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Patient information: Treatment of attention deficit hyperactivity disorder in children (Beyond the Basics)**Author**

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INTRODUCTION — Attention deficit hyperactivity disorder (ADHD) is a condition that causes trouble paying attention, hyperactivity, and impulsive behavior. It is often first recognized in early childhood. ADHD can affect a child's thinking, performance in school, behavior, feelings, and relationships with others. It often continues into adulthood.

Treatments for ADHD include medicines, behavior training, counseling, and changes at school and/or at home. These treatments can be used alone or in combination. The best treatment or combination of treatments depends on your child's situation. A doctor or nurse can guide you and your child as treatment begins.

The treatment of attention deficit hyperactivity disorder in children and adolescents will be reviewed here. A topic that discusses the symptoms and diagnosis of ADHD is available separately. (See "[Patient information: Symptoms and diagnosis of attention deficit hyperactivity disorder in children \(Beyond the Basics\)](#)".)

More detailed information about ADHD in children is available by subscription. (See "[Attention deficit hyperactivity disorder in children and adolescents: Clinical features and evaluation](#)" and "[Pharmacology of drugs used to treat attention deficit hyperactivity disorder in children and adolescents](#)" and "[Attention deficit hyperactivity disorder in children and adolescents: Overview of treatment and prognosis](#)".)

DOES MY CHILD NEED ADHD TREATMENT? — Some parents wonder if treatment for attention deficit hyperactivity disorder (ADHD) is necessary. Most experts agree that unrecognized and untreated ADHD can have serious consequences, including school failure and drop out, depression, poor behavior, failed relationships, poor performance in the workplace, and increased risk of accidents. Treatment can help a child to:

- Have better relationships with parents, teachers, siblings, or peers (eg, play without fighting at recess)
- Perform better in school (eg, finish school work)
- Follow rules (eg, not appear to be disobedient to the teacher)

What treatment is best? — Behavioral treatments usually are recommended for preschool-age children. Medications are sometimes added if necessary. The most effective treatment for most school-aged children with ADHD is a stimulant medicine. Behavioral treatments and counseling are sometimes added if needed.

Parents who prefer that their school-aged child avoid medicine should work closely with the child's doctor or nurse. While it is reasonable to consider using behavioral treatments alone, this may not work as well as medicine alone.

The American Academy of Child and Adolescent Psychiatry, in partnership with the American Psychiatric Association, has developed a [medicine guide for parents](#).

ADHD STIMULANT MEDICINES — Stimulant medicines are the first-line attention deficit hyperactivity disorder (ADHD) treatment for school-aged children. However, there are criteria that must be met before medicine is considered. In addition, parents (and the child, when appropriate) should understand the need for close monitoring during treatment.

Despite their name, stimulants do not cause a child with ADHD to become more stimulated, but instead improve communication between several areas of the brain. This helps to improve attention and concentration. However, medicines do not cure ADHD or teach the child to behave, work well with others, follow rules in school, or be motivated. Behavioral treatments can be added to the medicine to address these issues.

Two medicines, [methylphenidate](#) and amphetamines, are the most commonly used stimulants for the treatment of ADHD.

- [Methylphenidate](#) – Methylphenidate (sample brand names: Concerta, Focalin, Metadate, Methylin, Ritalin) is available as a tablet, capsule, and liquid.
 - Short-acting formulas are usually started with one dose per day, and then increased to twice or three times daily.
 - Long-acting formulas are usually taken once per day.
 - A [methylphenidate](#) patch (brand name: Daytrana) is also available; the child wears the patch on the skin for up to nine hours per day.
- Amphetamines – Amphetamines are also available in short-acting and long-acting formulas (sample brand names: Adderall, Dexedrine, Dextrostat, Vyvanse).

How well do stimulants work? — If the short-acting stimulant dose is correct, it will begin to work within 30 to 40 minutes. If the dose is not correct (for example, if the dose is too small, which is common when starting treatment), most experts recommend waiting three to seven days before increasing the dose. Your doctor or nurse will tell you when or if you should increase your child's stimulant dose.

At least 80 percent of children with ADHD will respond to a stimulant. However, it is not clear if stimulants have a long-term benefit for the child's thinking, school performance, behavior, or feelings.

Side effects — Stimulant medicines have a long history of being safe and working well when used properly, and few children have serious side effects. Stimulants are not addictive. [Methylphenidate](#) and amphetamines are equally likely to cause side effects. Some of the most common side effects include:

- Decreased appetite
- Trouble with sleep
- Weight loss
- Motor tics (sudden, involuntary movements)

Less common side effects include increased heart rate and blood pressure, headache, social withdrawal, nervousness, irritability, stomach pain, poor circulation in the hands and feet, and moodiness.

Many of these side effects are mild and temporary. Decreases in appetite can be improved by taking the medicines after meals, or eating within 30 to 40 minutes after taking the medicine.

Serious side effects are rare. They may include:

- Cardiovascular effects – Stimulants are not recommended for children with serious heart problems. There have been rare reports of serious side effects, including sudden unexpected death, in children taking stimulant medicines. However, it is not clear that the stimulant was the cause of death. Millions of children with ADHD have used stimulants and very few have had serious side effects.
- Psychiatric effects – There have been a small number of reports of children who take stimulant medicines developing suicidal thinking, hallucinations, or aggressive behavior.

Call your child's doctor or nurse if you notice irritability, anxiety, panic, difficulty sleeping, hostility, suicidal thinking or behavior, or other unusual changes in behavior. The child should also see a doctor or nurse on a regular basis while taking stimulant medicines.

Dosing — Stimulants are generally started at a low dose on the weekend so that parents can observe the child more closely. The dose and time the medicine is taken can be adjusted as needed (this is called "titrating" the dose).

The child may need to try more than one medicine or dose to find the one that works best and has the fewest side effects. Typically, only one stimulant is used at a time.

If the child needs to take medicine at school, he or she should have a separate bottle. A school nurse or faculty member should keep this medicine and give it to the child at the appropriate time. To avoid misuse and loss, the child should not keep the medicine in his or her school bag or desk.

Drug holidays — A "drug holiday" is a time when medicine is not taken on the weekend or during school vacations. If you or your child is interested in trying a drug holiday, talk to the child's doctor or nurse.

Certain children can consider trying a drug holiday, including those who:

- Only need ADHD treatment on school days
- Are having trouble with weight loss because of an ADHD medicine

Stopping stimulants — The length of treatment with a stimulant medicine depends upon the child's situation. For some children with ADHD, it is reasonable to consider a trial period without medicine. Talk to your child's doctor or nurse about the risks and benefits of stopping treatment.

ATOMOXETINE — [Atomoxetine](#) (brand name: Strattera) is a non-stimulant medicine used in the treatment of attention deficit hyperactivity disorder (ADHD). It is more expensive than stimulant medicines. Atomoxetine is an alternative to stimulants that can be used in patients with a history of drug abuse or who have family members with a history of drug abuse. It can also be used if a child has intolerable side effects with stimulants.

[Atomoxetine](#) is usually taken once or twice per day, and is available only in capsule form. Capsules should not be opened or chewed. Drug holidays are not recommended with atomoxetine.

[Atomoxetine](#) works as well as [methylphenidate](#) for treatment of ADHD.

Side effects — Side effects of [atomoxetine](#) can include weight loss, decreased appetite, vomiting, nausea, upset stomach, and trouble sleeping. Severe liver injury has been reported in children and adults treated with atomoxetine. Call your child's doctor or nurse immediately if the child develops jaundice (yellowing of the skin or whites of the eyes), which is a sign of liver injury.

There is also a small increased risk of suicidal thinking with [atomoxetine](#), similar to stimulant medicines. (See '[Side effects](#)' above.)

Other medicines — There are other medicines available to treat ADHD if stimulants or [atomoxetine](#) do not work or have unacceptable side effects. A developmental behavioral pediatrician, child psychiatrist, or psychopharmacologist is usually consulted in these situations.

ADHD BEHAVIORAL TREATMENTS — Behavioral treatments for attention deficit hyperactivity disorder (ADHD) include changes in a child's environment, which are designed to help the child change his or her behavior.

Behavioral treatments work to improve problems with:

- Behavior and learning at school
- Relationships with friends, parents, and siblings
- Following through with adult requests

A professional training program is recommended for parents because it can be difficult to learn these techniques and use them effectively without support. Adults can help to shape the behavior of a child who has ADHD with the following techniques:

- Follow a daily schedule
- Keep distractions to a minimum
- Provide specific and logical places for the child to keep schoolwork, toys, and clothes
- Set small, reachable, and clear goals
- Reward positive behavior (eg, a sticker chart with a bigger reward for a certain number of stickers)
- Use charts and checklists to help the child stay "on task"
- Suggest physical activity breaks during tasks that require attention
- Limit choices
- Find activities where the child can be successful (eg, hobbies, sports)

- Use calm discipline (eg, time out, distraction, removing the child from the situation)

ADHD AND SCHOOL — Children who are diagnosed with attention deficit hyperactivity disorder (ADHD) may need changes in how they are taught, including extra help with school work during or after class. This extra help can be given in the classroom or in a "resource" room setting.

Other suggestions for teachers include:

- Write homework assignments down (on paper or send by email)
- Have the child sit near the front of the classroom
- Allow the child extra time to complete school work
- Give the child a private signal when he or she is "off-task"
- Use a daily report card to help parents to monitor their child's symptoms and how well the current ADHD treatment plan is working

Sometimes children with ADHD also have learning disabilities. If attention and behavior improve with treatment, but the child still struggles with specific types of school work (eg, reading comprehension or mathematics), he or she may need to be evaluated for a specific learning disability.

More information for teachers of children with ADHD is available through the [National Resource Center on ADHD](#).

ADHD is considered to be a disability under the Individuals with Disabilities Education Act (IDEA [PL-101-476]). Under this act, children with ADHD may qualify for special education or related services. Alternatively, the child may qualify for changes in the regular classroom setting under Section 504 of the Rehabilitation Act of 1973.

In addition, the Americans with Disabilities Act may provide individuals with ADHD reasonable accommodations in certain private schools and colleges ([table 1](#)). To learn more about a child's educational rights, contact a local [Parent Technical Assistance Center](#) (available in every state in the United States).

COMPLEMENTARY AND ALTERNATIVE TREATMENTS FOR ADHD — Complementary therapies are used along with mainstream medical therapies. They do not replace medical treatment, but are offered to support the patient and family. Examples include massage, support groups, and biofeedback. Alternative treatments are treatments or products that are not considered to be part of conventional medicine. They usually are not reimbursed by insurance companies.

Complementary and alternative medicine (CAM) therapies that have been tried for attention deficit hyperactivity disorder (ADHD) include vision training, special diets (eg, avoiding sugar, allergy triggers, or particular food additives), megavitamins, herbal and mineral supplements, EEG biofeedback, and applied kinesiology.

These treatments are often used by parents of children with ADHD because they may believe that these treatments "are safer than traditional medicines", "are natural", or "can cure ADHD".

However, studies have not confirmed the benefits of these treatments, and the risks are not well understood. One significant risk is that the treatment will fail and cause a setback for the child if symptoms of ADHD continue. Another risk is that these treatments are expensive; CAM therapies are generally not covered by health insurance.

Any parent who is considering use of a CAM treatment should gather information about the safety, risks, and benefits of the treatment. You can find reliable information about alternative treatments from your child's healthcare team (physician, nurse, dietitian) and the [National Center for Complementary and Alternative Medicine](#).

If you are considering a complementary or alternative treatment for your child, ask the following questions:

- Does it claim to cure ADHD and multiple other health problems? There is currently no known cure for ADHD, and no single treatment is likely to cure multiple health problems.
- Does it claim to be harmless or natural? Natural does not necessarily mean safe.
- Is it offered by only one individual or is it a secret that only certain people can share? Reputable treatments that work well should be available from any licensed healthcare professional.
- Is it based on multiple studies that have been published? To confirm the safety and benefit of a treatment, multiple clinical studies should be published in mainstream medical journals (see www.pubmed.gov).

- Is it expensive? Spending a large amount of money on a treatment that is not proven is risky.
- Is the group or person promoting the CAM treatment an expert in ADHD treatment? Verify the education and licensing of any person who claims to be an expert. All states within the United States have a licensing board that can verify a person's credentials.

LIVING WITH ADHD

Other family members — Because attention deficit hyperactivity disorder (ADHD) is usually an inherited condition, parents and siblings of a child with ADHD could also have ADHD. Talk to your doctor or nurse to see if you should be evaluated. (See ["Patient information: Symptoms and diagnosis of attention deficit hyperactivity disorder in children \(Beyond the Basics\)"](#), section on 'Diagnostic criteria'.)

Driving — Adolescents with untreated ADHD are two to four times more likely to have motor vehicle accidents than those without ADHD. They also are more likely to have their driver's license suspended or revoked.

As a result, parents of adolescents with ADHD should discuss the issues surrounding driving before the adolescent is licensed to drive. A longer period of supervision (eg, the adolescent drives with an adult) can help to ensure that the teen is able to use good judgment, can react quickly and carefully, and is safe to drive independently.

Discussing medicines — If you decide to use medicine to treat ADHD, you should discuss this decision with your child. This includes discussing:

- The purpose and expected benefits of the medicine
- The need for the child to follow the rules and make good choices with the help of the medicine
- The possible need to try more than one medicine or dose

Diversion and misuse of stimulant medicines are common concerns of many parents.

- Diversion is defined as giving, selling, or trading stimulants
- Misuse is defined as using a stimulant in higher-than-prescribed doses or in combination with illegal drugs or alcohol

Ways to avoid these problems include using long-acting medicines, keeping track of prescription dates, and talking to the child about the possibility that friends or peers may ask them to divert or misuse medicine.

Seek support — Parenting a child with ADHD can be emotionally and physically exhausting, and most parents need support to cope. Support can come from multiple resources, including family, friends, and support groups. There are a number of organizations that can provide information about parenting a child with ADHD. (See ["Where to get more information"](#) below.)

ADHD in adulthood — For many children, the effect of ADHD on behavior, social skills, and school performance continues into adolescence and adulthood. A separate topic discusses ADHD in adults. (See ["Adult attention deficit hyperactivity disorder in adults: Epidemiology, pathogenesis, clinical features, course, assessment, and diagnosis"](#).)

- For adolescents or adults who have difficulty with organization and time management, certified "coaches" are available to provide support and instruction. Additional information about ADHD coaches can be obtained through the [National Resource Center on ADHD](#).
- Counseling or self-help groups also can provide support to adults with ADHD. Counseling is usually recommended along with medicines and skills training programs. Adults with newly diagnosed ADHD sometimes have a long history of low self-esteem, school failure, frequent job changes, and relationship problems.
- Counseling for married adults can focus on improving communication skills, resolving conflict and solving problems, and educating the patient's spouse about ADHD.

WHERE TO GET MORE INFORMATION — Your child's healthcare provider is the best source of information for questions and concerns related to your child's medical problem.

This article will be updated as needed on our web site (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for healthcare professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

[Patient information: Attention deficit hyperactivity disorder \(ADHD\) \(The Basics\)](#)

[Patient information: Medicines for attention deficit hyperactivity disorder \(ADHD\) \(The Basics\)](#)

[Patient information: Fragile X syndrome \(The Basics\)](#)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

[Patient information: Symptoms and diagnosis of attention deficit hyperactivity disorder in children \(Beyond the Basics\)](#)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

[Attention deficit hyperactivity disorder in children and adolescents: Clinical features and evaluation](#)

[Attention deficit hyperactivity disorder in children and adolescents: Epidemiology and pathogenesis](#)

[Pharmacology of drugs used to treat attention deficit hyperactivity disorder in children and adolescents](#)

[Cardiac evaluation of patients receiving pharmacotherapy for attention deficit hyperactivity disorder](#)

[Attention deficit hyperactivity disorder in children and adolescents: Overview of treatment and prognosis](#)

[Specific learning disabilities in children: Clinical features](#)

[Specific learning disabilities in children: Evaluation](#)

[Adult attention deficit hyperactivity disorder in adults: Epidemiology, pathogenesis, clinical features, course, assessment, and diagnosis](#)

The following organizations also provide reliable health information.

- National Library of Medicine

www.nlm.nih.gov/medlineplus/attentiondeficithyperactivitydisorder.html

- National Institute of Mental Health

www.nimh.nih.gov/health/publications/attention-deficit-hyperactivity-disorder/complete-index.shtml

- Children and Adults with Attention Deficit Hyperactivity Disorder

www.chadd.org

[1-4]

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GRAPHICS

Americans with Disabilities Act

Title I of the **Americans with Disabilities Act of 1990**, which took effect July 26, 1992, prohibits private employers, state and local governments, employment agencies, and labor unions from discriminating against qualified individuals with disabilities in job application procedures; hiring; firing; advancement; compensation; job training; and other terms, conditions and privileges of employment. An individual with a disability is a person who:

Has a physical or mental impairment that substantially limits one or more major life activities

Has a record of such an impairment

Is regarded as having such an impairment

A qualified employee or applicant with a disability is an individual who, with or without reasonable accommodation, can perform the essential functions of the job in question. Reasonable accommodation may include, but is not limited to:

Making existing facilities used by employees readily accessible to and usable by persons with disabilities

Job restructuring

Modifying work schedules

Reassignment to a vacant position

Acquiring or modifying equipment or devices

Adjusting modifying examinations, training materials, or policies, and providing qualified readers or interpreters

An employer is required to make an accommodation to the known disability of a qualified applicant or employee if it would not impose an "undue hardship" on the operation of the employer's business. Undue hardship is defined as an action requiring significant difficulty or expense when considered in light of factors such as an employer's size, financial resources, and the nature and structure of its operation.

An employer is not required to lower quality or production standards to make an accommodation, nor is an employer obligated to provide personal use items such as glasses or hearing aids.

Medical examinations and inquiries

Employers may not ask job applicants about the existence, nature, or severity of a disability. Applicants may be asked about their ability to perform specific job functions. A job offer may be conditioned on the results of a medical examination, but only if the examination is required for all entering employees in similar jobs. Medical examinations of employees must be job related and consistent with the employer's business needs.

Drug and alcohol abuse

Employees and applicants currently engaging in the illegal use of drugs are not covered by the ADA when an employer acts on the basis of such use. Tests for illegal drugs are not subject to the ADA's restrictions on medical examinations. Employers may hold illegal drug users and alcoholics to the same performance standards as other employees.

EEOC enforcement of the ADA

The U.S. Equal Employment Opportunity Commission issued regulations to enforce the provisions of Title I of the ADA on July 26, 1991. The provisions originally took effect on July 26, 1992, and covered employers with 25 or more employees. On July 26, 1994, the threshold dropped to include employers with 15 or more employees.

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