2ND ANNUAL
CHAIRS IN PSYCHIATRY SUMMIT
The Master Class for Psychiatric Professional Development
ADHD: Child

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Learning Objective

Implement assessment tools for accurate diagnosis and develop an evidence-based treatment strategy to optimize the management of ADHD in children and adolescents.
Recognizing ADHD in Children and Adolescents

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Disclosures

- **Research/Grants:** None
- **Speakers Bureau:** None
- **Consultant:** None
- **Stockholder:** None
- **Other Financial Interest:** None
- **Advisory Board:** None
Learning Objective

Recognize the importance of early identification of symptoms for improved diagnosis and treatment of children and adolescents with ADHD
ADHD

- One of the most common psychiatric disorders of childhood
- A neurobiological disorder
- Results in significant impairment
- Most will continue to meet criteria during adolescence
- Frequently associated with comorbid disorders
Prevalence and Impact

- Common disorder, long-lasting
- 5–10% of children in United States
- 2.5x more frequently reported in males
- Disparities in access and treatment
- Cost of illness $36–52 billion
- More likely to have major injuries
- Greater risk for accidents

Core Symptoms

- Inattention
- Impulsivity
- Hyperactivity

ADHD Types

- ADHD Combined Type
- ADHD Predominantly Inattentive Type
- ADHD Predominantly Hyperactive/Impulsive Type
ADHD Core Symptoms

- Difficulty sustaining attention
- Does not seem to listen
- Makes careless mistakes
- Difficulty organizing tasks
- Easily distracted
- Often forgetful
- Often loses things
- Often does not follow through

- Difficulty playing quietly
- Fidgets, squirms
- Leaves seat
- Runs about
- Often “on the go”
- Often talks excessively
- Blurts out
- Often interrupts
- Can’t wait turn

ADHD Presentation During Adolescence

- Risky, impulsive behavior
  - Driving, drugs/alcohol, sex, risk-taking
- Gives up easily
- Difficulty organizing tasks, poor time management, and easily distracted
  - Email, IM/texting, jobs, sports
- Interrupts
- Fooling around behavior
- Annoys others
- Often in trouble, difficulty with authority

ADHD Diagnostic Criteria
DSM-IV-TR

- Usually appears early between 3–6 must have impairment before age 7
- Impairment in two or more settings
- Clinically significant impairment x 6 mos

- Must exclude other disorders
- 6 or more symptoms of inattention or
- 6 or more symptoms of hyperactivity or impulsivity

State-Based Prevalence of ADHD Diagnosis

Correlates of ADHD

- Low self-esteem
- Impaired peer relationships
- Lower academic achievement
- School failure
- Family difficulties
ADHD Assessment

Parent Interview
- ADHD symptoms
- Impairment
- Comorbidity
- Academic function
- Family history
- Medical and developmental history

Behavior Rating Scales
- Parent
- Teacher

Child Interview
- ADHD symptoms?
- Inconsistencies
- Mental status exam

Neuropsychological Testing
- Academic impairment
- Learning disabilities
- Executive function (optional)

Laboratory/Neurological Testing
- Only if strong evidence in medical history

Unremarkable medical history laboratory and neurological testing is not indicated

Psychological and neuropsychological are not mandatory

Neuroimaging a research tool

Behavior Rating Scales for ADHD Recommended

- Academic Performance Rating Scale
- ADHD Rating Scale IV
- Child Behavior Checklist
- Conners Parent Rating Scale
- Conners Teacher Rating Scale
- Conners Wells Adolescent Self Report Scale
- Vanderbilt ADHD Diagnostic Parent and Teacher Scales
Resources for Rating Scales

- National Resource Center on ADHD
  www.help4adhd.org
- American Academy of Pediatrics
  www.aap.org
- American Academy of Child and Adolescent Psychiatry
  www.aacap.org
- Bright Futures
  www.brightfutures.org
- www.adhd.net
ADHD and Comorbidity

- Look for comorbidities in patients with ADHD
- Offer appropriate treatment options for both ADHD and comorbidities
Common Comorbidities
Prevalence with ADHD

Disruptive Behavior Disorders
ODD, CD

ODD, 39.9%
CD, 14.3%

Mania/Hypomania
2.2%

33.5%
Anxiety Disorders

22%
Affective Disorder

ADHD is a common childhood disorder with negative impact on multiple areas of function.

High prevalence of continuation of disorder into adolescence with varying presentations.

Assessment and diagnosis requires multi-pronged approach.

Psychiatric comorbidities prevalent.
Intervention Strategies Are Effective
Treatment Strategies for Childhood ADHD

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- **Speakers Bureau:** None
- **Consultant:** AstraZeneca Pharmaceuticals LP
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Compare and contrast the current treatment options for ADHD and develop individualized management strategies for each patient.
Treatment Overview

- Why Treat It? Myths and Legends
- Mechanisms of Action
- Drug Delivery System
- Treatment Choices
- Optimizing Treatment—Sculpting
- Side Effects
- Concurrent Conditions
ADHD: Impact of Untreated & Under-Treated ADHD

Health Care System
- 50% ↑ in bike accidents¹
- 33% ↑ in ER visits²
- 2-4x more motor vehicle crashes³⁻⁵

School & Occupation
- 46% expelled⁶
- 35% drop out⁶
- Lower occupational status⁷

Society
- Substance use disorders:
  - 2x risk⁸
  - Earlier onset⁸
- Less likely to quit smoking in adulthood⁹

Family
- 3-5x ↑ parental divorce or separation¹⁰,¹¹
- 2-4x ↑ sibling fights¹²

Employer
- ↑ parental absenteeism¹³
  and ↓ productivity¹³

See supplemental bibliography for a complete list of references.
Concerns About Drug Abuse

- Stimulants are Schedule II and should be taken seriously and monitored closely
- You do not get sued less because you did not see the patient
- Addictive potential is based upon rapid onset (absorption) and euphoric effects
- Diversion—mostly for amateurs and college students
- Tactics to change schedule
  - Prodrug
  - Getting rid of the L isomer (early peak onset)
Odds Ratio = 6.3; $p < .001$
Synaptic Actions of ADHD Medications

- Blocks NE reuptake
- Some DA reuptake

- Blocks reuptake of DA and NE
- Increases recirculating pools

- Blocks reuptake of DA

<table>
<thead>
<tr>
<th>Atomoxetine</th>
<th>D-Amphetamine</th>
<th>Methylphenidate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blocks NE reuptake</td>
<td>Blocks reuptake of DA and NE</td>
<td>Blocks reuptake of DA</td>
</tr>
<tr>
<td>Some DA reuptake</td>
<td>Increases recirculating pools</td>
<td></td>
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Drug Delivery Systems

It’s Really What Differentiates the Meds

- Immediate-release

- Sustained-release
  - Beads (bid dosing in one capsule)
  - OROS (ascending profile—sipping studies)

- Methylphenidate transdermal patches

- Prodrug lisdexamfetamine dimesylate effective 13 hours post-dose
Effect Sizes for FDA-Approved ADHD Medications

$p < .05$ for stimulants vs. non-stimulants

# Recommended Medications for ADHD

<table>
<thead>
<tr>
<th>Medication*</th>
<th>Initial Dose</th>
<th>Usual Dose</th>
<th>Doses per Day</th>
<th>Side Effects</th>
<th>Contraindications</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Methylphenidate</em>†</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Ritalin, Methyl</td>
<td>5-10</td>
<td>10-20</td>
<td>2-3</td>
<td>Appetite suppression, stomachaches, headaches, irritability, weight loss, deceleration in rate of growth, exacerbation of psychosis, exacerbation of tics, mild increase in blood pressure and pulse</td>
<td>Marked anxiety, tension, agitation, glaucoma, use of monoamine oxidase inhibitors, seizures, tics</td>
</tr>
<tr>
<td>Concerta</td>
<td>18-27</td>
<td>27-54</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metadate ER, Metadate CD, Methylin ER</td>
<td>10</td>
<td>10-20</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ritalin LA</td>
<td>20</td>
<td>20-40</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focalin‡</td>
<td>2.5-5</td>
<td>2.5-10</td>
<td>2-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daytrana</td>
<td>10-30</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For each category the generic drug is given and dosing information for each named marketed drug.  
† The manufacturer states that seizures and tic disorder are contraindications; research supports the use of stimulants in children with seizures that have stabilized with the use of anticonvulsants and in children with tic disorder or Tourette’s disorder. With use of long-acting methylphenidate or dextroamphetamine product, a short-acting product may be added at 4 p.m. to 6 p.m. for homework or special activities; appetite and sleep onset are then carefully monitored.  
‡ Focalin is a dextro isomer of methylphenidate that is given at a lower level.
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<tr>
<td></td>
<td><em>mg</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dextroamphetamine</strong> (sulfate alone and in combination with amphetamine salts)†</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dexedrine</td>
<td>5</td>
<td>5-20</td>
<td>2-3</td>
<td>Appetite suppression, stomachaches, headaches, irritability, weight loss, possible growth inhibition, exacerbation of psychosis, exacerbation of tics, mild increase in blood pressure and pulse</td>
<td>Cardiovascular disease, hypertension, hyperthyroidism, glaucoma, drug dependence, use of monoamine oxidase inhibitors</td>
</tr>
<tr>
<td>Dexedrine Spansule</td>
<td>5-10</td>
<td>5-15</td>
<td>1-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adderall</td>
<td>5-10</td>
<td>5-30</td>
<td>1-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addreall XR</td>
<td>5-10</td>
<td>10-30</td>
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<tr>
<td>Lisdexamfetamine dimesylate (LDX)</td>
<td></td>
<td></td>
<td></td>
<td>Vomiting, nausea, dry mouth, upper abdominal pain, pyrexia, Insomnia, irritability, appetite suppression, irritability, weight loss, possible growth inhibition, exacerbation of psychosis, dizziness, somnolence, exacerbation of tics, mild increase in blood pressure and pulse</td>
<td>Advanced arteriosclerosis, symptomatic cardiovascular disease, moderate to severe hypertension, hyperthyroidism, known hypersensitivity or idiosyncratic reaction to sympathomimetic amines, glaucoma, history of drug abuse, use of monoamine oxidase inhibitors</td>
</tr>
</tbody>
</table>

> Vyvanse

 mg

<p>| | | | | | |</p>
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www.fda.gov
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</thead>
<tbody>
<tr>
<td>Atomoxetine&lt;sup&gt;f&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strattera</td>
<td>10-25 mg</td>
<td>18-60 mg</td>
<td>1</td>
<td>Appetite suppression, nausea, vomiting, fatigue, weight loss, deceleration in rate of growth, mild increase in blood pressure and pulse</td>
<td>Jaundice or other clinical or laboratory evidence of liver injury, use of monoamine oxidase inhibitors, narrow-angle glaucoma</td>
</tr>
<tr>
<td>Bupropion&lt;sup&gt;∫&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wellbutrin SR</td>
<td>100-150 mg</td>
<td>150 mg</td>
<td>1-2</td>
<td>Weight loss, insomnia, agitation, anxiety, dry mouth, seizures, others</td>
<td>Seizures, bulimia, anorexia nervosa, abrupt discontinuation of alcohol or benzodiazepines, use of monoamine oxidase inhibitors or other bupropion products (e.g., Zyban)</td>
</tr>
<tr>
<td>Wellbutrin XL</td>
<td>150 mg</td>
<td>150-300 mg</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For each category the generic drug is given and dosing information for each named marketed drug.

<sup>f</sup> Younger children may need two doses a day.

<sup>∫</sup> Bupropion has not been approved by the FDA for pediatric use. Only sustained release (twice daily) or extended release (once daily) are recommended for adolescents. There is a higher incidence of side effects with the immediate-release preparation.
The classroom controls were drawn from the same classroom cohorts as MTA children were originally, and were age- and gender-matched to assure comparability with MTA subjects. The “normalization” indicator was based on a composite of parent and teacher ratings, with the overall symptom cutoff required to be indicative of “little or no” symptoms).

Goals: Good coverage throughout the day (or when needed)

Avoid or fill excessive troughs

How do you know if this is the best they can be? Switches can improve or worsen

MPH vs. dAMPH

Optimal dosing—frequently we stop when they are better with little idea of what they could be

Other treatments
# Sculpting Solutions

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution 1</th>
<th>Solution 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of early morning efficacy</td>
<td>Add an IR dose to the XR</td>
<td>Possibly atomoxetine</td>
</tr>
<tr>
<td>Can not get ready in the a.m.</td>
<td>Take meds 1 hour before desired wake up time</td>
<td>Take an IR dose upon awakening</td>
</tr>
<tr>
<td>Does not last long enough</td>
<td>Add an IR dose later</td>
<td>Add a second XR dose or atomoxetine</td>
</tr>
<tr>
<td>Trouble settling for bed</td>
<td>Clonidine or guanfacine</td>
<td>HS dose of IR stimulant</td>
</tr>
<tr>
<td>Wakes up late on weekends</td>
<td>Consider a patch</td>
<td>Use IR instead</td>
</tr>
</tbody>
</table>
Side Effects

- GI distress
- Vomiting
- Nausea
- Dry mouth
- Irritability
- Tics
- Insomnia
- Affective lability
- Decreased appetite (anorexia)
- Increased pulse
- Increased blood pressure
Wear Off and Rebound

- Stimulants are “out” of the blood stream every day.
- Irritability and moodiness can occur as the meds are wearing off.
- Poor “settling” for bed is frequently a characteristic of patients with ADHD even before treatment—it becomes a focus when everything else is better.
- Alpha2 adrenergic agonists can improve this.
Non-Stimulants

- Atomoxetine
- Alpha2 adrenergic agonists
- Bupropion
- Tricyclic antidepressant
### ADHD Comorbidity

- Conduct disorder
- Oppositional defiant disorder
- Tic disorders
- Sleep problems: Failure to settle—accelerate at bedtime
- Depression
- Anxiety disorders
- Bipolar disorder
- Tourette’s disorder
- Learning disorders
Behavioral interventions should be considered at each step for disruptive behavior disorders.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Solution 1</th>
<th>Solution 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggression</td>
<td>Alpha2 adrenergic agonist</td>
<td>Antipsychotic or mood stabilizer</td>
</tr>
<tr>
<td>Anxiety disorder</td>
<td>Start low and go slow with stimulant</td>
<td>Treat the anxiety disorder or atomoxetine</td>
</tr>
<tr>
<td>Depression</td>
<td>Treat ADHD first, if still present SSRI</td>
<td>Consider bupropion</td>
</tr>
<tr>
<td>Tic disorder</td>
<td>Lower dose</td>
<td>Alpha2 adrenergic agonist</td>
</tr>
<tr>
<td>Bipolar disorder</td>
<td>Treat BPD first</td>
<td>Consider over stabilization</td>
</tr>
<tr>
<td>Learning disorder</td>
<td>Treat ADHD</td>
<td>Refer to learning specialist</td>
</tr>
<tr>
<td>Conduct/ODD</td>
<td>Treat ADHD</td>
<td>Consider Alpha2 agonist, antipsychotic later</td>
</tr>
</tbody>
</table>
Why Consider Non-Pharmacological Treatment for ADHD?

- Medication does not ameliorate existing skills deficits\(^1\)
  - Deficits in prosocial skills remain
  - Academic achievement does not improve
- Some children only partial responders\(^2\)
- Poor maintenance effects after withdrawal of medication\(^3\)
- No appreciable impact on long-term outcome\(^3\)

2. MTA Cooperative Group. *Arch Gen Psychiatry* 1999;56:1073-1086.
Why Consider Non-Pharmacological Treatment for ADHD?

- Patient preferences and satisfaction
- Some individuals unable to tolerate side effects of medications
- Added benefits of combining pharmacologic and psychosocial treatments\(^1,2,3\)
  - May improve broader outcomes
  - May be necessary for some individuals to achieve significant improvement
  - May lower the acute and lifetime dosages of medication

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2. MTA Cooperative Group. *Arch Gen Psychiatry* 1999;56:1073-1086.
Summary

- Individualize treatment strategies for each patient based on safety, efficacy, and tolerability of treatment options
- Drug delivery systems matter
- Sculpting is an important option for optimizing treatment
- Consider comorbid psychiatric disorders in management strategy
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Supplemental Bibliography for:

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