Attention-Deficit/Hyperactivity Disorder Assessment and Diagnosis

David L. Kaye, MD

Professor of Psychiatry and Pediatrics

UB Jacobs School of Medicine

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Speaker:

David L. Kaye, MD

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Professor of Psychiatry and Pediatrics
UB Jacobs School of Medicine

Contact:
dlkaye@buffalo.edu

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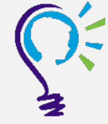

Disclosures

Cartesian Solutions

Health Now QI Committee

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Goals and Objectives

1. Recognize the presenting symptoms of ADHD
2. Discuss the core concept and DSM 5 criteria for diagnosing ADHD
3. Describe the AAP endorsed process of assessing ADHD, including the use of rating scales

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Your Patient: James

- 7 y.o. boy who you've known all his life
- Intact, college-educated family who care about boy and "argue like everyone"
- Early history unremarkable, early talker
- Mom brings in after one month in 2nd grade; teacher reports "trouble paying attention"; as a result grades are fair-poor
- Mom says he has always been really active, "just like his father"

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More on James

- With his sibs he often interrupts and "can't wait for anything"
- Trouble settling and falling asleep
- He is a "good kid" but he gets frustrated easily and it is really tough to get him to complete school work, parent must be right there
- He cries often in frustration and gives up, sayng "I can't do it"
- Last year in school he struggled also but parents thought due to teacher who "yelled a lot"

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What is the Differential?

1. **ADHD**
2. **Adjustment reaction/trauma/loss**
3. **Anxiety**
4. **Learning disability/disorder**
5. **Depression (crying)**
6. **Sleep disorder**

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First, what is ADHD?

- Core symptoms
  - Inattention
  - Hyperactivity
  - Impulsivity
- Continuously and persistently present
- From childhood (although sx may not become evident until older)
- In short: a neurodevelopmental disorder

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Core concept of ADHD

- Internal deficit
  - Inability to stop, look, listen, and think or intention deficit
  - A problem of “response organization and inhibition”/executive functioning
- External dopamine stimulation of reward system can improve attention!

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DSM 5 Diagnosis

- **Inattention: Six or more symptoms of inattention for children up to age 16, or five or more for adolescents 17 and older and adults;**
- **Hyperactivity and Impulsivity: Six or more symptoms of hyperactivity-impulsivity for children up to age 16, or five or more for adolescents 17 and older and adults**
- **Before age 12**
- **At least 6 months**
- **Two or more settings**
- **Interferes** with social, school, or work functioning
- NOT only during schizophrenia/psychosis, not better explained by another disorder (e.g. anxiety, PTSD, mood, dissociative disorders)

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ADHD Diagnostic Types

- Combined type (60%)
- Predominantly Inattentive type (25%)
- Predominantly Hyperactive-impulsive type (15%)

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Epidemiology

- 2-3% preschoolers
- 5-8% school age
- Note: recent 11% probably overestimate
- 3-4% adolescents and adults
- Seen around the world 3-7%
- Boys:Girls 2:1 (adults: 1.6:1)
- Girls more likely to have inattentive type

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Risk Factors: Genetics

- 75% heritable
  - Breast cancer 25%
  - Asthma 38%
  - Height 88%
- 25% have a parent with ADHD; 30% sibs; 40-50% children of parent with ADHD
- many specific genes hypothesized with some evidence, but none confirmed and no “single bullet”
- Candidate genes focused on dopamine and serotonin receptors and transporter

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Risk Factors: Environment

- Brain injury (uncommon)
  - Neurological insults (trauma, infection, tumor, toxins e.g. lead)
  - Pregnancy and delivery complications:
    - Toxemia, post-maturity, maternal age
    - Exposure to cigarette smoking, alcohol
- Psychosocial: Low SES and maltreatment (but seen in ALL SES, family backgrounds) and NO causal relationship

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Neurobiology

- Neuroimaging:
  - Smaller volume, OPFC (right>left), basal gang, cerebellum
  - AC gyrus underactivated during testing, caudate smaller
- Neurochemistry:
  - Dopamine (D1)
  - Norepinephrine (alpha-2A)
- Neural circuits:
  - *Fronto-striatal* (response suppression, freedom from distraction, executive functioning)
  - *Fronto-limbic* (motivational deficits/reward pathway, emotional control; mediated by dopamine)
  - *Fronto-striatal-cerebellar* (motor coordination, timing of behavior; mediated by NE)

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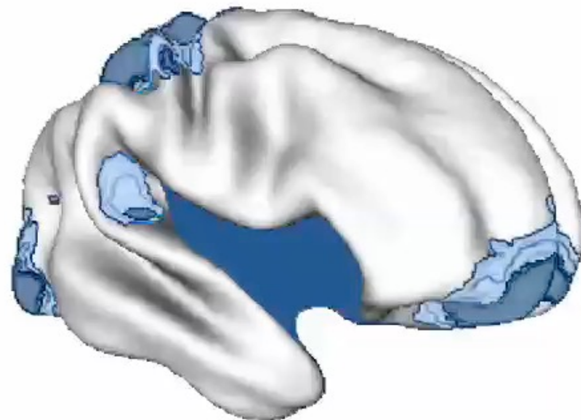
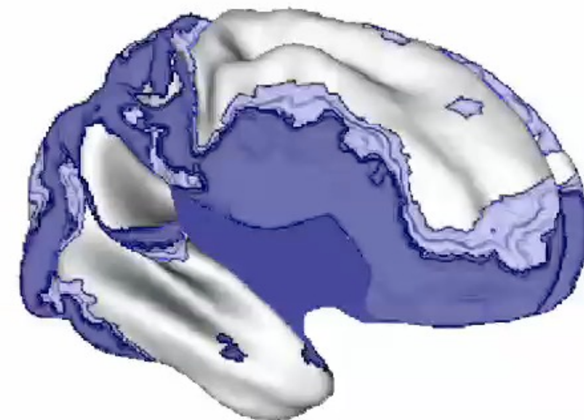
Neurobiology: The Latest
A Delay in Maturation

http://www.nimh.nih.gov/videos/press/adhddelayrtsideweb.mp4

AGE: 6



ADHD



HEALTHY CONTROLS

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ADHD: Medical “look alikes”

- Anemia
- Thyroid disorders
- Seizure disorders (e.g. absence)
- Deafness
- Sleep apnea
- Medications: antihistamines, sympathomimetics, steroids
- **In practice: labs generally NOT necessary; only when indicated by physical symptoms, PE**

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ADHD: Psychiatric DDx

- Anxiety disorders
- Major Depression
- Post-traumatic stress disorder
- Adjustment disorder
- Autism
- Bipolar disorder (rare in childhood)
- Psychosis (rare)
- Substance use disorder (rare in childhood)

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Differential Diagnosis: Core Symptoms Overlap but….

	≥2 settings	Persistent day to day	>6 months	Onset < 6
ADHD	Yes	Yes	Yes	Common
Anxiety disorder	Yes	No	Can be	Uncommon
Major Depression	Yes	No	Depends on when MDD started	Rare
Learning disorder	No	No	Yes	Previous language delays
Adjustment disorder	Maybe	No	No	
PTSD	Yes	Yes	Unlikely	Can be
Bipolar disorder	Yes	No	Depends on mood symptoms	Rare

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Comorbidity is the rule

- 67% clinical samples have at least one (probably lower in primary care settings)
- ODD 50%
- Conduct disorder 33%
- Depression 33%
- Anxiety 20-30%
- Learning disorders 20-60%
- Sleep problems

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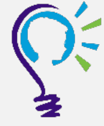

Making the Diagnosis

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Cliff Notes to Diagnosis and Assessment

1. Identify core symptoms
2. Assess impairment
3. Identify possible underlying or alternative causes
4. Identify comorbid conditions

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AAP Process of Care

Wolraich ML, Hagan JF, Allan C, et al. Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. Pediatrics. 2019;144(4): e20192528

- Don’t do this alone: use office staff and review procedure
- Use longitudinal knowledge
- Interview parent(s) and child
- Need input from others (e.g. teachers)
- Use DSM 5 criteria: sx+persistence+functional impair+age of onset
- Use checklists
- Assess for comorbidity

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Note: How ADHD is NOT Diagnosed!

- Despite claims to contrary there is no lab, EEG, or imaging test that diagnoses ADHD
- There is no psychological or neuropsychological test that is diagnostic although these can be helpful in assessing strengths and weaknesses, advocating in schools

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Use Rating Scales

- Many standardized forms (Conners, ACTers)
- Vanderbilt free and validated; 6-17; keyed to DSM 5 sx
- Parent, teacher, self reports
- Available at www.projectteachny.org
- Useful for efficiently obtaining information, confirming diagnosis, tracking treatment response

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Vanderbilt Parent and Teacher

- Count 2's, 3's
- Inattention (1-9): 6+
- Hyperactivity-impulsivity (10-18): 6+
- ODD/CD (19-28): 3+
- Internalizing screen (29-35): 3+
- PLUS: at least one area of impairment (4 or 5) items 36-43

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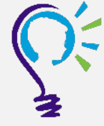

Back to James…..

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Child Study Center
Department of Pediatrics
University of Oklahoma Health Sciences Center
Phone: 271-5700•Fax: 271-8835

Vanderbilt ADHD Diagnostic Teacher Rating Scale

Teacher's Fax#

Child's Name: James **Teacher's Name:**

Today's Date: **School:** **Grade:**

Directions: Each rating should be considered in the context of what is appropriate for the age of the child you are rating and should reflect that child's behavior since the beginning of the school year. Please indicate the number of weeks or months you have been able to evaluate the behaviors: ________

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

Behavior:	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 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 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 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 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 in 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 get out of trouble or to avoid obligations (ie, "cons" others)	0	1	2	3
26. Is physically cruel to people	0	1	2	3
27. Has stolen things of nontrivial value	0	1	2	3
28. Deliberately destroys other's 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
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

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James' Teacher Vanderbilt

• Inattention:	**+7**
• Hyperactive-impulsive:	**+4**
• ODD:	**+2**
• Internalizing:	**+1**
• Impairments:	**+5**
• Diagnosis:	• **ADHD, predominantly inattentive type**

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Outcome: General

- 75% childhood ADHD persists into adolescence
- 50% persist into adulthood (residual sx 67%)
- 33% outgrow
- Comorbidity critical to prognosis
- Bottom line: *for most this is a chronic, lifelong condition=* neurodevelopmental disorder and prevention and chronic care model principles relevant

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Outcome: Risks

- Poor school achievement and failure to complete HS
- Un- or under-employment
- Smoking and substance abuse (mediated by Comorbid Conduct Disorder)
- Divorce
- TBI
- MVAs
- Premature death (suicide, MVAs?)

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Conclusions on Assessment

- ADHD is a serious, often lifelong, common public health problem recognized around the world
- PCPs are positioned well to diagnose early
- For assessment use
  - multiple informants
  - DSM 5 criteria
- Rating scales are your friend
- Look for comorbidity

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