What is Autism Spectrum Disorder?

Autism spectrum disorder (ASD) is a developmental disability caused by differences in the brain. Some people with ASD have a known difference, such as a genetic condition. Other causes are not yet known. Scientists believe there are multiple causes of ASD that act together to change the most common ways people develop. We still have much to learn about these causes and how they impact people with ASD.

People with ASD may behave, communicate, interact, and learn in ways that are different from most other people. There is often nothing about how they look that sets them apart from other people. The abilities of people with ASD can vary significantly. For example, some people with ASD may have advanced conversation skills whereas others may be nonverbal. Some people with ASD need a lot of help in their daily lives; others can work and live with little to no support.

ASD begins before the age of 3 years and can last throughout a person's life, although symptoms may improve over time. Some children show ASD symptoms within the first 12 months of life. In others, symptoms may not show up until 24 months of age or later. Some children with ASD gain new skills and meet developmental milestones until around 18 to 24 months of age, and then they stop gaining new skills or lose the skills they once had.

As children with ASD become adolescents and young adults, they may have difficulties developing and maintaining friendships, communicating with peers and adults, or understanding what behaviors are expected in school or on the job. They may come to the attention of healthcare providers because they also have conditions such as anxiety, depression, or attention-deficit/hyperactivity disorder, which occur more often in people with ASD than in people without ASD.

Signs and Symptoms of Autism Spectrum Disorder

Autism spectrum disorder (ASD) is a developmental disability caused by differences in the brain. People with ASD often have problems with social

communication and interaction, and restricted or repetitive behaviors or interests. People with ASD may also have different ways of learning, moving, or paying attention. It is important to note that some people without ASD might also have some of these symptoms. But for people with ASD, these characteristics can make life very challenging.

Social Communication and Interaction Skills

Social communication and interaction skills can be challenging for people with ASD.

Examples of social communication and social interaction characteristics related to ASD can include:

- Avoids or does not keep eye contact
- Does not respond to name by 9 months of age
- Does not show facial expressions like happy, sad, angry, and surprised by 9 months of age
- Does not play simple interactive games like pat-a-cake by 12 months of age
- Uses few or no gestures by 12 months of age (for example, does not wave goodbye)
- Does not share interests with others by 15 months of age (for example, shows you an object that they like)
- Does not point to show you something interesting by 18 months of age
- Does not notice when others are hurt or upset by 24 months of age
- Does not notice other children and join them in play by 36 months of age
- Does not pretend to be something else, like a teacher or superhero, during play by 48 months of age
- Does not sing, dance, or act for you by 60 months of age

Restricted or Repetitive Behaviors or Interests:

People with ASD have behaviors or interests that can seem unusual. These behaviors or interests set ASD apart from conditions defined by problems with social communication and interaction only.

Examples of restricted or repetitive behaviors and interests related to ASD can include

- Close-up of child playing with toy blocks on the carpet.
- Lines up toys or other objects and gets upset when order is changed
- Repeats words or phrases over and over (called echolalia)
- Plays with toys the same way every time
- Is focused on parts of objects (for example, wheels)
- Gets upset by minor changes
- Has obsessive interests
- Must follow certain routines
- Flaps hands, rocks body, or spins self in circles
- Has unusual reactions to the way things sound, smell, taste, look, or feel

Other Characteristics:

Most people with ASD have other related characteristics. These might include:

- Delayed language skills
- Delayed movement skills
- Delayed cognitive or learning skills
- Hyperactive, impulsive, and/or inattentive behavior
- Epilepsy or seizure disorder
- Unusual eating and sleeping habits
- Gastrointestinal issues (for example, constipation)
- Unusual mood or emotional reactions
- Anxiety, stress, or excessive worry
- Lack of fear or more fear than expected

It is important to note that children with ASD may not have all or any of the behaviors listed as examples here.

Diagnostic Criteria for Autism Spectrum Disorder

To meet diagnostic criteria for ASD according to DSM-5, a child must have persistent deficits in each of three areas of social communication and interaction (see A.1. through A.3. below) plus at least two of four types of restricted, repetitive behaviors (see B.1. through B.4. below).

A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history (examples are illustrative, not exhaustive; see text):
    1. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.
    2. Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.
    3. Deficits in developing, maintaining, and understanding relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.

Specify current severity:

Severity is based on social communication impairments and restricted, repetitive patterns of behavior. For either criterion, severity is described in 3 levels: Level 3 – requires very substantial support, Level 2 – Requires substantial support, and Level 1 – requires support.[1]

B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history (examples are illustrative, not exhaustive; see text):
    1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypes, lining up toys or flipping objects, echolalia, idiosyncratic phrases).
    2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat same food every day).

3. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).
4. Hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment (e.g. apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).

Specify current severity:

Severity is based on social communication impairments and restricted, repetitive patterns of behavior. For either criterion, severity is described in 3 levels: Level 3 – requires very substantial support, Level 2 – Requires substantial support, and Level 1 – requires support.[1]

C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life).
D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.
E. These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay. Intellectual disability and autism spectrum disorder frequently co-occur; to make comorbid diagnoses of autism spectrum disorder and intellectual disability, social communication should be below that expected for general developmental level.

Note: Individuals with a well-established DSM-IV diagnosis of autistic disorder, Asperger's disorder, or pervasive developmental disorder not otherwise specified should be given the diagnosis of autism spectrum disorder. Individuals who have marked deficits in social communication, but whose symptoms do not otherwise meet criteria for autism spectrum disorder, should be evaluated for social (pragmatic) communication disorder.

Specify if:

With or without accompanying intellectual impairment .With or without accompanying language impairment

Associated with a known medical or genetic condition or environmental factor

Associated with another neurodevelopmental, mental, or behavioral disorder

With catatonia (refer to the criteria for catatonia associated with another mental disorder)

ASD Screening :

Developmental screening can be done by a number of professionals in health care, community, and school settings. However, primary health care providers are in a unique position to promote children's developmental health.

Primary care providers have regular contact with children before they reach school age and are able to provide family-centered, comprehensive, coordinated care, including a more complete medical assessment when a screening indicates a child is at risk for a developmental problem.

Screening Recommendations

Research has found that ASD can sometimes be detected at 18 months or younger. By age 2, a diagnosis by an experienced professional can be considered very reliable.[1] However, many children do not receive a final diagnosis until they are much older. This delay means that children with an ASD might not get the help they need. The earlier an ASD is diagnosed, the sooner treatment services can begin.

The American Academy of Pediatrics (AAP) recommends that all children be screened for developmental delays and disabilities during regular well-child doctor visits at:
9 months
18 months

30 months

Additional screening might be needed if a child is at high risk for developmental problems because of preterm birth or low birth weight.

In addition, all children should be screened specifically for ASD during regular well-child doctor visits at:
18 months
24 months

Additional screening might be needed if a child is at high risk for ASD (e.g., having a sibling with an ASD) or if symptoms are present.

It is important for doctors to screen all children for developmental delays, but especially to monitor those who are at a higher risk for developmental problems due to preterm birth, low birth weight, or having a sibling or parent with an ASD.

Early identification of developmental disorders is critical to the well-being of children and their families. It is an integral function of the primary-care medical home and an appropriate responsibility of all pediatric health care professionals.

AAP recommends that developmental surveillance be incorporated at every health supervision visit. Any concerns raised during surveillance should be addressed promptly with standardized developmental screening tests. In addition, screening tests should be administered regularly at the 9-, 18-, and 24- or 30-month visits.

The early identification of developmental problems should lead to further developmental and medical evaluation, diagnosis, and treatment, including early developmental intervention. If a child is diagnosed with a developmental disorder through the evaluation and diagnostic process, they should be identified as a child with special health care needs, and chronic-condition management should be initiated. Identification of a developmental disorder and its underlying etiology may also drive a range of treatment planning,

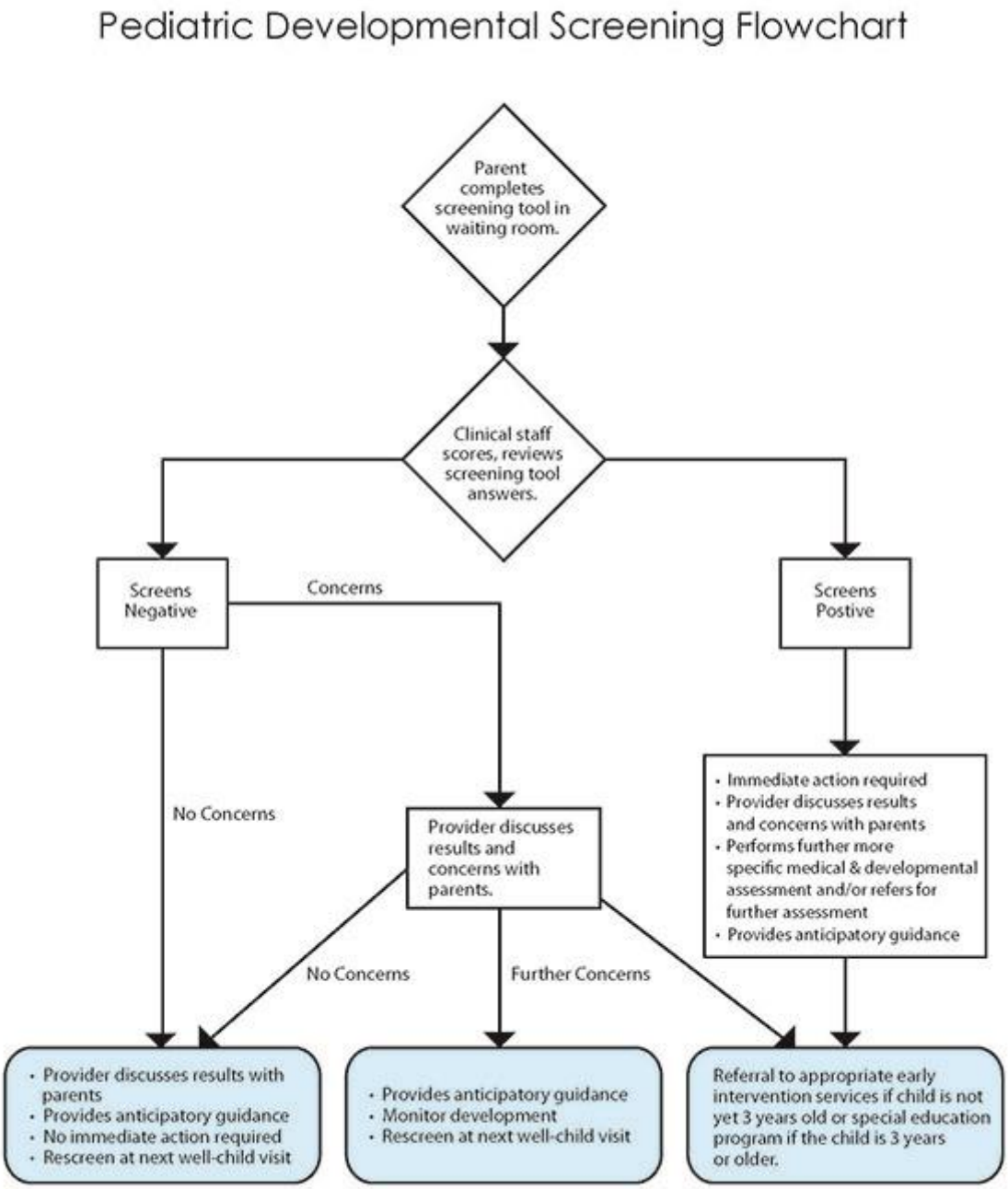
from medical treatment of the child to genetic counseling for his or her parents.

In February 2016, the United States Preventive Services Task Force released a recommendation regarding universal screening for ASD among young children. This final recommendation statement applies to children ages 3 and younger who have no obvious signs or symptoms of ASD or developmental delay and whose parents, caregivers, or doctors have no concerns about the child's development. The Task Force reviewed research studies on the potential benefits and harms of ASD screening in young children who do not have obvious signs or symptoms of ASD. They looked at whether screening all children for ASD helps with their development or quality of life. The final recommendation statement summarizes what the Task Force learned: There is not enough evidence available on the potential benefits and harms of ASD screening in all young children to recommend for or against this screening. This recommendation statement is not a recommendation against screening; it is a call for more research. For more information, please visit www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/autism-spectrum-disorder-in-young-children-screening.

Developmental Screening in Pediatric and Primary Care Practice

Integrating routine developmental screening into the practice setting can seem daunting. Following are suggestions for integrating screening services into primary care efficiently and at low cost, while ensuring thorough coordination of care.

An example of how developmental screening activities might flow in your clinic:



Involving Families in Screening

Research indicates that parents are reliable sources of information about their children's development. Evidence-based screening tools

that incorporate parent reports (e.g., Ages and Stages Questionnaire, the Parents' Evaluation of Developmental Status, and Child Development Inventories) can facilitate structured communication between parents and providers to discover parent concerns, increase parent and provider observations of the child's development, and increase parent awareness. Such tools can also be time- and cost-efficient in clinical practice settings.2,3,4 A 1998 analysis found that, depending on the instrument, the time for administering a screening tool ranged from about 2 to 15 minutes, and the cost of materials and administration .

Screening children and providing parents with anticipatory guidance—that is, educating families about what to expect in their child's development, how they can promote development, and the benefits of monitoring development—can also improve the relationship between the provider and parent.6 By establishing relationship-based practices, providers promote positive parent-child relationships, while building the strongest possible relationship between the parent and provider. Such practices are fundamental to quality services.

Developmental Screening Tools

Screening tools are designed to help identify children who might have developmental delays. Screening tools can be specific to a disorder (for example, autism) or an area (for example, cognitive development, language, or gross motor skills), or they may be general, encompassing multiple areas of concern. Some screening tools are used primarily in pediatric practices, while others are used by school systems or in other community settings.

Screening tools do not provide conclusive evidence of developmental delays and do not result in diagnoses. A positive screening result should be followed by a thorough assessment. Screening tools do not provide in-depth information about an area of development.

Selecting a Screening Tool

When selecting a developmental screening tool, take the following into consideration:

- Domain(s) the creening Tool Covers.
- What are the questions that need to be answered?
- What types of delays or conditions do you want to detect?
- Psychometric Properties
- These affect the overall ability of the test to do what it is meant to do.
- The sensitivity of a screening tool is the probability that it will correctly identify children who exhibit developmental delays or disorders.
- The specificity of a screening tool is the probability that it will correctly identify children who are developing normally.
- Characteristics of the Child. For example, age and presence of risk factors.

- Setting in which the Screening Tool will be Administered
  Will the tool be used in a physician's office, daycare setting, or community setting? Screening can be performed by professionals, such as nurses or teachers, or by trained paraprofessionals.

Types of Screening Tools

There are many different developmental screening tools. CDC does not approve or endorse any specific tools for screening purposes. This list is not exhaustive, and other tests may be available.

Examples of screening tools for general development and ASD:

1- Ages and Stages Questionnaires (ASQ)

This is a general developmental screening tool. Parent-completed questionnaire; series of 19 age-specific questionnaires screening communication, gross motor, fine motor, problem-solving, and personal adaptive skills; results in a pass/fail score for domains.

2- Communication and Symbolic Behavior Scales (CSBS)

Standardized tool for screening of communication and symbolic abilities up to the 24-month level; the Infant Toddler Checklist is a 1-page, parent-completed screening tool.

3- Parents' Evaluation of Developmental Status (PEDS)

This is a general developmental screening tool. Parent-interview form; screens for developmental and behavioral problems needing further evaluation; single response form used for all ages; may be useful as a surveillance tool.

4- Modified Checklist for Autism in Toddlers (MCHAT)

Parent-completed questionnaire designed to identify children at risk for autism in the general population.

5- Screening Tool for Autism in Toddlers and Young Children (STAT)

This is an interactive screening tool designed for children when developmental concerns are suspected. It consists of 12 activities assessing play, communication, and imitation skills and takes 20 minutes to administer.

Diagnostic Tools

There are many tools to assess ASD in young children, but no single tool should be used as the basis for diagnosis. Diagnostic tools usually rely on two main sources of information—parents' or caregivers' descriptions of their child's development and a professional's observation of the child's behavior.

In some cases, the primary care provider might choose to refer the child and family to a specialist for further assessment and diagnosis. Such specialists include neurodevelopmental pediatricians, developmental-behavioral pediatricians, child neurologists, geneticists, and early intervention programs that provide assessment services.

Selected exaamles of diagnostic tools:

1- Autism Diagnosis Interview – Revised (ADI-R)[7]

A clinical diagnostic instrument for assessing autism in children and adults. The instrument focuses on behavior in three main areas: reciprocal social interaction; communication and language; and restricted and repetitive, stereotyped interests and behaviors. The ADI-R is appropriate for children and adults with mental ages about 18 months and above.

2- Autism Diagnostic Observation Schedule – Generic (ADOS-G)[8]

A semi-structured, standardized assessment of social interaction, communication, play, and imaginative use of materials for individuals suspected of having ASD. The observational schedule consists of four 30-minute modules, each designed to be administered to different individuals according to their level of expressive language.

3- Childhood Autism Rating Scale (CARS)[9]

Brief assessment suitable for use with any child over 2 years of age. CARS includes items drawn from five prominent systems for diagnosing autism; each item covers a particular characteristic, ability, or behavior.

4- Gilliam Autism Rating Scale – Second Edition (GARS-2)[10]

Assists teachers, parents, and clinicians in identifying and diagnosing autism in individuals ages 3 through 22. It also helps estimate the severity of the child's disorder.

In addition to the tools above, the American Psychiatric Association's Diagnostic and Statistical Manual, Fifth Edition (DSM-5) provides standardized criteria to help diagnose ASD.

Myths About Developmental Screening

Myth #1 There are no adequate screening tools for preschoolers.

Fact Although this may have been true decades ago, today sound screening measures exist. Many screening measures have sensitivities and specificities greater than 70%. [5], [11]

Myth #2 A great deal of training is needed to administer screening correctly.

Fact Training requirements are not extensive for most screening tools. Many can be administered by paraprofessionals.

Myth #3 Screening takes a lot of time.

Fact Many screening instruments take less than 15 minutes to administer, and some require only about 2 minutes of professional time.[5], [12]

Myth #4 Tools that incorporate information from the parents are not valid.

Fact Parents' concerns are generally valid and are predictive of developmental delays. Research has shown that parental concerns detect 70% to 80% of children with disabilities.[13],[14]

Please review the following fact sheet :

https://www.cdc.gov/ncbddd/autism/pdf/2023-ADDM-Factsheet_508.pdf

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