Autism Spectrum Disorder

National Institute of Mental Health

What is autism spectrum disorder?

Autism spectrum disorder (ASD) is a neurological and developmental disorder that affects how people interact with others, communicate, learn, and behave. Although autism can be diagnosed at any age, it is described as a "developmental disorder" because symptoms generally appear in the first two years of life.

According to the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*, a guide created by the American Psychiatric Association that health care providers use to diagnose mental disorders and developmental disorders, people with ASD often have:

- Difficulty with social communication and interaction with other people
- Restricted interests and repetitive behaviors
- Symptoms that affect their ability to function in school, work, and other areas of life

Autism is known as a "spectrum" disorder because people with autism have a range of characteristics, needs, strengths, and challenges.

People of all ages, races, ethnicities, sexes, and economic backgrounds can be diagnosed with ASD. Although ASD can be a lifelong disorder, treatments, services, and supports can improve a person's health, well-being, and daily functioning. The American Academy of Pediatrics recommends that all children receive screening for autism. Caregivers should talk to their child's health care provider about ASD screening or evaluation.

What are the signs and symptoms of ASD?

The list below gives some examples of different types of behaviors that are common among people diagnosed with ASD. Not all people with ASD will have all behaviors, but most will have several of the behaviors listed below.

Social communication and social interaction behaviors may include:

- Making little or inconsistent eye contact
- Appearing not to look at or listen to people who are talking
- Infrequently sharing interest, emotion, or enjoyment of objects or activities (including infrequently pointing at or showing things to others)
- Not responding or being slow to respond to one's name or other verbal bids for attention
- Having difficulties with the back and forth of conversation
- Often talking at length about a subject of interest without considering social cues or conversational give-and-take
- Displaying facial expressions, movements, and gestures that do not match what is being said

- Having an unusual tone of voice that may sound flat, lacking emotion or tonal variation
- Having trouble understanding another person's point of view or being unable to predict or understand other people's actions
- Difficulties adjusting behavior to different social situations
- Difficulties sharing in imaginative play or in making friends

Restrictive/repetitive behaviors may include:

- Repeating certain behaviors or having unusual behaviors, such as repeating words or phrases (a behavior called *echolalia*)
- Having a lasting intense interest in specific topics, such as numbers, details, or facts
- Showing overly focused interests, such as with moving objects or with parts of objects
- Becoming upset by slight changes in a routine and having difficulty with transitions

Autistic people often have sensory differences such as:

- Being more sensitive or less sensitive than other people to sensory input, such as light, sound, clothing, or temperature

People with ASD also may experience sleep problems and irritability.

People on the autism spectrum also may 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

What causes ASD?

Researchers do not know the primary causes of ASD, but studies suggest that a person's genes and aspects of their environment may affect development in ways that lead to ASD. Some factors that are associated with an increased likelihood of developing ASD include:

- Having a sibling with ASD
- Having older parents
- Having a very low birth weight
- Having certain genetic conditions (such as Down syndrome or Fragile X syndrome)

Not everyone who has these factors will develop ASD.

How is ASD diagnosed?

Health care providers diagnose ASD by evaluating a person's behavior and development. ASD can usually be reliably diagnosed by the age of 2. It is important to seek an evaluation as soon as possible. The earlier ASD is diagnosed, the sooner treatments and services 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 checkups with a pediatrician or an early childhood health care provider. The American Academy of Pediatrics recommends that all children receive screening for developmental delays at their 9-, 18-, and 24- or 30-month well-child visits, with specific autism screenings at the 18- and 24-month well-child visits. A child may receive additional screenings if they have an increased likelihood of developing ASD or developmental problems.

Considering caregivers' experiences and concerns is an important part of the screening process for young children. The health care provider may ask questions about the child's behaviors and evaluate those answers together with information from ASD screening tools and clinical observations of the child. To learn more about ASD screening, visit the Centers for Disease Control and Prevention (CDC) website at **www.cdc.gov/autism/diagnosis**.

The health care provider may refer the child for additional evaluation if they show developmental differences in behavior or functioning during this screening process.

Stage 2: Additional diagnostic evaluation

It is important to accurately detect and diagnose children with ASD as early as possible, as this will shed light on their unique strengths and challenges. Early detection can also help caregivers determine which services, educational programs, and behavioral therapies are most likely to be helpful for their child.

A team of health care providers who have experience diagnosing ASD will conduct the diagnostic evaluation. This team may include child neurologists, developmental behavioral pediatricians, speech-language pathologists, child psychologists and psychiatrists, educational specialists, and occupational therapists.

The diagnostic evaluation is likely to include:

- Medical and neurological examinations
- Assessment of the child's cognitive abilities
- Assessment of the child's speech and language abilities
- Observation of the child's behavior
- An in-depth conversation with the child's caregivers about the child's behavior and development
- Assessment of age-appropriate skills needed to complete daily activities independently, such as eating, dressing, and toileting
- Questions about the child's family history

Because ASD is a complex disorder that sometimes occurs with other conditions or learning disorders, the comprehensive evaluation may include blood tests and a hearing test.

The outcome of this evaluation may result in a formal diagnosis and recommendations for treatment.

Diagnosis in older children and adolescents

Caregivers and teachers are often the first to recognize ASD symptoms in older children and adolescents. The school's special education team may perform an initial evaluation and then recommend that a child receive additional evaluation from their primary health care provider or a health care provider who specializes in ASD.

A child's caregivers may talk with these health care providers about the child's social difficulties, including problems with subtle communication. These subtle communication differences 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. They also may have challenges forming friendships with peers.

It is also important for the health care provider to learn about the child's strengths so they can tailor their recommendations for services and supports.

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 mental disorders such as an anxiety disorder or attention-deficit/hyperactivity disorder (ADHD).

Adults who have questions about whether they may be on the autism spectrum should talk with a health care provider and ask for a referral for an ASD evaluation. Although evaluation 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:

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

The evaluation may also include a conversation with caregivers and family members to learn about the person's early developmental history, which can help ensure an accurate diagnosis.

Obtaining a correct diagnosis of ASD as an adult can help people understand past challenges, identify personal strengths, and find the right kind of help. Studies are underway to determine the types of services and supports that are most helpful for autistic transition-age youth and adults.

What treatments and services are available for ASD?

Interventions, services, and supports for ASD are most effective when they begin as soon as possible after diagnosis. Receiving appropriate care and services can help address a person's specific needs and challenges while also helping them learn new skills and build on their strengths.

People with ASD have a wide range of issues and needs, which means there is no single best approach. Working closely with health care and service providers is an important part of finding the right combination of interventions, services, and supports.

Interventions and Services

People with ASD may be referred to health care and service providers who specialize in various intervention approaches, including behavioral, psychological, educational, occupational, physical, or speech-language therapy. These interventions and services are often highly structured and intensive and may involve caregivers, siblings, and other family members. These programs may help people:

- Learn social, communication, and language skills
- Manage behaviors that interfere with daily functioning and well-being
- Increase or build on strengths
- Learn life skills for living independently
- Find housing, educational supports, and job coaching or training

Medication

A health care provider may prescribe medication to treat specific symptoms, including:

- Aggression
- Anxiety and depression
- Attention
- Hyperactivity
- Irritability
- Repetitive behavior
- Self-injurious behavior

Read the most up-to-date information on medication, side effects, and warnings on the U.S. Food and Drug Administration (FDA) website at **www.fda.gov/drugsatfda**.

Finding services, programs, and resources

Many services, programs, and other resources are available to help people with autism and their families. Here are some tips for finding these additional resources:

- Contact a health care provider, local health department, school, community center, or autism advocacy group to learn about special programs or local resources.
- Find an autism support group. Sharing information and experiences can help people with autism and their caregivers learn about treatment options and autism-related programs.
- Keep records of your conversations and meetings with health care providers and teachers. This information helps when it is time to decide which programs and services are appropriate.
- Keep copies of health care reports and evaluations. This information may help people with autism qualify for special programs.

Where can I learn more about ASD?

For more information about ASD, visit:

- Centers for Disease Control and Prevention
  www.cdc.gov/autism
- *Eunice Kennedy Shriver* National Institute of Child Health and Human Development
  www.nichd.nih.gov/health/topics/autism
- Interagency Autism Coordinating Committee
  https://iacc.hhs.gov
- National Institute on Deafness and Other Communication Disorders
  www.nidcd.nih.gov/health/autism-spectrum-disorder-communication-problems-children

Clinical trials

Clinical trials are research studies that look at ways to prevent, detect, or treat diseases and conditions. These studies help show whether a treatment is safe and effective in people. Some people join clinical trials to help doctors and researchers learn more about a disease and improve health care. Other people, such as those with health conditions, join to try treatments that aren't widely available.

NIMH supports clinical trials across the United States. Talk to a health care provider about clinical trials and whether one is right for you. For more information, visit **www.nimh.nih.gov/clinicaltrials**.

For more information

Learn more at **www.nimh.nih.gov/health**. For information about various health topics, visit the National Library of Medicine's MedlinePlus resource at **https://medlineplus.gov**.

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