Autism Spectrum Disorder

Overview

Autism spectrum disorder (ASD) is a developmental disorder that affects communication and behavior. Although autism can be diagnosed at any age, it is said to be a “developmental disorder” because symptoms generally appear in the first two years of life.

According to the *[Diagnostic and Statistical Manual of Mental Disorders](https://www.psychiatry.org/psychiatrists/practice/dsm)*[(](https://www.psychiatry.org/psychiatrists/practice/dsm)*[DSM-5](https://www.psychiatry.org/psychiatrists/practice/dsm)*[)](https://www.psychiatry.org/psychiatrists/practice/dsm), a guide created by the American Psychiatric Association used to diagnose mental disorders, people with ASD have:

* Difficulty with communication and interaction with other people (symptoms that hurt the person’s ability to function properly in school, work, and other areas of life)
* Restricted interests and repetitive behaviors
* Sensory issues

Autism is known as a “spectrum” disorder because there is wide variation in the type and severity of symptoms people experience. ASD occurs in all ethnic, racial, and economic groups. Although ASD can be a lifelong disorder, treatments and services can improve a person’s symptoms and ability to function. The [American Academy of Pediatrics](https://www.aap.org/en-us/Pages/Default.aspx) recommends that all children be screened for autism. All caregivers should talk to their doctor about ASD screening or evaluation.

Signs and Symptoms of ASD

People with ASD have difficulty with social communication and interaction, restricted interests, and repetitive behaviors. The list below gives some examples of the types of behaviors that are seen in people diagnosed with ASD. Not all people with ASD will show all behaviors, but most will show several.

Social communication / interaction behaviors may include:

* Making little or inconsistent eye contact
* Tending not to look at or listen to people
* Rarely sharing enjoyment of objects or activities by pointing or showing things to others
* Failing to, or being slow to, respond to someone calling their name or to other verbal attempts to gain attention
* Having difficulties with the back and forth of conversation
* Often talking at length about a favorite subject without noticing that others are not interested or without giving others a chance to respond
* Having facial expressions, movements, and gestures that do not match what is being said
* Having an unusual tone of voice that may sound sing-song or flat and robot-like
* Having trouble understanding another person’s point of view or being unable to predict or understand other people’s actions

Restrictive / repetitive behaviors may include:

* Repeating certain behaviors or having unusual behaviors. For example, repeating words or phrases, a behavior called *echolalia*
* Having a lasting intense interest in certain topics, such as numbers, details, or facts
* Having overly focused interests, such as with moving objects or parts of objects
* Getting upset by slight changes in a routine
* Being more or less sensitive than other people to sensory input, such as light, noise, clothing, or temperature

People with ASD may also experience sleep problems and irritability. Although people with ASD experience many challenges, they may also have many strengths, including:

* Being able to learn things in detail and remember information for long periods of time
* Being strong visual and auditory learners
* Excelling in math, science, music, or art

Causes and Risk Factors

While scientists don’t know the exact causes of ASD, research suggests that genes can act together with influences from the environment to affect development in ways that lead to ASD. Although scientists are still trying to understand why some people develop ASD and others don’t, some risk factors include:

* Having a sibling with ASD
* Having older parents
* Having certain genetic conditions—people with conditions such as Down syndrome, fragile X syndrome, and Rett syndrome are more likely than others to have ASD
* Very low birth weight

Diagnosing ASD

Doctors diagnose ASD by looking at a person’s behavior and development. ASD can usually be reliably diagnosed by the age of two. It is important for those with concerns to seek out assessment as soon as possible so that a diagnosis can be made, and treatment can begin.

Diagnosis in Young Children

Diagnosis in young children is often a two-stage process.

Stage 1: General Developmental Screening During Well-Child Checkups

Every child should receive well-child check-ups with a pediatrician or an early childhood health care provider. The [American Academy of Pediatrics](https://www.aap.org/en-us/Pages/Default.aspx) recommends that all children be screened for developmental delays at their 9-, 18-, and 24- or 30-month well-child visits and specifically for autism at their 18- and 24-month well-child visits. Additional screening might be needed if a child is at high risk for ASD or developmental problems. Those at high risk include children who have a family member with ASD, have some ASD behaviors, have older parents, have certain genetic conditions, or who were born at a very low birth weight.

Parents’ experiences and concerns are very important in the screening process for young children. Sometimes the doctor will ask parents questions about the child’s behaviors and combine those answers with information from ASD screening tools, and with his or her observations of the child. Read more about [screening instruments](http://www.cdc.gov/ncbddd/autism/hcp-screening.html) on the Centers for Disease Control and Prevention (CDC) website.

Children who show developmental problems during this screening process will be referred for a second stage of evaluation.

Stage 2: Additional Evaluation

This second evaluation is with a team of doctors and other health professionals who are experienced in diagnosing ASD.

This team may include:

* A developmental pediatrician—a doctor who has special training in child development
* A child psychologist and/or child psychiatrist—a doctor who has specialized training in brain development and behavior
* A neuropsychologist—a doctor who focuses on evaluating, diagnosing, and treating neurological, medical, and neurodevelopmental disorders
* A speech-language pathologist—a health professional who has special training in communication difficulties

The evaluation may assess:

* Cognitive level or thinking skills
* Language abilities
* Age-appropriate skills needed to complete daily activities independently, such as eating, dressing, and toileting

Because ASD is a complex disorder that sometimes occurs along with other illnesses or learning disorders, the comprehensive evaluation may include:

* Blood tests
* Hearing test

The outcome of the evaluation will result in a formal diagnosis and recommendations for treatment.

Diagnosis in older children and adolescents

ASD symptoms in older children and adolescents who attend school are often first recognized by parents and teachers and then evaluated by the school’s special education team. The school’s team may perform an initial evaluation and then recommend these children visit their primary health care doctor or doctors who specialize in ASD for additional testing.

Parents may talk with these specialists about their child’s social difficulties including problems with subtle communication. These subtle communication issues may include problems understanding tone of voice, facial expressions, or body language. Older children and adolescents may have trouble understanding figures of speech, humor, or sarcasm. Parents may also find that their child has trouble forming friendships with peers.

Diagnosis in adults

Diagnosing ASD in adults is often more difficult than diagnosing ASD in children. In adults, some ASD symptoms can overlap with symptoms of other mental-health disorders, such as anxiety or attention-deficit/hyperactivity disorder (ADHD).

Adults who notice the signs and symptoms of ASD should talk with a doctor and ask for a referral for an ASD evaluation. While testing for ASD in adults is still being refined, adults can be referred to a neuropsychologist, psychologist, or psychiatrist who has experience with ASD. The expert will ask about concerns, such as:

* Social interaction and communication challenges
* Sensory issues
* Repetitive behaviors
* Restricted interests

Information about the adult’s developmental history will help in making an accurate diagnosis, so an ASD evaluation may include talking with parents or other family members.

Getting a correct diagnosis of ASD as an adult can help a person understand past difficulties, identify his or her strengths, and obtain the right kind of help. Studies are now underway to determine the types of services and supports that are most helpful for improving the functioning and community integration of transition-age youth and adults with ASD.

Changes to the diagnosis of ASD

In 2013, a revised version of the *[Diagnostic and Statistical Manual of Mental Disorders (DSM)](https://www.psychiatry.org/psychiatrists/practice/dsm)* was released. This revision changed the way autism is classified and diagnosed. Using the previous version of the *DSM*, people could be diagnosed with one of several separate conditions:

* Autistic disorder
* Asperger’s’ syndrome
* Pervasive developmental disorder not otherwise specified (PDD-NOS)

In the current revised version of the *DSM* (the *DSM-5*), these separate conditions have been combined into one diagnosis called “autism spectrum disorder.” Using the *DSM-5*, for example, people who were previously diagnosed as having Asperger’s syndrome would now be diagnosed as having autism spectrum disorder. Although the “official” diagnosis of ASD has changed, there is nothing wrong with continuing to use terms such as Asperger’s syndrome to describe oneself or to identify with a peer group.

Treatments and Therapies

Treatment for ASD should begin as soon as possible after diagnosis. Early treatment for ASD is important as proper care can reduce individuals’ difficulties while helping them learn new skills and make the most of their strengths.

The wide range of issues facing people with ASD means that there is no single best treatment for ASD. Working closely with a doctor or health care professional is an important part of finding the right treatment program.

Medication

A doctor may use medication to treat some symptoms that are common with ASD. With medication, a person with ASD may have fewer problems with:

* Irritability
* Aggression
* Repetitive behavior
* Hyperactivity
* Attention problems
* Anxiety and depression

*Read more about the latest news and information on medication warnings, patient medication guides, or newly approved medications at the Food and Drug Administration’s (FDA) website at*[*https://www.fda.gov/*](https://www.fda.gov/)*.*

Behavioral, psychological, and educational therapy

People with ASD may be referred to doctors who specialize in providing behavioral, psychological, educational, or skill-building interventions. These programs are typically highly structured and intensive and may involve parents, siblings, and other family members. Programs may help people with ASD:

* Learn life-skills necessary to live independently
* Reduce challenging behaviors
* Increase or build upon strengths
* Learn social, communication, and language skills

Other resources

There are many social services programs and other resources that can help people with ASD. Here are some tips for finding these additional services:

* Contact your doctor, local health department, school, or autism advocacy group to learn about special programs or local resources.
* Find an autism support group. Sharing information and experiences can help individuals with ASD and/or their caregivers learn about treatment options and ASD-related programs.
* Record conversations and meetings with health care providers and teachers. This information helps when it’s time to make decisions about which programs might best meet an individual’s needs.
* Keep copies of doctors' reports and evaluations. This information may help an individual qualify for special programs.

Join a Study

Clinical trials are research studies that look at new ways to prevent, detect, or treat diseases and conditions. Clinical trials may test new treatments, such as new drugs or new combinations of drugs, new psychotherapies or devices, or new ways to use existing treatments. The goal of clinical trials is to determine if a new test or treatment works and is safe.

Although individual participants may benefit from being part of a clinical trial, participants should be aware that the primary purpose of a clinical trial is to gain new scientific knowledge so that others may be better helped in the future. **Decisions about participating in a clinical trial are best made in collaboration with a licensed health professional.**

To learn more about clinical trials, please visit the main page of the [NIH Clinical Trials and You](http://www.nih.gov/health/clinicaltrials/) website. To find a clinical trial, visit the [Finding a Clinical Trial](https://www.nih.gov/health-information/nih-clinical-research-trials-you/finding-clinical-trial) page.

Learn More

Free brochures and factsheets

* [Autism Spectrum Disorder](https://www.nimh.nih.gov/health/publications/autism-spectrum-disorder/index.shtml): This brochure provides information about the symptoms, diagnosis, and treatment of ASD.

Research

Many research studies supported by the National Institutes of Health (NIH) and the National Institute of Mental Health (NIMH) focus on gaining a better understanding of ASD and on finding the best diagnosis and treatment options for this disorder. The links below provide information about NIH and NIMH support for ASD research:

* [NIH Joins Public-Private Partnership to Fund Research on Autism Biomarkers](https://www.nimh.nih.gov/news/science-news/2015/nih-joins-public-private-partnership-to-fund-research-on-autism-biomarkers.shtml)
* [NIMH Has Awarded a Number of Grants for Services Research](https://www.nimh.nih.gov/news/science-news/2014/new-grants-fund-cross-lifespan-services-research-for-autism-spectrum-disorder.shtml)
* [NIH awards nearly $100 million for Autism Centers of Excellence program](https://www.nih.gov/news-events/news-releases/nih-awards-nearly-100-million-autism-centers-excellence-program)
* [National Database for Autism Research (NDAR)](https://ndar.nih.gov/) (an NIH-funded data bank that is helping to speed progress in ASD research)

Visit the [NIMH’s Autism News page](https://www.nimh.nih.gov/news/science-news/science-news-about-autism.shtml" \o "Science News About Autism) for the latest news about ASD research

Statistics

For more information about ASD statistics, visit:

* The NIMH [autism spectrum disorder statistics page](https://www.nimh.nih.gov/health/statistics/autism-spectrum-disorder-asd.shtml" \o "Autism Spectrum Disorder (ASD))
* The CDC [autism spectrum disorder data and statistics page](https://www.cdc.gov/ncbddd/autism/data.html)
* The CDC [Autism and Developmental Disabilities Monitoring (ADDM) Network](https://www.cdc.gov/ncbddd/autism/addm.html)

Federal resources

* [*Eunice Kennedy Shriver* National Institute of Child Health and Human Development](https://www.nichd.nih.gov/health/topics/autism/Pages/default.aspx)
* [National Institute of Neurological Disorders and Stroke](https://www.ninds.nih.gov/Disorders/All-Disorders/Autism-Spectrum-Disorder-Information-Page)
* [National Institute on Deafness and Other Communication Disorders](https://www.nidcd.nih.gov/health/autism-spectrum-disorder-communication-problems-children)
* [National Institute of Environmental Health Sciences](https://www.niehs.nih.gov/health/topics/conditions/autism/)
* [NIH Autism Listserv](https://list.nih.gov/cgi-bin/wa.exe?A0=AUTISM)
* [Centers for Disease Control and Prevention](http://www.cdc.gov/ncbddd/autism/index.html)
* [Interagency Autism Coordinating Committee](https://iacc.hhs.gov/)
* [MedlinePlus](https://www.nlm.nih.gov/medlineplus/autismspectrumdisorder.html), the National Library of Medicine
* [MedlinePlus](https://vsearch.nlm.nih.gov/vivisimo/cgi-bin/query-meta?v%3Aproject=medlineplus-spanish&v%3Asources=medlineplus-spanish-bundle&query=Espectro+Autista), en Español, Biblioteca Nacional de Medicina

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