

# American Osteopathic College of Occupational and Preventive Medicine 2015 Mid Year Educational Conference, Ft Lauderdale, Florida

## Adolescent and Adult ADHD: An Update on Impact, Diagnosis and Treatment

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### Joel L. Young, MD Disclosures

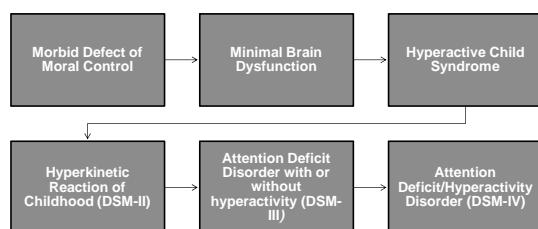
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- **Other Financial Interest:** None
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## Overview

- History
- Prevalence and Persistence
- The Economics of AD/HD
- Symptom Trajectory (Childhood to Adulthood)
- Impact on Quality of Life
- Functional Impairments
- The Diagnostic Process
- Comorbidities in Adolescent and Adult ADHD
- Treatment Options and Considerations

## About AD/HD

### Historical Overview Trajectory of Names for AD/HD



(From National Institute for Mental Health)

### Prevalence and Persistence

- Estimated prevalence:  
-4%-12% of children<sup>1</sup>  
-4% of adults<sup>2</sup>
- Estimated 30%-60% persistence into adulthood
- ➔ Diagnosis may be residual rather than full but this is NOT equivalent to remission<sup>3</sup>

1. American Academy of Pediatrics. *Pediatrics* 2000;105:1158-1170.
2. Kessler R, et al. *Am J Psychiatry* 2006;163:716-723.
3. Faraone SV, et al. *Psychol Med* 2006;36:159-165.

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## Heritability of ADHD

A 1990 study by Biederman and colleagues found that:  
**more than 25% of first-degree relatives of children with AD/HD also had AD/HD, versus 5% of controls**

Biederman J, Faraone SV, Keenan K, Knee D, Tsuang MT. Family-genetic and psychosocial risk factors in DSM-III attention deficit disorder. *J Am Acad Child Adolesc Psychiatry*. 1990;29:526-533.

## The Economics of ADHD

- Costs in school
  - Special education
  - Counseling and psychological services
  - Teacher training
- Other ADHD-related costs in childhood and adolescence
  - Costs related to delinquency (i.e., juvenile justice system)
  - Substance abuse
  - Early childbearing
  - Injury
  - Higher rates of motor vehicle accidents

Hinshaw S, et al. 1999. Available at: <http://www.cdc.gov/ncbddd/adhd/dadburden.htm>. Accessed April 3, 2008.

## Economic Burden of Adult ADHD

- Adult ADHD is associated with<sup>1</sup>:
  - ~8.4 excess sick days/year
  - 143.8 million lost days of productivity/year
- A review of 19 studies (1990-2011) revealed<sup>2</sup>:
  - Excess costs are ~3x higher for adults with ADHD compared to children with ADHD
  - Workplace productivity and income losses are the largest contributors to the economic burden of adult ADHD
    - \$87 billion to \$138 billion
    - Accounting for >70% to 80% of the overall costs in adults

1. de Graaf R, et al. *Occup Environ Med*. 2008;65:835-842; 2. Doshi JA, et al. *J Am Acad Child Adolesc Psychiatry*. 2012;51:990-1002.

## DSM-5: Adult ADHD

- DSM-5: ADHD symptoms present before age 12 years (DSM-IV: present before age 7 years)
- Domains of inattention and hyperactivity/impulsivity remain, with 9 symptoms in each category
- Lower symptom threshold for adults aged 17 years and older: at least 5 (for children, at least 6)
- ADHD was moved within the manual to the "Neurodevelopmental Disorders" chapter to reflect brain developmental correlates with ADHD
- "Subtypes" now termed "presentations"

American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, 5th ed. Arlington, VA: American Psychiatric Association; 2013.

## ADHD Presentations and Core Symptoms

Presentation	Criteria
Hyperactive/impulsive	If these symptoms but not symptoms of inattention have been shown since age 12 years
Predominantly inattentive	If symptoms of inattention but not of hyperactivity-impulsivity have been shown since age 12 years
Combined	If symptoms in both domains have been shown since age 12 years

Centers for Disease Control and Prevention. <http://www.cdc.gov/ncbddd/adhd/diagnosis.html>. Accessed October 18, 2013.

## Trajectory of ADHD from Childhood to Adulthood (Inattentive Symptoms)

Childhood Inattentive Symptoms	Adulthood Inattentive Symptoms
Difficulty sustaining attention in school and at home (homework, chores)	Difficulty sustaining attention on the job (meetings, paperwork)
Losing items	Procrastination, difficulty budgeting time
Appears not to listen	Inefficient, slow to get things done
Trouble with follow-through	Follow-through continues to be a problem
Difficulty with organization	Disorganized

Adler LA. *J Clin Psychiatry* 2004;65(suppl 3):8-11; American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, 4th Ed. (DSM-IV), Washington, D.C.: American Psychiatric Publishing, Inc. 1994.

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### Trajectory of ADHD from Childhood to Adulthood (Hyperactive/Impulsive Symptoms)

Childhood Hyperactive/Impulsive Symptoms	Adulthood Hyperactive/Impulsive Symptoms
Squirming, fidgeting, can't stay in seat	Can't sit through meetings
Can't wait turn, blurts out answers	Can't wait in line, interrupts others
Runs/climbs excessively, can't work or play quietly	Drives too fast, self-selects very active job
Intrudes, interrupts others	Makes inappropriate comments (no "mental filter")

Adler LA. *J Clin Psychiatry* 2004;65(suppl 3):8-11; American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, 4th Ed. (DSM-IV). Washington, D.C.: American Psychiatric Publishing, Inc. 1994.

### Presentation of Adults Inattentive vs. Hyperactive/Impulsive Symptoms

- Hyperactive symptoms often decline with age but inattentive symptoms do not decline substantially with age<sup>1</sup>

Symptom Type	% Affected
Inattentive	90
Hyperactive	~60

N = 149; p < .05

1. Biederman J, et al. *Am J Psychiatry* 2000;157:816-818.  
2. Millstein R, et al. *J Atten Disorders* 1999;2:159-166.

# Diagnosing AD/HD

### Beginning the Diagnostic Process Symptom Assessment Scales

EXAMPLES<sup>1</sup>

- Brown ADD Scale (available in adolescent and adult versions)
  - [www.drthomasebrown.com/assess\\_tools/brown\\_forms.html](http://www.drthomasebrown.com/assess_tools/brown_forms.html)
- Conners ADHD Rating Scales (available in adolescent and adult versions)
  - [www.mhs.com](http://www.mhs.com)
- Adult Self-Report Scale
  - 18-item [www.med.nyu.edu/psych/assets/adhdscreen18.pdf](http://www.med.nyu.edu/psych/assets/adhdscreen18.pdf)
  - 6-item version: good tool for ruling out the diagnosis in general client population [www.med.nyu.edu/psych/assets/adhdscreener.pdf](http://www.med.nyu.edu/psych/assets/adhdscreener.pdf)
- ADHD Module from the Mini-International Neuropsychiatric Interview (MINI)<sup>2</sup>
  - 1. Adler LA. *J Clin Psychiatry* 2004;65(suppl 3):8-11.
  - 2. Sheehan DV, et al. *J Clin Psychiatry* 1998;59(suppl 20):22-33.

### An Example of a "Symptom Assessment Scale"

- The Adult Self-Report Scale<sup>1</sup> (ASRS) is **predictive** but not diagnostic; often a good place to start the process<sup>2</sup>

1. ASRS World Health Organization. Available at: <http://www.med.nyu.edu/psych/assets/adhdscreener.pdf>.

2. Adler LA. *J Clin Psychiatry* 2004;65(suppl 3):8-11.

### The Clinical Interview

#### Reason for Presentation and Goals for Treatment:

- What is bringing you in today?
- Why now?
- Did someone recommend that you seek treatment? If so, who?
- How can we be helpful to you?

Young JL. *ADHD Grownup: Evaluation, diagnosis and treatment of adolescents and adults*. W.W. Norton, Ltd: London. 2007.

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## The Clinical Interview (continued)

### Timeline of Symptoms:

- When did these symptoms first appear?
- What were you like as a child, both in school and at home? (Report cards can be helpful here; look at grades and citizenship marks)
- Have the symptoms been chronic or episodic?
- How have these symptoms affected your functioning?

**A collaborative source can be very important; particularly for adolescent patients**

Young JL. ADHD Grownup: Evaluation, diagnosis and treatment of adolescents and adults. W.W. Norton, Ltd: London, 2007.

## The Clinical Interview (cont'd): Special Considerations

### • Medical Rule-Outs:

#### – Thyroid Disorders

- Hypothyroidism: may exhibit inattentive symptoms
- Hyperthyroidism: may exhibit hyperactivity and inattention, act impulsively

#### – Iron Deficiency Anemia

- Inattention
- Slowed cognitive processes

### • Symptom Overlap and Comorbidity

Young JL. ADHD Grownup: Evaluation, diagnosis and treatment of adolescents and adults. W.W. Norton, Ltd: London, 2007.

## The Clinical Interview (continued)

### • Family History

- Be sure to include patient's children in the history; the diagnosis is often made this way

### • Clinical Observations

- Does the patient have a hard time sitting still?
- Do the patient's thoughts quickly shift from one topic to another?
- Is the patient talking excessively?
- Does the patient often lose his train of thought?
- Is the patient late to the appointment or disorganized upon arrival?

Young JL. ADHD Grownup: Evaluation, diagnosis and treatment of adolescents and adults. W.W. Norton, Ltd: London, 2007.

## Symptoms Must be Present Across Multiple Domains

In order to meet diagnostic criteria for AD/HD, symptoms must be present across multiple domains<sup>1</sup>. For this reason, an AD/HD evaluation should assess for the impact of a patient's symptoms on his/her:

### Personal, Academic, and Professional life.

Treatment plans should be developed accordingly!

American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision. Washington, DC, American Psychiatric Association, 2000.

## The Impact of AD/HD

## Quality of Lifes Issue for ADHD Adults

ADHD symptoms may lead to<sup>1</sup>:

- Low self-esteem, frustration, hopelessness
- Depression, anxiety, fatigue
- Substance abuse (self-medication)

Impulse dyscontrol may lead to:

- Arguments, accidents, increased spending, legal difficulties, substance use<sup>2</sup>
- Disappointing their partner with forgetfulness, lack of follow-through<sup>2</sup>
- Divorce rates are higher (28% of those with ADHD have been divorced, compared to 15% of controls)<sup>3</sup>

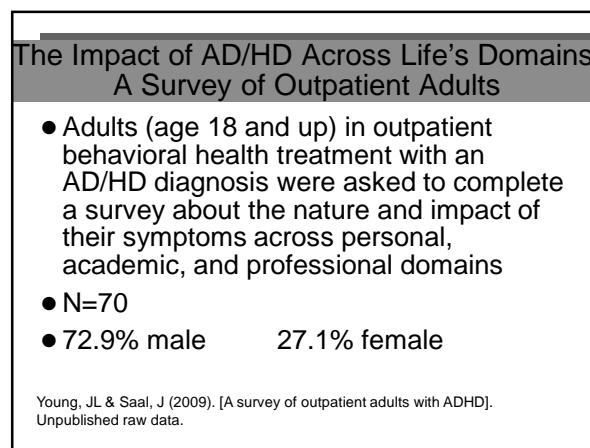
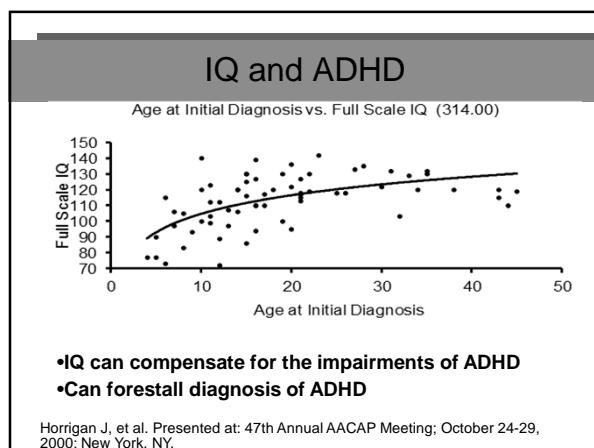
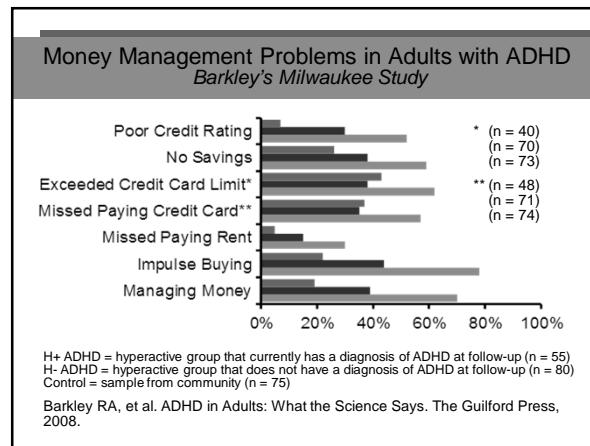
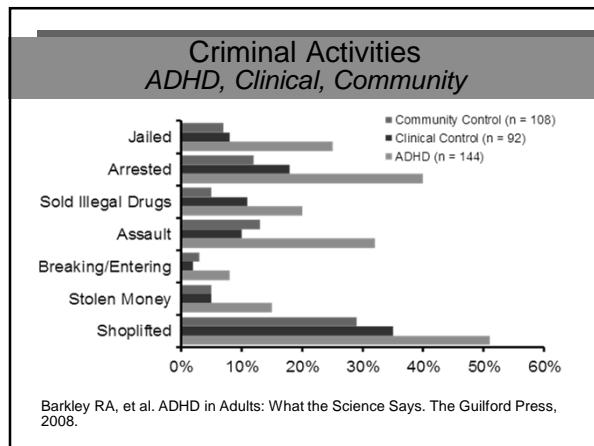
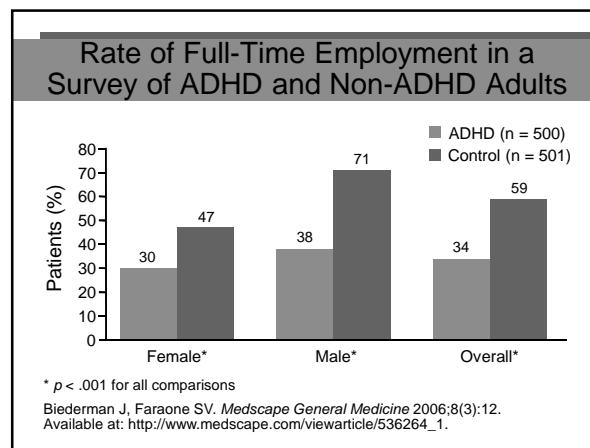
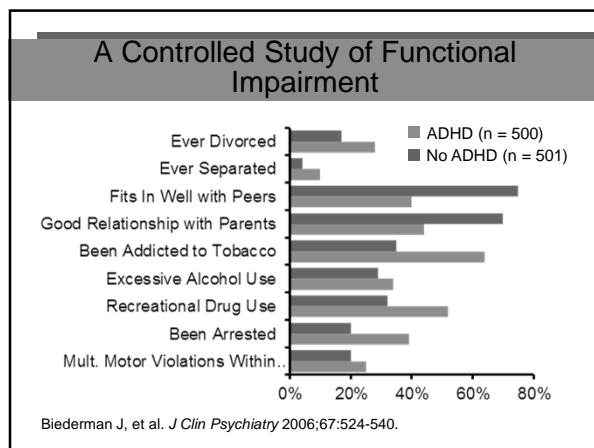
1. Young JL. ADHD Grownup: Evaluation, diagnosis and treatment of adolescents and adults. W.W. Norton, Ltd: London, 2007.

2. Weiss M, Murray C. *CMAJ* 2003;168:715-722.

3. Biederman J, et al. *J Clin Psychiatry* 2006;67:524-540.

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## Impact of ADHD on Personal Life

Participants were asked, *"How do you think your personal life would have been different if your AD/HD had been treated sooner?"*

- "Maybe used better judgment with birth control, not so impulsive. It would have saved me from numerous emotional issues with relationships and helped me to keep from destroying relationships through my behavior."
- "Better choice of spouse, and probably would not have gone through a divorce"
- "Friends wouldn't have had to repeat themselves, I wouldn't have seemed aloof or like I wasn't listening."
- "Probably would've stayed away from self-medicating with drugs and alcohol and promiscuity"

Young, JL & Saal, J (2009). [A survey of outpatient adults with ADHD]. Unpublished raw data.

## Impact of ADHD on Professional Life

Participants were asked, *"How do you think your professional life would have been different if your AD/HD had been treated sooner?"*

- "There would not have been as much 'job hopping' and would have been able to keep a job longer than 1.5 years!"
- "I think I would have avoided jobs that weren't a good fit for me. That would have saved me aggravation and frustration, plus feelings of failure. I know now what jobs aren't good for me, and I do work that has more flexibility and creativity attached to it"
- "I would have benefitted from knowing my limitations and seeking resources to help instead of feeling incompetent"

Young, JL & Saal, J (2009). [A survey of outpatient adults with ADHD]. Unpublished raw data.

## Conditions Commonly Comorbid with AD/HD

### Challenges in Differential Diagnosis of Adolescent and Adult ADHD (Symptom Overlap, continued)

#### ADHD-Related Frustration

- Frustrated by underperformance
- Symptoms are chronic
- Minimally relieved by antidepressants
- Often triggered by an event
- Amotivation

#### Depression

- Hopelessness, helplessness, suicidality
- Symptoms are episodic
- Generally responsive to antidepressants
- Onset can occur with or without a trigger
- Psychomotor retardation

Young JL. ADHD Grownup: Evaluation, diagnosis and treatment of adolescents and adults. W.W. Norton, Ltd: London. 2007.

### Challenges in Differential Diagnosis of Adolescent and Adult ADHD (Symptom Overlap)

#### Hyperactivity/Impulsivity

Similarities:

- Excessive talking
- "On the go"
- Often acts without thinking
- Racing thoughts
- Mood swings

Differences:

- Symptoms are chronic
- No psychosis present
- Mood swings are rapid and brief but not severe

Young JL. ADHD Grownup: Evaluation, diagnosis and treatment of adolescents and adults. W.W. Norton, Ltd: London. 2007.

#### Bipolar Mania

Similarities:

- Excessive talking
- "On the go"
- Often acts without thinking
- Racing thoughts
- Mood swings

Differences:

- Symptoms are episodic
- Typically accompanied by psychosis
- Mood swings last from days to weeks and can be severe

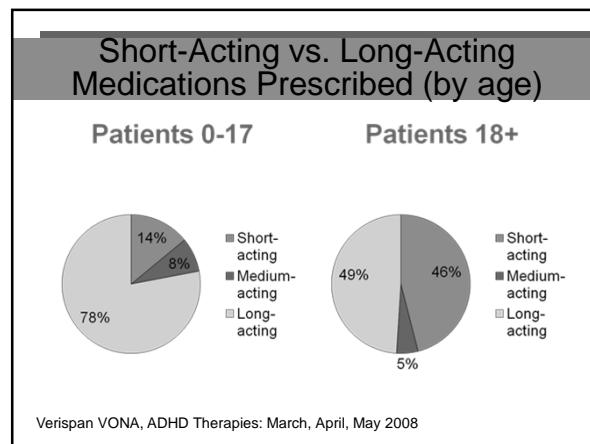
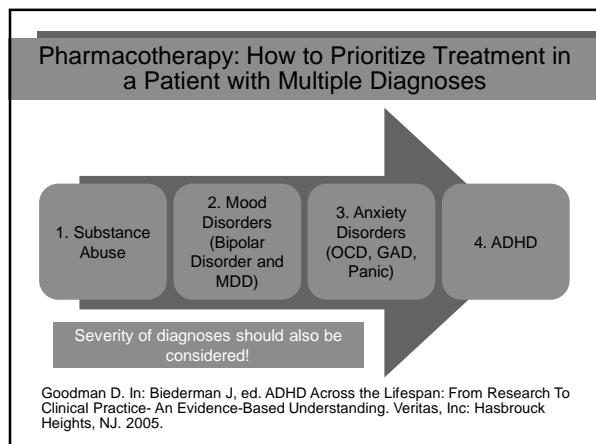
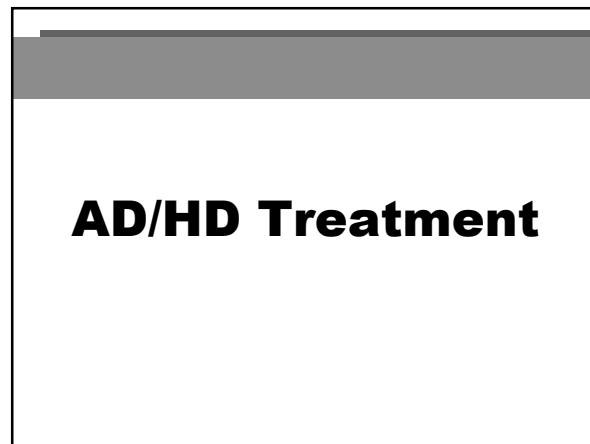
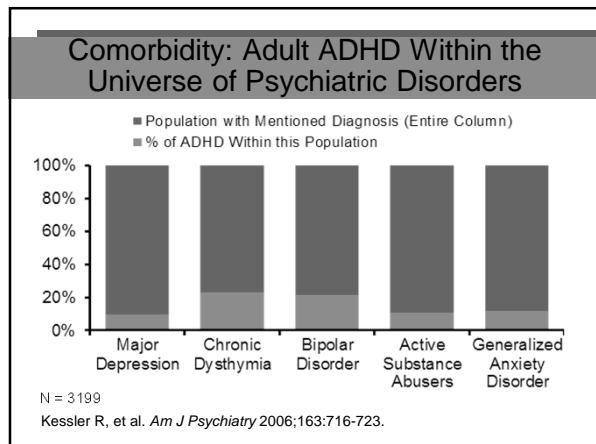
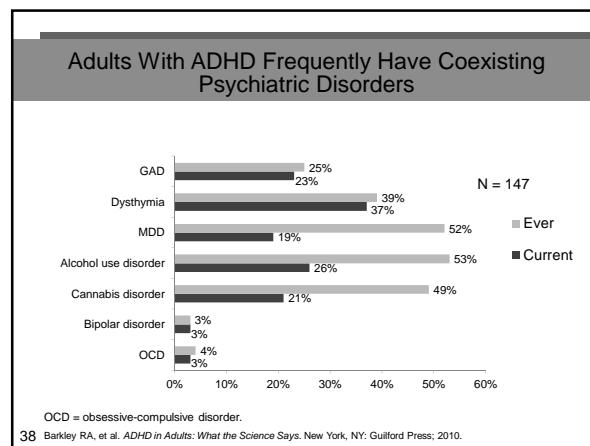
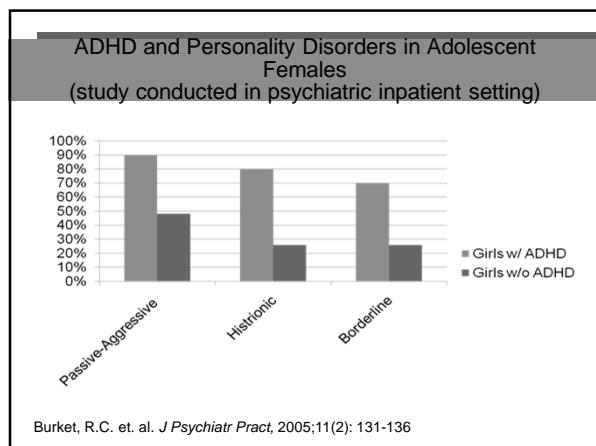
### Comorbidity in Adolescent ADHD: Axis I Disorders

- 45-50% of adolescents with ADHD also have a diagnosis of Conduct Disorder<sup>1</sup>
- 33.5% of adolescents with ADHD also struggle with 1 or more anxiety disorders (compared to 5% of adolescents without ADHD)<sup>2</sup>
- Risk of depression in individuals with ADHD increases from 29% in childhood to 45% in adolescence<sup>3</sup>

Young, JL. Adolescent Medicine .19 (2008) 216-228.

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### FDA-Approved Medications for Child, Adolescent and Adult ADHD

- Atomoxetine (Strattera)
- Dexmethylphenidate XR (Focalin XR)
- Mixed amphetamine salts XR (Adderall XR)
- Methylphenidate HCL (Concerta)
- Lisdexamfetamine (Vyvanse)
- Guanfacine (Intuniv)— indicated for individuals 6-17 years of age

### AD/HD Medications Not Specifically Approved for Adults)

- Short-Acting Mixed Amphetamine Salts (Adderall)
- Dextroamphetamine (Dexedrine, Dexedrine Spansules, Dextrostat)
- Short-Acting Methylphenidate (Methylin, Ritalin, Focalin)
- Methylphenidate Transdermal System (Daytrana)
- Methylphenidate Extended Release--Liquid Preparation (Quillivant XR)

### FDA-Approved Medications for ADHD: Dosing Guidelines

Note: No short-acting medication has been FDA-approved for adults with ADHD

Medication	Dosing			
	Child	Adolescent	Adult	US Trials (adult) Max. Dose
Atomoxetine (nonstimulant)	0.5 mg/kg (<70 kg) max 1.2 mg/kg (max 100 mg)		40 mg max 100 mg	120 mg
Dexmethylphenidate XR		5 mg max 20 mg	10 mg max 20 mg	40 mg
Lisdexamfetamine	30 mg max 70 mg	30 mg max 70 mg	30 mg max 70 mg	70 mg
Mixed amphetamine salts XR		10 mg max 30 mg	20 mg max-none	60 mg
OROS Methylphenidate HCl	18 mg max 54 mg	18 mg max 72 mg	18 or 36 mg max 72 mg	108 mg

FDA = Food and Drug Administration. Slide courtesy of David Goodman, MD.

### Why Long-Acting Agents Are Preferred

- Less than half of prescriptions for adult ADHD are for long-acting agents, but:
- ADHD affects all domains of functioning all day long—home, family, work, driving
- Improved symptom control with smoother delivery, longer duration of effect
- Improved adherence with long-acting agents

Cascade E, et al. *Psychiatry (Edgemont)*. 2008;5:24-27.

### Monitoring Adults Taking Stimulants and Atomoxetine

- Patients should be monitored for:
  - Cardiac symptoms
    - Patients should be evaluated for cardiac risk before beginning treatment
  - Blood pressure and pulse (routine monitoring)
  - Psychiatric adverse events
    - Stimulants and atomoxetine should be prescribed with caution in patients with preexisting psychosis (eg, bipolar disorder and suicidality)
  - Patients should be observed carefully for emergence of new symptoms of psychosis or changes in mood

Strattera (atomoxetine hydrochloride) [package insert]. Indianapolis, IN: Eli Lilly and Company; 2013. Adderall XR (mixed amphetamine salts) [package insert]. Wayne, PA: Shire US Inc.; 2013. Concerta (methylphenidate HCl XR) [package insert]. Titusville, NJ: Janssen Pharmaceuticals, Inc.; 2013. Focalin XR (dexmethylphenidate hydrochloride) [package insert]. East Hanover, NJ: Novartis Pharmaceuticals Corporation; 2013. Vyvanse (lisdexamfetamine dimesylate) [package insert]. Wayne, PA: Shire US, Inc.; 2013.

### Possible Side Effects of Stimulant Medications:

- Insomnia
- GI upset
- Decreased appetite
- Weight loss
- Headaches
- Dry mouth
- Constipation
- Hand tremors
- Jittery
- Some research has shown that side-effects may be more likely in stimulant-naïve patients<sup>1</sup>

<sup>1</sup>Goodman DW et al. (2005), CNS Spectrum 10(Suppl 20):26-34

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