferred activities- work before play!
- Most of us thrive with structure and routine ADHD child needs lots of this!
- Tight collaboration with school- behavior plan, daily report card
- Avoid shaming and excessive punishment

Non-pharmacological Interventions

- Organizational skills training, Peer tutoring
  - Computer assisted instruction – targets attention and working memory- popular in research sector and commercially. Evidence not clear- reviewed by Rutledge 2012
  - EndeavorRx FDA authorized video game. Cost $100- 25 minutes, 5 days a week for at least 4 consecutive weeks
- Homework focused interventions
- School accommodations
  - Eligibility for a 504 plan
    - Additional time for exams, quiet setting for exams, training interventions at school
  - IDEA (Other Health Impairment) creating an Individual Education Plan (IEP)
    - for appropriate class placement, instructional and behavioral support
- Dealing with co-morbid conditions
- Social skills training if needed

Social Supports

- Support groups (e.g. CHADD)
- Online
  - www.teachingkidstolisten.com
  - www.Help4ADHD.org
- Books
  - 1-2-3 Magic (Tom Phelan)
  - Making the System Work for Your ADHD Child (Peter Jensen)
  - Taking Charge of ADHD: The Complete Authoritative Guide for Parents (Russell Barkley)
  - ADHD: What Every Parent Needs to Know (M Reiff)

Why Should I Treat My Patient's ADHD

Risk of Not Treating

- Academic struggles
- Difficult family and peer relationships
- Risk of injury
- Teen risk-taking and impulsive behavior
- Poor vocational performance
- Dangerous driving

Risk of Treating

- Possible adverse side effects
- Medication misuse/abuse

Bottom Line

- Titrate closely and relatively quickly
- Use your algorithms
- Higher stimulant dose is usually the first step
- Follow up every 3 months only after stable
- Remember psychosocial treatments and school interventions

What would you do for this patient?

- Medication
  - Which one?
  - Dose?
  - How soon to follow up
  - What about sleep?
- Behavior Therapy
  - Suggestions for parents
- Accommodations
  - School-based suggestions?

- My thanks to Dr. J. Wallace at University of Rochester for the following accommodations menu

Accommodation Menu

Pro

Focus and Attention

- _____Seat in the front of the classroom
- _____Seat away from distractions (fish tank)
- _____Seat near quiet peers and away from disruptive peers
- _____Increase space between seats
- _____Private cue to stay on/return to task
- _____Involve student in discussions/activities
- _____Make instructions clear and brief
- _____Select teachers with energetic, engaging style
- _____Pair written and oral instructions
- _____Check to be sure assignments are copied correctly
- _____Break large assignments into parts with deadlines
- _____Make extra eye contact with student
- _____each in close proximity to student
- _____Consider need for smaller environment with more adult support

Accommodation Menu

Impulsivity and Hyperactivity

- ____Ignore minor impulsive behavior
- ____Keep student occupied and active
- ____Supervise closely during transitions
- ____Reprimand(s) should be brief and private if possible
- ____Seat near good role model
- ____Notice and reinforce positive behaviors
- ____Set up behavior contract with clear short-term goals
- ____Encourage hand-raising and waiting
- ____Rewards and consequences should be immediate
- ____Implement home/school reward token system
- ____Allow student to stand and move at times
- ____Provide movement breaks between seated activities
- ____Consider need for smaller environment with more adult support

Accommodation Menu

Organization and Planning

____Use adults to support organization – teachers, parents, resource teachers

- ____Create “Homework Loop” to complete daily assignments
- ____Check to see that assignments are written down correctly
- ____Be sure correct books go home or consider extra copies
- ____Encourage parents to set up homework time and place and assistant
- ____Have teachers ask for completed assignments
- ____Empty and reorganize book bag and locker at least weekly
- ____Use colored dividers and folders
- ____Consider peer assistant for organization
- ____Use multi-sensory approaches for giving assignments and teaching
- ____Consider allowing tape recording of assignments and lessons
- ____Use consistent repetitive approach to getting organized
- ____Ask student to repeat instructions

Accommodation Menu

Academic Struggles

- ____Consider referral for testing for any learning concerns/disabilities
- ____Explore other possible impairing conditions (speech, hearing, learning disabilities)
- ____Use multi-sensory techniques in all phases of teaching
- ____Use games, songs and chants/raps for rote learning and memorization
- ____Accommodate weaknesses in learning – math, reading, foreign language
- ____Be aware that learning weaknesses worsen attentional problems and vice versa
- ____Schedule regular meetings/communication with parents about learning concerns
- ____Direct parents to practice skills with student
- ____Parents can consider private tutoring or after-school homework support
- ____Consider need for formal 504 accommodations or Special Education support
- ____Consider different levels of support (resource room, consult teacher, self-contained setting)
- ____Emphasize any areas of interest in academics content

ADHD Medication Guide (www.ADHDMedicationGuide.com)

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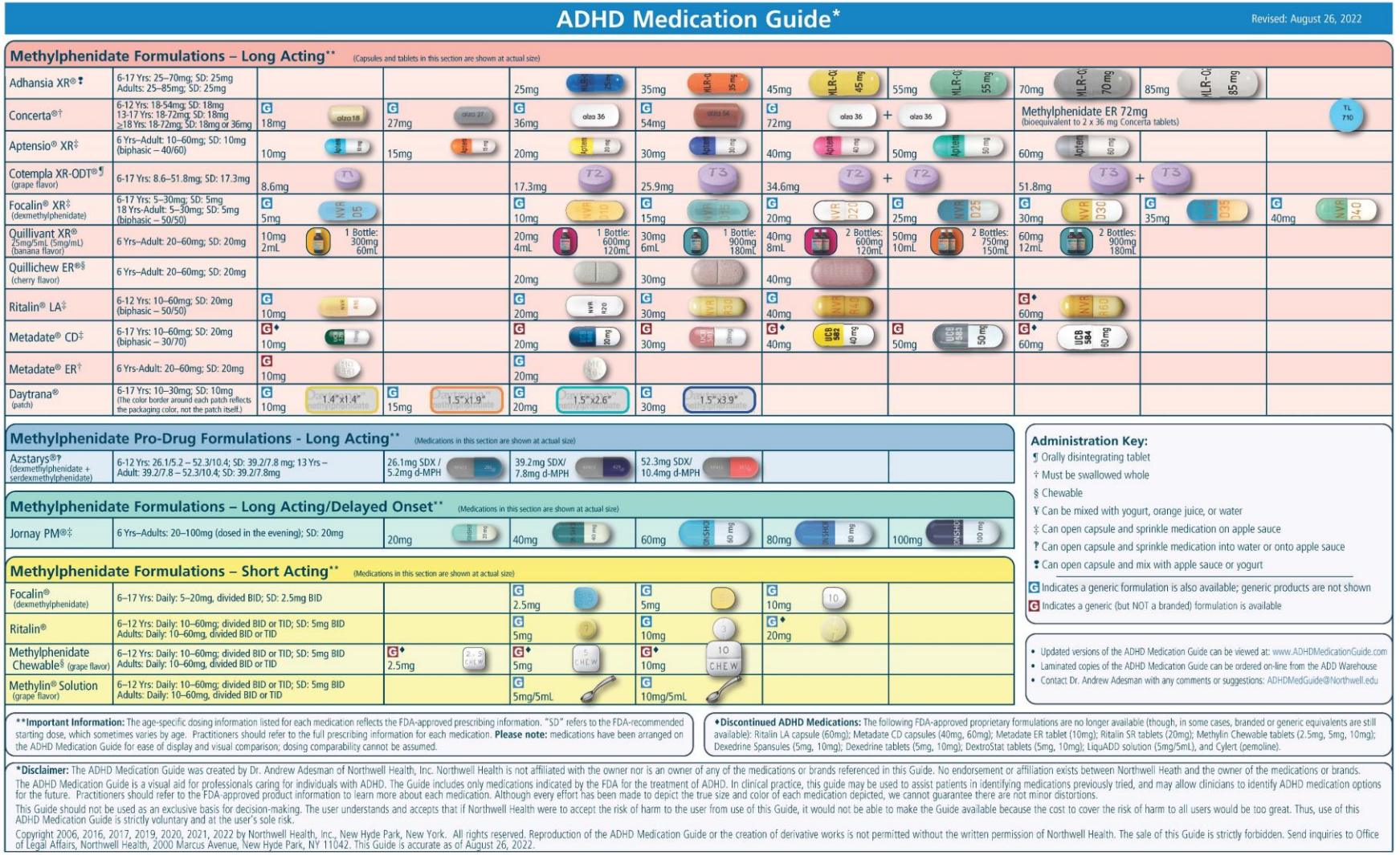

ADHD Medication Guide*

Revised: August 26, 2022

Methylphenidate Formulations – Long Acting**

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

Adhansia XR®⁝	6-17 Yrs: 25–70mg; SD: 25mg Adults: 25–85mg; SD: 25mg			25mg	35mg	45mg	55mg	70mg	85mg	
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	36 + 36	Methylphenidate ER 72mg (bioequivalent to 2 x 36 mg Concerta tablets)		
Aptensio® XR‡	6 Yrs–Adult: 10–60mg; SD: 10mg (biphasic – 40/60)	10mg	15mg	20mg	30mg	40mg	50mg	60mg		
Cotempla XR-ODT®¶ (grape flavor)	6-17 Yrs: 8.6–51.8mg; SD: 17.3mg	8.6mg		17.3mg	25.9mg	34.6mg		51.8mg		
Focalin® XR‡ (dexmethylphenidate)	6-17 Yrs: 5–30mg; SD: 5mg 18 Yrs-Adult: 5–30mg; SD: 5mg (biphasic – 50/50)	G 5mg		G 10mg	G 15mg	G 20mg	G 25mg	G 30mg	G 35mg	G 40mg
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				
Ritalin® LA‡	6-12 Yrs: 10–60mg; SD: 20mg (biphasic – 50/50)	G 10mg		G 20mg	G 30mg	G 40mg		G♦ 60mg		
Metadate® CD‡	6-17 Yrs: 10–60mg; SD: 20mg (biphasic – 30/70)	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® (patch)	6-17 Yrs: 10–30mg; SD: 10mg (The color border around each patch reflects the packaging color, not the patch itself.)	G 10mg 1.4"x1.4"	G 15mg 1.5"x1.9"	G 20mg 1.5"x2.6"	G 30mg 1.5"x3.9"					

Methylphenidate Pro-Drug Formulations - Long Acting**

(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	26.1mg SDX / 5.2mg d-MPH	39.2mg SDX/ 7.8mg d-MPH	52.3mg SDX/ 10.4mg d-MPH	

Methylphenidate Formulations – Long Acting/Delayed Onset**

(Medications in this section are shown at actual size)

Jornay PM®‡	6 Yrs–Adults: 20–100mg (dosed in the evening); SD: 20mg	20mg	40mg	60mg	80mg	100mg	

Methylphenidate Formulations – Short Acting**

(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		

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

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

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 visual comparison; dosing comparability cannot be assumed.

♦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).

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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. Practitioners should refer to the FDA-approved product information to learn more about each medication. Although every effort has been made to depict the true size and color of each medication depicted, we cannot guarantee there are not minor distortions.

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ADHD Medication Guide

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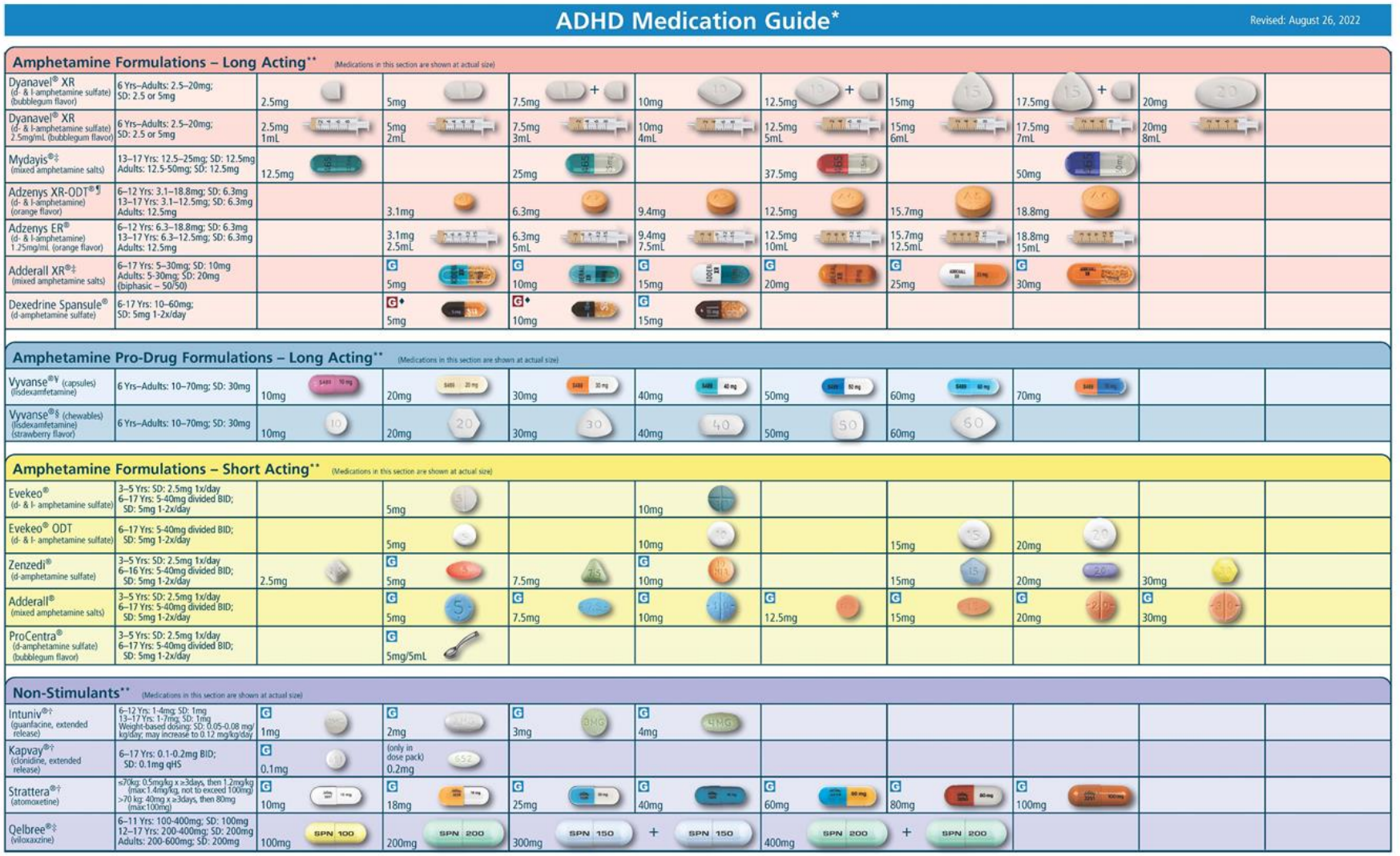

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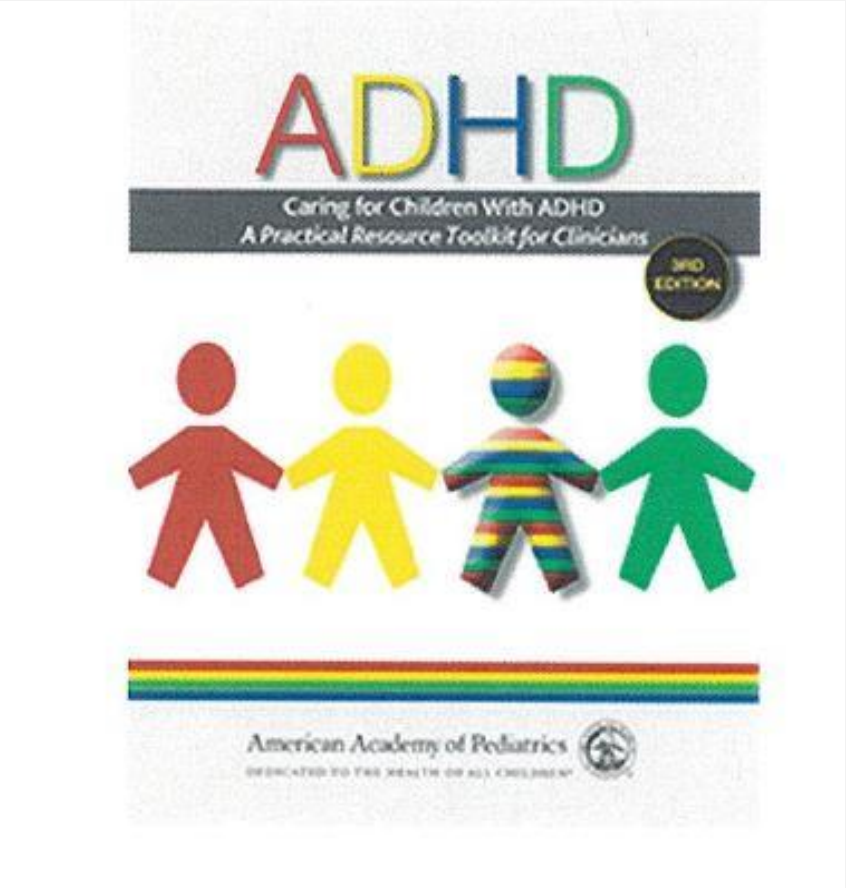

AAPP Pharmacist Toolkit: Addressing Stimulant Shortages

Authors:
Sandra Mitchell, PharmD, BCPP
Danielle L Stutzman, PharmD, BCPP

Reviewers:
Julie A Dopheide, PharmD, BCPP, FASHP
Kelly Lee, PharmD, MAS, BCPP, FCCP
Lauren Leiby, PharmD, BCPP
Megan Maroney, PharmD, BCPP

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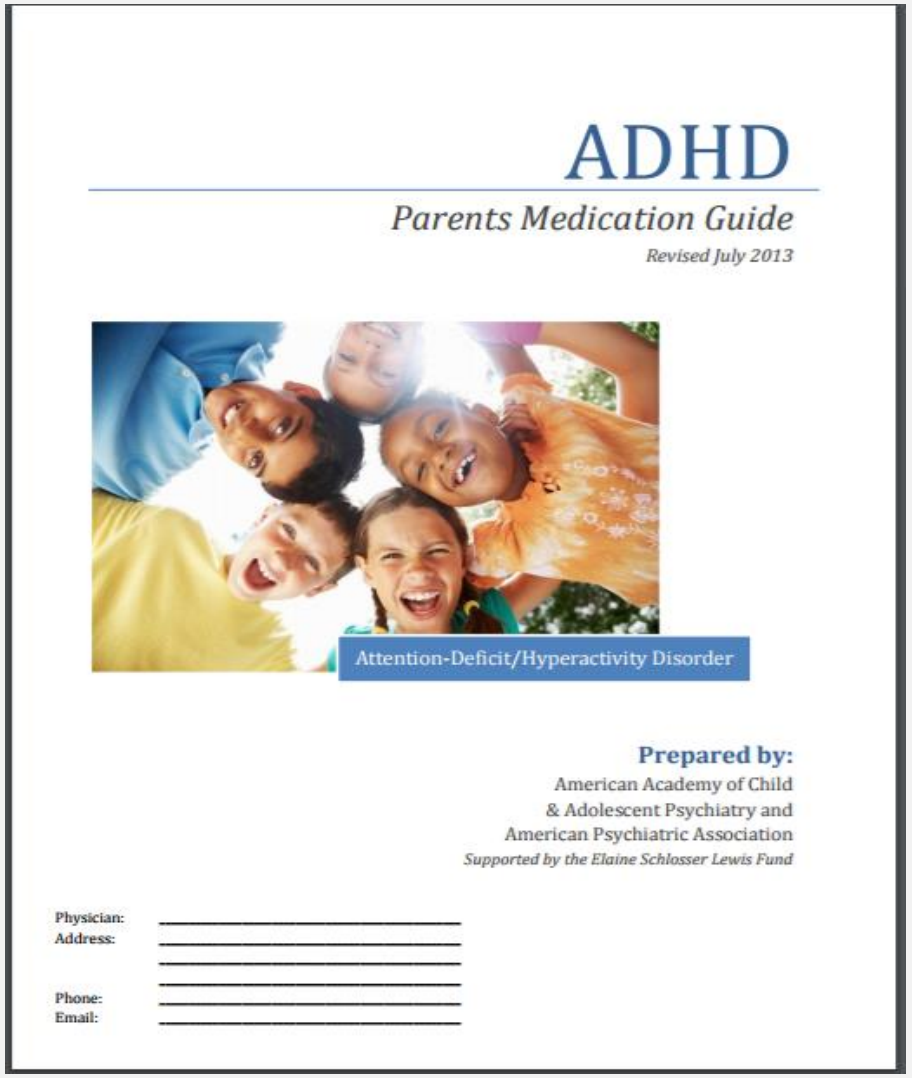
This toolkit is intended to highlight both the evidence base available as well as strategies of clinical decision making used by expert clinicians. The content reflects the views and practice of the authors as substantiated with evidence-based facts as well as opinion and experience. The opinions and recommendations in this document reflect those of the authors and do not necessarily reflect those of their employers or AAPP.



ADHD

Parents Medication Guide

Revised July 2013

Attention-Deficit/Hyperactivity Disorder

Prepared by:

American Academy of Child
& Adolescent Psychiatry and
American Psychiatric Association

Supported by the Elaine Schlosser Lewis Fund

Physician: _____
Address: _____
_____
_____
Phone: _____
Email: _____