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Text  
References  
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**Patient information: Symptoms and diagnosis of attention deficit hyperactivity disorder in children (Beyond the Basics)**

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**Literature review current through:** Sep 2014. | **This topic last updated:** Oct 07, 2013.

**ATTENTION DEFICIT HYPERACTIVITY DISORDER OVERVIEW** — Attention deficit hyperactivity disorder (ADHD) is a medical condition with symptoms of inattention, hyperactivity, and impulsivity. It is often first recognized in childhood. The symptoms affect a child's cognitive, academic, behavioral, emotional, and social functioning, and the condition often continues into adulthood.

Approximately 8 to 10 percent of children aged 4 to 17 years have ADHD, making it one of the most common disorders of childhood. It occurs two to four times more commonly among boys.

The symptoms and diagnosis of ADHD will be reviewed here. The treatment of ADHD is discussed separately. (See "[Patient information: Treatment of attention deficit hyperactivity disorder in children \(Beyond the Basics\)](#)".)

**ADHD CAUSES** — The cause(s) of attention deficit hyperactivity disorder (ADHD) are not clear, although there are a number of theories. Most experts agree that ADHD is a medical or neurodevelopmental disorder. Many experts believe there is an inherited imbalance of chemicals in the brain. This is supported by the improvements often seen with the use of medications that affect these chemicals.

Exposure to tobacco before birth may increase the risk of developing ADHD. Most experts do not feel that dietary factors (food additives, sugar, food sensitivity, mineral deficiency) cause ADHD. It is possible that some children have mild behavioral changes in response to certain foods or food additives. However, these changes do not meet the diagnostic criteria for ADHD. (See '[Diagnostic criteria](#)' below.)

**ADHD SYMPTOMS** — Attention deficit hyperactivity disorder (ADHD) is a condition that can cause three categories of symptoms: hyperactivity, impulsivity, and inattention. Children with ADHD may have one or more of these symptoms and the symptoms may change in frequency or pattern as the child develops. In most situations, the child has difficulty controlling his or her behavior or attention and may have difficulty anticipating the consequences of his or her behavior. The child does not usually misbehave because he or she is willful or wants to annoy those around him or her.

**Hyperactivity** — Hyperactive behavior is defined as excessive fidgetiness or talking, difficulty remaining seated when required to do so, difficulty playing quietly, and frequent restlessness or always seeming to be "on the go".

These symptoms are usually seen by the time a child is four years old and typically increase over the next three to four years. The symptoms may peak in severity when the child is seven to eight years of age, after which they often begin to decline. By the adolescent years, the hyperactive symptoms may be less noticeable, although ADHD can continue to be present.

**Impulsivity** — Impulsive behavior almost always occurs with hyperactivity in younger children. It can cause difficulty waiting turns, blurting out answers too quickly, disruptive classroom behavior, intruding or interrupting others' activities, rejection by classmates, and unintentional injury.

Similar to the hyperactive symptoms, impulsive symptoms are typically seen by the time a child is four years old and increase

during the next three to four years to peak in severity when the child is seven to eight years of age. However, impulsive symptoms usually continue to be a problem throughout the life of the individual.

**Inattention** — Inattention may take many forms, including forgetfulness, being easily distracted, losing or misplacing things, disorganization, underachievement in school, poor follow-through with assignments or tasks, poor concentration, and poor attention to detail.

Because of the developmental demands on a child (eg, needing to pay attention, sit still), these problems may become more obvious in school when the child is eight to nine years old, although the child may have symptoms at a younger age when at home. Inattention is most likely to persist through adolescence and potentially into adulthood.

**Types of ADHD** — Three subtypes of ADHD have been identified:

- The predominantly inattentive type, previously known as attention deficit disorder
- The predominantly hyperactive-impulsive type
- The combined type

The subtype is determined based upon a child's predominant symptoms, and can change over time.

**ADHD EVALUATION AND DIAGNOSIS** — Parents who are concerned their child may have attention deficit hyperactivity disorder (ADHD) should speak with the child's healthcare provider. Early recognition and treatment of ADHD are important to prevent or limit emotional, academic, and behavioral difficulties.

There is no simple test to diagnose ADHD. In addition, many of the symptoms of ADHD are common among four- to six-year-old children, but tend to occur with less frequency and/or intensity than in children with ADHD. Thus, it may be difficult for parents to tell if their young child has ADHD or is simply behaving as young children often do. However, studies that evaluate children over time have confirmed that most preschool children who meet all the criteria for ADHD will continue to do so as they get older.

**Diagnostic criteria** — Criteria for the diagnosis of ADHD have been defined by the American Psychiatric Association. There are several important features of these criteria, including the following:

- The symptoms must be present in more than one setting (eg, school and home).
- The symptoms must persist for at least six months.
- The symptoms must be present before the age of 12 years.
- The symptoms must impair function in academic, social, or occupational activities.
- The symptoms must be excessive for the age of the child.
- Other mental disorders that could account for the symptoms must be excluded.

There are a number of other medical and psychological conditions that have symptoms similar to those of ADHD. A thorough medical, developmental, educational, and psychosocial evaluation is necessary to confirm the diagnosis. Several office visits, occasionally with more than one healthcare provider, may be necessary during the evaluation process.

**CONDITIONS THAT EXIST WITH ADHD** — Other psychological and developmental disorders exist in as many as one-half of children with attention deficit hyperactivity disorder (ADHD). These can be difficult to distinguish from ADHD because there are frequently overlapping symptoms. The most common coexisting disorders include learning disabilities, disruptive behavior disorders (oppositional defiant disorder and conduct disorder), anxiety, and mood disorders (depression or bipolar disorder). ADHD can also co-occur with autism spectrum disorder.

Treatment for coexisting conditions may require medication. Behavioral or psychosocial treatments may also be recommended. A child with a coexisting condition usually requires the care of a specialist (eg, psychiatrist, child psychologist or developmental behavioral pediatrician, pediatric neuropsychologist, pediatric neurologist).

**Learning disorders** — Learning disorders occur in 20 to 50 percent of children with ADHD, and may cause difficulty with performance in school. Parents should consult with the child's teacher and/or school counselor if their child is demonstrating difficulty with reading, spelling, or arithmetic.

**Disruptive behavior disorders** — Disruptive behavior disorders include oppositional defiant disorder (ODD) and conduct disorder (CD), and affect up to 40 percent of people with ADHD. While all children and adolescents can exhibit disruptive behaviors at some point, those with ODD or CD behave in this way frequently and over a longer period of time than would

normally be expected.

ODD often causes a pattern of arguing with adults, frequent temper tantrums, and refusing to follow school or family rules. CD is a more severe form of ODD that includes a pattern of intentionally breaking the rules while trying to avoid being caught; lying or stealing; and aggressive behaviors that threaten or harm property, people, or animals.

**Mood disorders** — Mood disorders include depression, anxiety, and bipolar (manic depressive) disorder. (See "[Patient information: Depression in adolescents \(Beyond the Basics\)](#)" and "[Patient information: Bipolar disorder \(manic depression\) \(Beyond the Basics\)](#)".)

**WHEN TO SEEK HELP** — Parents who suspect that their child has attention deficit hyperactivity disorder (ADHD) should begin by talking to the child's teacher and/or school staff. This can help parents determine if the child has difficulties with behavior in more than one setting (eg, at home and at school).

The next step is to make an appointment with the child's healthcare provider. The provider will evaluate the child and determine if further testing or evaluation is needed, and if ADHD or another condition is a possible cause of symptoms. Bringing school records to the appointment may help the provider to have a clearer understanding of the child's situation. More than one visit, occasionally with another clinician, is often necessary before a diagnosis is made.

After the diagnosis is made and treatment begins, the parent, teacher, and healthcare provider will continue to monitor the child to ensure that treatment is effective and the diagnosis is correct. Referral to a developmental behavioral pediatrician or child psychiatrist may be recommended if improvements are not seen; further evaluation is sometimes required.

**ADHD TREATMENT** — The treatment of attention deficit hyperactivity disorder is discussed separately. (See "[Patient information: Treatment of attention deficit hyperactivity disorder in children \(Beyond the Basics\)](#)".)

**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](http://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: Learning disabilities \(The Basics\)](#)

**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: Treatment of attention deficit hyperactivity disorder in children \(Beyond the Basics\)](#)

[Patient information: Depression in adolescents \(Beyond the Basics\)](#)

[Patient information: Bipolar disorder \(manic depression\) \(Beyond the Basics\)](#)

**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](#)

[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](#)

[Long-term neurodevelopmental outcome of premature infants](#)

[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](#)

The following organizations also provide reliable health information.

- Children and Adults with Attention Deficit Hyperactivity Disorder  
([www.chadd.org](http://www.chadd.org))
- National Alliance for the Mentally Ill  
([www.nami.org](http://www.nami.org))
- National Attention Deficit Disorder Association  
([www.add.org](http://www.add.org))
- National Institute of Mental Health  
([www.nimh.nih.gov/health/publications/adhd-listing.shtml](http://www.nimh.nih.gov/health/publications/adhd-listing.shtml))
- The United States Department of Education  
([www.ed.gov/about/offices/list/osers](http://www.ed.gov/about/offices/list/osers))
- The American Academy of Child and Adolescent Psychiatry  
([www.aacap.org](http://www.aacap.org))
- Learning Disabilities Association of America  
([www.ldanatl.org/aboutld/teachers/understanding/adhd.asp](http://www.ldanatl.org/aboutld/teachers/understanding/adhd.asp))

[1-4]

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Topic 1210 Version 13.0

## Disclosures

**Disclosures:** Kevin R Krull, PhD Nothing to disclose. Marilyn Augustyn, MD Nothing to disclose. Mary M Torchia, MD Employee of UpToDate, Inc. Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting through a multi-level review process, and through requirements for references to be provided to support the content. Appropriately referenced content is required of all authors and must conform to UpToDate standards of evidence.

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