Topic: Attention Deficit Hyperactivity Disorder (ADHD): Evaluation/management

Learning Objectives:

At the end of this session, residents will be able to:

1. Outline the essential elements of a DSM-based evaluation for ADHD
2. Apply current management guidelines including the use of medication and behavioral interventions
3. Compare the efficacy of the most commonly used stimulant medications used for treatment of ADHD
4. List the co-morbidities associated with ADHD
5. Describe the appropriate timing for scheduling follow up visits for children prescribed ADHD medication
Case:

JK is a seven year-old boy who came to your office with his mother for his annual well child exam. His mother’s only concern is his poor grades in school. JK’s schoolwork has declined in the second grade when the work became more challenging. At the fall parent-teacher conference, the teacher mentioned that JK has been fidgeting a lot in his seat, impulsively blurting out answers, and has trouble paying attention to the teacher’s instructions.

At home, JK is very active and loves sports. His mother notes that he has trouble sitting still to do his homework, but can sit for hours when he plays videogames.

In the office today JK is cooperative but very talkative, and he frequently interrupts his mother. He climbs up and down from the exam table several times and fidgets with the instruments. His vital signs, including pulse and blood pressure, are normal, with his weight and height 50th percentile on stable curves. His physical exam is normal.

JK’s mother asks you if her son has “ADD,” a concern that his teacher had raised - or is he just “lazy” and in need of stricter discipline at school?

Question 1: How often is ADHD encountered in the primary care pediatric office? How do children with ADHD typically present?

School aged children present to primary care pediatricians with a variety of developmental and behavioral concerns. Pediatricians recognize behavioral problems that may impact academic performance in up to 18% of their school aged patients.

- Hyperactivity or inattention is diagnosed in 7-9% of school aged children.
- 2-8% of young adults self-report ADHD symptoms.
- There is a strong genetic association: a five times greater risk if a first-degree relative has ADHD.
- Male:female ratios are 3:1; girls are more likely to have the inattentive subtype.

Evidence supports that the principal etiology is genetic. Neuropsychological studies show deficits in executive functions like response inhibition, vigilance and working memory. Other factors contribute to the diagnosis of ADHD: prenatal stresses, LBW, maternal smoking in pregnancy and early deprivation.

The presentation of ADHD in the office may vary. For example,

- Children with core ADHD symptoms of hyperactivity and impulsivity will often be identified by the teacher due to discipline problems.
- Children with the inattentive type of ADHD may present with school underachievement.
Children with poor social relationships and low self esteem may raise parent concerns.

Question 2: Describe the 3 subtypes of ADHD and the diagnostic criteria which support each different subtype.

On May of 2013 the Diagnostic and Statistical Manual of Mental Disorder Fifth Edition DSM-5 was published. Few minor changes were made to the DSM-IV Criteria for ADHD.

The diagnostic and treatment recommendations of this module are derived from the DSM-based AAP clinical practice guidelines for ADHD (see References.)

Pediatric providers should use the DSM-5 criteria for Attention Deficit disorders. Use of these criteria will help ensure more accurate diagnosis and decrease the variability in how the diagnosis of ADHD is made.

DSM-5 requires that a person meets criteria for A, B, C, D, and E below:

<table>
<thead>
<tr>
<th>Criterion A: A persistent pattern of 1 (inattention) and/or 2 (hyperactivity-impulsivity) that interferes with functioning or development:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Six or more of the following symptoms of inattention have persisted for at least six months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities. Note: The symptoms are not solely a manifestation of oppositional behavior, defiance, hostility or failure to understand instructions. For older adolescents and adults (age 17 and older) at least five symptoms are required. Inattention</td>
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<tr>
<td>✓ Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities</td>
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<td>✓ Often has difficulty sustaining attention in tasks or play activities</td>
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<td>✓ Often does not seem to listen when spoken to directly</td>
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<td>✓ Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace</td>
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<tr>
<td>✓ Often has difficulty organizing tasks and activities</td>
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<tr>
<td>✓ Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as homework)</td>
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<tr>
<td>✓ Often loses things necessary for tasks or activities (toys, school assignments, pencils, books, or tools)</td>
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<tr>
<td>✓ Is often easily distracted by extraneous stimuli</td>
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</table>
✓ Is often forgetful in daily activities

2. Six or more of the following symptoms of **hyperactivity-impulsivity** have persisted for at least six months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities:

   Note: The symptoms are not solely a manifestation of oppositional behavior, defiance, hostility or failure to understand instructions. For older adolescents and adults (age 17 and older) at least five symptoms are required.

   **Hyperactivity**
   - ✓ Often fidgets with hands or feet or squirms in seat
   - ✓ Often leaves seat in classroom or in other situations in which remaining seated is expected
   - ✓ Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
   - ✓ Often has difficulty playing or engaging in leisure activities quietly
   - ✓ Is often "on the go" or often acts as if "driven by a motor"
   - ✓ Often talks excessively

   **Impulsivity**
   - ✓ Often blurts out answers before questions have been completed
   - ✓ Often has difficulty awaiting turn
   - ✓ Often interrupts or intrudes on others (such as butting into conversations or games)

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<th>Criterion B</th>
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<td>Several hyperactive, impulsive, or inattentive symptoms that caused impairment were <strong>present before age 12 years</strong></td>
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<th>Criterion C</th>
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<td>Several impairment from the symptoms is present in <strong>two or more settings</strong> (such as in school or work and at home)</td>
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| Criterion D |
There must be clear evidence that the symptoms **interfere with, or reduce the quality of, social, academic, or occupational functioning**

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<th>Criterion E</th>
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<td>The symptoms do not occur exclusively during the course of schizophrenia, or another psychotic disorder and are <strong>not better explained by another mental disorder</strong> (such as a mood, anxiety, dissociative, or personality disorders or substance intoxication or withdrawal)</td>
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**There are three ADHD subtypes using DSM-5 criteria**

1. ADHD, predominantly inattentive type: Meets inattention criteria (section A1) for the past 6 months but it does not meet hyperactive-impulsive criteria (section A2) for the past 6 months

2. ADHD, predominantly hyperactive-impulsive type: Meets hyperactive-impulsive criteria (section A2) for the past 6 months but it does not meet inattention criteria (section A1) for the past 6 months

3. ADHD, combined type: Meets criteria for section A1 and section A2 for the past 6 months

**Under the DSM-5, similar diagnoses which are no longer considered ADHD subtypes include:**

Other Specified Attention Deficient Hyperactivity Disorder AND Unspecified Attention Deficient Hyperactivity Disorder: Symptoms of inattention or hyperactivity-impulsivity that cause clinically significant distress or impairment in social, occupational or other important areas of functioning but do not meet the full criteria for ADHD.

**Other diagnostic requirements:**

- **Evidence of functional impairment:**
  If a child meets diagnostic criteria for the behavioral symptoms of ADHD but does not demonstrate functional impairment, then he does not meet the diagnostic criteria for ADHD. Functional impairment is the effect the core and associated symptoms of ADHD have on academic achievement, classroom performance, family and social relationships, independent functioning, self-esteem, leisure activities and self care tasks. Symptoms have to be maladaptive and inconsistent with developmental level.
• **Setting:** The symptoms must be present in 2 or more settings, one of which involves active learning (home/school/preschool)

• **Age:** The symptoms must be present by age 12 (used to be age 7 prior to the 2011 AAP Guidelines and the DSM-5.)

• **Duration of symptoms:** longer than 6 months

**Question 3: How should the general pediatrician begin to evaluate a patient for ADHD?**

Screening for ADHD symptoms should be part of every patient’s educational review and mental health assessments.

• Review with parents for any signs of hyperactivity, inattention or impulsivity.

• Look for the presence of impaired functioning in educational and the social realms.

Assessment for ADHD should then include

• **Medical history:** A careful review of the medical history including birth history, developmental history and presence of any chronic medical conditions.

• **Family/social history:** Then a thorough family/social history should be explored asking specifically if ADHD or other mental health disorders are present in the family.

• **Behavioral history:** An in-depth behavioral history should be taken paying particular attention to the presence of symptoms, duration, severity and frequency. Parents should complete behavior rating scales such as the Conner’s Questionnaires or the NICHQ Vanderbilt Assessment Scales.

Information should be obtained from the child’s school/after school activities including Individualized Educational Plans (IEP’s), report cards and similar behavior rating scales.

**Question 4: What tools are available to aid you in making a diagnosis of ADHD?**

Currently there are no biological markers or computerized tests that can accurately identify individuals with ADHD.

Diagnosis of ADHD comes from a compilation of reports from parents, other caregivers, schools, any involved mental health professionals, and an interview and examination of the child.
**ADHD-specific rating scales** are used to gather reports from various observers. These scales can accurately distinguish between children with and without ADHD. These scales are the

- Conners Questionnaires (Parent, Teacher and Adolescent Questionnaires)  
  (Example from 2004 of a Conners Parent Questionnaire)
- NICHQ (National Initiative for Children’s Health Care Quality) Vanderbilt Assessment Scales which are recommended by the American Academy of Pediatrics.
  - Parent Informant Scale
  - Teacher Informant Scale
  - Follow-up Parent Informant Scale
  - Follow-up Teacher Informant Scale
  - Scoring instructions

In contrast, global nonspecific questionnaires and rating scales that assess a variety of behavioral conditions do not identify children with ADHD and, therefore, are **NOT** recommended in the diagnosis of children with ADHD.

In 2001, the AAP and the NICHQ updated their 2002 toolkit developed to assist clinicians in providing quality care for children with ADHD. This toolkit is rooted in the evidence-based AAP guidelines for the diagnosis and treatment of children with ADHD. It contains:

- Tools for diagnosis and management
- Parent information and support materials
- Resources for coding and documentation
- Glossary of ADHD resources available on the internet.

**Case (continued):**

You discuss with JK’s mother the symptoms of ADHD and the importance of diagnosis and treatment when functional impairment is present. In an attempt to support your initial impression that JK’s school difficulties may be secondary to ADHD, you give his mother copies of the Vanderbilt Assessment Scales. You ask her to complete a Parent Informant form. You also ask that she have JK’s teachers complete the Vanderbilt Teacher Informant forms. Then you arrange to see JK and his mother back within four weeks to discuss the results of the Vanderbilt assessments and develop a management plan if the diagnosis of ADHD is made.
Two weeks later:
JK and his mother return with their parent and teacher Vanderbilt assessments and you score them during this office visit. Click to open the links below and score the Parent and Teacher Vanderbilt forms according to the instructions.

JK’s PARENT Informant Vanderbilt - Initial

JK’s TEACHER Informant - Initial

Vanderbilt Scoring Instructions

**Question 5: What is your diagnosis? What would you recommend next as part of your management plan for a child with the diagnosis of ADHD?**

The parent and teacher assessments support the diagnosis of ADHD-Combined type with no evidence of any co-morbidities at the present time.

Since JK’s medical history was unremarkable, no laboratory or neurologic testing is indicated. However, if JK’s low school performance suggests low achievement or general cognitive abilities, consider a multidisciplinary team evaluation to assess his academic skill level and/or consider a learning disability.

If there had been a co-morbid mental health diagnosis suggested by screening, then appropriate referrals should be made to a mental health professional.

**Question 6: What are the elements of a comprehensive management plan?**

Once the diagnosis of ADHD is made, a well thought-out, comprehensive treatment plan should be developed. Treatment should be multimodal including behavioral management plans for the parents and family, school interventions and medications.

The child/teen and family need education regarding this chronic disorder as well as counseling and support. Behavioral interventions can include behavioral therapy, social skills training or psychotherapy for the child. Parents may want to participate in parent skills training, support groups, or family therapy.

Behavioral therapy is the first line of treatment in children 4 to 6 years of age. If a child in this age group fails to respond to behavioral therapy, then psychostimulant medications are recommended.
Case (continued):

JK’s mother informs you that his teachers have requested that JK be placed on medication because his behavior continues to disrupt the classroom. However, his mother is reluctant to treat JK with medication because she believes that he will become “addicted” to it.

Question 7: How can you explain the patho-physiology of ADHD to JK’s mother? What evidence can you discuss with her to help her understand the value of a trial of stimulant medications?

In everyday language, you explain the pathophysiology of ADHD:

Computer images of brain structure in a child with ADHD reveals smaller basal ganglia ("parts of the brain which control routine behaviors") and reduced frontal lobe activity ("brain activity involved in planning, organizing, impulse control and limiting the response from sensory stimuli, such as sights and sounds:).

The neurotransmitter ("brain chemical") dopamine may also have a role in ADHD symptoms, with low levels causing three primary symptoms of inattention, impulsivity and hyperactivity.

Stimulant medications increase dopamine as well as other neurotransmitters (epinephrine and serotonin) suggesting there is a complex interaction with these neurotransmitters.

Evidence supporting the role of stimulant medication

Most of our evidence for treatment efficacies comes out of the Multimodal Treatment study of children with ADHD (MTA) and the Canadian CCOHTA study. In the MTA study, 579 school-aged children, including children in Pittsburgh, were randomized to 4 treatment groups: “medication management alone”, “medication plus behavior management”, “behavior management alone”, and a standard community care group.

Children in the “medication alone” and the “medication plus behavioral management” groups showed a marked reduction in their core ADHD symptoms. These two approaches were essentially equivalent and both were superior to the other two groups (“behavior management alone” and standard care). These study findings support the essential role of pharmacological management of ADHD.

Furthermore, there is no evidence to support concern about addiction to stimulant medication. Children may abruptly discontinue stimulant use with no ill effects, other than a return to baseline behavior problems; no weaning is necessary.
Question 8: Which medication will you recommend and at what dose? What are the important side effects to review with the family?

Psychostimulant medications have been the first-line medical therapy for ADHD for many years for children older than 6 years of age.

70-80% of individuals with ADHD respond favorably to this class of drugs.

Psychostimulant medications are also recommended in children 4 to 6 years of age who have failed behavioral treatment. For this age group, it is recommended to start with short-acting medications and low doses. There is only 1 multicenter study on pre-school children on stimulant medications. In this study the participating children had moderate to severe dysfunction. A number of children improved with behavior therapy alone (mostly parenting classes). The use of methylphenidate in this age group remains off-label.

Common psychostimulant medications used in the treatment of ADHD include:

- Methylphenidate (Ritalin, Concerta, Metadate, Focalin)
- Dextroamphetamine (Dexadrine, Dextrostat)
- Mixed salts of a single-entity amphetamine product (Adderall, Adderall XR)

All of these preparations are available in short, intermediate or long-acting preparations. There are several guides to assist in your decision of the appropriate medication for your patients.

- Stimulant Medication Management Information Sheet from the AAP toolkit
- Medications approved by the FDA for ADHD (from the 2007 AACAP practice parameter)

Guidelines for initiating stimulant medication:

Choice and dosages

- Stimulant dosages are not weight-dependent; clinicians should begin at a low dose and titrate upward until no further improvement is seen in functioning and/or adverse effects are observed.
• If one stimulant does not work at the highest feasible dose, another recommended stimulant should be tried. There is evidence that most children who fail to respond to one medication will have a positive response to an alternative one.

• The effect of the medication is seen within 30 to 60 minutes of taking the medication. To assess the impact of the medication in improving the child’s behavior, it is recommended that Vanderbilt surveys are completed within two weeks of starting the treatment.

• If there is a lack of response to all available medications, then the pediatric provider needs to assess the accuracy of the diagnosis and the possibility of undiagnosed coexisting conditions. Referral for behavior therapy may be indicated.

• Medications not approved by the FDA may be indicated in the treatment of ADHD but most providers will refer to psychiatry for this type of medication management.

**Contraindications and side effects**

• Contraindications for stimulant use include use of MAO inhibitors within 14 days, glaucoma, symptomatic cardiovascular disease, and moderate to severe hypertension.

• Stimulants are generally considered safe, but side effects can occur early in treatment and are typically short-lived. Most common side effects are:
  - decreased appetite
  - stomachache or headache
  - delayed sleep onset
  - jitteriness
  - social withdrawal or emotional lability
  - poor weight gain
  - increased pulse or blood pressure

Some of these symptoms can be managed by adjusting the dose or schedule of medication.

• Occasionally, tics may be exacerbated, but tics are not an absolute contraindication to stimulant use.

• Behavioral rebound (worsening behavior seen often in the late afternoon as stimulant levels are dropping) is reported clinically, but can be easily managed by using a sustained release medication or adding a small late-afternoon dose.

• Stimulants are also contraindicated in children with major mental illness like bipolar disease or psychosis. Glaucoma, seizure disorders and use of MAO inhibitors are also a contraindication for stimulant use. When given continuously
(7 days per week), occasionally a slowdown in linear growth and or weight loss can be seen and may warrant a drug holiday or discontinuing the medication

Pricing: US

**Capsule ER 24 Hour Therapy Pack (Aptensio XR Oral)**

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**Capsule ER 24 Hour Therapy Pack (Methylphenidate HCl ER (LA) Oral)**

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**Capsule ER 24 Hour Therapy Pack (Ritalin LA Oral)**

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**Capsule, controlled release (Metadate CD Oral)**

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**Capsule, controlled release** (Methylphenidate HCl ER (CD) Oral)

- 10 mg (100): $560.21
- 20 mg (100): $560.21
- 30 mg (100): $560.21
- 40 mg (100): $711.52
- 50 mg (100): $944.19
- 60 mg (100): $944.19

**Chewable** (Methylin Oral)

- 2.5 mg (100): $351.16
- 5 mg (100): $501.60
- 10 mg (100): $715.09

**Chewable** (Methylphenidate HCl Oral)

- 2.5 mg (100): $315.65
- 5 mg (100): $450.90
- 10 mg (100): $642.80

**Patch** (Daytrana Transdermal)

- 10 mg/9 hrs (30): $330.98
- 15 mg/9 hrs (30): $330.98
- 20 mg/9 hrs (30): $330.98
- 30 mg/9 hrs (30): $330.98

**Solution** (Methylin Oral)

- 5 mg/5 mL (500 mL): $502.01
- 10 mg/5 mL (500 mL): $715.67

**Solution** (Methylphenidate HCl Oral)

- 5 mg/5 mL (500 mL): $451.61
- 10 mg/5 mL (500 mL): $643.82
**Suspension (reconstituted)** (Quillivant XR Oral)
25 mg/5 mL (120 mL): $245.42

**Tablet, controlled release** (Concerta Oral)
- 18 mg (100): $1002.71
- 27 mg (100): $1027.85
- 36 mg (100): $1060.21
- 54 mg (100): $1153.62

**Tablet, controlled release** (Metadate ER Oral)
- 20 mg (100): $216.73

**Tablet, controlled release** (Methylphenidate HCl ER Oral)
- 10 mg (100): $750.00
- 18 mg (100): $622.18
- 20 mg (100): $775.00
- 27 mg (100): $637.78
- 36 mg (100): $657.86
- 54 mg (100): $715.83

**Tablets** (Methylphenidate HCl Oral)
- 5 mg (100): $73.90
- 10 mg (100): $105.30
- 20 mg (100): $151.25

**Tablets** (Ritalin Oral)
- 5 mg (100): $78.83
- 10 mg (100): $112.38
- 20 mg (100): $161.59

**Disclaimer**: The pricing data provide a representative AWP and/or AAWP price from a single manufacturer of the brand and/or generic product, respectively. The pricing data should be used for benchmarking purposes only, and as such should not be used to set or adjudicate any prices for reimbursement or purchasing functions. Pricing data is updated monthly.
Assessing efficacy

- Objective and accurate feedback needs to be obtained in all the child’s domains to provide the best feedback about the medication efficacy. (i.e. the Vanderbilt follow-up forms from the ADHD Toolkit)

Case (continued):

JK’s mother brought in an advertisement for Strattera and asks you why you are not suggesting this reportedly safer and effective drug.

Question 9: Discuss other medications and formulations available for the treatment of ADHD.

1. Strattera (atomoxetine) was approved by the FDA in November 2002. It has become popular in the general public secondary to an aggressive marketing campaign and because it is not a stimulant.

Pros:

- Strattera alleviates inattention and hyperactivity/impulsivity symptoms by blocking the reuptake of norepinephrine. As a result, the concentration of norepinephrine in the posterior brain attentional system is increased.
- Dosages should begin at 0.5 mg/kg/day and gradually increased weekly or every two weeks to a dosage maximum of 1.2-1.8 mg/kg/day. Once-daily dosing is most commonly used but can be split in two daily doses especially if GI upset or sedation is a side effect.
- It may take 3-4 weeks to see maximal effects, but has a lower incidence of side effects than stimulants (appetite and sleep disturbance).
- Because it is not a stimulant, the stringent prescribing regulations for controlled substances do not apply.

Cons:

- Reports regarding liver toxicity has prompted the FDA to distribute a consumer warning to screen for symptoms of liver disease (abdominal pain, jaundice, weight loss) when children are on long-term treatment.
- FDA also issued a warning about suicidal thoughts in children taking Strattera, especially during the initial titration phase.
- Children still need to be monitored for side effects such as increased diastolic blood pressure and heart rate.
Due to its high cost, some insurance companies require that both methylphenidate and amphetamine classes have been tried and failed before they will cover this medication. It is not considered first line therapy.

Comparison to stimulants
- There have been nine randomized trials comparing methylphenidate and atomoxetine, with a total of 2762 participants included. A meta-analysis of these studies did not find a significant difference in efficacy between methylphenidate and atomoxetine. (Hanwella et al. *BMC Psychiatry*. 2011 11:176)
- The 2011 AAP Guidelines mention that atomoxetine has lower effect size of 0.7 compared to stimulants.

2. Daytrana Patch
- Methylphenidate in a transdermal form.
- 10, 15, 20, and 30 mg patches.
- Approved for children 6-12 years age.
- Recommended to apply 2 hours before expected effects.
- Remove after 9 hours maximum; effects last another 2 hours.
- Useful in children who refuse oral meds or when parents want to control when the med effect is over (i.e., improve evening appetite or sleep onset).

3. Focalin
- Racemic form of methylphenidate.
- 6 hour duration of action so needs BID dosage; Focalin XR now available with 50% immediate release and 50% delayed release.
- Fewer side effects reported.
- In many cases for insurance coverage, need to have demonstrated at least two other stimulant failures.

4. Vyvanse (lisdexamfetamine dimesylate)
- Stimulant prodrug: administered in an inactive form then metabolized in vivo into the active compound. It is designed for better bioavailability.
- Side effect similar to stimulants.

5. Alpha agonists (Clonidine and Guanfacine)
- Often prescribed to treat side effects such as tics, insomnia or aggressive behaviors
- Usefulness is limited to adjunctive therapy rather than primary treatment.
• Need for taper-off over 1-2 weeks to avoid sudden increase in BP.

Click here to view the FDA Approved Medications for the treatment of Attention-Deficit Hyperactivity Disorder. (source unknown)

Question 10: What are the warnings that have been issued for stimulants

All children need to be monitored for treatment of emergent side effects (see previous Question 7 and Question 12). Warnings have been issued by the FDA to monitor for cardiovascular issues.

• No evidence for a routine CV evaluation in healthy individuals.
• Stimulant contraindicated for children with preexisting heart disease or symptoms suggestive of significant cardiac disease (palpitations, fainting, and family history of sudden death).
• Refer for cardiac evaluation if preexisting conditions or symptoms.
• Monitor pulse and BP especially if prescribing alpha agonists.

Click here to view “Treatment, Safety Considerations, and Management Strategies for ADHD Medications,” a complete listing of safety and management strategies.

Question 11: Are there any other treatment modalities you should discuss at this time with the family?

Behavior therapy can be implemented after training parents and teachers in specific techniques of improving behaviors. These techniques include:

• Positive reinforcement (praise, reward for desired behaviors)
• Time-out (interrupting the undesired behavior; calmly removing the child from action or setting)
• Token economy (combining rewards and consequences—e.g., a child can earn stars for completing assignments and lose stars for getting out of his seat. At the end of the week, the child cashes in the sum of the stars for a prize)
• Response-cost (withdrawing privileges or rewards because of unwanted behaviors)

Parent training typically begins with 8-12 weekly group sessions with a trained therapist. Expectations for appropriate behavior should be clearly explained to the child. Complex tasks should be broken down into smaller steps. Written reminders can be used to keep the child focused on the tasks at hand. Classroom management can also include a periodic (or daily) report card to report a child’s progress towards goals (see example.)
From the 2011 *Caring for Children with ADHD: A Resource Toolkit for Clinicians, 2nd Edition*, (NICHQ ADHD toolkit) see:

- Click here to view How to Establish a School-Home Daily Report Card (restricted © material AAP/NICHQ)
- Click here to view For Parents of Children With ADHD (restricted © material AAP/NICHQ)

The NICHQ ADHD toolkit also includes:
- examples of excellent management plans that should be used by clinicians and families to outline desired goals both at home and school,
- medication specifics with attention to worrisome side effects,
- any plans for further evaluations,
- additional resources and treatment strategies indicated, and
- the next follow-up visit date.

**Question 12:** How will you address warning statements required by the FDA about serious cardiovascular events and concerns of the parents to this respect?

**Sudden death**

“Sudden death has been reported in association with CNS stimulant treatment at usual doses in children and adolescents with structural cardiac abnormalities or other serious heart problems. Although some serious heart problems alone carry an increased risk of sudden death, stimulant products generally should NOT be used in children or adolescents with known serious structural cardiac abnormalities, cardiomyopathy, serious heart rhythm abnormalities, or other serious cardiac problems that may place them at increased vulnerability to the sympathomimetic effects of a stimulant drug.”

(From: GlaxoSmithKline Important Prescribing Information to Health Care Professionals letter 2/4/2006 posted as a [FDA Safety Alert](https://www.fda.gov/Drugs/InformationOnDrugs/ucm127079.htm).)

**Hypertension and Other Cardiovascular Conditions**

“Stimulant medications cause a modest increase in average blood pressure (about 3-4 mmHg) and average heart rate (about 1-2 bpm), and individuals may have larger increases. While the mean changes alone would not be expected to have short-term consequences, all patients should be monitored for larger changes in heart rate and blood pressure. Caution is indicated in treating patients whose underlying medical conditions might be compromised by increases in blood pressure or heart rate, e.g., those with pre-existing hypertension, heart failure, recent myocardial infarction, or
ventricular arrhythmia.” (Warning From Novartis Pharmaceuticals Corporation, rev 06-2012, posted as a FDA Safety Alert)

Assessing Cardiovascular Status in Patients Being Treated with Stimulant Medications

“Children, adolescents, or adults who are being considered for treatment with stimulant medications should have a careful history (including assessment for a family history of sudden death or ventricular arrhythmia) and physical exam to assess for the presence of cardiac disease, and should receive further cardiac evaluation if findings suggest such disease (e.g., EKG, echocardiogram). Patients who develop symptoms such as exertional chest pain, unexplained syncope, or other symptoms suggestive of cardiac disease during stimulant treatment should undergo a prompt cardiac evaluation.”


Also see:

- 2008 AAP Policy Statement on Cardiovascular Monitoring & Stimulant Drugs for ADHD
- 2008 AHA Scientific Statement on Cardiovascular Monitoring of Children & Adolescents with Heart Disease Receiving Medications for ADHD

The Childrens Hospital of Pittsburgh Primary Care Centers use a tool for screening children for heart disease: Click here to view the AHA Guidelines: Screening for Pediatric Heart Disease. Check to see the tools that are used in your setting.

Question 13. How soon will you see JK back for a follow-up visit? What will you monitor at JK’s return visit?

Providing close follow-up both to monitor for adverse effects and efficacy of prescribed medication, as well as to assess progress in achieving behavioral goals is key to quality ADHD management.

Periodic monitoring can be achieved through office visits, written reports and phone calls. Consider using a daily report card both at home and school to monitor behavior.

Initially, office visits are needed every 2-4 weeks to monitor:

- Appetite
- Growth (height, weight)
- Vital signs (blood pressure, pulse)
• Sleep habits
• Mood
• Presence of other side effects (i.e., tics)

Once a child is stable (without intolerable side effects and meeting the target outcomes in the management plans), he/she should be scheduled for an office visit every 3-6 months to assess:

• Medication side effects (especially height and weight, pulse, BP)
• Academic progress

Change in targeted behaviors at home and school

Vanderbilt follow-up assessment forms should be completed by both parents and teachers to objectively monitor progress toward decreasing ADHD symptoms and improving function.

NOTE: To provide high quality care for children prescribed ADHD medication, remember to schedule:

1) An office visit within 30 days of starting medication
2) At least three follow up visits within 10 months, including the initial follow up visit

This recommendation is based on the NCQA (National Commission for Quality Assurance) HEDIS (Healthcare Effectiveness Data and Information Set) quality measure for care for children with ADHD.

Children who are prescribed a medication dose increase should also be seen within 30 days.

Question 14: What are the most frequent co-existing conditions associated with ADHD? How can you begin screening for these co-morbidities during your overall assessment of JK’s school difficulties?

Up to one-third of all children with ADHD may have one or more coexisting conditions. The Vanderbilt Assessment scales (long form– initial version) screen for

• oppositional-defiant disorder,
• conduct disorder and
• anxiety/depression.

Several other screening tests are available to detect these other mental health disorders and may require referral to a mental health professional to diagnose and appropriately treat.
Pediatricians should inquire about family histories of mental health disorders. In addition, lack of expected response to the recommended treatment plan should prompt an investigation for co-existing conditions.

**Take home points:**

Overall ADHD management should include:

- Applying DSM-based diagnostic criteria in the evaluation of children with ADHD
- Setting treatment goals to address symptoms
- Scheduling appropriate follow up appointments including a visit within 30 days of initiating medication.
- Monitoring medication side effects, including effects on vital signs (P,BP), growth, appetite, sleep and mood
- Discussing and/or implementing behavior therapy
National Resources:

Developed by the American Academy of Pediatrics, along with McNeil pharmaceuticals and the National Initiative for Children’s Healthcare Quality (NICHQ) It is a comprehensive and complete tool that aids in the diagnosis and management of the ADHD spectrum disorders. It contains resources for both practitioners and families. The toolkit is available through the AAP website Bookstore and can also be downloaded from the Members Only Channel on the AAP Website (www.aap.org/moc).

- Copies are stored in the charting area of the Children’s Hospital of Pittsburgh Oakland PCC.
- If you are in a different setting, ask your colleagues or preceptor if these resources are available to you

**CHADD** (Children and Adults with Attention-Deficit/Hyperactivity Disorder)
A national non-profit, organization providing education, advocacy and support for individuals with ADHD. website: http://www.chadd.org/

**National Disability Rights Network**
**Protection and Advocacy for Individuals with Disabilities**
A nonprofit membership organization for the federally mandated Protection and Advocacy (P&A) Systems and Client Assistance Programs (CAP) for individuals with disabilities: P&A/CAP network is the largest provider of legally based advocacy services to people with disabilities in the U.S. Has links to state groups as well 900 Second Street, NE, Suite 211 Washington, DC 20002 202-408-9514 TTY: 202-408-9521 http://www.ndrn.org/index.php

Resources in Pittsburgh:

**Child Development Unit**
Specializes in child assessment
Referrals are required
Children’s Hospital of Pittsburgh of UPMC
3420 Fifth Ave
Pittsburgh PA
412-692-5560
Child and Family Counseling Center (CFCC)
Behavioral health therapies to children/adolescents and their families
Children's Hospital of Pittsburgh of UPMC
Children’s Pine Center
11270 Perry Highway, 204
Wexford, PA 15090
No referrals necessary
724-933-3910; Toll Free 1-877-933-3910

Clinical Psychology Center at the University of Pittsburgh
Provides a full range of outpatient psychological services at reduced fees: (Oakland)
3820 Sennott Square
210 South Bouquet Street
Pittsburgh, PA 15260
No insurance accepted; minimal fees, sliding scale ($5 - $40 per visit)
412-624-8822

Western Psychiatric Institute and Clinic (WPIC)
Outpatient Services
3811 O’Hara St
Pittsburgh, PA 15213
412-624-2000; option 3

Mercy Behavioral Health
Mental and behavioral health services
Multiple locations in the Pittsburgh area
1-877-MERCYBH (1-877-637-2924)

Pittsburgh Pastoral Institute
Interfaith ministry of counseling and education
Locations in Allegheny and surrounding counties
6324 Marchand Street
Pittsburgh, PA 15206
412-661-1239 (ext. 16) or 1-877-661-9623

Turtle Creek Valley Mental Health/Mental Retardation
Children and Family Services
Provides a continuum of behavioral health care for children and families.
723 Braddock Avenue, Braddock, PA 15104
Phone: 412-351-0222; answered 24 hours/day
FamilyLinks
Special learning facilities and prevention programs
250 Shady Ave
Pittsburgh PA 15206
412-661-1800; option 0
Families can call: 866-583-6003

Disabilities Rights Network of Pennsylvania
Federally-mandated organization to advance and protect the civil rights of adults and children with disabilities.
Offices in Philadelphia, Harrisburg and Pittsburgh
Pittsburgh Office
429 Fourth Avenue, Suite 701
Pittsburgh, PA 15219-1505
(412) 391-5225
http://www.drnpa.org/
References:

Sources for this module:

- AAP Clinical Practice Guidelines for the Diagnosis and Evaluation of the Child with Attention-Deficit/Hyperactivity Disorder (2000)
- AAP Clinical Practice Guideline: Treatment of the School-Aged Child with Attention-Deficit Hyperactivity Disorder (2001)
- AAP Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents (2011)


Conners CK: Functional impairments in ADHD: the therapeutic target. Contemp Pediatr; 2003; 4-6 (Supplement).


