

Attention Deficit Hyperactivity Disorder

Overview - ADHD is a condition of the brain that makes it difficult for children to control their behavior. It is one of the most common chronic conditions of childhood. It affects 4% to 12% of school-aged children. About 3 times more boys than girls are diagnosed with ADHD.

ADHD includes 3 groups of behavior symptoms: inattention, hyperactivity, and impulsivity.

Not all children with ADHD have all the symptoms. They may have one or more of the symptom groups listed above. The symptoms usually are classified as the following types of ADHD:

- **Inattentive only** (formerly known as attention-deficit disorder [ADD])—Children with this form of ADHD are not overly active. Because they do not disrupt the classroom or other activities, their symptoms may not be noticed. Among girls with ADHD, this form is more common.
- **Hyperactive/Impulsive**—Children with this type of ADHD show both hyperactive and impulsive behavior, but can pay attention. They are the least common group and are frequently younger.
- **Combined Inattentive/Hyperactive/Impulsive**—Children with this type of ADHD show a number of symptoms in all 3 dimensions. It is the type that most people think of when they think of ADHD.

Keep Safety in Mind - If your child shows any symptoms of ADHD, it is very important that you pay close attention to safety. A child with ADHD may not always be aware of dangers and can get hurt easily. Be especially careful around: Traffic, Firearms, Swimming Pools, Tools such as lawn mowers, poisonous chemicals, cleaning supplies or medicines.

Diagnosis - Your pediatrician will determine whether your child has ADHD using standard guidelines developed by the American Academy of Pediatrics. These diagnosis guidelines are specifically for children 4 to 18 years of age.

It is difficult to diagnose ADHD in children younger than 4 years. This is because younger children change very rapidly. It is also more difficult to diagnose ADHD once a child becomes a teenager.

There is no single test for ADHD. The process requires several steps and involves gathering a lot of information from multiple sources. You, your child, your child's school, and other caregivers should be involved in assessing your child's behavior.

Children with ADHD show signs of inattention, hyperactivity, and/or impulsivity in specific ways. Your pediatrician will look at how your child's behavior compares to that of other children her own age, based on the information reported about your child by you, her teacher, and any other caregivers who spend time with your child, such as coaches or child care workers.

In addition to looking at your child's behavior, your pediatrician will do a physical and neurologic examination. A full medical history will be needed to put your child's behavior in context and screen for other conditions that may affect her behavior. Your pediatrician also will talk with your child about how she acts and feels.

Your pediatrician may refer your child to a pediatric subspecialist or mental health clinician if there are concerns in one of the following areas: Intellectual disability (mental retardation)

- Developmental disorder such as speech problems, motor problems, or a learning disability
- Chronic illness being treated with a medication that may interfere with learning
- Trouble seeing and/or hearing
- History of abuse
- Major anxiety or major depression
- Severe aggression
- Possible seizure disorder
- Possible sleep disorder

Common coexisting conditions include:

- **Learning disabilities**—Learning disabilities are conditions that make it difficult for a child to master specific skills such as reading or math. ADHD is not a learning disability. However, ADHD can make it hard for a child to do well in school. Diagnosing learning disabilities requires evaluations, such as IQ and academic achievement tests, and requires educational interventions.
- **Oppositional defiant disorder or conduct disorder**—Up to 35% of children with ADHD also have oppositional defiant disorder or conduct disorder. Children with oppositional defiant disorder tend to lose their temper easily and annoy people on purpose and are defiant and hostile toward authority figures. Children with conduct disorder break rules, destroy property, get suspended or expelled from school, and violate the rights of other people. Children with coexisting conduct disorder are at much higher risk for getting into trouble with the law or having substance abuse problems than children who have only ADHD. Studies show that this type of coexisting condition is more common among children with the primarily hyperactive/impulsive and combination types of ADHD. Your pediatrician may recommend behavioral therapy for your child if she has this condition.
- **Mood disorders/depression**—About 18% of children with ADHD also have mood disorders such as depression or bipolar disorder (formerly called manic depression). There is frequently a family history of these types of disorders. Coexisting mood disorders may put children at higher risk for suicide, especially during the teenage years. These disorders are more common among children with inattentive and combined types of ADHD. Children with mood disorders or depression often require additional interventions or a different type of medication than those normally used to treat ADHD.
- **Anxiety disorders**—These affect about 25% of children with ADHD. Children with anxiety disorders have extreme feelings of fear, worry, or panic that make it difficult to function. These disorders can produce physical symptoms such as racing pulse, sweating, diarrhea, and nausea. Counseling and/or different medication may be needed to treat these coexisting conditions.
- **Language disorders**—Children with ADHD may have difficulty with how they use language. It is referred to as a pragmatic language disorder. It may not show up with standard tests of language. A speech and language clinician can detect it by observing how a child uses language in her day-to-day activities.

What Causes ADHD - Research to date has shown:

- ADHD is a neurobiological condition whose symptoms are also dependent on the child's environment.
- A lower level of activity in the parts of the brain that control attention and activity level may be associated with ADHD.
- ADHD frequently runs in families. Sometimes a parent is diagnosed with ADHD at the same time as the child.
- In very rare cases, toxins in the environment may lead to ADHD. For instance, lead in the body can affect child development and behavior. Lead may be found in many places, including homes built before 1978 when lead was added to paint.
- Significant head injuries may cause ADHD in some cases.
- Prematurity increases the risk of developing ADHD.
- Prenatal exposures, such as alcohol or nicotine from smoking, increase the risk of developing ADHD.

Treatment - Each child's treatment must be tailored to meet his individual needs. In most cases, treatment for ADHD should include

A long-term management plan with

- Target outcomes for behavior
- Follow-up activities
- Monitoring
- Education about ADHD
- Teamwork among doctors, parents, teachers, caregivers, other health care professionals, and the child
- Medication
- Behavior therapy including parent training
- Individual and family counseling

Treatment for ADHD uses the same principles that are used to treat other chronic conditions like asthma or diabetes. Long-term planning is needed because these conditions are not cured. Families must manage them on an ongoing basis. In the case of ADHD, schools and other caregivers must also be involved in managing the condition.

The following are examples of target outcomes:

- Better schoolwork (eg, completing class work or homework assignments)
- More independence in self-care or homework (eg, getting ready for school in the morning without supervision)
- Improved self-esteem (eg, increase in feeling that she can get her work done)
- Fewer disruptive behaviors (eg, decrease in the number of times she refuses to obey rules)
- Safer behavior in the community (eg, when crossing streets)
- Improved relationships with parents, siblings, teachers, and friends (eg, fewer arguments with brothers or sisters or being invited more frequently to friends' houses or parties)

The target outcomes should be:

- Realistic
- Something your child will be able to do
- Behaviors that you can observe and count (eg, with rating scales)

Medications

For most children, stimulant medications are a safe and effective way to relieve ADHD symptoms. As glasses help people focus their eyes to see, these medications help children with ADHD focus their thoughts better and ignore distractions. This makes them more able to pay attention and control their behavior.

Stimulants may be used alone or combined with behavior therapy. Studies show that about 80% of children with ADHD who are treated with stimulants improve a great deal once the right medication and dose are determined.

Two forms of stimulants are available: immediate-release (short-acting) and extended-release (intermediate-acting and long-acting). (See Table 1.) Immediate-release medications usually are taken every 4 hours, when needed. They are the cheapest of the medications. Extended-release medications usually are taken once in the morning.

Type of Medication	Brand Name	Generic Name	Duration
Short acting amphetamine stimulants	Adderall	Mixed amphetamine salts	4-6 hours
	Dexedrine	Dextroamphetamine	4-6 hours
	Dextrostat	Dextroamphetamine	4-6 hours
Short acting methylphenidate stimulants	Focalin	Dexmethylphenidate	4-6 hours
	Methylin	Methylphenidate (tablet, liquid, chewable tablet)	3-5 hours
Long acting methylphenidate stimulants	Ritalin	Methylphenidate	3-5 hours
	Metadate CD	Extended release methylphenidate	6-8 hours
Long acting amphetamine stimulants	Ritalin LA	Extended release methylphenidate	6-8 hours
	Adderall XR	Extended release amphetamine	10-12 hours
Long acting methylphenidate stimulants	Dexedrine Spansule	Extended release amphetamine	6+ hours
	Vyvanse	Lisdexamfetamine	10-12 hours
	Concerta	Extended release methylphenidate	10-12 hours
Long-acting non-stimulant medications	Daytrana	Extended release methylphenidate (skin patch)	11-12 hours
	Focalin XR	Extended release dexmethylphenidate	8-12 hours
Long-acting non-stimulant medications	Intuniv	Guanfacine	24 hours
	Strattera	Atomoxetine	24 hours

*Products are mentioned for informational purposes only and do not imply an endorsement by the American Academy of Pediatrics. Your doctor or pharmacist can provide you with important safety information for the products listed.

Your child may need to try different types of stimulants or other medication. Some children respond to one type of stimulant but not another.

The amount of medication (dosage) that your child needs also may need to be adjusted. The dosage is not based solely on his weight. Your pediatrician will vary the dosage over time to get the best results and control possible side effects.

The medication schedule also may be adjusted depending on the target outcome. For example, if the goal is to get relief from symptoms mostly at school, your child may take the medication only on school days.

It is important for your child to have regular medical checkups to monitor how well the medication is working and check for possible side effects.

Side effects - Side effects occur sometimes. These tend to happen early in treatment and are usually mild and short-lived, but in rare cases can be prolonged or more severe.

The most common side effects include:

- Decreased appetite/weight loss
- Sleep problems
- Social withdrawal

Some less common side effects include:

- Decreased appetite/weight loss
- Sleep problems
- Social withdrawal

Some less common side effects include:

- Minor growth delay
- Rebound effect (increased activity or a bad mood as the medication wears off)
- Transient muscle movements or sounds called tics

Very rare side effects include:

- Significant increase in blood pressure or heart rate
- Bizarre behaviors

The same sleep problems do not exist for atomoxetine, but initially it may make your child sleepy or upset her stomach. There have been very rare cases of atomoxetine needing to be stopped because it was causing liver damage. Rarely atomoxetine increased thoughts of suicide. Guanfacine can cause drowsiness, fatigue, or a decrease in blood pressure.

More than half of children who have tic disorders, such as Tourette syndrome, also have ADHD. Tourette syndrome is an inherited condition associated with frequent tics and unusual vocal sounds. The effect of stimulants on tics is not predictable, although most studies indicate that stimulants are safe for children with ADHD and tic disorders in most cases. It is also possible to use atomoxetine or guanfacine for children with ADHD and Tourette syndrome. Most side effects can be relieved by: Changing the medication dosage, Adjusting the schedule of medication, Using a different stimulant or trying a non-stimulant (See Table 1.)

Close contact with your pediatrician is required until you find the best medication and dose for your child. After that, periodic monitoring by your doctor is important to maintain the best effects. To monitor the effects of the medication, your pediatrician will probably have you and your child's teacher(s) fill out behavior rating scales; observe changes in your child's target goals; notice any side effects; and monitor your child's height, weight, pulse, and blood pressure.

Controlling Behavior - As the child's primary caregivers, parents play a major role in behavior therapy. Parent training is available to help you learn more about ADHD and specific, positive ways to respond to ADHD-type behaviors. This will help your child improve. In many cases parenting classes with other parents will be sufficient, but with more challenging children, individual work with a counselor/coach may be needed.

Taking care of yourself also will help your child. Being the parent of a child with ADHD can be tiring and trying. It can test the limits of even the best parents. Parent training and support groups made up of other families who are dealing with ADHD can be a great source of help. Learn stress-management techniques to help you respond calmly to your child. Seek counseling if you feel overwhelmed or hopeless.

Ask your pediatrician to help you find parent training, counseling, and support groups in your community. Additional resources are listed at the end of this publication.

Classroom management techniques may include:

- Keeping a set routine and schedule for activities
- Using a system of clear rewards and consequences, such as a point system or token economy (See Table 3.)
- Sending daily or weekly report cards or behavior charts to parents to inform them about the child's progress
- Seating the child near the teacher
- Using small groups for activities
- Encouraging students to pause a moment before answering questions
- Keeping assignments short or breaking them into sections
- Close supervision with frequent, positive cues to stay on task
- Changes to where and how tests are given so students can succeed (For example, allowing students to take tests in a less distracting environment or allowing more time to complete tests.)

Tips for controlling behavior:

- **Keep your child on a daily schedule.** Try to keep the time that your child wakes up, eats, bathes, leaves for school, and goes to sleep the same each day.
- **Cut down on distractions.** Loud music, computer games, and TV can be overstimulating to your child. Make it a rule to keep the TV or music off during mealtime and while your child is doing homework. Don't place a TV in your child's bedroom. Whenever possible, avoid taking your child to places that may be too stimulating, like busy shopping malls.
- **Organize your house.** If your child has specific and logical places to keep his schoolwork, toys, and clothes, he is less likely to lose them. Save a spot near the front door for his school backpack so he can grab it on the way out the door.
- **Reward positive behavior.** Offer kind words, hugs, or small prizes for reaching goals in a timely manner or good behavior. Praise and reward your child's efforts to pay attention.
- **Set small, reachable goals.** Aim for slow progress rather than instant results. Be sure that your child understands that he can take small steps toward learning to control himself.
- **Help your child stay "on task."** Use charts and checklists to track progress with homework or chores. Keep instructions brief. Offer frequent, friendly reminders.
- **Limit choices.** Help your child learn to make good decisions by giving him only 2 or 3 options at a time.
- **Find activities at which your child can succeed.** All children need to experience success to feel good about themselves.
- **Use calm discipline.** Use consequences such as time-out, removing the child from the situation, or distraction. Sometimes it is best to simply ignore the behavior. Physical punishment, such as spanking or slapping, is *not* helpful. Discuss your child's behavior with him when both of you are calm.
- **Develop a good communication system with your child's teacher** so that you can coordinate your efforts and monitor your child's progress.

Your child's school should work with you and your pediatrician to develop strategies to assist your child in the classroom. When a child has ADHD that is severe enough to interfere with her ability to learn, 2 federal laws offer help. These laws require public schools to cover the costs of evaluating the educational needs of the affected child and providing the needed services.

- The Individuals with Disabilities Education Act, Part B (IDEA) requires public schools to cover the costs of evaluating the educational needs of the affected child and providing the needed special education services if your child qualifies because her learning is impaired by his ADHD.
- Section 504 of the Rehabilitation Act of 1973 does not have strict qualification criteria but is limited to changes in the classroom and modifications in homework assignments and taking tests in a less distracting environment or allowing more time to complete tests.

Teenagers with ADHD - Parents play an important role in helping teenagers become independent. Encourage your teenager to help herself with strategies such as

- Using a daily planner for assignments and appointments
- Making lists
- Keeping a routine
- Setting aside a quiet time and place to do homework
- Organizing storage for school supplies, clothes, CDs, sports equipment, etc
- Being safety conscious (eg, always wearing seat belts, using protective gear for sports)
- Talking about problems with someone she trusts
- Getting enough sleep
- Understanding her increased risk of abusing substances such as tobacco and alcohol

Activities such as sports, drama, and debate teams can be good places to channel excess energy and develop friendships. Find what your teenager does well and support her efforts to "go for it."

Milestones such as learning to drive and dating offer new freedom and risks. Parents must stay involved and set limits for safety. Your child's ADHD increases her risk of incurring traffic violations and accidents.

It remains important for parents of teenagers to keep in touch with teachers and make sure that their teenager's schoolwork is going well.

Talk with your pediatrician if your teenager shows signs of severe problems such as depression, drug abuse, or gang-related activities.

Resources:

National Resource Center on AD/HD

www.help4adhd.org/

Children and Adults with Attention-Deficit/Hyperactivity Disorder (CHADD)

800/233-4050

www.chadd.org

Attention Deficit Disorder Association

856/439-9099

www.add.org

National Dissemination Center for Children with Disabilities

800/695-0285

www.nichcy.org

National Institute of Mental Health

866/615-6464

www.nimh.nih.gov