



# SWLA

## BEHAVIORAL HEALTH

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### **ATTENTION-DEFICIT/HYPERACTIVITY DISORDER**

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#### **FOR PATIENTS AND FAMILIES**

Attention-deficit/hyperactivity disorder (ADHD) is a common psychiatric disorder in young and school-aged children. However, it is not merely a childhood disorder. In recent years, an increasing number of adults have been diagnosed with ADHD, raising some concern that it may be overdiagnosed. Estimates of the prevalence (i.e., percentage of the population affected) of ADHD in the United States range from 2% to 12%, and the disorder is about three times more likely in boys than in girls. For most children the disorder improves with maturation, but follow-up studies have shown that a significant number of cases of ADHD persist into adulthood.

Children with ADHD are typically inattentive, very distractible, overactive, impulsive, labile, and difficult to manage. During preschool years, early symptoms and behavioral problems may be passed off simply as manifestations of an active, impetuous child. When the child enters school and begins the task of learning, the disorder then becomes more obvious. The child may have difficulty sitting still, staying focused, completing assignments, and obeying classroom rules. The teacher, school nurse, or school psychologist are usually the first to recognize the child's ADHD and inform the parents to seek help for the child.

#### **COURSE OF DISORDER**

Generally, ADHD is not diagnosed before 5 years of age because of the difficulty of differentiating the disorder from the normal developmental stages of toddlers when hyperactivity may be the norm. The period of "terrible twos," for example, is a normal phase of childhood rather than an exception. ADHD is usually not identified until elementary school, when the child is placed in a routine structured environment where attentiveness and sitting still are instilled. In this environment, the child may stand out in comparison to his or her peers.

The outcome of ADHD is variable. According to experts, children with ADHD frequently have good outcome and outgrow the disorder with maturation. However, approximately 50% of childhood ADHD persists with attention deficit and impulsivity into adulthood. The hyperactivity usually improves by early adolescence, but mild symptoms of restlessness and fidgeting may still be seen in some adults. Adults with ADHD may continue to show inattention, impulsivity, and emotional lability without prominent features of hyperactivity.

Treatment also influences outcome. Long-term studies have documented the improvement of children treated with stimulants, especially when compared with children who did not receive medications. Clinical improvement was seen in attention, impulsivity, hyperactivity, and emotional lability. Attenuation of these symptoms helped "normalize" children during critical stages of learning and social development. Moreover, with behavioral improvement, children were likely to receive less negative criticism and more positive reinforcement from parents, teachers, peers, and siblings to improve their self-esteem. The long-term studies also found that children who were treated with stimulants and then followed into adolescence and adulthood had completed more years of school, had fewer automobile accidents, had fewer problems with alcohol and substance abuse, and engaged in less criminal behavior and had fewer court appearances. Therefore, when the natural course of ADHD is changed and improved with treatment, the secondary complications from low self-esteem, compromised social skills, and behavioral problems may be prevented.

## CAUSE OR ETIOLOGY

Studies show that ADHD runs in families, particularly in male relatives of ADHD children, but it is unclear how the disorder is transmitted. There is no evidence that ADHD is caused by a single, identifiable genetic defect. Genetic transmission of ADHD will probably be explained by a group of genes that controls or modifies the inheritance of the disorder.

There are nongenetic explanations of ADHD, as well. Recognized nongenetic causes of ADHD include brain damage, low birth weight, and prenatal factors, including inadequate maternal nutrition, alcohol, and substance abuse. Brain damage may result from obstetrical complications, viral infections, and exposure to toxins. Low birth weight is correlated with ADHD, with or without birth complications. In some cases, low birth weight may be attributed to lack of prenatal care (e.g., malnutrition) and substance abuse. Fetal exposure to toxic substances, including alcohol and lead, may predispose to ADHD and cognitive deficits. For example, **fetal alcohol syndrome** includes hyperactivity, attention deficit, and impulsivity, as well as other physical problems.

The manifestation of ADHD may be explained by aberrations of neurotransmitter systems in areas of brain that mediate attention. ADHD may be associated with the neurons (brain cells) that require **dopamine** and **norepinephrine** as their neurotransmitters (i.e., brain chemicals that facilitate transmission of impulses between neurons). Low levels of these neurotransmitters in specific and interrelated areas of the brain that regulate attention, regardless of the cause, may result in the symptoms of attention-deficit and hyperactivity. A depletion of dopamine may result in difficulties in sustaining attention, and depletion of norepinephrine may be responsible for hyperactivity. The most compelling evidence to support this hypothesis is the treatments prescribed for ADHD—medications such as **amphetamine** (Dexedrine) and **methylphenidate** (Ritalin)—work by enhancing the levels of dopamine and norepinephrine.

## DIAGNOSIS

The diagnosis of ADHD is based on presentation of symptoms in two broad categories: A) inattention and B) hyperactivity and impulsivity. The diagnostic criteria<sup>1</sup> for ADHD include the following:

### A. Symptoms of Inattention

1. Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
2. Often has difficulty sustaining attention in tasks or play activities
3. Often does not seem to listen when spoken to directly
4. Often does not follow through on instructions and fails to finish schoolwork, chores, or duties (not due to oppositional behavior or failure to understand instructions)
5. Often has difficulty organizing tasks and activities
6. Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
7. Often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)

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<sup>1</sup>Adapted from American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, 4th Edition, Text Revision. Washington, DC, American Psychiatric Association, 2000. Copyright 2000, American Psychiatric Association. Used with permission.

8. Is often easily distracted by extraneous stimuli
9. Is often forgetful in daily activities

## **B. Symptoms of Hyperactivity–Impulsivity**

### *Hyperactivity*

1. Often fidgets with hands or feet or squirms in seat
2. Often leaves seat in classroom or in other situations in which remaining seated is expected
3. 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)
4. Often has difficulty playing or engaging in leisure activities quietly
5. Is often “on the go” or often acts as if “driven by a motor”
6. Often talks excessively

### *Impulsivity*

1. Often blurts out answers before questions have been completed
2. Often has difficulty awaiting turn
3. Often interrupts or intrudes on others (e.g., butts into conversations or games)

For the diagnosis of ADHD to be established, the symptoms of inattention and/or hyperactivity-impulsivity must have persisted for at least 6 months. Three subtypes of ADHD are recognized: 1) **Predominantly Hyperactive-Impulsive Type** is the subtype if six (or more) symptoms in the hyperactivity-impulsivity category but fewer than six symptoms in the inattention category are met. 2) **Predominantly Inattentive Type** is the subtype if six (or more) symptoms in the inattention category but fewer than six symptoms in the hyperactivity-impulsivity category are met. This type of ADHD is sometimes referred to as **Attention-Deficit Disorder**, or **ADD**. 3) **Combined Type** is the subtype if six (or more) symptoms in the inattention category and six (or more) symptoms in the hyperactivity-impulsivity category are met. Most children and adolescents with ADHD have the combined type.

Other diagnostic criteria for ADHD include the onset of some symptoms of ADHD before age 7, the symptoms cause dysfunction in at least two settings (e.g., at school and at home), and there is clear evidence that the symptoms affect social or academic functioning.

Because the diagnostic criteria are very explicit in defining a childhood onset, ADHD is not generally diagnosed in adults without a documented childhood history of the disorder. Adults with ADHD usually have problems sustaining attention and controlling impulses but have fewer problems with hyperactivity than do children with ADHD. Unlike childhood ADHD, in which boys are three to four times more likely to have ADHD than girls, men and women are equally prone to the disorder. Therapy for ADHD in kids and adults is essentially the same.

## **TREATMENT**

The primary treatment for ADHD is with medications, and stimulants are medications most commonly prescribed. The benefits of stimulants for treating the core features of ADHD (i.e., hyperactivity, impulsivity, and inattentiveness) are documented by numerous controlled studies and supported by decades of clinical experience. Commonly prescribed stimulants include **methylphenidate** (Ritalin, Metadate, and Concerta),

**amphetamine** (Dexedrine), **amphetamine mixture** (Adderall), and **pemoline** (Cylert). For a discussion of stimulants used in treatment of ADHD, see the handout *Information About Amphetamines and Methylphenidate for Patients and Families* (Form 3-27).

Nonstimulant medications prescribed for ADHD include antidepressants, **clonidine** (Catapres), **guanfacine** (Tenex), and a recently introduced medication, **atomoxetine** (Strattera). Nonstimulant medications that can enhance levels of dopamine and norepinephrine in the brain may be as effective in treating ADHD as stimulants.

**Tricyclic antidepressants** (a group of antidepressants that are chemically similar by their three-ring structures) enhance various brain neurotransmitters, including norepinephrine. The tricyclic antidepressants used to treat ADHD with some success include **imipramine** (Tofranil), **desipramine** (Norpramin), and **nortriptyline** (Pamelor).

Nontricyclic antidepressants prescribed for treatment of ADHD include **bupropion** (Wellbutrin) and **venlafaxine** (Effexor).

Clonidine and guanfacine, two medications commonly used for treatment of high blood pressure and other medical conditions, are also effective in treating ADHD. These agents also exert their action in the areas of the brain involved with cognition and attention.

Atomoxetine represents the most recent agent introduced for treating ADHD. It works by blocking the reuptake of norepinephrine back into nerve cells, enhancing neurotransmission of the neurons in areas of the brain involved with cognition and attention. For a discussion of atomoxetine, as well as clonidine and guanfacine, refer to the handout *Information About Nonstimulants for the Treatment of Attention-Deficit/Hyperactivity Disorder for Patients and Families* (Form 3-26).

The treatment of ADHD also emphasizes nonmedical management through behavior modification techniques, involving parents and teachers at home and in school. Behavior modification procedures, for example, emphasize establishing daily checklists for the child, setting limits, providing feedback to the child to reinforce desired behavior, and focusing on success to reinforce self-esteem. Parents learn to become more proactive in managing their child's behavior. They are encouraged to provide a setting that reduces the amount of stimulation for the child and thereby diminish distractibility and inattentiveness. Parents are also encouraged to work closely with their child to tackle tasks in small increments that are best suited to the child's attention span and to reinforce the desired behavior through positive feedback.

**If you have questions about this handout, please consult your physician.**

## **ADVOCACY AND SUPPORT GROUPS**

Attention Deficit Disorder Association  
1788 Second Street, Suite 200  
Highland, Park, IL 60035  
Phone: (847) 432-2332  
Web site: [www.add.org](http://www.add.org)

Learning Disabilities Association of America  
4156 Library Road  
Pittsburgh, PA 15234-1349  
Phone: (412) 341-1515  
Web site: [www.ldanatl.org](http://www.ldanatl.org)

Children and Adults With Attention-Deficit /  
Hyperactivity Disorder (CHADD)  
8181 Professional Place, Suite 150  
Landover, MD 20785  
Phone: (800) 233-4050; (301) 306-7070  
Web site: [www.chadd.org](http://www.chadd.org)