

Diagnosis and Management of ADHD in Children: Sharpening our ADHD Tools

S. Sutton Hamilton, MD



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S. Sutton Hamilton, MD

Faculty, Inspira Family Medicine Residency, Woodbury, New Jersey

Dr. Hamilton is a graduate of Duke University, Durham, North Carolina, and earned his medical degree at the University of Pittsburgh School of Medicine in Pennsylvania. He completed his internship and family medicine residency at Franklin Square Hospital, Baltimore, Maryland, where he served as chief resident. At the University of Cincinnati, Ohio, he completed a fellowship in faculty development and received additional training in developmental pediatrics and adolescent medicine. Prior to joining the faculty of Inspira Family Medicine Residency, he served as assistant program director at Blackstone Family Practice Residency in Virginia. Dr. Hamilton's clinical interests include the evaluation and management of children who have attention-deficit/hyperactivity disorder (ADHD), learning difficulties, and emotional/behavioral problems. He has been published in *American Family Physician* and *UpToDate* on the topics of developmental pediatrics and emotional/behavioral problems. He obtained his Drug Abuse Treatment Act (DATA) waiver and treats individuals who have opioid use disorder.

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Learning Objectives

1. Utilize current AAP evidence-based guidelines and DSM 5 criteria to diagnose and evaluate ADHD in symptomatic child.
2. Screen all children diagnosed with ADHD for other primary conditions or comorbidities.
3. Develop a management plan that includes multimodal interventions.
4. Understand the evidence base behind both pharmacologic and non-pharmacologic interventions in the management of childhood ADHD.
5. Counsel children and family members on successful management of ADHD, including transition management from adolescence to adulthood.

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Associated Sessions

- (PBL) Diagnosis and Management of ADHD in Children: Sharpening our ADHD Tools

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Audience Engagement System



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Case: Braxton 9 years old

- ▶ Teacher concerns with inattention, difficulty taking turns, blurting out.
- ▶ Dislikes reading, does not read for pleasure.
- ▶ Dislikes recess as he “does not know what to do.”
- ▶ He identifies two friends, but his mother gives a look as if to say “not exactly.”
- ▶ Mother without issues but father did not graduate high school, history of behavior problems at school, substance use problems as an adult.
- ▶ Braxton is not aggressive but can react strongly when he “does not get what he wants.”

What this talk aims to cover

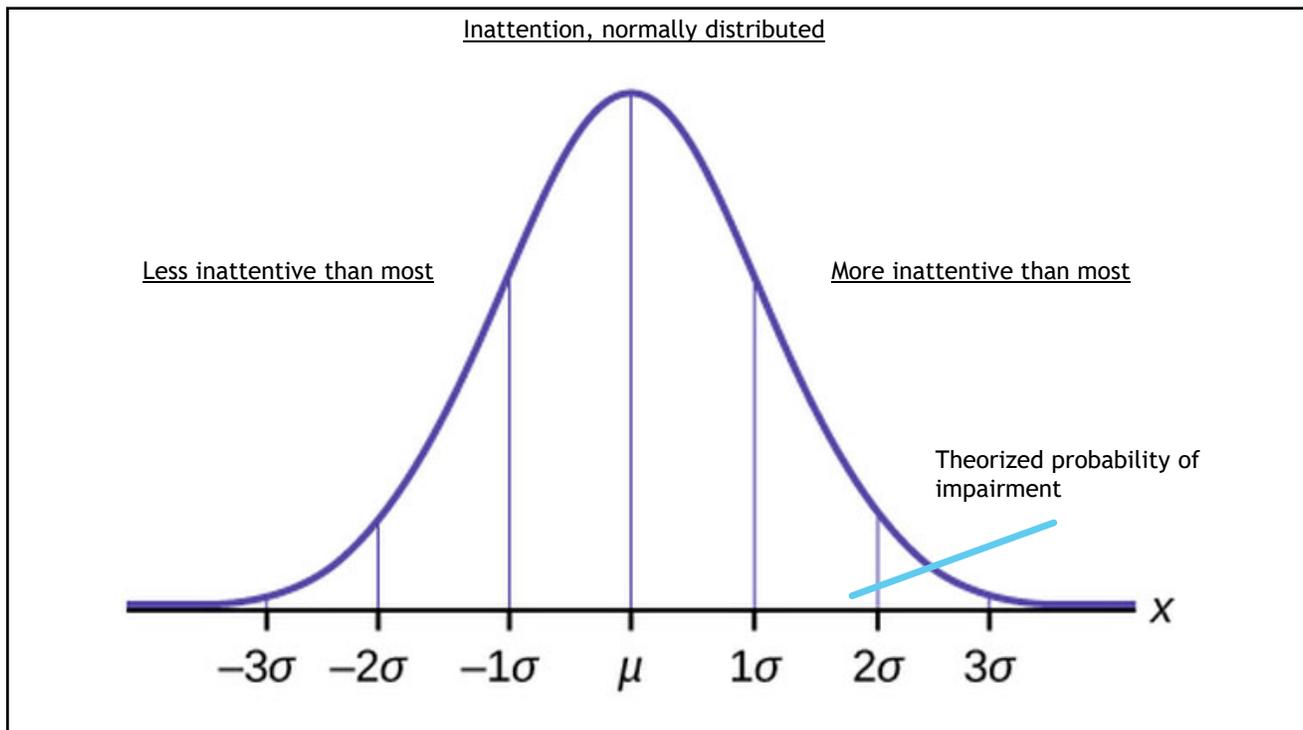
- ▶ What does it mean to say that ADHD is “dimensional?” (1)
- ▶ What conditions commonly co-occur with ADHD?(2)
- ▶ How does the natural history of ADHD make the case for treatment? (3)

What this talk aims to cover

- ▶ What does research (i.e. MTA) tell us about the optimal treatment strategy for children with ADHD? (4)
- ▶ How do we diagnose, determine severity of ADHD?(5)
- ▶ What do we know about adherence? What are ways we can improve it? (6)

ADHD =

- ▶ Inattention, hyperactivity and impulsivity that is
 - ▶ Marked (substantially greater than in peers)
 - ▶ Persistent
 - ▶ Developmentally inappropriate
- ▶ Inattention and hyperactivity/impulsivity are “*distributed dimensions*” in the community.



Re-conceptualize the diagnosis of ADHD

- ▶ The question is less “Does this child have ADHD?” but rather...
- ▶ “how much ADHD does this child have?”
- ▶ More precisely “what degree of core ADHD symptoms and what degree of impairment?”

Poll Question 1

Which of the following is not considered “core” ADHD feature?

- A. Impulsivity
- B. Inattention
- C. Emotional hyper-reactivity
- D. Hyperactivity

A fuller conception of ADHD

- ▶ Inattention (a multifaceted concept)
- ▶ Hyperactivity
- ▶ Impulsivity
- ▶ Emotion dysregulation / affective disorder esp. anxiety
- ▶ Oppositional defiant disorder / conduct disorder / antisocial personality disorder (in adulthood)
- ▶ Reading disability / AKA dyslexia
- ▶ Impaired social skills (autism spectrum disorder (ASD) features)
- ▶ Fine motor difficulties (e.g. Developmental Coordination Disorder)

ADHD and emotional dysregulation

Emotional dysregulation is defined as

deficits in inhibition when faced with emotionally charged situations, resulting in greater emotional reactivity (Barkley 1997)

- ▶ Present in about 50% of children with ADHD, 15% of controls.

Barkley RA. Attention-deficit/hyperactivity disorder: self-regulation and time: toward a more comprehensive theory. *J Dev Behav Pediatr.* 1997; 18:271-79

ADHD and emotional dysregulation

- ▶ Potentially caused by
 - ▶ Poor executive functioning (i.e., future goal maintenance, inhibitory control, working memory, planning)
 - ▶ Challenges interpreting social cues, nonverbal communication.
- ▶ Emotional dysregulation is common in ADHD, often persistent and disabling

Van Stralen J. Emotional dysregulation in children with attention-deficit/hyperactivity disorder. *Atten Def Hyp Disorder*. 2016; 8:175-86

Shaw, PJ, Stringaris A, Nigg J, Leibenluft E. Emotional dysregulation and Attention-Deficit/Hyperactivity Disorder. *Am J Psychiatry* 2014; 171:276-93

ADHD and conduct disorder (CD) and oppositional defiant disorder (ODD)

- ▶ Both ODD and CD are highly prevalent in children with ADHD
- ▶ ADHD combined ODD or CD is associated with considerably worse outcomes than either condition alone.
- ▶ ODD as the expression of a rigid child with poor problem-solving skills, often with inflexible parents/teacher.
- ▶ ODD less about “disobedience” and more about “executive skill deficits.”

ADHD and conduct disorder

- ▶ A more serious form of ODD
- ▶ Aggressive behavior, willingness to harm others, transgression of serious societal/legal rules.
- ▶ Can be an independent risk factor for subsequent development of antisocial personality disorder.

Erskine HE et al. Long-Term Outcomes of Attention-Deficit/Hyperactivity Disorder and Conduct Disorder: A Systematic Review and Meta-Analysis. *J Am Acad Child Adolesc Psychiatry* 2016; 55:841-50

ADHD and social skills impairment

- ▶ Children with ADHD can have difficulty initiating and sustaining friendships.
- ▶ Possible explanations are that core ADHD features, i.e. difficulty taking turns, blurting out, difficulty following rules is causal.
- ▶ Another explanation is the presence of autism spectrum disorder (ASD)-type features.

Sokolova E et al. A Causal and Mediation Analysis of the Comorbidity Between Attention Deficit Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder (ASD). *J Autism Dev Disorders* 2017; 47:1596-604

ADHD and reading disability/dyslexia

- ▶ Commonly co-exist, but the exact reason is not known
- ▶ Executive deficits present in ADHD causal? E.g.
 - ▶ Working memory skills
 - ▶ Planning and problem solving
 - ▶ Cognitive organizational skills

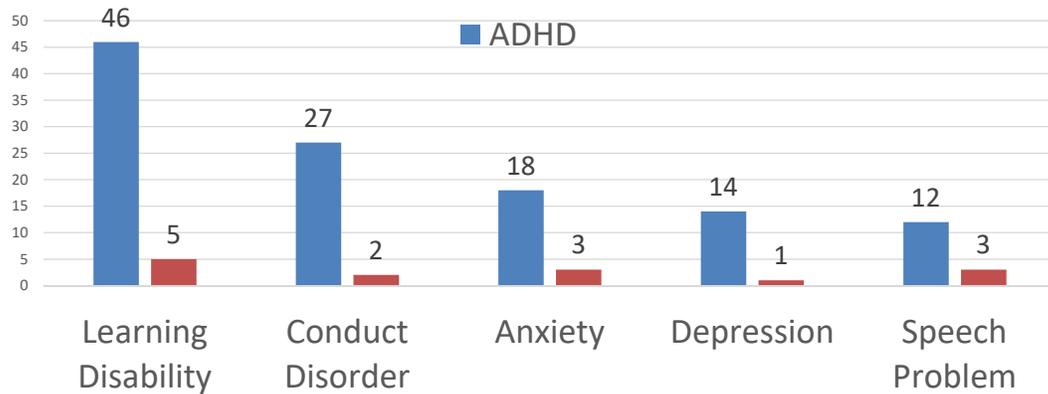
Willcutt EG, et al. Etiology and Neuropsychology Of Comorbidity Between RD and ADHD: The Case for Multiple-Deficit Models Cortex 2010; 46:1345-61

ADD and impaired fine motor skills / Developmental Coordination Disorder

- ▶ Substantial deficits in fine motor control (e.g. handwriting), are present in approximately 30-50% of children with ADHD
- ▶ Children with ADHD and motor difficulties have worse psychosocial outcomes.

Goulardins JB, Rigoli D, Licari M, Piek JP, Hasue RH, Oosterlaan K, Oliveria JA. Attention deficit hyperactivity Disorder and Developmental Coordination Disorder: Two separate disorders or do they share a common etiology? Behav Brain Res 2015; 292:484-92

Co-existing conditions: ADHD vs. Controls 2007 National Survey



Larson K et al. Patterns of Comorbidity, Functioning, and Service Use for US Children With ADHD, 2007. *Pediatrics* 2011; 127:462-70

Poll Question 2

Which of the following is not a condition that commonly co-exists in children with ADHD?

- A. Anxiety disorders
- B. Fine motor difficulties
- C. Myopia
- D. Reading disability

ADHD: Natural History (age 41)

	ADHD	Controls	
Educational attainment *	13.3	15.8	p < .001
Did not graduate high school *	12.6%	0.7%	p < .001
Median Salary*	\$60,000	\$100,000	p < .001
Ever divorced*	31.1%	11.8%	p < .001
Homelessness*	23.7%	4.4%	p < .001

*Klein R, Mannuzza S, et al. Clinical and Functional Outcome of Childhood Attention-Deficit/Hyperactivity Disorder 33 Years Later. Arch Gen Psychiatry 2012

+Murillo G, Ramos-Olazagasti MA, et al. Childhood Attention-Deficit Disorder and Homelessness: A 33-Year Follow-Up Study. J Am Acad Child Adolesc Psychiatry 2016; 44:931-36

ADHD: Natural History (age = 20s)

	ADHD - SX persistent	ADHD- SX remission	Control Group
Completed college	8.0%	17.8%	37.1%*
Public assistance	22.2%	9.6%	3.2%
Anxiety disorder	14.2%*	5.0%*	8.1%
Substance use disorder	38.5%	28.7%	26%

Hectman L et al. Functional Adult Outcomes 16 Years After Childhood Diagnosis of Attention-Deficit/Hyperactivity Disorder: MTA Results. J Am Acad Child Adolesc Psychiatry 2017; 56:687-95

ADHD: Natural History (age 20s)

	ADHD - SX persistent	ADHD- SX remission	Control Group	OR (persistent vs. controls)	OR (persistent vs. remissions)
Completed college	8.0%	17.8%	37.1%	7.4	2.5
Public assistance	22.2%	9.6%	3.2%	8.7	2.7
Anxiety disorder	14.2%*	5.0%*	8.1%		3.1
Substance use disorder	38.5%	28.7%	26%		1.3

Hectman L et al. Functional Adult Outcomes 16 Years After Childhood Diagnosis of Attention-Deficit/Hyperactivity Disorder: MTA Results. J Am Acad Child Adolesc Psychiatry 2017; 56:687-95

Assessment for ADHD

- ▶ Routine use of a standardized assessment tool is an essential component of quality care of children with possible ADHD.
- ▶ Such forms gather information regarding the child's behavior in two or more settings - most typically this means home and school.

Assessment for ADHD

- ▶ NICHQ Vanderbilt Assessment Scales:
 - ▶ Free for download
 - ▶ Allow a detailed assessment of child's behaviors
 - ▶ Assess for commonly co-existing conditions (or **conditions** that may mimic ADHD)
 - ▶ It is quick for parents and teacher to complete.
 - ▶ Does not replace parent interview and clinical judgment

Care of Adolescents and Children with ADHD

- ▶ The ADHD treatment paradox:
 - ▶ Short term treatment CLEARLY works (by just about any measure)
 - ▶ Short term treatment dose not “inoculate”
 - ▶ It is much more difficult to definitively establish if long-term treatment improves outcomes.

Care of Children and Adolescents with ADHD

- ▶ Research is challenging as limited opportunities for randomized controlled studies. (can you imagine?)
- ▶ What can we learn from the largest RCT concerning treatment?

NIMH Collaborative Multisite Multimodal Treatment Study of Children With Attention-Deficit/Hyperactivity Disorder (MTA)

- ▶ 579 children (ages 7-9.9 years) in a 14 month trial that randomized to:
 - ▶ Intensive medication management
 - ▶ Intensive behavioral treatment
 - ▶ Combination (intensive medical and behavioral) treatment)
 - ▶ Community Care (control)

The MTA Cooperative Group. A 14-month randomized clinical trial of treatment strategies for attention-deficit/hyperactivity disorder. Multimodal Treatment Study of Children with ADHD. *Ach Gen Psychiatry* 1999; 56:1073-86

NIMH Collaborative Multisite Multimodal Treatment Study of
Children With Attention-Deficit/Hyperactivity Disorder (MTA)

Principal findings:

- ▶ Intensive medical treatment was superior to “community care” as well as intensive behavioral management.
- ▶ Addition of behavioral therapy to intensive medical improved anxiety, academic performance and family relationships.
- ▶ Anxiety did not preclude response to stimulants.
- ▶ Benefit of medication disappears when it is stopped (like many other conditions!).

NIMH Collaborative Multisite Multimodal Treatment Study of
Children With Attention-Deficit/Hyperactivity Disorder (MTA)

Conclusions (Core ADHD symptoms and ODD)

- ▶ Combination (i.e. intensive medical management and behavioral therapy) *was not significantly better than intensive medical management.*
- ▶ Combination therapy was superior with addressing anxiety, academic performance, parent-child relations, school behavior and social skills.

The MTA Cooperative Group: A 14-Month randomized clinical trial of treatment strategies for attention-deficit/hyperactivity disorder (ADHD). *Ach Gen Psychiatry* 1999; 56:1073-86

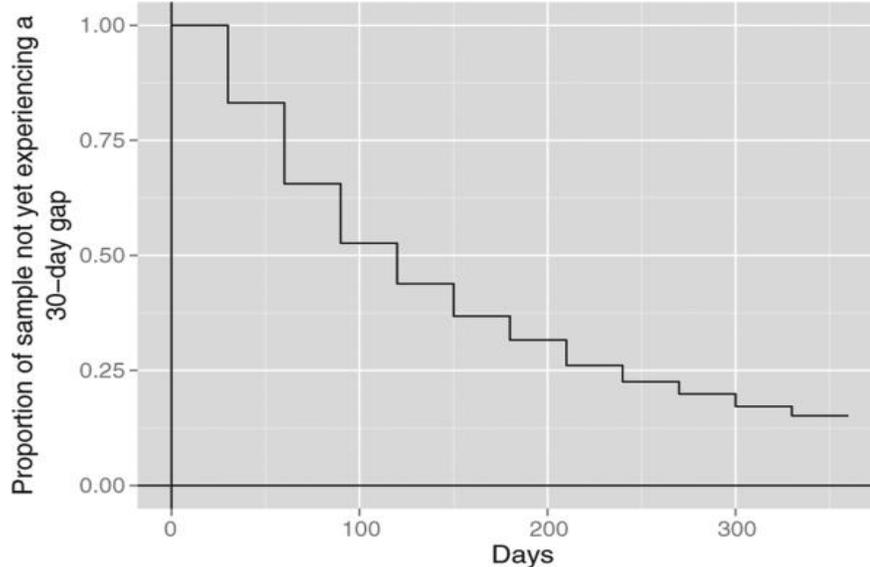
Poll Question 3

Concerning core ADHD symptoms and ODD, the MTA showed that...

- A. Intensive medical therapy outperformed community care.
- B. Behavioral therapy was most effective for reducing inattention and hyperactivity.
- C. The additional of behavioral therapy to intensive medical treatment generated the greatest improvements in attention and hyperactivity.
- D. When the study concluded, most individuals continued the therapy to which they were assigned.

Choice of medical therapy.

- ▶ Stimulants: - methylphenidate, amphetamines
- ▶ Alpha-2-adrenergic agonists: guanfacine XR
- ▶ Selective norepinephrine reuptake inhibitor: atomoxetine
- ▶ Non-stimulants approximately 70% as effective as stimulants.



Brinkman WB et al. Relationship Between Attention-Deficit/Hyperactivity Disorder Care and Medication Continuity. *J Am Acad Child Adolesc Psychiatry* 2016; 55: 289-94

Adherence

- ▶ Most commonly cited reasons for discontinuation
 - ▶ Medicine not helping
 - ▶ Adverse effects of medication
 - ▶ Logistical barriers
 - ▶ Social stigma
- ▶ Adherence as “dynamic” and predictors of short-term adherence differ from long-term predictors.

Brinkman WB, Simon JO, Epstein JN, Reasons Why children and Adolescents Stop and Restart Taking Medicine. *Acad Pediatr* 2018; 18:273-280

Brinkman WB, et al. Predictors of Medication Continuity in Children with ADHD. *Pediatrics* 2018; 141:e201172580

Best practices in ADHD management (practical inferences from the MTA study)

- ▶ Frequent follow-up after drug initiation
- ▶ Achieve optimal dosing.
- ▶ Enhance the effect of pharmacotherapy with behavioral therapy
- ▶ Measure outcomes with a goal of non-impairing ADHD on Teacher follow-up assessment.

How to improve adherence

- ▶ Address the child's concerns about medication.
- ▶ Address parental concerns about treatability.
- ▶ Provide education and information.
- ▶ Engage in shared decision-making to reduce decisional conflict.
- ▶ Titrate medication to maximize symptom reduction while minimizing side effects.

Brinkman WB, Simon JO, Epstein JN. Reasons Why Children and Adolescents Stop and Restart Taking Medication: Acad Pediatr 2018; 18:273-80

Practice Recommendations

- ▶ Use instruments like the NICHQ Vanderbilt and gather information from more than one setting (typically home and school).(SORT C)
- ▶ Use standardized instruments and interview to identify potentially disability co-existing conditions.(SORT C)
- ▶ Improve outcomes through frequent visits, shared decision making, careful medication titration, targeted behavioral therapy.(SORT C)

Contact Information

- ▶ Sutton Hamilton
- ▶ sutton.Hamilton@gmail.com

Questions



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