ADHD UPDATE

Amanda O'Kelly, MD

March 5, 2019

DISCLOSURES

- I have no financial interests or conflicts to disclose.
- I do discuss off-label use of medications in this presentation.

OVERVIEW

- Background
- Assessment
- **Treatment & Resources**

BACKGROUND

BACKGROUND

- **ADHD is common** & increasing
  - Prevalence ~7.5%

- **Neurodevelopmental disorder**
  - Prefrontal cortex, other areas
  - Affected areas of the brain are smaller, less developed
  - Developmental age 30% younger

ETIOLOGY

- **2/3 inherited**
- **1/3 acquired**
  - Most are **pre/perinatal insults** (**in utero exposure to smoking or alcohol, prematurity, IVH**)
  - Postnatal insults (seizures, trauma, lead poisoning, leukemia tx, strep infection)

ADHD: A NEUROGENETIC D/O

- ~20 genes implicated
  - Dopamine & Norepinephrine regulation
  - DRD4, DAT1, DBH, MAO-A, others
    - DAT1 allele predicts response to methylphenidate

KIDS W/UNTREATED ADHD ARE AT RISK FOR:

- Undereducation
  - 90% have school problems
  - 1/3 don't finish HS
  - Only 5-10% graduate college
- Social problems
  - Few or no friends
  - Effects long-term relationships

KIDS W/UNTREATED ADHD ARE AT RISK FOR:

- Risk-taking behavior
  - 2-3X risk accidental injuries
  - 2-3X driving risk
  - More pregnancies, earlier parenthood
  - 2X Substance use

& AS ADULTS…

- Parenting problems
- Legal problems
  - ¼ with antisocial behavior
  - Substance abuse
- Financial problems
  - Credit cards
- Medical problems
  - Obesity, CAD, binging/bulimia

IMPACT OF ADHD

- **School**
  - Self-view (industry vs inferiority stage)
- **Peer relationships, home and family life**
  - Frustrating for parents and kids
- **Requires medical monitoring & intervention, coordination of care**
- **Kids w/ADHD = CSHCN** (children w/special health care needs)

TREATMENT
ALTERS THE
COURSE

ASSESSMENT

DSM5 ADHD CRITERIA

- Diagnosis
  - 6+ sxs of inattention and/or hyperactivity
  - Onset before age 12y, >6months of sxs
  - 2 or more settings
  - Clinically significant impairment

ADHD CORE FEATURES

- Inattention/Distractibility
  - Difficulties with executive function
  - Sustaining attention
  - Suppressing response to distractions

ADHD CORE FEATURES

- Hyperactivity/Impulsivity
  - Difficulty self-regulating
  - Intrusive & impulsive behavior
  - Fails to think before acting
  - Irritability (Difficulty regulating emotions)

VANDERBILT ADHD SCREEN

NICHQ Vanderbilt Assessment Scale—PARENT Informant

Today's Date: _____ Child's Name: _____ Date of Birth: _____

Parent's Name: _____ Parent's Phone Number: _____

Directions: Each rating should be considered in the context of what is appropriate for the age of your child. When completing this form, please think about your child's behaviors in the past 6 months.

Is this evaluation based on a time when the child ☐ **was on medication** ☐ **was not on medication** ☐ **not sure?**

Symptoms	Never	Occasionally	Often	Very Often
1. Does not pay attention to details or makes careless mistakes with, for example, homework	0	1	2	3
2. Has difficulty keeping attention to what needs to be done	0	1	2	3
3. Does not seem to listen when spoken to directly	0	1	2	3
4. Does not follow through when given directions and fails to finish activities (not due to refusal or failure to understand)	0	1	2	3
5. Has difficulty organizing tasks and activities	0	1	2	3
6. Avoids, dislikes, or does not want to start tasks that require ongoing mental effort	0	1	2	3
7. Loses things necessary for tasks or activities (toys, assignments, pencils, or books)	0	1	2	3
8. Is easily distracted by noises or other 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 when remaining seated is expected	0	1	2	3
12. Runs about or climbs too much when remaining seated is expected	0	1	2	3
13. Has difficulty playing or beginning quiet play activities	0	1	2	3

ASSESSMENT

- Establish Diagnosis
  - **Rating scales** are helpful, free, can track change
  - Psychological testing is **helpful, but not required**
  - Co-morbidities are common (ODD/CD, Learning disorders, mood, anxiety)
- Medical Evaluation
  - Include Physical Exam and cardiac-focused history
  - VS and Growth parameters
  - Baseline sleep pattern, appetite, somatic symptoms (HA, GI sxs)
  - Screen for substance use in adolescents

TREATMENT & RESOURCES

TREATMENT OVERVIEW

- Preschool Children (ages 4 & 5)
  - Behavioral therapy alone
  - Medications second line
    - Methylphenidate or non-stimulants preferred
- School-age Children (ages 6 & older)
  - Combined treatment (stimulant + behavioral therapy) recommended

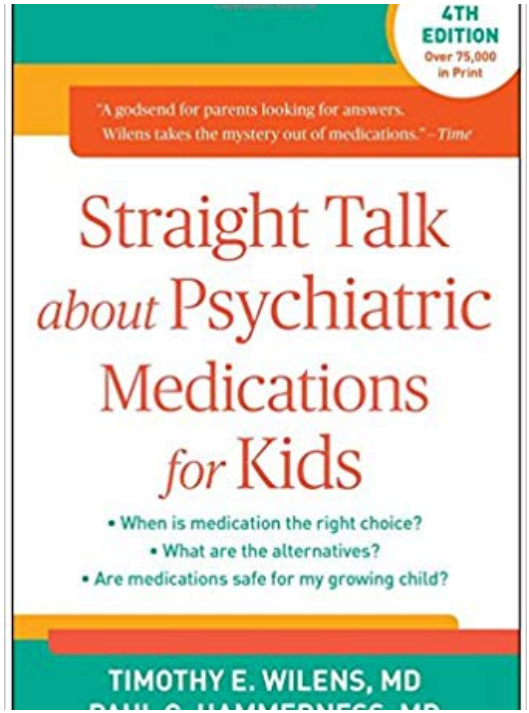
EDUCATIONAL ACCOMODATIONS

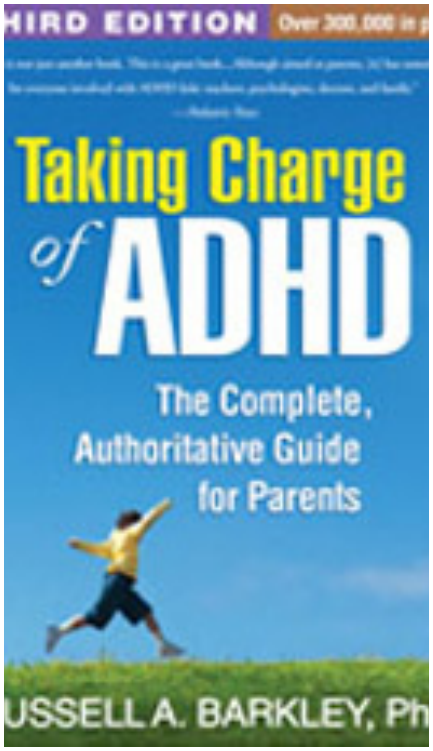
- **Most pts benefit from 504 plan or IEP**
  - Break up tasks into small chunks
  - Accommodations for testing
  - Visual aides in classroom
  - Externalize time periods
  - Make mental info physical
- **Administration of meds in school**
  - Form available online

BEHAVIORAL INTERVENTIONS

- Organize time, belongings, & tasks
  - Daily schedule, designated location for homework, charts & checklists
- Minimize distractions & Limit choices
- Set small, reachable goals
- Reward positive behavior … "Token Economy"
- Encourage activities that provide the experience of success!
- Use calm discipline (e.g. time outs)

PSYCHOEDUCATION





BEHAVIORAL INTERVENTIONS

- Additional Resources
  - Parents: ADHD Parent Medication Guide
  - Teachers: National Resource Center on ADHD
  - Providers: National Institute for Children's Health Quality – ADHD Toolkit

MORE RESOURCES

- **Washington PAL/Seattle Children's**
- https://www.seattlechildrens.org/healthcare-professionals/access-services/partnership-access-line/resources/
- Parent handouts:
  - ADHD, Time Out, Disruptive/Aggressive Behavior
- Provider info:
  - Rating Scales, Care Guides (ADHD)

ADDRESSING *Mental Health* CONCERNS IN PRIMARY CARE
A CLINICIAN'S TOOLKIT

EVIDENCE-BASED CHILD AND ADOLESCENT PSYCHOSOCIAL INTERVENTIONS

This report is intended to guide practitioners, educators, youth, and families in developing appropriate plans using psychosocial interventions. It was created for the period May 2013–October 2013 using the PracticeWise Evidence-Based Services (PWEBS) Database, available at www.practicewise.com. If this is not the most current version, please check the American Academy of Pediatrics mental health Web site (www.aap.org/mentalhealth) for updates.

Problem Area	Level 1- BEST SUPPORT	Level 2- GOOD SUPPORT	Level 3- MODERATE SUPPORT
Attention and Hyperactivity Behaviors	Behavior Therapy and Medication, Biofeedback, Parent Management Training, Self-Verbalization	Contingency Management, Education, Parent Management Training (with Problem Solving, or with Teacher Psychoeducation), Physical Exercise (with or without Relaxation), Social Skills and Medication, Working Memory Training	Biofeedback and Medication

MEDICATIONS ARE…

- Safe
  - Long track record
  - Well studied
    - Exception: No RCTs of long-acting preparations in preschoolers

Medication	Condition	Evidence for efficacy[1]	US FDA-approved indication and age, in years, for which it is approved
Methylphenidate and dexmethylphenidate	ADHD	Type I	6 and older
Amphetamines	ADHD	Type I	3 and older
Atomoxetine	ADHD	Type I	6 and older
Clonidine	ADHD	Type I	6 and older
	Tourette's disorder	Type I	
Guanfacine	ADHD	Type I	6 and older
Bupropion	ADHD	Type II	
	Major depression	Type V	

www.iacapap.org

MEDICATIONS ARE…

- Safe
  - No increased cardiac risk
    - No need for routine EKG's
    - Refer to cardiology for structural heart disease, arrhythmias

MEDICATIONS ARE…

- Effective – 90% response
  - Stimulants best
    - ~1.0 (large effect size)
  - Atomoxetine & α-2-adrenergic agonists
    - ~0.7 (moderate effect size)

MEDICATIONS ARE…

- Manageable
  - Stimulant (1st and 2nd line) or non-stimulant
  - Age and weight-based dosing
    - Titrate to optimal effect
    - Use charts/apps
  - Usually Daily or BID dosing

ADHD Medication Guide*

Revised: November 2018

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		17.3mg	25.9mg	34.6mg		51.8mg	
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)								

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.

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

*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.

Copyright 2006, 2016, 2017, 2018 by Northwell Health, Inc., Great Neck, New York. All rights reserved. Reproduction of the ADHD Medication Guide or the creation of derivative works is not permitted without the written permission of Northwell Health. The sale of this Guide is strictly forbidden. Send inquiries to Office of Legal Affairs, Northwell Health, Inc., 2000 Marcus Avenue, Lake Success, NY 11042.

This Guide is accurate as of November 28, 2018.

Cohen Children's Medical Center
Northwell Health

ADHD Medication Guide*

Revised: November 2018

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

Cohen Children's Medical Center
Northwell Health

MEDICATION

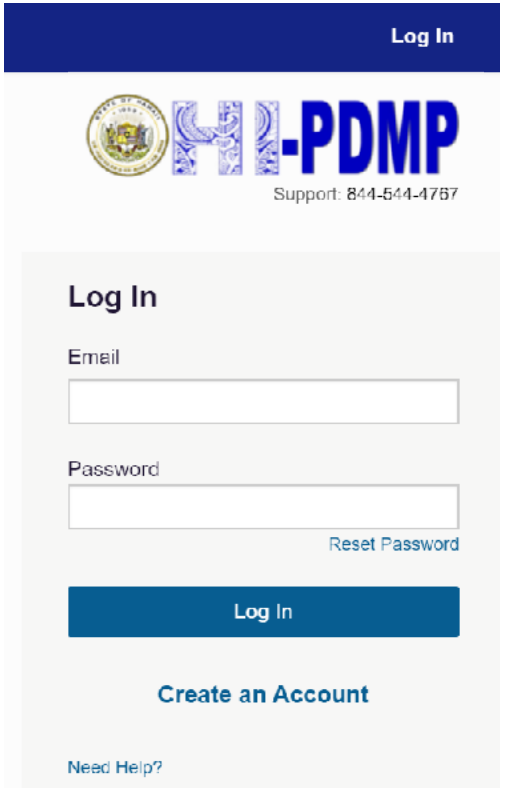
- Stimulants
  - Methylphenidate or Amphetamine
  - IRs last 3-6hrs
  - XRs last 8+ hrs
  - Difference in XR delivery system
    - Pill (IRs), Pump (Concerta), Pellets (most other XRs), Patch (Daytrana), Prodrug (Vyvanse)

MED MANAGEMENT: ASK ABOUT

- **+ effects**
  - Focus, Hyperactivity, Impulsivity, Distractibility
  - Mood and Behavior
  - Feedback from school
- **Potential Side Effects**
  - Decreased appetite -> **Track weight/BMI!**
  - BP/pulse -> often clinically insignificant increase
  - GI upset, HA
  - Sleep difficulty
  - Mood lability
  - Jitteriness/Tics/movements
  - Any other concerns? Rare priapism, psychosis

STATE REGULATIONS

- Stimulants are Schedule II Controlled Rx's
- Rx expires after 7 days
- Paper Rx
  - Electronic possible!
- Can't ~~correct~~ any info on Rx
- 90 day supply w/some insurance
  - Quest is 30day limit
- Pharmacist discretion to fill
- Check PDMP first
  - Utilize delegates



PRACTICAL CONSIDERATIONS

- Tell families the timing matters:
  - Paper Rx and 30 day supply
  - Rx only good for 7 days
    - Med has to be picked up, not just at pharmacy
  - Refill usually covered 21+days after last Rx
  - Keep meds in safe location
- Insurance formularies change
  - Some require PA or stepped therapy or specific generics
  - Some limit amount (30)

MEDICATION

- Non-stimulants:
  - **Strattera (atomoxetine)**
    - Useful w/ comorbid anxiety
    - SNRI – boxed warning for SI
    - GI upset common
    - Weight-based, Daily or BID dosing
    - Initial onset of action: 1-4 weeks
    - Full response: 6-12 weeks

MEDICATION

- Non-stimulants (continued):
  - **Alpha-agonists (guanfacine & clonidine)**
    - Most helpful for hyperactivity, comorbid trauma
    - Sedation most common SE
    - Daily/BID/TID dosing
    - XR formulations still need BID dosing for 24 coverage
  - **Buproprion** – not as effective

MEDICATION TREATMENT

- What Gets Better w/meds?
  - Core ADHD symptoms
  - Parent-child interactions
  - Aggressive behavior
  - Academic productivity & accuracy

MEDICATION TREATMENT

- What Gets Better?
  - Decrease risks associated w/ untreated ADHD
  - Early intervention best
    - Treatment before age 9y normalizes rates of substance abuse

MEDICATION TREATMENT

- What Gets Better?
  - Long-term benefits of meds
    - Treatment >2 years, significant academic improvements
    - Treatment >5 years, academic improvements persist

CASE

- A 5 year old boy "J", who is new to the pediatric practice, presents with his mother and her boyfriend.
- **Chief complaint: "He's so hyper, I think he may have ADHD."**
- **HPI:** Mother reports J is very active, much moreso than other children his age. He is constantly running and jumping on things when he's not supposed to be. He also interrupts others, and has a great deal of difficulty in school.
- At school he can't stay in his seat, and often has difficulty paying attention to the teacher. Homework is a daily struggle. It takes a very long time, and he requires lots of help and redirection to stay on task.

CASE

- School calls mother "nearly every day" due to his behaviors. J says he hates school and has no friends there. He reports the other kids tease and bully him.
- J has also gotten into trouble for aggressive behavior at school, at times hitting or cursing at other students. He is also aggressive at home, often hitting his older sister.
- His mood is described as often irritable, but also happy sometimes.
- Mom's boyfriend ("Uncle") has noticed J does better when he gets lots of exercise, so they try to run and play in the park for at least an hour every day.

CASE

- **ROS:** all systems reviewed, sleep/appetite normal

  Psych: + for inattention, hyperactivity, irritability, aggression,

  - for SI/depression/anxiety/psychosis/eating difficulties

- **Allergies**: none
- **Medications:** none
- **Past Medical History:** Mother denies any chronic medical problems or previous psychiatric diagnoses, no cardiac concerns
- **Family History:** ADHD in mother, unknown psych hx in father

CASE

- **Social History**: Mother recently moved to Hawai'i with pt and his sibling from the mainland US. She is employed, but reports significant financial hardship and no family support. Patient's **biological father was physically and verbally abusive to mother and children**. Patient still has occasional telephone contact with father, but mother has sole physical and legal custody of the pt and his 7year old sister.
- **Physical Exam: Nml VS**
- **Growth parameters approx. 50% for weight 75% for height**
- **Pt cannot sit still and is constantly moving around the room, and requires some repeated questions on interview. He frowns and gives thumbs down sign when asked about school**
- **Otherwise normal PE**

CASE

You discuss your impression with the pt's mother, that the pt likely has ADHD, however the history of trauma is also impacting his functioning. He is also young, and inattention/hyperactivity symptoms are very common in preschoolers.

Input from the school is sought, and mother also completes Vanderbilt rating scales. The results are consistent with ADHD, with teachers and mother in concordance with severity and types of symptoms noted.

THE PLAN

- Psychoeducation
- Educational accommodations in school
- Discuss holding off on medication until educational and behavioral interventions trialed
- Discuss the impact of trauma
- Refer to a psychologist (state DOH which can go to the home)
- Discuss resources for mother's psychological health
- Discuss available case management resources
- Follow up regularly to provide support and oversight

MAHALO!