

Attention-deficit/hyperactivity disorder (ADHD) in children

By Mayo Clinic staff <http://www.mayoclinic.com/health/adhd/DS00275>

Definition

Attention-deficit/hyperactivity disorder (ADHD) is a chronic condition that affects millions of children and often persists into adulthood. ADHD includes a combination of problems, such as difficulty sustaining attention, hyperactivity and impulsive behavior.

Children with ADHD also may struggle with low self-esteem, troubled relationships and poor performance in school. Symptoms sometimes lessen with age. However, some people never completely outgrow their ADHD symptoms. But they can learn strategies to be successful.

While treatment won't cure ADHD, it can help a great deal with symptoms. Treatment typically involves medications and behavioral interventions. Early diagnosis and treatment can make a big difference in outcome.

Symptoms

Attention-deficit/hyperactivity disorder (ADHD) has been called attention-deficit disorder (ADD) in the past. But ADHD is now the preferred term because it describes both of the primary features of this condition: inattention and hyperactive-impulsive behavior. In some children, signs of ADHD are noticeable as early as 2 or 3 years of age.

Signs and symptoms of ADHD may include:

- Difficulty paying attention
- Frequently daydreaming
- Difficulty following through on instructions and apparently not listening
- Frequently has problems organizing tasks or activities
- Frequently forgetful and loses needed items, such as books, pencils or toys
- Frequently fails to finish schoolwork, chores or other tasks
- Easily distracted
- Frequently fidgets or squirms
- Difficulty remaining seated and seemly in constant motion
- Excessively talkative

- Frequently interrupts or intrudes on others' conversations or games
- Frequently has trouble waiting for his or her turn

ADHD occurs more often in males than in females, and behaviors can be different in boys and girls. For example, boys may be more hyperactive and girls may tend to be quietly inattentive.

Normal behavior vs. ADHD

Most healthy children are inattentive, hyperactive or impulsive at one time or another. It's normal for preschoolers to have short attention spans and be unable to stick with one activity for long. Even in older children and teenagers, attention span often depends on the level of interest.

The same is true of hyperactivity. Young children are naturally energetic — they often wear their parents out long before they're tired. In addition, some children just naturally have a higher activity level than others do. Children should never be classified as having ADHD just because they're different from their friends or siblings.

Children who have problems in school but get along well at home or with friends are likely struggling with something other than ADHD. The same is true of children who are hyperactive or inattentive at home, but whose schoolwork and friendships remain unaffected.

When to see a doctor

If you're concerned that your child shows signs of ADHD, see your pediatrician or family doctor. Your doctor may refer you to a specialist, but it's important to have a medical evaluation first to check for other possible causes of your child's difficulties.

If your child is already being treated for ADHD, he or she should see the doctor regularly until symptoms have largely improved, and then every three to four months if symptoms are stable. Call the doctor if your child has any medication side effects, such as loss of appetite, trouble sleeping, increased irritability, or if your child's ADHD has not shown much improvement with initial treatment.

Causes

While the exact cause of ADHD is not clear, research efforts continue.

Multiple factors have been implicated in the development of ADHD. It can run in families, and studies indicate that genes may play a role. Certain environmental factors also may increase risk, as can problems with the central nervous system at key moments in development.

Risk factors

Risk factors for ADHD may include:

- Blood relatives (such as a parent or sibling) with ADHD or another mental health disorder
- Exposure to environmental toxins — such as lead, found mainly in paint and pipes in older buildings
- Maternal drug use, alcohol use or smoking during pregnancy
- Maternal exposure to environmental poisons — such as polychlorinated biphenyls (PCBs) — during pregnancy
- Premature birth

Although sugar is a popular suspect in causing hyperactivity, there's no reliable proof of this. Many things in childhood can lead to difficulty sustaining attention, but that is not the same as ADHD.

Complications

ADHD can make life difficult for children. Children with ADHD:

- Often struggle in the classroom, which can lead to academic failure and judgment by other children and adults
- Tend to have more accidents and injuries of all kinds than children who don't have the disorder
- Have poor self-esteem
- Are more likely to have trouble interacting with and being accepted by peers and adults
- Are at increased risk of alcohol and drug abuse and other delinquent behavior

Coexisting conditions

ADHD doesn't cause other psychological or developmental problems. However, children with ADHD are more likely than are other children to also have conditions such as:

- **Learning disabilities**, including problems with understanding and communicating
- **Anxiety disorders**, which may cause overwhelming worry, nervousness and worsening of ADHD symptoms until the anxiety is treated and under control
- **Depression**, which frequently occurs in children with ADHD
- **Bipolar disorder**, which includes depression as well as manic behavior
- **Oppositional defiant disorder (ODD)**, generally defined as a pattern of negative, defiant and hostile behavior toward authority figures

- **Conduct disorder**, marked by antisocial behavior such as stealing, fighting, destroying property, and harming people or animals
- **Tourette syndrome**, a neurological disorder characterized by repetitive muscle or vocal tics

Preparing for your appointment

You're likely to start by taking your child to a family doctor or pediatrician. Depending on the results of the initial evaluation, your doctor may refer you to a specialist, such as a developmental-behavioral pediatrician, psychologist, psychiatrist or pediatric neurologist.

What you can do

To prepare for your child's appointment:

- **Make a list of any symptoms and difficulties your child has** at home or at school.
- **Prepare key personal information**, including any major stresses or recent life changes.
- **Make a list of all medications**, as well as any vitamins, herbs or supplements, that your child is taking.
- **Bring any past evaluations and results of formal testing with you**, if you have them.
- **Make a list of questions** to ask your child's doctor.

Some basic questions to ask your doctor include:

- Other than ADHD, what are possible causes for my child's symptoms?
- What kinds of tests does my child need?
- What treatments are available, and which do you recommend?
- What are the alternatives to the primary approach that you're suggesting?
- My child has these other health conditions. How can I best manage these conditions together?
- Should my child see a specialist?
- Is there a generic alternative to the medicine you're prescribing for my child?
- What types of side effects can we expect from the medication?
- Are there any printed materials that I can have? What websites do you recommend?

Don't hesitate to ask questions anytime you don't understand something.

What to expect from your doctor

Be ready to answer questions your doctor may ask, such as:

- When did you first notice your child's behavior issues?
- Do the troubling behaviors occur all the time or only in certain situations?
- How severe are your child's difficulties?
- What, if anything, appears to worsen your child's behavior?
- What, if anything, seems to improve your child's behavior?
- Does your child consume caffeine? How much?
- What are your child's sleep hours and patterns?
- How is your child's current and past academic performance?
- Does your child read at home? Does he or she have trouble reading?
- What discipline methods have you used at home? Which ones are effective?
- Describe who lives at home and a typical daily routine.

Tests and diagnosis

In general, a child shouldn't receive a diagnosis of ADHD unless the core symptoms of ADHD start early in life and create significant problems at home and at school on an ongoing basis.

There's no specific test for ADHD, but making a diagnosis will likely include:

- **Medical exam**, to help rule out other possible causes of symptoms
- **Information gathering**, such as any current medical issues, personal and family medical history and school records
- **Interviews or questionnaires** for family members, your child's teachers or other people who know your child well, such as baby sitters and coaches
- **ADHD rating scales** to help collect and evaluate information about your child

Diagnostic criteria for ADHD

To be diagnosed with ADHD, your child must meet the criteria in the Diagnostic and Statistical Manual of Mental

Disorders published by the American Psychiatric Association. For a diagnosis of ADHD, a child must have six or more signs and symptoms from one or both of the two categories below.

Inattention

- Often fails to give close attention to details or makes careless mistakes in schoolwork and other activities
- Often has difficulty sustaining attention in tasks or play activities
- Often doesn't seem to listen when spoken to directly
- Often doesn't follow through on instructions and fails to finish schoolwork or chores
- Often has difficulty organizing tasks and activities
- Often avoids, dislikes or is reluctant to engage in tasks that require sustained mental effort, such as schoolwork or homework
- Often loses items necessary for tasks or activities (for example, toys, school assignments, pencils, books)
- Is often easily distracted
- Is often forgetful in daily activities

Hyperactivity and impulsivity

- Often fidgets with hands or feet or squirms in seat
- Often leaves seat in classroom or in other situations when remaining seated is expected
- Often runs about or climbs excessively in situations when it's inappropriate
- 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 too much
- Often blurts out answers before questions have been completed
- Often has difficulty awaiting turn
- Often interrupts or intrudes on others' conversations or games

In addition to having at least six signs or symptoms from these two categories, a child with ADHD:

- Has inattentive or hyperactive-impulsive signs and symptoms that cause impairment

- Has behaviors that aren't normal for children the same age who don't have ADHD
- Has symptoms for at least six months
- Has symptoms that affect school, home life or relationships in more than one setting (such as at home and at school)

A child diagnosed with ADHD is often given a more specific diagnosis (a subtype), such as:

- **Predominantly inattentive type ADHD.** A child has at least six signs and symptoms from the inattention list above. This child may sit quietly and appear to get along with others, but he or she is not paying attention.
- **Predominantly hyperactive-impulsive type ADHD.** A child has at least six signs and symptoms from the hyperactivity and impulsivity list above. This may be misjudged as an emotional or disciplinary problem.
- **Combined-type ADHD.** A child has six or more signs and symptoms from each of the two lists above.

Other conditions that resemble ADHD

A number of medical conditions or their treatments may cause signs and symptoms similar to those of ADHD, or exist along with ADHD. Examples include:

- Learning or language problems
- Mood disorders (such as depression)
- Anxiety disorders
- Seizure disorders
- Vision or hearing problems
- Tourette syndrome
- Sleep disorders
- Thyroid medication
- Substance abuse
- Brain injury

Diagnosing ADHD in young children

Although signs of ADHD can sometimes appear in preschoolers or children even younger, diagnosing the disorder in very young children is difficult. That's because developmental problems such as language delays can be mistaken

for ADHD. For that reason, children preschool age or younger suspected of having ADHD are more likely to need evaluation by a specialist, such as a psychologist or psychiatrist, speech pathologist, or developmental pediatrician.

Treatments and drugs

Standard treatments for ADHD in children include medications, education, training and counseling. These treatments can relieve many of the symptoms of ADHD, but they don't cure it. It may take some time to determine what works best for your child.

Stimulant medications

Currently, stimulant drugs (psychostimulants) are the most commonly prescribed medications for ADHD. Stimulants appear to boost and balance levels of brain chemicals called neurotransmitters. These medications help improve the signs and symptoms of inattention and hyperactivity — sometimes dramatically.

Examples include methylphenidate (Concerta, Metadate, Ritalin, others), dextroamphetamine (Dexedrine), dextroamphetamine-amphetamine (Adderall XR) and lisdexamfetamine (Vyvanse).

Stimulant drugs are available in short-acting and long-acting forms. A long-acting patch is available that can be worn on the hip.

The right dose varies from child to child, so it may take some time to find the correct dose. And the dose may need to be adjusted if significant side effects occur or as your child matures. Ask your doctor about possible side effects of stimulants.

Stimulant medications and heart problems

Although rare, several heart-related deaths occurred in children and teenagers taking stimulant medications. The possibility of increased risk of sudden death is still unproved, but if it exists, it's believed to be in people who already have underlying heart disease or a heart defect. Your child's doctor should make sure your child doesn't have any signs of a heart condition and should ask about family risk factors for heart disease before prescribing a stimulant medication.

Other medications

Other medications used to treat ADHD include atomoxetine (Strattera) and antidepressants such as bupropion (Wellbutrin, others) and desipramine (Norpramin). Clonidine (Catapres) and guanfacine (Intuniv, Tenex) have also been shown to be effective. Atomoxetine and antidepressants work slower than stimulants and may take several weeks before they take full effect. These may be good options if your child can't take stimulants because of health problems or if stimulants cause severe side effects.

Ask your doctor about possible side effects of any medications.

Suicide risk

Although it remains unproved, concerns have been raised that there may be a slightly increased risk of suicidal thinking in children and teenagers taking nonstimulant ADHD medication or antidepressants. Contact your child's doctor if you notice any signs of suicidal thinking or other signs of depression.

Giving medications safely

Making sure your child takes the right amount of the prescribed medication is very important. Parents may be concerned about stimulants and the risk of abuse and addiction. Dependence hasn't been shown in children who take these drugs for appropriate reasons and at the proper dose.

On the other hand, there's concern that siblings and classmates of children and teenagers with ADHD might abuse stimulant medications. To keep your child's medications safe and to make sure your child is getting the right dose at the right time:

- **Administer medications carefully.** Children and teens shouldn't be in charge of their own ADHD medication without proper supervision.
- **At home, keep medication locked in a childproof container.** An overdose of stimulant drugs is serious and potentially fatal.
- **Don't send supplies of medication to school with your child.** Deliver any medicine yourself to the school nurse or health office.

ADHD behavior therapy and counseling

Children with ADHD often benefit from behavior therapy and counseling, which may be provided by a psychiatrist, psychologist, social worker or other mental health care professional. Some children with ADHD may also have other conditions such as anxiety disorder or depression. In these cases, counseling may help both ADHD and the coexisting problem.

Examples of therapy include:

- **Behavior therapy.** Teachers and parents can learn behavior-changing strategies for dealing with difficult situations. These strategies may include token reward systems and timeouts.
- **Psychotherapy.** This allows older children with ADHD to talk about issues that bother them, explore negative behavioral patterns and learn ways to deal with their symptoms.

- **Parenting skills training.** This can help parents develop ways to understand and guide their child's behavior.
- **Family therapy.** Family therapy can help parents and siblings deal with the stress of living with someone who has ADHD.
- **Social skills training.** This can help children learn appropriate social behaviors.

The best results usually occur when a team approach is used, with teachers, parents, and therapists or physicians working together. Educate yourself about ADHD, and then work with your child's teachers and refer them to reliable sources of information to support their efforts in the classroom.

Lifestyle and home remedies

Because ADHD is complex and each person with ADHD is unique, it's hard to make recommendations that work for every child. But some of the following suggestions may help create an environment in which your child can succeed.

Children at home

- **Show your child lots of affection.** Children need to hear that they're loved and appreciated. Focusing only on the negative aspects of your child's behavior can harm your relationship and affect self-confidence and self-esteem. If your child has a hard time accepting verbal signs of affection, a smile, a pat on the shoulder or a hug can show you care. Look for behaviors for which you can compliment your child regularly.
- **Take time to enjoy your child.** Make an effort to accept and appreciate the parts of your child's personality that aren't so difficult. One of the best ways to do this is simply to spend time together. This should be a private time when no other children or adults interfere. Try to give your child more positive than negative attention every day.
- **Find ways to improve your child's self-esteem and sense of discipline.** Children with ADHD often do very well with art projects, music or dance lessons, or martial arts classes, such as karate or tae kwon do. But don't force children into activities that are beyond their abilities. All children have special talents and interests that can be fostered. Small frequent successes help to build self-esteem.
- **Work on organization.** Help your child organize and maintain a daily assignment notebook and be sure your child has a quiet place to study. Group objects in the child's room and store in clearly marked spaces. Try to help your child keep his or her environment organized and uncluttered.
- **Use simple words and demonstrate when giving your child directions.** Speak slowly and quietly and be very specific and concrete. Give one direction at a time. Stop and make eye contact with the child before and while you're giving directions.

- **Try to keep a regular schedule for meals, naps and bedtime.** Use a big calendar to mark special activities that will be coming up. Children with ADHD have a hard time accepting and adjusting to change. Avoid or at least warn children of sudden transitions from one activity to another.
- **Make sure your child is rested.** Try to keep your child from becoming overtired because fatigue often makes ADHD symptoms worse.
- **Identify difficult situations.** Try to avoid situations that are difficult for your child, such as sitting through long presentations or shopping in malls and supermarkets where the array of merchandise can be overwhelming.
- **Use timeouts or appropriate consequences to discipline your child.** Timeouts should be relatively brief, but long enough for your child to regain control. Children can also be expected to accept the results of the choices they make. The idea is to interrupt and defuse out-of-control behavior.
- **Be patient.** Try to remain patient and calm when dealing with your child, even when your child is out of control. If you're calm, your child is more likely to model that behavior and become calm too.
- **Keep things in perspective.** Be realistic in your expectations for improvement — both your own and your child's. Keep your child's developmental stage in mind.
- **Take a break yourself.** If you're exhausted and stressed, you're a much less effective parent.

Children in school

- **Ask about school programs.** Take advantage of any special programs your school may have for children with ADHD. Schools are required by law to have a program to make sure children who have a disability that interferes with learning get the support they need. Your child may be eligible for additional services offered under the federal laws Section 504 of the Rehabilitation Act of 1973 or the Individuals with Disabilities Education Act (IDEA). These can include evaluation, curriculum adjustments, changes in classroom setup, modified teaching techniques, study skills instruction, and increased collaboration between parents and teachers.
- **Talk to your child's teachers.** Stay in close communication with your child's teachers, and support their efforts to help your child in the classroom. Be sure teachers closely monitor your child's work, provide positive feedback, and are flexible and patient. Ask that they be very clear about their instructions and expectations.
- **Ask about having your child use a computer in the classroom.** Children with ADHD may have trouble with handwriting and sometimes benefit from using a computer.

Alternative medicine

There's little research that indicates that alternative medicine treatments can reduce ADHD symptoms. Before considering any alternative interventions, talk with your doctor to determine if the therapy will be

safe. Some alternative medicine treatments that have been tried, but are not yet fully proved scientifically, include:

Yoga or meditation. Doing regular yoga routines or meditation and relaxation techniques may help children relax and learn discipline, which may help them manage their symptoms of ADHD.

Special diets. Most diets that have been promoted for ADHD involve eliminating foods thought to increase hyperactivity, such as sugar, and common allergens such as wheat, milk and eggs. Some diets recommend eliminating artificial food colorings and additives. So far, studies haven't found a consistent link between diet and improved symptoms of ADHD, though there is some anecdotal evidence that suggests diet changes might make a difference. Limiting sugar, however, doesn't seem to help. Caffeine use as a stimulant for children with ADHD can have risky effects and is not recommended.

Vitamin or mineral supplements. While certain vitamins and minerals are necessary for good health, there's no evidence that supplemental vitamins or minerals can reduce symptoms of ADHD. "Megadoses" of vitamins — doses that far exceed the Recommended Dietary Allowance (RDA) — can be harmful.

Herbal supplements. There is no evidence to suggest that herbal remedies help with ADHD, and some may be harmful.

Proprietary formulations. These are products made from vitamins, micronutrients and other ingredients that are sold as possible treatment supplements for children with ADHD. These products have had little or no research and are exempt from FDA oversight, making them possibly ineffective or potentially harmful.

Essential fatty acids. These fats, which include omega-3 oils, are necessary for the brain to function properly. Researchers are still investigating whether these may improve ADHD symptoms.

Neurofeedback training. Also called electroencephalographic (EEG) biofeedback, this treatment involves regular sessions in which a child focuses on certain tasks while using a machine that shows brain wave patterns. Theoretically, a child can learn to keep brain wave patterns active in the front of the brain — improving symptoms of ADHD. While this treatment looks very promising, more research is needed to see whether it works.

Other techniques. These can include sensory integration therapy and interactive metronome training. At this time there is not enough research to support their effectiveness.

Coping and support

Caring for a child with ADHD can be challenging for the whole family. Parents may be hurt by their child's behavior as well as by the way other people respond to it. The stress of dealing with ADHD can lead to marital conflict. These problems may be compounded by the financial burden that ADHD can place on families.

Siblings of a child with ADHD also may have special difficulties. They can be affected by a brother or sister who is demanding or aggressive, and they may also receive less attention because the child with ADHD requires so much of a parent's time.

Resources

Many resources are available, such as social services or support groups. Support groups often can provide helpful information about coping with ADHD. Ask your child's doctor if he or she knows of any support groups in your area.

There also are excellent books and guides for both parents and teachers, and Internet sites dealing exclusively with ADHD. But be careful of websites or other resources that focus on risky or unproved remedies or those that conflict with your health care team's recommendations.

Techniques for coping

Many parents notice patterns in their child's behavior as well as in their own responses to that behavior. Both you and your child may need to change behavior. But substituting new habits for old ones isn't easy — it takes a lot of hard work. It's important to have realistic expectations. Set small goals for both yourself and your child and don't try to make a lot of changes all at once.

To help manage ADHD:

- **Structure your child's life.** Structure doesn't mean rigidity or iron discipline. Instead, it means arranging things so that a child's life is as predictable, calm and organized as possible. Children with ADHD don't handle change well, and having predictable routines can make them feel safe as well as help improve behavior. Give your child a few minutes warning — with a countdown — when it's necessary to change from one activity or location to another.
- **Provide positive discipline.** Firm, loving discipline that rewards good behavior and discourages destructive actions is the best place to start. Also, children with ADHD usually respond well to positive reinforcement, as long as it's earned. Rewarding or reinforcing a new good behavior every time it occurs can encourage new habits.
- **Stay calm and set a good example.** Set a good example by acting the way you want your child to act. Try to remain patient and in control — even when your child is out of control. If you speak quietly and calmly, your child is more likely to calm down too. Learning stress management techniques can help you deal with your own frustrations.

- **Strive for healthy family relationships.** The relationship among all family members plays a large part in managing or changing the behavior of a child with ADHD. Couples who have a strong bond often find it easier to face the challenges of parenting than those whose bond isn't as strong. That's one reason it's important for partners to take time to nurture their own relationship.
- **Give yourself a break.** If your child has ADHD, give yourself a break now and then. Don't feel guilty for spending a few hours apart from your child. You'll be a better parent if you're rested and relaxed. And don't hesitate to ask relatives and friends for help. Make sure that baby sitters or other caretakers are knowledgeable about ADHD and mature enough for the task.

Prevention

To help reduce your child's risk of ADHD:

- **During pregnancy,** avoid anything that could harm fetal development. Don't drink alcohol, smoke cigarettes or use drugs. Avoid exposure to environmental toxins, such as polychlorinated biphenyls (PCBs).
- **Protect your child from exposure to pollutants and toxins,** including cigarette smoke, agricultural or industrial chemicals, and lead paint (found in some old buildings).
- **Limit screen time.** Although still unproved, it may be prudent for children to avoid excessive exposure to TV and video games in the first five years of life.

If your child has ADHD, to help reduce problems or complications:

- **Be consistent, set limits and have clear consequences** for your child's behavior.
- **Put together a daily routine for your child with clear expectations** that include such things as bedtime, morning time, mealtime, simple chores and TV.
- **Avoid multitasking yourself when talking with your child,** make eye contact when giving instructions, and set aside a few minutes every day to praise your child.
- **Work with teachers and caregivers to identify problems early,** to decrease the impact of the condition on your child's life.

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