



PSYCH TLC  
DEPARTMENT OF PSYCHIATRY  
DIVISION OF CHILD & ADOLESCENT PSYCHIATRY  
UNIVERSITY OF ARKANSAS FOR MEDICAL SCIENCES  
PSYCHIATRIC RESEARCH INSTITUTE

**Attention-Deficit/Hyperactivity Disorder (ADHD)  
in Children and Adolescents**

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of Human Services**

**Psych TLC Phone Numbers:**

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  - Side effects of psychiatric medications
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# 1. Definition

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Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder of childhood that is characterized by developmentally inappropriate levels of:

- **Hyperactivity**
  - Often fidgets with hands or feet or squirms in seat
  - Often leaves seat when remaining in seat is expected
  - Often runs about or climbs excessively in situations in which it is inappropriate
  - Often has trouble playing or enjoying 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 finished
  - Often has trouble waiting one's turn
  - Often interrupts or intrudes on others (e.g., butts into conversations or games)
  
- **Inattention**
  - Often does not pay close attention to details or makes careless mistakes in schoolwork, work, or other activities
  - Often has trouble maintaining attention while engaging in tasks or play activities
  - Often does not seem to listen when spoken to directly
  - Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or misunderstanding instructions)
  - Often has trouble organizing tasks and activities
  - Often avoids, dislikes, or doesn't want to do things that require a lot of mental effort for a long period of time
  - Often loses things needed for regular or daily tasks and activities
  - Is often easily distracted by irrelevant stimuli
  - Is often forgetful in daily activities

## 1.1 Subtypes of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents

- **Predominantly Inattentive Type:**
  - Children who only meet the criteria for Inattention
  
- **Predominantly Hyperactive-Impulsive Type:**
  - Children who only meet the criteria for Hyperactivity-Impulsivity
  
- **Combined Type:**
  - Children who meet the criteria for both Inattention and Hyperactivity-Impulsivity

## 1.2 Highlights of Changes in ADHD from DSM-IV to DSM-5

- The diagnostic criteria for attention-deficit/hyperactivity disorder (ADHD) in DSM-5 are similar to those in DSM-IV.
- The same 18 symptoms are used as in DSM-IV, and continue to be divided into two symptom domains (inattention and hyperactivity/impulsivity), of which at least six symptoms in one domain are required for diagnosis.
- However, several changes have been made in DSM-5:
  - Examples have been added to the criterion items to facilitate application across the life span.
  - The cross-situational requirement has been strengthened to “several” symptoms in each setting.
  - The onset criterion has been changed from “symptoms that caused impairment were present before age 7 years” to “several inattentive or hyperactive-impulsive symptoms were present prior to age 12”.
  - Subtypes have been replaced with presentation specifiers that map directly to the prior subtypes.
  - A comorbid diagnosis with autism spectrum disorder is now allowed.
  - A symptom threshold change has been made for adults, to reflect their substantial evidence of clinically significant ADHD impairment, with the cutoff for ADHD of five symptoms, instead of six required for younger persons, both for inattention and for hyperactivity and impulsivity.
  - Finally, ADHD was placed in the neurodevelopmental disorders chapter to reflect brain developmental correlates with ADHD and the DSM-5 decision to eliminate the DSM-IV chapter that includes all diagnoses usually first made in infancy, childhood, or adolescence. (APA DSM-5, 2013)

## 1.3 Diagnosis

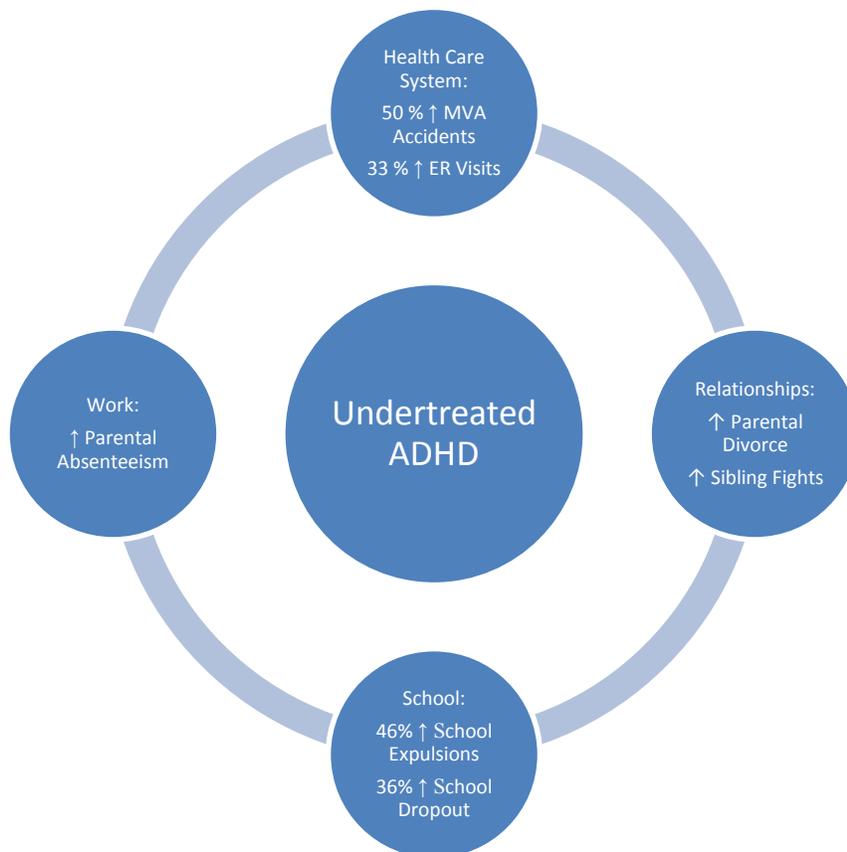
- **Primary DSM-5 Criteria**
  - Six or more inattention symptoms or six or more hyperactivity-impulsivity symptoms
  - Symptoms must be inconsistent with the child’s current developmental level
  - Must persist to a degree that is considered maladaptive for at least six months
- **Additional DSM-5 Criteria**
  - Several inattentive or hyperactive-impulsive symptoms were present prior to age 12
  - Impairment from symptoms must be present in at least two different types of settings
  - Clinically significant impairment in school, social or occupational functioning
  - Symptoms do not occur solely during a psychotic disorder
  - Symptoms are not accounted for better by another mental disorder.

## 2. Epidemiology

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- Attention-Deficit/Hyperactivity Disorder (ADHD) affects 5 to 12% of children worldwide
- It is a costly public health concern since it can cause significant impairment in functioning that interferes with normal development
- The prevalence in the United States and worldwide is similar
- The male to female ratio is about two to one in preeminently discerned samples

## 2.1 Public Health Cost of Untreated ADHD



## 3. Etiology/Risk Factors

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### 3.1 Temperamental Risk Factors:

- ADHD is associated with reduced behavioral inhibition, effortful control, or constraint; negative emotionality; and/or elevated novelty seeking.
- These traits may predispose some children to ADHD but are not specific to the disorder.

### 3.2 Environmental Risk Factors:

- Very low birth weight (less than 1,500 grams) conveys a two- to three-fold risk for ADHD, but most children with low birth weight do not develop ADHD.
- Perinatal complications including unusually long or short labor, forceps delivery, toxemia, and meconium staining could increase the risk of ADHD. Birth during the month of September has

also been correlated with an increased risk of ADHD.

- Although ADHD is correlated with smoking during pregnancy, some of this association reflects common genetic risk.
- A minority of ADHD cases may be related to reactions to aspects of diet.
- There may be a history of child abuse, neglect, multiple foster placements, neurotoxin exposure (e.g., lead), infections (e.g., encephalitis), or alcohol exposure in utero. Exposure to environmental toxicants has been correlated with subsequent ADHD, but it is not known whether these associations are causal.

### 3.3 Genetic and Physiological Risk Factors:

- ADHD is elevated in the first-degree biological relatives of individuals with ADHD. The heritability of ADHD is substantial. While specific genes have been correlated with ADHD, they are neither necessary nor sufficient causal factors.
- Visual and hearing impairments, metabolic abnormalities, sleep disorders, nutritional deficiencies, and epilepsy should be considered as possible influences on ADHD symptoms.
- Factors that can result in brain damage are associated with ADHD.
- ADHD is not associated with specific physical features, although rates of minor physical anomalies (e.g., hypertelorism, highly arched palate, low-set ears) may be relatively elevated. Subtle motor delays and other neurological soft signs may occur.
- ADHD occurs more often in children with seizure disorders who are presumed to have neurological involvement (APA DSM-5, 2013)

## 4 Assessment and Diagnosis

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### 4.1 Typical Clinical Presentations

- **Gender:**
  - Females tend to present more often with less disruptive symptoms, more attention problems and more internalizing problems such as depression and anxiety. Boys tend to present more often with disruptive behavior (aggression, oppositional behavior, hyperactivity, impulsivity).
- **Younger Children:**
  - The hyperactive subtype is more common and the prevalence may vary from a low of 2% in the primary care setting to a high of 59% in the child psychiatry clinic.

### 4.2 Screening Tools

- **SNAP-IV Rating Scale-Revised (SNAP-IV-R):**

This scale, used with children and adolescents ages 6-18, contains 90 items and takes about 10 minutes to administer. The SNAP-IV includes symptoms of ADHD, as well as symptoms of Oppositional Defiant Disorder (ODD) and aggression. It was developed by Swanson, Nolan and Pelham. The SNAP-IV rating scale form, along with scoring instructions, can be downloaded from: <http://www.adhd.net/>

- **Vanderbilt ADHD Diagnostic Parent and Teacher Rating Scales:**

This initial assessment tool, for use with children ages 6-12, contains rating scales for ADHD symptoms and for symptoms related to impairment in academic and behavioral performance. Although this tool is not intended for diagnosis, it is widely used to provide information about symptom presence and severity, and performance in the classroom, home and social settings. The Vanderbilt Scale takes about 10 minutes to complete (Parent Form has 55 items and Teacher Form has 43 items). The Vanderbilt ADHD Parent Rating Scale, the Vanderbilt ADHD Teacher Rating Scale, and scoring instructions for both scales can be downloaded from:

[http://childrenshospital.vanderbilt.org/uploads/documents/med-ped\\_VADPRS\\_Quest\(1\).pdf](http://childrenshospital.vanderbilt.org/uploads/documents/med-ped_VADPRS_Quest(1).pdf)

[http://childrenshospital.vanderbilt.org/uploads/documents/med-ped\\_VADTRS\\_Quest\(2\).pdf](http://childrenshospital.vanderbilt.org/uploads/documents/med-ped_VADTRS_Quest(2).pdf)

[www.nichq.org/toolkits\\_publications/.../07Scoring%20Instructions.pdf](http://www.nichq.org/toolkits_publications/.../07Scoring%20Instructions.pdf)

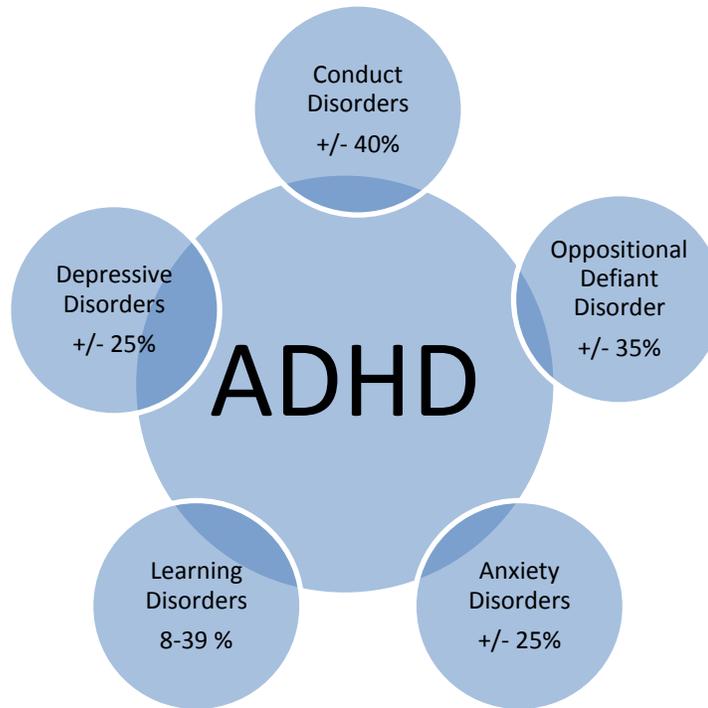
## 5. Differential Diagnosis

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The differential diagnosis for suspected ADHD in children and adolescents typically includes:

- Schizophrenia
- Autism Spectrum Disorder
- Narcolepsy
- Phenylketonuria
- Affective/Mood Disorders
- Learning Disabilities
- Birth Complications
- Fetal Alcohol Syndrome
- Vision/Hearing/Speech Impairments
- Anxiety Disorders
- Head Injury
- Brain Tumors/Infections
- Sleep/Breathing Disorders
- Eating Disorders
- Adjustment Disorders
- Normal Moodiness of Teens
- Substance Induced Mood Disorder
- Posttraumatic Stress Disorder
- Conduct Disorder

## 5.1 Associated Disorders



*Pliska et al JAACAP 1998*

## 5.2 Bipolar Disorder

Along with ruling out normal mood changes of adolescence, which are generally not associated with a decline in functioning (e.g., a drop in grades), clinicians should assess for symptoms of Bipolar Disorder. Bipolar Disorder is less common in teens than in adults. In addition, many teens that may eventually manifest Bipolar Disorder tend to present first with a depressive episode in adolescence. Therefore, diagnosing Bipolar Disorder at that point will not be possible.

### Bipolar Disorder Symptoms

- **Middle Childhood**
  - Persistently irritable mood is described more than a euphoric mood
  - Aggressive and uncontrollable outbursts, agitated behaviors
  - Attention-Deficit/Hyperactivity Disorder symptoms (severe hyperactivity and impulsivity)
  - Extreme fluctuations in mood that can occur on the same day or over the course of days or weeks
  - Reckless behaviors, dangerous play, inappropriate sexual behaviors

- **Adolescence**
  - Markedly labile mood
  - Agitated behaviors, aggression, pressured speech, racing thoughts, sleep disturbances
  - Reckless behaviors (e.g., dangerous driving, substance abuse, sexual indiscretions)
  - Illicit activities (e.g., impulsive stealing, fighting), spending sprees
  - Psychotic symptoms (e.g., hallucinations, delusions, irrational thoughts)

*If you rule out ADHD during your evaluation but the patient has another mental health illness, please refer to other treatment guidelines in this series for treatment recommendations or refer the patient to the Psych TLC team for recommendations on diagnosis and treatment.*

### 5.3 Medical Conditions

There are also some *medical conditions* that can “mimic” ADHD including:

- Uremia
- Malnutrition
- Lead Intoxication
- Stroke
- Multiple Sclerosis
- Absence Seizures

## 6. Clinical Course

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- Hyperactivity and impulsivity decrease with time but inattention is stable across time (Biederman et al, 2000)
- Studies have shown that ADHD persists into adulthood (Biederman et al, 2000)
- The ratio of males to females in adult samples is from 2:1 to 1:1
- Adults with ADHD may present with self-esteem issues and hopelessness related to managing stress of daily life

### 6.1 Red Flags

- Patients reporting auditory or visual hallucinations
- Patients who have suicidal ideation, thoughts or attempts
- Patients with poor parental supervision or family support
- Patients with poor functioning in multiple areas of his/her life (school, social and family life)
- Psychotic or Bipolar Disorder
- If any of these are present, then referral to a child psychiatrist is indicated

## 6.2 Complications

- ADHD hinders development of the child’s emotional, cognitive and social skills
- ADHD may interfere considerably with family relationships
- Children and adolescents with ADHD are also at high risk for substance abuse (including nicotine dependence), legal problems, exposure to negative life events, physical illness, early pregnancy, and poor work, academic and psychosocial functioning

## 7. Treatment

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### Recommendation 1

Patients with ADHD risk factors (e.g., a history of inattention, hyperactivity or impulsivity, family history of ADHD, other psychiatric disorders, substance abuse, trauma, psychosocial adversity, etc.) should be identified.

### Recommendation 2

An assessment for ADHD should include a physical exam and direct interviews with the patients and families/caregivers, and if possible, teachers. **The presence of functional impairment in two different environments/domains (e.g., at home and school) is required for the diagnosis.**

Clinicians should educate and counsel families and patients about ADHD and options for the management of the disorder.

- Encourage parents to establish routines for their child or adolescent to help her learn organizational skills. It may be useful for parents to have a daily calendar at home for the child to see and use. A good example is building a visual calendar with pictures and drawings explaining the daily and /or weekly schedule.
- Encourage the child or adolescent to participate in activities that improve his self-esteem and sense of mastery (e.g., encourage a child or adolescent who likes to draw to take an art class).
- Discuss the importance of a healthy lifestyle (e.g., participating in regular physical activity, eating healthy foods) in maintaining a sense of well-being. In particular, regular physical activity can have a beneficial impact on depressed mood (Tkachuk and Martin, 1999) and should be discussed as an important element in any comprehensive treatment plan for adolescents with depressive symptoms (or any other mental health condition for that matter).
- Encourage the child or adolescent to interact with peers in a supportive environment (e.g., during after-school activities, in clubs or sports, at play dates [for younger children], through faith-based activities, etc.).
- The child or adolescent should be assessed and appropriate modifications should be made for a child or adolescent with a learning disorder or school difficulties that may be contributing to their sense of failure.
- Collaborate with the school team to ensure that academic expectations and the level of services are appropriate for the child’s or adolescent’s needs and abilities. Involve school-based professionals such as school nurses, school social workers, school psychologists, guidance counselors and teachers in the child’s or adolescent’s treatment plan.
- Clinicians should develop a treatment plan with patients and families and set specific treatment goals in key areas of functioning including home, peer, and school settings.

### **Recommendation 3**

The patient's Primary Care Clinician should establish relevant links/collaboration with the school and mental health resources in the community, which may include patients and families who have dealt with adolescent ADHD and are willing to serve as resources to other affected adolescents and their family members. Of special importance is the modification of the educational planning if necessary.

#### **Things to do if you suspect your child has ADHD:**

- Request that the school conduct an evaluation to determine whether he or she qualifies for special education services.
- Involve your child's teacher, school counselor, or the school's student support team to begin an evaluation.
- Once your child has been evaluated, it may be determined that he/she requires special education services and your child is eligible under the Individuals with Disabilities Education Act. At that point, the school district must develop an "individualized education program" specifically for your child within 30 days.
- If your child is not eligible for special education services, he/she can still obtain "free appropriate public education," available to all public-school children with disabilities under Section 504 of the Rehabilitation Act of 1973, regardless of the nature or severity of the disability.
- For more information on Section 504 visit the: U.S. Department of Education's Office for Civil Rights (<http://www2.ed.gov/about/offices/list/ocr/504faq.html>), which enforces Section 504 in programs and activities that receive Federal education funds.
- Always make sure that if a new teacher is on board, consider telling the teacher that your child has ADHD when he/she starts school or moves to a new class. Additional support will help your child deal with the transition.
- Additional practical information about classroom interventions for children and adolescents with ADHD can be found at various websites, including: <http://www.ADDinSchool.com>.

### **Recommendation 4**

If a clinician identifies an adolescent with moderate or severe ADHD, but there are also complicating factors/conditions such as co-existing mental health disorders, consultation with a mental health specialist should be considered. Appropriate roles and responsibilities for ongoing management by the Primary Care Clinician and mental health clinicians should be communicated and agreed upon. The patient and family should be consulted and approve the roles of the Primary Care Clinician and mental health professionals.

#### **Treatment**

**After identifying a patient with ADHD, a treatment plan should be established. The approach should recommend the initiation of medication treatment, behavioral recommendations or a combination of both treatment modalities. The evidence has shown that medications are the most effective intervention for the control of ADHD symptoms.**

**Assessment of treatment response should be completed frequently and modified accordingly as needed.**

#### **Psychosocial Interventions**

- Education can help improve parent, teacher, employer, spouse, and patient understanding of symptoms and their impact on relationships.
- Psychotherapy can help deal with negative beliefs about the self that have developed over time, improve the ability to cope with emotions and improve communication skills.

- Behavior Therapy can help to problem solve the demands of an academic setting, occupational stress, social demands, or other psychological demands (i.e. organizing tasks, structuring daily activities, anger management, etc.).
- Support groups or group therapy.
- Address comorbidities with other disorders.
- Parent Skills Training can help individualize positive and negative reinforcement to extinguish behaviors, improve self-control, improve quality time, and implement a token economy when applicable.

## Medication Treatment

Medication Treatment should be reassessed frequently (at least every month) and necessary changes should be made accordingly to accomplish diminution in symptoms.

- Stimulants (most commonly used)
- Non-stimulants
- Antidepressants
- Anti-hypertensives

It is our recommendation to start with a trial of a stimulant. Explain the process to the parents and the potential side-effects of these medications. If after trying a medication there is no response, then you may try other stimulants. However, if there is limited or no response after trying different stimulants, we recommend that you seek a consultation with a mental health specialist or the Psychiatric Telemedicine program (Psych TLC: 501-526-7425 or 1-866-273-3835).

### 7.1 FDA Approved Stimulants for Children & Adolescents

Trade Name	Generic Name	Approved Age
Adderall	amphetamine	3 and older
Adderall XR	amphetamine (extended release)	6 and older
Concerta	methylphenidate (long acting)	6 and older
Daytrana	methylphenidate patch	6 and older
Desoxyn	methamphetamine hydrochloride	6 and older
Dexedrine	dextroamphetamine	3 and older
Dextrostat	dextroamphetamine	3 and older
Focalin	dexmethylphenidate	6 and older
Focalin XR	dexmethylphenidate (extended release)	6 and older
Metadate ER	methylphenidate (extended release)	6 and older
Metadate CD	methylphenidate (extended release)	6 and older
Methylin	methylphenidate (oral solution and chewable tablets)	6 and older
Ritalin	methylphenidate	6 and older
Ritalin SR	methylphenidate (extended release)	6 and older
Ritalin LA	methylphenidate (long acting)	6 and older
Strattera	atomoxetine	6 and older
Vyvanse	lisdexamfetamine dimesylate	6 and older

## 7.2 Arkansas Medicaid Preferred Drug List

### Preferred List:

Amphetamine Salts ER Capsule (Adderall XR)  
Amphetamine Salts Tablet (Adderall)  
Atomoxetine (Strattera) Effective 7/21/2009  
Dexmethylphenidate ER Capsule (Focalin XR)  
Dexmethylphenidate Tablet (Focalin)  
Dextroamphetamine Tablet Effective 7/21/2009  
Lisdexamfetamine (Vyvanse) Effective 7/21/2009  
Methylphenidate ER Patch (Daytrana)  
Methylphenidate ER Tablet (Concerta)  
Methylphenidate Swallow Tablet (Ritalin)

### Non-Preferred List Includes But Is Not Limited To:

Dextroamphetamine Capsule (Dexedrine Spansule)  
Dextroamphetamine Solution (Procentra)  
Guanfacine ER Tablet (Intuniv)  
Methamphetamine Tablet (Desoxyn)  
Methylphenidate Chewable Tablet (Methylin)  
Methylphenidate Solution (Methylin)  
Methylphenidate ER Capsule (Metadate CD, Ritalin LA)  
Methylphenidate ER Tablet (Metadate ER, Ritalin SR)

## 7.3 Common Stimulant Side Effects

- Appetite suppression, nausea, stomachache
- Insomnia
- Mood changes: sadness, dampening, agitation, irritability, emotionality
- Jitteriness
- Headache
- Growth delay by age 21 (Kramer et al, JAACAP, April 2000)
  - 2.6 inches shorter if initial nausea/vomiting
  - 10 pounds lighter if higher stimulant dose for 7 months

## 7.4 Relative Contraindications to Stimulants

- Auditory or Visual Hallucinations
- Glaucoma
- Stimulant Abuse or Dependence
- Some Eating Disorders
- Symptomatic Cardiovascular Disease
- Hypertension
- Hyperthyroidism
- FDA contraindications also include motor tics, marked anxiety and diagnosis of Tourette's Disorder, but recent clinical trials suggest that these conditions may not be worsened by stimulant use.

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