Attention-deficit/hyperactivity disorder (ADHD) is an illness characterized by inattention, hyperactivity, and impulsivity. ADHD is the most common neurobehavioral disorder in children and youth. Studies demonstrate a U.S. community prevalence of approximately 8 to 12%. It is more common in boys.

**Diagnosis**
This disorder is usually first evident in childhood and adolescence. However, some individuals may not present for clinical attention until adulthood.

Primary care clinicians are encouraged to initiate an evaluation for ADHD for children age 4 through 18. Before making the diagnosis of ADHD, the evaluation should include assessment for potential coexisting conditions such as:

- Emotional/behavioral (eg, anxiety, depression, substance abuse, oppositional defiant and conduct disorders)
- Developmental (eg, learning and language disorders or other neurodevelopmental disorders)
- Physical conditions (eg, tics, sleep apnea)

To make the diagnosis of ADHD there must be a persistent pattern of inattention and/or hyperactivity/impulsivity that is more severe and frequent than is typically observed in individuals at a comparable level of development.

The overall approach to diagnosis includes a comprehensive interview with the child’s adult caregivers; a mental status examination; a medical evaluation for general health and neurological status; ADHD focused parent and teacher rating scales and school reports.

**DSM-5 Criteria for ADHD**

People with ADHD show a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development:

1. **Inattention:** Six or more symptoms of inattention for children up to age 16, or five or more for adolescents 17 and older and adults; symptoms of inattention have been present for at least 6 months, and they are inappropriate for developmental level:
   - Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or with other activities.
   - Often has trouble holding attention on tasks or play activities.
   - Often does not seem to listen when spoken to directly.
o Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., loses focus, side-tracked).

o Often has trouble organizing tasks and activities.

o Often avoids, dislikes, or is reluctant to do tasks that require mental effort over a long period of time (such as schoolwork or homework).

o Often loses things necessary for tasks and activities (e.g., school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones).

o Is often easily distracted

o Is often forgetful in daily activities.

2. Hyperactivity and Impulsivity: Six or more symptoms of hyperactivity-impulsivity for children up to age 16, or five or more for adolescents 17 and older and adults; symptoms of hyperactivity-impulsivity have been present for at least 6 months to an extent that is disruptive and inappropriate for the person’s developmental level:

o Often fidgets with or taps hands or feet, or squirms in seat.

o Often leaves seat in situations when remaining seated is expected.

o Often runs about or climbs in situations where it is not appropriate (adolescents or adults may be limited to feeling restless).

o Often unable to play or take part in leisure activities quietly.

o Is often "on the go" acting as if "driven by a motor".

o Often talks excessively.

o Often blurts out an answer before a question has been completed.

o Often has trouble waiting his/her turn.

o Often interrupts or intrudes on others (e.g., butts into conversations or games)

In addition, the following conditions must be met:

- Several inattentive or hyperactive-impulsive symptoms were present before age 12 years.

- Several symptoms are present in two or more setting, (e.g., at home, school or work; with friends or relatives; in other activities).

- There is clear evidence that the symptoms interfere with, or reduce the quality of, social, school, or work functioning.

- The symptoms do not happen only during the course of schizophrenia or another psychotic disorder. The symptoms are not better explained by another mental disorder (e.g. Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).
Based on the types of symptoms, three kinds (presentations) of ADHD can occur:

*Combined Presentation*: if enough symptoms of both criteria inattention and hyperactivity-impulsivity were present for the past 6 months

*Predominantly Inattentive Presentation*: if enough symptoms of inattention, but not hyperactivity-impulsivity, were present for the past six months

*Predominantly Hyperactive-Impulsive Presentation*: if enough symptoms of hyperactivity-impulsivity but not inattention were present for the past six months.

Because symptoms can change over time, the presentation may change over time as well.

**Clinical Evidence**

The assessment of ADHD requires evidence directly obtained from parents or caregivers regarding the core symptoms of ADHD in various settings, the age of onset, duration of symptoms, and degree of functional impairment.

A practitioner should review reports from a school-based multidisciplinary evaluations and assessments where they exist, from teachers or other school-based professionals; guidance counselors, coaches or leaders of community activities.

Assessment should rule out medical causes or coexisting conditions of observed behaviors. Adolescents are less likely to display overt hyperactive behavior and are at a greater risk of substance abuse (especially when ADHD is left untreated). Clinicians should assess this age group for signs and symptoms of substance abuse; and if found, evaluation and treatment for addiction should precede treatment for ADHD when possible.

**Treatment**

Practitioners should establish a treatment program that recognizes ADHD as a chronic condition. Recommendations for treatment of children and youth with ADHD vary depending on the patient’s age. **Behavioral intervention should be used as the first line of treatment prior to the use of medications in four and five year old children.**

The treatment program should include drug treatment and non-pharmacologic treatment (i.e. parental interventions, behavioral interventions and school interventions). The treating practitioner, parents, and child, in collaboration with school personnel, should specify appropriate target outcomes to guide management.

The AAP (American Academy of Pediatrics) continues to recommend a careful assessment of all children including those starting stimulants by using a trusted cardiac history and physical examination including cardiac examination.

Given current evidence, the AAP encourages primary care and subspecialty physicians to continue currently recommended treatment for ADHD, including stimulant medications without obtaining routine ECG’s or subspecialty cardiology evaluations for most children before starting therapy with these medications.
**Medication**

Stimulants are the most widely used drugs for treating ADHD. These drugs increase activity in parts of the brain that are under-active in those with ADHD, improving attention and reducing impulsiveness, hyperactivity, and/or aggressive behavior. Practitioners should begin with a low dose of medication and titrate upward because of the marked individual variability in the dose-response relationship. The dosage should continue to increase until no further improvement is seen or side effects become apparent or maximum recommended dose for that medication has been attained. If one class of stimulant fails or has unacceptable side effects then another should be tried.

**Behavioral Techniques**

Treatment strategies such as rewarding positive behavior changes and communicating clear expectations of those with ADHD have also proven effective. Additionally, it is extremely important for family members and teachers to remain patient and understanding. Children with ADHD can additionally benefit from caregivers paying close attention to their progress, adapting classroom environments to accommodate their needs, and using positive reinforcers. Treatment often should include behavioral therapy at home and at school.

**Positive reinforcement** - Providing rewards or privileges contingent on the child’s performance (e.g.: child completes an assignment and is permitted to play on the computer).

**Time-out** - Removing access to positive reinforcement contingent on performance of unwanted or problem behavior (e.g.: child hits sibling impulsively and is required to sit for five minutes in the corner of the room).

**Response cost** - Withdrawing rewards or privileges contingent on the performance of unwanted or problem behavior (e.g.: child loses free time privileges for not completing homework).

**Token economy** - Combining positive reinforcement and response cost. The child earns rewards and privileges contingent on performing desired behaviors and loses the rewards and privileges based on undesirable behavior (e.g.: child earns stars for completing assignments and loses stars for getting out of seat. The child cashes in the sum of stars at the end of each week for a prize).

Practitioners should educate parents and children about the ways in which ADHD can affect learning, behavior, self-esteem, social skills, and family function. This initial phase of patient education is critical to demystifying the diagnosis and providing parents and children with knowledge about the condition. Education enables parents to work with practitioners, educators, and, in some cases, mental health professionals to develop an effective treatment plan. A therapeutic alliance among practitioners, parents, and the child is enhanced when attention is directed toward cultural values that affect the child’s health and health care. The long term care of a child with ADHD requires an ongoing partnership among practitioners, parents, teachers and the child. Other school personnel including nurses, psychologists, and counselors can also help with developing and monitoring plans.

**Follow Up Visits (Measures to be audited annually for HEDIS/NCQA)**

Practitioners should establish a plan for periodic monitoring of the effects of treatment. Plans should include obtaining information about target behaviors, educational output, and medication side effects periodically through office visits, written reports, and phone calls. The frequency of monitoring depends on the degree of dysfunction, complications, and adherence.
During all visits information from the child, parents and school should be used in assessing progress, adjusting medication, reinforcing behavioral interventions and educating the parent and child about ADHD.

**When children are initially given an ADHD medication they should be seen by the prescribing practitioner within 30 days of when the prescription was originally written.** This visit as well as subsequent visits will allow assessment of potential side effects of stimulants, such as decreased appetite and alteration of weight, height, and growth velocity. Monitor for potential cardiac effects of the medication by measuring blood pressure and pulse.

**After the initial follow-up visit (within 30 days of the new prescription for ADHD medication) the patient should be seen twice in the subsequent nine months that follow.** Periodic requests for medication refills offer an additional opportunity for communication with the family. Once a treatment regimen is established, additional follow up visits should occur twice per year.

**Referral**
If a child fails two stimulant medication trials, or a co-morbid psychiatric disorder other than a learning disability (oppositional defiant disorder, conduct disorder, anxiety disorder, major depression, bipolar disorder, post-traumatic stress disorder) is suspected, referral to a behavioral health provider for further assessment and treatment should be considered.

**References:**
- National Alliance for Mental Illness (NAMI) @ nami.org- Attention-Deficit/Hyperactivity Disorder-ADHD
- National Guideline Clearinghouse @ www.guideline.gov