Cigna Medical Coverage Policy

Subject **Attention-Deficit/Hyperactivity Disorder (ADHD): Assessment and Treatment**

Effective Date **11/15/2013**
Next Review Date **11/15/2014**
Coverage Policy Number **0231**

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Coverage Policy

Services provided by a psychiatrist, psychologist or other behavioral health professionals may be subject to the provisions of the applicable behavioral health benefit.

Assessment and treatment for comorbid behavioral health and/or medical diagnoses and associated symptoms and/or conditions may be covered under applicable medical and behavioral health benefit plans.

Services for the assessment or treatment of attention-deficit/hyperactivity disorder (ADHD) that are considered primarily educational or training in nature or focused on improving academic or work performance are not covered under many benefit plans.

When not otherwise excluded, Cigna covers medically necessary services for the treatment of ADHD when the criteria of the Diagnostic and Statistical Manual of Mental Health Disorders, Fifth Edition (DSM-5) are met.

Coverage of medications related to the treatment of ADHD is subject to the pharmacy benefit of the applicable benefit plan.

Cigna does not cover any of the following services, because each is considered educational in nature and not medically necessary for the assessment and/or treatment of ADHD (this list may not be all-inclusive):

- Intelligence Quotient (IQ) testing
- education and achievement testing
- educational intervention (e.g., classroom environmental manipulation, academic skills training, and parental training)
- neuropsychological testing

Cigna does not cover the following procedures/services, because each is considered experimental, investigational or unproven for the assessment and/or treatment of ADHD (these lists may not be all-inclusive):

Assessment:

- actometer
- computerized electroencephalogram (EEG) (e.g., brain mapping, neurometrics, or quantitative electroencephalography [QEEG], Neuropsychiatric EEG-Based Assessment Aid [NEBA] System)
- computerized tests of attention and vigilance
- event-related potentials (i.e., evoked potential studies)
- hair analysis
- neuroimaging (e.g., computerized tomography [CT], magnetic resonance imaging [MRI], positron emission tomography [PET] and single-photon emission computerized tomography [SPECT])
- Quotient ADHD Test/System

Treatment:

- Acupuncture/acupressure
- anti-candida albicans and antifungal medications
- anti-motion sickness medication
- auditory integration therapy
- chiropractic manipulation
- cognitive rehabilitation
- dietary treatments
- Dore program/Dyslexia Dyspraxia Attention Treatment (DDAT)
- EEG biofeedback/neurofeedback
- herbal remedies
- intensive behavioral intervention programs (e.g., early intensive behavior intervention [EIBI] intensive behavior intervention [IBI], Lovaas therapy, applied behavior analysis [ABA])
- megavitamin therapy
- metronome training
- movement therapy
- Neuro-Emotional Technique (NET)
- sensory integration therapy
- transcranial magnetic stimulation/cranial electrical stimulation
- vision therapy

General Background

Attention-deficit/hyperactivity disorder (ADHD) is a common disorder of childhood and adolescence that is characterized by symptoms of inattention and/or hyperactivity/impulsivity. In this disorder, the symptoms have

persisted for at least six months, to a degree that is maladaptive and inconsistent with developmental level. The hyperactive-impulsive or inattention symptoms that cause impairment are present before age seven, although many individuals are diagnosed after the symptoms have been present for a number of years. Some impairment from the symptoms is present in two or more settings (e.g., at home and at school).

Children with ADHD may experience significant functional problems, such as school difficulties, academic underachievement, troublesome interpersonal relationships with family members and peers, and low self-esteem. Individuals with a history of untreated childhood ADHD are more likely to experience conduct disorder, substance abuse, antisocial behavior and injuries later in life (National Institute of Health [NIH], 1998). Early recognition, assessment and management of this condition can redirect the educational and psychosocial development of most children with ADHD.

The Diagnostic and Statistical Manual of Mental disorders, Fifth edition (DSM-5) notes that there are three subtypes of ADHD (American Psychiatric Association [APA]), 2013):

<table>
<tr><td colspan="2">Diagnostic Criteria from Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) for:
314.01 (F90.2) Attention-Deficit/Hyperactivity Disorder, combined type: If both Criterion A1 (inattention) and Criterion A2 (hyperactivity/impulsivity) are met for the past six months.
314.00 (F90.0) Attention-Deficit/Hyperactivity Disorder, predominantly inattentive type: If Criterion A1 (inattention) is met but Criterion A2 (hyperactivity/impulsivity) is not met for the past six months.
314.01 (F90.1) Attention-Deficit/Hyperactivity Disorder, predominantly hyperactive-impulsive type: If Criterion A2 (hyperactivity/impulsivity) 1(inattention) is met but Criterion A1 (inattention) is not met for the past six months.</td></tr>
<tr><td colspan="2">A. A persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development as characterized by (1) or (2):</td></tr>
<tr><td>1) Inattention: six (or more) of the following symptoms of inattention have persisted for at least six months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities:
Note: The symptoms are not solely a manifestation of oppositional behavior, defiance, hostility, or failure to understand tasks or instructions. For older adolescents and adults (age 17 and older), at least five symptoms are required.

a) Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or during other activities (e.g., overlooks or misses detail, work is inaccurate).
b) Often has difficulty sustaining attention in tasks or play activities (e.g., has difficulty remaining focused during lectures, conversations, or lengthy reading).
c) Often does not seem to listen when spoken to directly (e.g., mind seems elsewhere, even in the absence of any obvious distraction).
d) Often does not follow through on instructions and fails to finish school work, chores, or duties in the workplace (e.g., starts tasks but quickly loses focus and is easily sidetracked).
e) Often has difficulty organizing tasks and</td><td>2) Hyperactivity-impulsivity: six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least six months to a degree that is inconsistent with developmental level and that negatively impacts directly on social and academic/occupational activities:
Note: the symptoms are not solely a manifestation of oppositional behavior, defiance, hostility, or a failure to understand tasks or instructions. For older adolescents and adults (age 17 and older), at least five symptoms are required.

a) Often fidgets with or taps hands or feet or squirms in seat.
b) Often leaves seat when remaining seated is expected (e.g., leaves his or her place in the classroom, in the office or other workplace, or in other situations that require remaining in place).
c) Often runs about or climbs in situations in where it is inappropriate (Note: in adolescents or adults, may be limited to feeling restless).
d) Often unable to play or engage in leisure activities quietly.
e) Is often "on the go" acting as if "driven by a motor" (e.g., is unable to be or uncomfortable being still for extended time, as in restaurants, meetings; may be experienced by others as being restless or difficult to keep up with).</td></tr>
</table>

activities (e.g., difficulty managing sequential tasks; difficulty keeping materials and belongings in order; messy, disorganized work; has poor time management; fails to meet deadlines). f) Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (e.g., schoolwork or homework; for older adolescents and adults, preparing reports, completing forms, reviewing lengthy papers). g) Often loses things necessary for tasks or activities (e.g., school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones). h) Is often easily distracted by extraneous stimuli (for older adolescents and adults, may include unrelated thoughts). i) Is often forgetful in daily activities (e.g., doing chores, running errands, for older adolescents and adults, returning calls, paying bills, keeping appointments).	f) Often talks excessively. g) Often blurts out an answer before a question has been completed (e.g., completes people's sentences' cannot wait for turn in conversation). h) Often has difficulty waiting his or her turn (e.g., while waiting in line). i) Often interrupts or intrudes on others (e.g., butts into conversations, games, or activities; may start using other people's things without asking or receiving permission; for adolescents and adults, may intrude into or take over what others are doing).
B. Several inattentive or hyperactive-impulsive symptoms were present prior to age 12 years. C. Several inattentive or hyperactive-impulsive symptoms are present in two or more settings (e.g., at home, school, or work; with friends or relatives; in other activities). D. There is clear evidence that the symptoms interfere with, or reduce the quality of social, academic, or occupational functioning. E. The symptoms do not occur exclusively during the course of schizophrenia or other psychotic disorder and are not better explained by another mental disorder (e.g., mood disorder, anxiety disorder, dissociative disorders, personality disorder, substance intoxication or withdrawal).	

It should be specified if the condition is in partial remission: when full criteria were previously met, fewer than the full criteria have been met for the past six months, and the symptoms still result in impairment in social, academic or occupational functioning.

The severity should be specified:
Mild: Few, if any, symptoms in excess of those required to make the diagnosis are present and symptoms results in no more than minor impairments in social or occupational functioning.
Moderate: Symptoms or functional impairment between "mild" and "severe" are present.
Severe: Many symptoms in excess of those required to make the diagnosis, or several symptoms that are particularly severe, are presents, or the symptoms results in marked impairment in social or occupational functioning.

The DSM-5 notes that the designation of "other specified" (DSM-5 code 314.01) (F90.8) applies to presentation in which symptoms characteristic of attention-deficit/hyperactivity disorder that cause clinically significant distress or impairment in social, occupational or other important areas of functioning predominate but do not meet the full criteria for attention-deficit/hyperactivity disorder or any of the disorders in the neurodevelopmental disorders diagnostic class. The other specified attention-deficit/hyperactivity disorder category is used in situations n which the clinician chooses to communicate the specific reason that the presentation does not meet the criteria for attention-deficit/hyperactivity disorder or any specific neurodevelopmental disorder. This is done by recording "other specified attention-deficit/hyperactivity disorder" followed by the specific reason (e.g. "with insufficient inattention symptoms").

The DSM-5 notes that the designation of "not otherwise specified" (NOS) (DSM-5 code 314.01) (F90.9) applies to presentations in which symptoms characteristic of attention-deficit/hyperactivity disorder that cause clinically significant distress or impairment in social, occupational or other important areas of functioning predominate but not meet the full criteria of attention-deficit hyperactivity disorder or any of the disorder in the

neurodevelopmental disorders diagnostic class. This should be used in situations in which the clinician chooses not to specify the reason that the criteria are not met for attention-deficit hyperactivity disorder or for a specific neurodevelopmental disorder, and includes presentations in which there is insufficient information to make a more specific diagnosis.

While there is ongoing research as to the etiology of ADHD, it is thought by some experts that both genetic and developmental factors are strong causes of this condition. There is evidence that ADHD is a highly heritable condition with the rates of inheritance between 0.85 and 0.90 (Katragadda and Schubiner, 2007). Recent studies suggest that the genetic cause of ADHD may be complex with an association noted with markers at chromosomes 4, 5, 6, 8, 11, 16, and 17 (Pliszka, et al., 2007). In addition, it has been proposed that there are nongenetic causes of ADHD that are considered neurobiological in nature—these causes include such factors as prenatal stress and low birth weight, traumatic brain injury, maternal smoking during pregnancy, and severe early deprivation (Pliszka, et al., 2007).

Assessment
The diagnosis is clinical, based on findings that are derived from the history, physical and patient/family interviews. There are no specific diagnostic tests for ADHD. The established diagnostic tools used in the assessment of ADHD include:

- parent/child interview (to rule out other psychiatric or environmental causes of symptoms)
- medical evaluation with a complete medical history and physical examination (to assess for co-existing conditions)
- electroencephalogram (EEG) or neurological consult when the presence of focal signs or clinical findings is suggestive of a seizure disorder or a degenerative neurological condition

The use of the DSM-5 criteria is a standard of care for practitioners of all types (e.g., primary care, subspecialty, psychiatry and non-physician mental health providers) to use in the assessment and diagnosis of ADHD (APA, 2013). Diagnosis usually requires several steps, and clinicians will generally need to carry out the evaluation in more than one visit, often two to three visits. The behaviors must adversely affect functioning in school or in a social setting. Information obtained from the parent and school can assist the physician in assessing the effects that the symptoms are having on classroom performance, self-esteem, and family and social relationships.

Other psychological and developmental disorders, including oppositional defiant disorder, conduct disorder, depression, anxiety disorder, and learning disabilities, frequently coexist in children who are evaluated for ADHD. Assessment and examination for such coexisting disorders are an integral part of the evaluation process for ADHD patients. Evidence for most of these coexisting disorders may be readily detected by the primary care clinician. For example, a family history of anxiety disorders, coupled with a patient's history of frequent fears and difficulties with separation from caregivers, may suggest the presence of anxiety disorder either as the primary diagnosis or as a comorbid diagnosis to ADHD. Several screening tests are available that can detect areas of concern for many of the mental health disorders that coexist with ADHD. Although these scales have not been tested for use in primary care settings and are not diagnostic tests for either ADHD or associated mental health conditions, some clinicians may use them to establish high risk for coexisting psychological conditions.

Other coexisting medical conditions may be present and include speech delays, auditory and visual processing disorders (Cunningham, et al. 2011; American Academy of Pediatrics [AAP], 2011). Depending on the clinical findings, evaluation of the coexisting conditions may be needed; including speech and language evaluations, occupational therapy evaluation, audiological evaluations, central auditory testing. In addition to ADHD there are other conditions that may affect the ability to understand auditory information. An individual with ADHD may be a poor listener and have difficulty understanding or remembering verbal information; however, the actual neural processing of auditory input in the central nervous system (CNS) is intact. Rather, it is the attention deficit that is impeding their ability to access or use the auditory information that is coming in. Central auditory processing disorder, or auditory processing disorder, refers to the efficiency and effectiveness by which the CNS utilizes auditory information (American Speech-Language-Hearing Association [ASHA], 2005).

According to the literature, several medical screening tests and laboratory measures have been used to evaluate children with suspected ADHD. These include neuroimaging (e.g., computerized tomography [CT], magnetic resonance imaging [MRI]), EEG, and neurological screening exams, as well as other miscellaneous laboratory assessments (Brown, et al., 2001). The association between elevated lead levels and impairments in

cognitive functioning, including attention problems, has been consistently reported in the literature. Brown et al. (2001) reviewed six studies and found no statistically significant associations in three of them. One study reported a positive association between lead level and behavioral problems. Two studies examined children screened for disruptive behavioral problems and found associations between elevated lead levels and behavioral problems. Since these studies did not assess ADHD, however, the extent to which their findings may apply to children with this disorder is unknown (Brown, et al., 2001). The studies' findings suggest an association between elevated lead levels and a range of behavioral problems, including inattention, but do not support the routine use of lead screening as a diagnostic indicator for ADHD. Only when clinical or environmental factors are present is the measurement of blood lead levels appropriate.

Neuropsychiatric EEG-Based Assessment Aid (NEBA) System (NEBA Health, Augusta, GA) is a device that is based on electroencephalogram (EEG) technology. It records different kinds of electrical impulses (waves) given off by neurons (nerve cells) in the brain and the number of times (frequency) the impulses are given off each second. The NEBA System is a 15- to 20-minute non-invasive test that calculates the ratio of two standard brain wave frequencies, known as theta and beta waves. It is theorized that the theta/beta ratio has been shown to be higher in children and adolescents with ADHD than in children without it.

The NEBA system was recently reviewed by the FDA through the de novo classification process, a regulatory pathway for some low- to moderate-risk medical devices that are not substantially equivalent to an already legally marketed device. The FDA notice noted that the manufacturer submitted data including a clinical study that evaluated 275 children and adolescents ranging from six to 17 years old with attention or behavioral concerns. Clinicians evaluated all 275 patients using the NEBA System and using standard diagnostic protocols, including the DSM-IV-TR criteria, behavioral questionnaires, behavioral and IQ testing, and physical exams to determine if the patient had ADHD. An independent group of ADHD experts reviewed these data and arrived at a consensus diagnosis regarding whether the research subject met clinical criteria for ADHD or another condition. The manufacturer noted that the study results showed that the use of the NEBA System aided clinicians in making a more accurate diagnosis of ADHD when used in conjunction with a clinical assessment for ADHD, compared with doing the clinical assessment alone. This study appears to be unpublished and preliminary.

There is insufficient evidence in the medical literature to support the use of computerized methods of electroencephalogram EEG (EEG) (e.g., brain mapping, neurometrics, or quantitative electroencephalography [QEEG], Neuropsychiatric EEG-Based Assessment Aid (NEBA) System) in the assessment of ADHD.

When another condition is present along with ADHD, genetic testing may be considered. While there is ongoing research into the genetic causes of ADHD, it is preliminary and currently there is no established role for genetic testing, in the assessment of this condition.

Neuropsychological testing for educational reasons is generally considered not medically necessary for the assessment of ADHD. Educational testing is usually provided by school systems under applicable state and federal rules. Neuropsychological testing may be medically necessary in neurologically complicated cases of ADHD (e.g., post-head trauma, seizures). Children with uncomplicated ADHD do not require neuropsychological testing.

The Quotient® ADHD Test/System (BioBehavioral Diagnostics Company [BioBDx], Plymouth Meeting, PA) is a computerized system that has been proposed to be used in the assessment of ADHD and for re-assessment at follow-up visits. It is purported that it will measure micro-motion and analyze impulsivity and shifts in attention state to provide an objective and quantitative picture of the core symptom areas of ADHD. There is insufficient evidence to support the clinical utility of this testing in the assessment or management of ADHD.

Treatment

The most widely researched and commonly prescribed treatments for ADHD are psychostimulant medications, including methylphenidate and other amphetamines (NIH, 1998). The U.S. Food and Drug Administration (FDA) approved Stattera® (atomoxetine) (Eli Lilly and Co., Indianapolis, IN) in November 2002 as a new non-stimulant treatment for ADHD. Studies with atomoxetine have thus far compared it only to a placebo. Until head-to-head studies are available comparing the efficacy and safety of atomoxetine with those of stimulants, its role in the treatment of ADHD remains limited. It can be recommended for those patients who are unable to tolerate stimulants or cannot take stimulants because of a clinical reason (Corman, et al., 2004).

Literature Review—Treatment: The Agency for Healthcare Research and Quality (AHRQ) published a comparative effectiveness review: Attention Deficit Hyperactivity Disorder: Effectiveness of Treatment in At-Risk Preschoolers; Long-Term Effectiveness in All Ages; and Variability in Prevalence, Diagnosis, and Treatment (Charach, 2011). The conclusions of the review include:
Treatment of preschoolers with disruptive behavior disorders:

- Parental behavior training is an efficacious treatment option for preschoolers with disruptive behavior disorders or ADHD symptoms. Benefits for children with disruptive behavior disorders are maintained at least 6 months and up to 2 years in some studies. Parents who attend more parental behavior training sessions see more improvement in their child's behavior. (strength of evidence [SOE]: high)
- Methylphenidate (MPH)* is efficacious and generally safe for treating ADHD symptoms, but there has been limited long-term follow-up in preschoolers beyond 12 months. (SOE: low)
- Evidence is insufficient to know if there is an additional benefit to combining different treatments. (SOE: insufficient)
- It should be noted that where there is socioeconomic burden, a school-based intervention appears to be the primary beneficial intervention. Benefits, however, diminished over 2 years. This appears to be related to lack of parental engagement and attendance at sessions. (SOE: insufficient)

Long-term (>1 Year) Effectiveness of Interventions for ADHD in Individuals 6 Years of Age or Older:
Pharmacologic:

- Psychostimulants provide control of ADHD symptoms and are generally well tolerated for months to years at a time. The best evidence for benefits is for MPH* in the setting of careful medication monitoring for up to 14 months. (SOE: low)
- Atomoxetine appears to be safe and effective for treating ADHD symptoms over a period of 12 months. (SOE: low)
- Extended-release guanfacine may reduce ADHD symptoms, but evidence is insufficient to permit an evidence-based conclusion about its long-term effectiveness. (SOE: insufficient)

Nonpharmacologic:

- Evidence is insufficient to know if behavioral or psychosocial treatment alone is an effective long-term treatment option for children ages 6 years or older with ADHD. (SOE: insufficient)
- There are not enough studies to know if parental behavior training or school-based interventions are effective as long-term treatment options for children ages 6 years or older with ADHD. However, one good-quality study and its extension showed that school-based programs to enhance academic skills are effective in improving achievement scores in multiple domains. (SOE: insufficient)

Combined Treatments

- Both psychostimulant medication alone and a combination of medication and behavioral treatment are effective in treating ADHD plus ODD symptoms in children. Results are most applicable to elementary school-age boys of normal intelligence with the combined subtype of ADHD. (SOE: low)

Strength of Evidence (SOE) Scale:
High: There are consistent results from good-quality studies. Further research is very unlikely to change the conclusions.
Moderate: Findings are supported, but further research could change the conclusions.
Low: There are very few studies, or existing studies are flawed.
Insufficient: Research is either unavailable or does not permit estimation of a treatment effect.

Many studies have documented the efficacy of stimulants in reducing the core symptoms of ADHD. Numerous short-term studies have established the safety and efficacy of stimulants and psychosocial treatments for alleviating the symptoms of ADHD, as well as for improving function in a number of domains. Most studies of stimulants have been short-term, demonstrating efficacy over several days or weeks. The National Institute of Mental Health (NIMH) Multimodal Treatment Study (MTA) of ADHD extended the demonstrated efficacy to 14 months (MTA, 2004). The NIMH research indicates that the two most effective treatment modalities for elementary school children with ADHD are a closely monitored medication treatment and a treatment that combines medication with intensive behavioral interventions. The study involved 579 elementary school children with ADHD (ages 7.0–9.9 years) across multiple sites. The participants were randomized to four treatment groups: medication management alone; medication management and behavior treatment; behavior treatment alone; and standard community care. The results showed that nine out of ten children with ADHD showed

marked reduction in core ADHD symptoms over a 14-month period when treated with medication management alone or a combination of medication and behavior treatment. While the medications were extremely beneficial to most children, MTA findings indicated that medications alone may not necessarily be the best strategy for many children. For example, children who had accompanying problems (e.g., anxiety, stressful home circumstances, social skills deficits) over and above the ADHD symptoms appeared to obtain maximal benefit from the combined treatment.

In April 2004, the MTA group published an evaluation of the persistence of the beneficial effects of medication management and the combination of medication and behavior treatment for 10 months beyond the 14 months previously reported. Ninety-three per cent of the original group participated in the follow-up. It was noted that the medication management strategy showed persisting significant superiority over the behavior treatment and community comparison, although not as great as at 14 months (MTA, 2004).

In August 2007, a three-year follow-up of the MTA study was published with 83.8% participating (Jensen, et al., 2007). Once the delivery of randomly assigned treatments by MTA staff ended at 14 months, the MTA became an observational study in which the subjects and their parents were able to choose their own treatment in the context of availability and barriers to care existing in their communities. It was noted that in contrast to the significant advantage of medication management and combination treatment over behavior treatment and community comparison for ADHD symptoms at 14 and 24 months, treatment groups did not differ significantly on any measure at 36 months. The percentage of children taking medication > 50% of the time changed between 14 and 36 months across the initial treatment groups: Behavior therapy significantly increased (14% to 45%), combination of medication and behavior treatment significantly decreased (91% to 71%), and community care remained relatively constant (60%–62%). The report indicated that regardless of their treatment use changes, all of the groups showed symptom improvement over baseline. The authors theorized that the results may be due to age-related decline in ADHD symptoms, changes in the medication management intensity, starting or stopping medications altogether, or other factors that have not been evaluated.

Molina et al. (2009) reported on long-term effects of this study six and eight years after childhood enrollment of the MTA study. In nearly every analysis, it was found that the originally randomized treatment groups did not differ significantly on repeated measures or newly analyzed variables (e.g., grades earned in school, arrests, psychiatric hospitalizations, other clinically relevant outcomes). The medication use decreased by 62% after the 14-month controlled trial, but adjusting for this did not change the results. The ADHD symptom trajectory in the first three years predicted 55% of the outcomes. The MTA participants fared worse than the local normative comparison group on 91% of the variables tested. The results indicated that the type or intensity of 14 months of treatment for ADHD in childhood does not predict functioning six to eight years later, but rather the early ADHD symptom trajectory regardless of treatment type is prognostic. The researchers noted that the finding implies that children with behavioral and sociodemographic advantage, with the best response to any treatment, will have the best long-term prognosis.

A Cochrane review was performed (Bjornstad and Montgomery, 2005) to address the question of whether family therapy without medication can reduce the core symptoms of ADHD as compared to no treatment or standard treatment. The review involved two studies that met the criteria for quality of research method. It was noted that one found no difference in children's symptoms of ADHD after either family therapy or normal treatment in the community. The second study found that family therapy was more effective than a medication placebo. The reviewers concluded that further research examining the effectiveness of family therapy versus a non-treatment control condition is needed to determine whether family therapy is an effective intervention for children with ADHD.

Other Treatment: A variety of nonpharmacological treatments for ADHD other than behavior therapy were reviewed by the AACAP in developing their practice parameters (Pliszka, et al., 2007). These include cognitive-behavioral therapy and dietary modifications. It was found that there was no evidence to support these interventions

Other alternative interventions have been proposed for treatment of ADHD. These include the use of anti-candida albicans, antifungal medications and anti-motion sickness medication, chiropractic manipulation, herbal remedies, megavitamin therapy, vision therapy, sensory (auditory) integration therapy, transcranial magnetic stimulation/cranial electrical stimulation, metronome training, movement therapy or cognitive rehabilitation. There is insufficient evidence in the medical literature to support the use of these interventions for ADHD.

Acupuncture/Acupressure: Acupuncture is a form of complementary and alternative medicine involves the insertion of needles and the stimulation of the needles through manual, electrical, heat, laser or other forms of stimulation. Acupressure, which may be with non-penetrating needles, is the application of pressure needles to acupuncture points. Brain integration technique/therapy is a form of acupressure that has been proposed as a treatment of learning difficulties such as attention deficit disorder (ADD) both with and without hyperactivity, sensory integration, dyslexia, poor coordination, closed head traumas and brain injuries, autism and nervous breakdowns.

A Cochrane review was conducted to assess the efficacy and safety of acupuncture as a treatment for ADHD (Li, et al., 2011). No randomized or quasi-randomized studies were found to support the use of acupuncture as a treatment for ADHD in children and adolescents.

Acupuncture and acupressure, including brain integration therapy, has not been proven effective in the peer-reviewed published scientific literature for the treatment of ADHD.

Dore Program/Dore Program for Attention Deficit Disorder: The Dore program, also known as Dore Program for Attention Deficit Disorder, or Dyslexia Dyspraxia Attention Treatment (DDAT), is an exercise-based program that was originally developed to treat dyslexia. The program is aimed at treating dyslexia, ADHD, dyspraxia and Asperger's Syndrome. The program consists of a specialized neurological evaluation and series of patient-specific exercises designed to simulate the cerebellum or "hind brain." The proponents of this program theorize that cerebellar size and function are related to a constellation of learning disorders that are referred to as cerebellar developmental delay (CDD). At the Dore USA website, it notes that the exercises incorporated in the program "stimulate the cerebellum to function more rapidly and to enable the development of previously poor motor and cognitive skills. The exercise program directly impacts motor skills while cognitive skills slowly improve through the exercises' stimulatory effects." A review of this treatment (Bishop, 2007) notes that published studies regarding this program "are seriously flawed." The review notes that two studies were published regarding this treatment for children with dyslexia. Regarding the use of the Dore program for ADHD, the review notes that, "There is nothing here to justify the claims made that the Dore Programme is more effective than state-of-the-art medication for ADHD, especially in view of the fact that only one child in the study had an ADHD diagnosis." There is insufficient evidence to support the efficacy of the Dore program for treatment of ADHD.

EEG Biofeedback/Neurofeedback: The AACAP guidelines note that the efficacy of EEG feedback (e.g., neurofeedback), either as primary treatment or an adjunct to medications, has not been established (Pliszka, et al., 2007).

A systematic review and meta-analysis was published by ECRI (2007) on the effectiveness of neurofeedback for treatment of ADHD. Eight studies met inclusion criteria. Five studies (n=167) compared neurofeedback to a waitlist or placebo, and four studies (n=242) compared neurofeedback to stimulant medication. Most of the studies were nonrandomized, small and in some studies patients were also on medication. ECRI stated that neurofeedback is comparable to standard medical care for improving attention in ADHD patients, but that the evidence was weak (based on four studies) and was insufficient to allow a precise, quantitative estimate of the effect of neurofeedback on this outcome. ECRI also stated that due to insufficient evidence, it could not be determined if neurofeedback was comparable to standard medical care for other ADHD symptoms (i.e., hyperactivity, impulsivity and aggression). The evidence was insufficient to determine if neurofeedback improved patient function and quality of life.

In a randomized controlled trial, Gevensleben et al. (2010) reported on the six-month follow-up of 61 of 94 children, ages 8–12 years, with ADHD who were treated with a computerized attention skills training (AST) (n=35) or neurofeedback (n=59) with a system developed by the authors. Based on parental responses, there was a significant group overall effect ($P<0.005$) on the FBB-HKS ADHD rating scale and a significant group effect on the FBB-HKS inattention subscale ($p<005$), but no significant time effect following neurofeedback at the six-month follow-up. Compared to pre-training scores, reductions of inattention and hyperactivity/impulsivity at follow-up were 25–30% in the neurofeedback group compared to 10–15% in the AST control group. A significant group effect ($p<0.005$) was seen on the Strength and Difficulties Questionnaire hyperactivity subscale (SDQ) in the neurofeedback group. A significant group difference ($p<0.05$) was also seen in homework in the neurofeedback group. A total of 50% of children in the neurofeedback group showed a ≥ 25% reduction in the

primary outcome measure following post-training and at the six-month follow-up. In the control group, 26.1% were responders at post-training and 30.4% at six-months. Limitations of the study include the small patient population, short-term follow-up, number of patients lost to follow-up (n=33), neurofeedback system developed by the authors and outcomes reported by parents.

Logemann et al. (2010) reported on a sham-controlled, double-blind evaluation of 27 participants who were selected on relatively high scores on impulsivity/inattention questionnaires. They were assigned to a neurofeedback treatment or a sham group. Neurofeedback training was planned for 15 weeks consisting of a total of 30 sessions, each lasting 22 min. Before and after 16 sessions, qEEG was recorded and impulsivity and inattention was assessed using a stop signal task and reversed continuous performance task and two questionnaires. The results of the interim analyses demonstrated that participants were blind with respect to group inclusion, but no trend towards an effect of neurofeedback on behavioral measures was observed. As a result, in line with ethical guidelines the experiment was ceased.

Duric, et al. (2012) conducted a randomized, controlled study to evaluate the use of neurofeedback (NF) to treat attention-deficit/hyperactivity disorder (ADHD) in children and adolescents. Ninety-one participants were ADHD participants were randomized into three groups, with 30 in the NF group, 31 controls in a group that was given methylphenidate, and 30 in a group that received NF and methylphenidate. Two ADHD core symptoms (attention and hyperactivity were reported by parents with the parent form of the Clinician's Manual for Assessment by Russell A. Barkley. The parents reported significant effects of the treatments. The change was quite strong for hyperactivity, but weak for attention. There was no significant differences between the treatment groups were observed. The study was limited by the low number of participants.

Ogrim et al. (2013 reported on a randomized, controlled trial that compare the effects of 30 sessions of neurofeedback (NF) with stimulant medication on 32 ADHD patients. There was no difference in other actions, such as parent management training, information, or support in school. All participants were assessed before treatment on two rating scales, each with parent and teacher forms. Along with quantitative electroencephalogram (QEEG) and event-related potentials (ERPs), which included behavioral data from a go/no go test, were administered. NF training took place in the clinic over a period of 7–11 months, and was followed by a repeat of the same assessment tools. The 18 symptoms of ADHD (American Psychiatric Association, Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (DSM-IV)) were used as the primary outcome measure. The results noted that analysis of covariance revealed a significant difference between the groups at evaluation in favor of medication, with a large effect size. This was confirmed by the other outcome measures. The authors concluded that the study supports effects for stimulants, but not for NF.

Sonuga-Barke et al. (2013) published a systematic review and meta-analyses of randomized controlled trials of non-pharmacological interventions for ADHD. The review included eight studies that involved neurofeedback using the visualization of brain activity to teach children to increase attention and impulse control. The study found that for neurofeedback the effects were substantially lower for probably blinded than for most proximal assessments, despite attempts in some trials to blind parents to treatment allocation by using sham and/or active control conditions. The authors concluded that, “While the most proximal assessment data on neurofeedback, cognitive training, and restrictive elimination diets were potentially more positive, evidence of efficacy from blinded assessments is required before they are likely to be supported as ADHD treatments.” The authors note that properly powered, randomized controlled trials with blinded, ecologically valid outcome measures are urgently needed, especially in the psychological treatment domain.

The American Academy of Pediatrics (AAP) Task Force on Mental Health (2013) published a mental health tool kit for primary care clinicians as a guide for mental health care for pediatric practices. Included in the supplement is an “Evidence Based Child and Adolescents Psychosocial Interventions” document developed by using data from the PracticeWise Evidence-Based Services Database. The table lists primary problem areas and interventions based on the level of support. For ADHD, biofeedback is listed as a level 1, best support, and biofeedback and medication is listed with level 3 moderate support. According to the authors the ratings are based on an ongoing review of randomized clinical psychosocial and combined treatment trials for children and adolescents with mental health needs. The actual references that were utilized to develop this guide are not listed at the AAP website.

Intensive Intervention Programs: Intensive intervention programs, also known as early intensive behavior intervention (EIBI) intensive behavior intervention (IBI), Lovaas therapy, and applied behavior analysis {ABA}.

These programs incorporate behavior modification and applied behavior analysis. The programs were developed initially to treat children with autism spectrum disorders (ASD) and have recently been proposed to treat children with learning disabilities and ADHD. These programs may be prescribed by school systems as an intervention that is part of the individualized educational plan (IEP). The program is intensive and usually involves hours of treatment (usually more than 15 hours per week) delivered over a long period of time (ECRI, 2011). There is a lack of scientific evidence to support the efficacy of the programs for ADHD.

Neuro Emotional Technique (NET): NET has been described as methodology of finding and removing Neuro Emotional Complexes (NECs) which are defined as a subjective maladaptation syndrome adopted by the organism in response to a real or perceived threat to any aspect of its survival (Karpouzis, et al., 2009). NET has been proposed as a treatment designed to address negative distressing stimuli, by removing these patterns by accessing the nervous system via stimulation of the spine. It was first developed as a branch of chiropractic care, but is now being provided by other practitioners such as psychologists and licensed acupuncturists to treat many other disorders including ADHD. It is purported that there is a mind-body connection with these conditions that can be corrected with NET. There is insufficient evidence in published peer-reviewed scientific literature to support the efficacy of this treatment for ADHD.

Adult ADHD
It was previously thought that ADHD did not continue beyond adolescence, but long-term, controlled, follow-up studies have shown that the disorder persists in a sizable number of adults who were diagnosed with ADHD in childhood. ADHD occurs in approximately 4% of adults, and the condition can impair work and social functioning (Goroll, 2009). The clinical features are highly reminiscent of the pediatric form of the disorder. The condition frequently coexists with anxiety, depression and substance abuse. ADHD can be diagnosed reliably in adults who currently have symptoms of ADHD as defined in the DSM-5 and who, on careful questioning, give a history of such symptoms since childhood.

Unlike treatment for childhood ADHD, treatment for adult ADHD has not been well-established by randomized, controlled trials, nor are there any published treatment guidelines (Goroll, 2009). Modalities include cognitive-behavioral therapy and pharmacotherapy. Support groups, such as Children and Adults with Attention-Deficit/ Hyperactivity Disorder (CHADD) assist newly diagnosed adults by providing information about ADHD and available resources, including peer support groups. Coaching and training in organizational skills appear useful but remain unstudied.

The benefit of pharmacotherapy for the treatment of ADHD in children has been established, but the usefulness of medication as a treatment for adults with ADHD has not been well-established. To date, the FDA has approved the following agents for adult use: mixed amphetamine compounds, the noradrenergic-specific reuptake inhibitor, Strattera. In May 2005, the FDA approved Focalin XR® (dexmethyphenidate HCl) (Novartis, East Hanover, NJ) for treatment of ADHD in adults, adolescents and children. One review article notes that the stimulants, methylphenidate and amphetamine, are the most commonly used and are highly effective in a dose-dependent manner for adults with ADHD (Wilens, 2004). Other available medication shown to be effective for adults with ADHD includes bupropion, desipramine and pemoline (Wilens, 2004).

Cigna Behavioral Health: In an effort to support and empower parents of children age 12 and under who are diagnosed with ADHD, Cigna Behavioral Health has implemented a preventive health program for improving the management of ADHD Automated algorithms within the Care Advocacy Program of Cigna Behavioral Health identify the first claim for a service to a child age 12 or under who carries the diagnosis of ADHD. An information packet is then mailed to the child's parents, and resources are made available to treating practitioners. The ability of parents to effectively understand and report information to those involved with their child is critical to care planning and to evaluating treatment response for ADHD. Early recognition, assessment, and management of this condition can redirect the educational and psychosocial development of most children with ADHD. (http://apps.cignabehavioral.com/web/basicsite/provider/newsAndLearning/newsletter/newsletter2007Quarter3/pages/CAP.html)

Professional Societies/Organizations
American Academy of Child and Adolescent Psychiatry (AACAP): the AACAP published practice parameters for the assessment and treatment of children and adolescents with attention-deficit/hyperactivity disorder. They include the following recommendations regarding evaluation of ADHD (Pliszka, et al., 2007a):

- Screening for ADHD should be part of every patients' mental health assessment: if a patient or the parent reports that the patient suffers from any symptom of ADHD that induce impairment of if the patient scores in the clinical range for ADHD symptoms on a rating scale, then a full evaluation is indicated
- Evaluation of preschooler, child or adolescent for ADHD should consist of clinical interviews with the parent and patient, obtaining information about the patient's school or day care functioning, evaluation for comorbid psychiatric disorders and review of patient's medical, social and family histories.
- If the patient's medical history is unremarkable, laboratory or neurological testing is not indicated. The guidelines note that there are few medical conditions that pose as ADHD, and the vast majority of patients with ADHD will have an unremarkable medical history. The parameters note that, "Unless there is strong evidence of such factors in the medical history, neurological studies (electroencephalography [EEG], magnetic resonance imaging, single-photon emission computed tomography [SPECT], or positron emission tomography [PET]) are not indicated for the evaluation of ADHD." They note that the American Psychiatric Association Council on Children, Adolescents and Their Families in their report of brain imaging and child and adolescent psychiatry have warned against the exposure of children to intravenous radioactive nucleotides as part of the diagnosis or treatment of childhood psychiatric disorders, citing both a lack of evidence of validity and safety issues.
- Psychological and neuropsychological tests are not mandatory for the diagnosis for ADHD, but should be performed if the patient's history suggests low general cognitive ability or low achievement in language or mathematics relative to the patient's intellectual ability. The guidelines note that, "Psychological testing of the ADHD patient usually consists of a standardized assessment of intellectual ability (IQ) to determine any contribution of low general cognitive ability to the academic impairment, and academic achievement. Neuropsychological testing, speech-language assessments, and computerized testing of attention or inhibitory control are not required as part of a routine assessment for ADHD, but may be indicated by the findings of the standard psychological assessment."

The clinician must evaluate the patient with ADHD for the presence of comorbid psychiatric disorders. The guidelines note that it should be determined if the patient meets criteria for separate comorbid disorder in addition to ADHD, the comorbid disorder is the primary disorder and ADHD is caused by it, or the comorbid symptoms do not meet criteria for separate disorder but rather represent secondary symptoms that are caused by the ADHD.

American Academy of Child and Adolescent Psychiatry (AACAP): The AACAP guidelines (Pliszka, et al., 2007a) contain the following recommendations regarding treatment of ADHD:

- A well-thought-out and comprehensive treatment plan should be developed for the patient with ADHD. The treatment plan may consist of pharmacological and/or behavior therapy. The plan should consider the most recent evidence concerning effective therapies as well as family preferences and concerns. The treatment plan should be reviewed on a regular basis and modified if the patient is not responding.
- The initial psychopharmacological treatment of ADHD should be a trial with an agent approved by the FDA for treatment of ADHD. These medications include dextroamphetamine (DEX), D, L-methylphenidate (MPH), mixed salts amphetamine and atomoxetine. The guidelines also include typical dosing of medications. Regarding selection of which agent, the guidelines note that it is the sole choice of the family and the clinician as to which agent should be used, and each patient's treatment must be individualized.
- If none of the FDA approved agents results in satisfactory treatment of the patient with ADHD, the clinician should undertake a careful review of the diagnosis and then consider behavior therapy and/or use of medications not approved by the FDA for treatment of ADHD. As part of the review of diagnosis, it should be examined whether any undetected comorbid conditions are present, such as affective disorders, anxiety disorders, or subtle developmental disorders. Among the medications that may be used at this time are bupropion, tricyclic antidepressants (TCAs), and alpha-antagonists. The guidelines note that the evidence base for these medications is far weaker than for the FDA-approved agents.
- While receiving psychopharmacological interventions, the patient should be monitored for treatment-emergent side effects. This assessment may necessitate the use of a different stimulant or a nonstimulant medication.
- If there is a robust response to psychopharmacological treatment and subsequently normative functioning in academic, family and social functioning, the psychopharmacological treatment of the

ADHD alone is satisfactory. The guidelines note that it is not mandatory that behavior therapy be added to the regimen, although parental preferences should be taken into account.
- When there is a less than optimal response to medication, the patient has a comorbid disorder, or experiences stressors in their family life, then psychosocial treatment in conjunction with medication is often beneficial.
- The patient should be assessed at regular intervals to determine whether there is continued need for treatment or if symptoms have been decreased. The treatment should continue as long as symptoms remain present and cause impairment. The guidelines note that signs that ADHD has diminished include: lack of any need to adjust despite robust growth, lack of deterioration when a dose of stimulant medication is missed, or newfound abilities to concentrate during drug holidays.
- While treated with medication, height and weight should be monitored.

The American Academy of Pediatrics (AAP): The AAP published updated clinical practice guideline for the diagnosis, evaluation, and treatment of attention-deficit/hyperactivity disorder in children and adolescents. The guidelines include the following key action statements (Subcommittee on Attention-Deficit/Hyperactivity Disorder/AAP, 2011):

- The primary care clinician should initiate an evaluation for ADHD for any child 4 through 18 years of age who presents with academic or behavioral problems and symptoms of inattention, hyperactivity, or impulsivity (quality of evidence B/strong recommendation).
- To make a diagnosis of ADHD, the primary care clinician should determine that the DSM-IV-TR criteria have been met (including documentation of impairment in more than one major setting); information should be obtained primarily from reports from parents or guardians, teachers, and other school and mental health clinicians involved in the child's care. The primary care clinician should also rule out any alternative cause (quality of evidence B/strong recommendation).
- In the evaluation of a child for ADHD, the primary care clinician should include assessment for other conditions that might coexist with ADHD, including emotional or behavioral (e.g., anxiety, depressive, oppositional defiant, and conduct disorders), developmental (e.g., learning and language disorders or other neurodevelopmental disorders), and physical (e.g., tics, sleep apnea) conditions (quality of evidence B/strong recommendation).
- The primary care clinician should recognize ADHD as a chronic condition and, therefore, consider children and adolescents with ADHD as children and youth with special health care needs.
- Management of children and youth with special health care needs should follow the principles of the chronic care model and the medical home (quality of evidence B/strong recommendation).
- Recommendations for treatment of children and youth with ADHD vary depending on the patient's age:
    - For preschool-aged children (4–5 years of age), the primary care clinician should prescribe evidence-based parent- and/or teacher-administered behavior therapy as the first line of treatment (quality of evidence A/strong recommendation) and may prescribe methylphenidate if the behavior interventions do not provide significant improvement and there is moderate-to severe continuing disturbance in the child's function. In areas where evidence-based behavioral treatments are not available, the clinician needs to weigh the risks of starting medication at an early age against the harm of delaying diagnosis and treatment (quality of evidence B/recommendation).
    - For elementary school–aged children (6–11 years of age), the primary care clinician should prescribe US Food and Drug Administration–approved medications for ADHD (quality of evidence A/strong recommendation) and/or evidence-based parent and/or teacher-administered behavior therapy as treatment for ADHD, preferably both (quality of evidence B/strong recommendation). The evidence is particularly strong for stimulant medications and sufficient but less strong for atomoxetine, extended-release guanfacine, and extended-release clonidine (in that order) (quality of evidence A/strong recommendation).The school environment, program, or placement is a part of any treatment plan.
    - For adolescents (12–18 years of age), the primary care clinician should prescribe Food and Drug Administration–approved medications for ADHD with the assent of the adolescent (quality of evidence A/strong recommendation) and may prescribe behavior therapy as treatment for ADHD (quality of evidence C/recommendation), preferably both.
- The primary care clinician should titrate doses of medication for ADHD to achieve maximum benefit with minimum adverse effects (quality of evidence B/strong recommendation).

The supplemental information published along with the AAP guidelines includes information regarding complementary and unproven therapies that may include: large doses of vitamins, essential fatty acids, and other dietary alterations; chelation; and electroencephalographic (EEG) biofeedback. The report notes that, "To date, there is insufficient evidence to determine whether these therapies lead to changes in core symptoms of ADHD or function, and for many of them, there is limited information about their safety. For these reasons, these therapies cannot be recommended. Some therapies, chelation, and megavitamins have been proven to cause some adverse effects and are contraindicated." (AAP, 2011)

Use Outside of the US

Spanish National Healthcare System: This organization published Clinical Practice Guideline on Attention Deficit Hyperactivity Disorder (ADHD) in Children and Adolescents (2010). Recommendations regarding evaluation include:

- Diagnostic criteria: To diagnose ADHD in children and adolescents the use of the diagnostic criteria of DSM-IV-TR or ICD-10 is recommended (grade of recommendation: D*).
- Diagnosis in children and adolescents(grade of recommendation: D*):
  - The diagnosis of ADHD in children and adolescents is exclusively clinical.
  - The diagnosis of ADHD in children and adolescents must be carried out by a health professional with training and experience in the diagnosis of ADHD and its most frequent comorbidities.
- Evaluation areas must be included in the diagnosis of ADHD: The diagnosis of ADHD in children and adolescents must be done via clinical interviews with parents and the patient, obtaining information from the school, reviewing family and personal background as well as the physical and psychopathological examination of the patient(grade of recommendation: D*).
- Neuropsychological assessment:
  - The neuropsychological assessment is not essential for the diagnosis of ADHD in children and adolescents (grade of recommendation: C*).
  - The neuropsychological examination of ADHD in children and adolescents is useful to get to know the profile of skills and difficulties in cognitive functioning and comorbidity with specific learning disorders (grade of recommendation: consensus*).
  - To diagnose ADHD it is not necessary for there to be an alteration in the results of the neuropsychological tests that assess executive functions (grade of recommendation: C*).
- Supplementary examinations: To diagnose ADHD in children and adolescents supplementary laboratory, neuroimage or neurophysiological tests are not indicated unless the clinical evaluation justifies this (grade of recommendation: B*).

Recommendations regarding complementary and alternative therapies include:

- The elimination of artificial coloring agents and additives from the diet is not recommended as general treatment applicable in children and adolescents with ADHD (grade of recommendation: D*).
- A supplementary diet of fatty acids is not recommended as general treatment applicable in children and adolescents with ADHD (grade of recommendation: D*).
- Treatment with optometry, auditory stimulation, osteopathy and psychomotricity is not recommended to treat ADHD in children and adolescents (grade of recommendation: consensus*).
- Treatment with homeopathy, herbal medicine and encephalogram biofeedback is not recommended to treat ADHD in children and adolescents (grade of recommendation: B*).
- Health professionals must place emphasis, as with any other child and adolescent, on the importance of a balanced diet and regular exercise for children and adolescents with ADHD(grade of recommendation: consensus*).
- Health professionals must ask the families about the use of complementary and alternative therapies to identify and inform about their possible risks or side effects to treat ADHD in children and adolescents (grade of recommendation: consensus*).

*Grades of recommendation:
B: A body of evidence including studies rated as 2++, directly applicable to the target population of the guideline and demonstrating overall consistency of results; or extrapolated evidence from studies rated as 1++ or 1+.
C: A body of evidence including studies rated as 2++, directly applicable to the target population of the guideline and demonstrating overall consistency of results; or extrapolated evidence from studies rated as 1++ or 1+.
D: Scientific evidence level 3 or 4; or extrapolated scientific evidence from studies rated as 2+.

Consensus: Recommended practice based on the clinical experience and the consensus of the development group.
1++: High quality meta-analysis, systematic reviews of clinical trials or high-quality clinical trials with a very low risk of bias.
1+: Well-conducted meta-analyses, systematic reviews of clinical trials or well-performed clinical trials with a low risk of bias.
1- : Meta-analyses, systematic reviews of clinical trials, or clinical trials with high risk of bias.
2++: High-quality systematic reviews of case control or cohort studies. Well-conducted case control or cohort studies with a very low risk of bias and a high probability that the relationship is causal.
2+: Well-conducted case control or cohort studies with a low risk of bias and a moderate probability that the relationship is causal.
2- : Case control or cohort studies with a high risk of bias and a significant risk that the relationship is not causal.
3: Non-analytical studies, such as case reports and case series.
4: Experts' opinion.

National Institute for Health and Clinical Excellence (NICE): NICE clinical guideline published guidelines for diagnosis and management of ADHD in children, young people and adults (NICE, 2009; revised March 2013). The recommendations regarding diagnosis include:

- A diagnosis of ADHD should only be made by a specialist psychiatrist, pediatrician or other appropriately qualified healthcare professional with training and expertise in the diagnosis of ADHD, on the basis of:
  - a full clinical and psychosocial assessment of the person; this should include discussion about behavior and symptoms in the different domains and settings of the person's everyday life
  - a full developmental and psychiatric history
  - observer reports and assessment of the person's mental state
- A diagnosis of ADHD should not be made solely on the basis of rating scale or observational data. However rating scales such as the Conners' rating scales and the Strengths and Difficulties questionnaire are valuable adjuncts, and observations (for example, at school) are useful when there is doubt about symptoms.
- For a diagnosis of ADHD, symptoms of hyperactivity/impulsivity and/or inattention should:
  - meet the diagnostic criteria in DSM-IV or ICD-10 (hyperkinetic disorder)
  - be associated with at least moderate psychological, social and/or educational or occupational impairment based on interview and/or direct observation in multiple settings
  - be pervasive, occurring in two or more important settings including social, familial, educational and/or occupational settings
- As part of the diagnostic process, include an assessment of the person's needs, coexisting conditions, social, familial and educational or occupational circumstances and physical health. For children and young people, there should also be an assessment of their parents' or caregivers' mental health.
- ADHD should be considered in all age groups, with symptom criteria adjusted for age-appropriate changes in behavior.
- In determining the clinical significance of impairment resulting from the symptoms of ADHD in children and young people, their views should be taken into account wherever possible

The recommendations regarding treatment include:

- Parent-training/education programs are the first-line treatment for parents or caregivers of pre-school children. These programs are the same as those recommended for the parents or caregivers of other children with conduct disorder. If more help is needed the child can be referred to a tertiary service.
- Group-based parent-training/education programs are usually the first-line treatment for parents and caregivers of children and young people of school age with ADHD and moderate impairment. This may also include group psychological treatment (cognitive behavioral therapy [CBT] and/or social skills training) for the younger child. For older age groups, individual psychological treatment may be more acceptable if group behavioral or psychological approaches have not been effective, or have been refused. Drug treatment may be tried next for those children and young people with ADHD and moderate levels of impairment.
- The first-line treatment for school-age children and young people with severe ADHD (hyperkinetic disorder) and severe impairment is drug treatment. If the child or young person wishes to refuse medication and/or the parents or caregivers reject it, a psychological intervention may be tried but drug treatment has more benefits and is superior to other treatments for this group.

- Drug treatment is the first-line treatment for adults with ADHD with either moderate or severe levels of impairment. Methylphenidate is the first-line drug. Psychological interventions without medication may be effective for some adults with moderate impairment, but there are insufficient data to support this recommendation. If methylphenidate is ineffective or unacceptable, atomoxetine or dexamfetamine can be tried. If there is residual impairment despite some benefit from drug treatment, or there is no response to drug treatment, CBT may be considered.

Scottish Intercollegiate Guidelines Network (SIGN): SIGN published evidenced-based clinical guidelines for the management of attention deficit and hyperkinetic disorders (HKD) in children and young people. The guidelines include the following (2009):

- Parents/carers of children with ADHD/HKD (and older children with ADHD/HKD) should be given information about ADHD/HKD and about possible interventions, including their potential risks and benefits.
- There should be regular communication between health and education services to promote understanding of the difficulties of ADHD/HKD, to ensure a consistent approach to the individual across settings and to monitor effectiveness of intervention(s).
- Psychological interventions: Behavioral parent training is recommended for parents of pre-school children with symptoms of ADHD/HKD. This should be delivered by trained facilitators.
- Treatment selection:
  - For school aged children and young people with hyperkinetic disorder (severe ADHD) medication is recommended.
  - For school aged children and young people with ADHD /HKD and comorbid symptoms of oppositional defiant disorder and/or aggressive behavior a combination of medication and behavioral treatments is recommended.
  - For school aged children and young people with ADHD /HKD and comorbid generalized anxiety disorders a combination of medication and behavioral treatments is recommended.
  - Where symptoms of ADHD are mild, clinicians should consider behavioral approaches in the first instance.
- Regarding complementary and alternative therapies: There is insufficient evidence on which to base any recommendations for complementary or alternative therapies in the treatment of ADHD including:
  - Bach flower remedies: One small, placebo-controlled randomized controlled trial (RCT) found no effect for Bach flower remedies (five flower essences) in the treatment of children with ADHD/HKD.
  - Homeopathy: A well conducted Cochrane meta-analysis identified four small trials of homeopathic treatments. The study concluded that there is little evidence of efficacy.
  - Massage therapy: One small, short term RCT study found that twice weekly massage therapy improved short term mood state and classroom behavior in young people with ADHD/HKD.
  - Neurofeedback: Neurofeedback is presently considered to be an experimental intervention in children and young people with ADHD/HKD.

Summary
Attention-deficit/hyperactivity disorder (ADHD) is a common neurobehavioral disorder of childhood and adolescents that is characterized by symptoms of inattention and/or hyperactivity/impulsivity that have persisted for at least six months. There is evidence to support that a combination of certain medical and behavioral interventions can be effective in the treatment of ADHD in children.

Coding/Billing Information

Note: 1) This list of codes may not be all-inclusive.
2) Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement

Experimental, investigational or unproven and not covered when used to report the assessment and/or treatment of ADHD:

Assessment

CPT* Codes	Description
70450	Computed tomography, head or brain; without contrast material
70460	Computed tomography, head or brain; with contrast material(s)
70470	Computed tomography, head or brain; without contrast material, followed by contrast material(s) and further sections
70551	Magnetic resonance (eg, proton) imaging, brain (including brain stem); without contrast material
70552	Magnetic resonance (eg, proton) imaging, brain (including brain stem); with contrast material(s)
70553	Magnetic resonance (eg, proton) imaging, brain (including brain stem); without contrast material, followed by contrast material(s) and further sequences
70554	Magnetic resonance imaging, brain, functional MRI; including test selection and administration of repetitive body part movement and/or visual stimulation, not requiring physician or psychologist administration
70555	Magnetic resonance imaging, brain, functional MRI; requiring physician or psychologist administration of entire neurofunctional testing
76390	Magnetic resonance spectroscopy
78600	Brain imaging, less than 4 static views;
78601	Brain imaging, less than 4 static views; with vascular flow
78605	Brain imaging, minimum 4 static views;
78606	Brain imaging, minimum 4 static views; with vascular flow
78607	Brain imaging, tomographic (SPECT)
78608	Brain imaging, positron emission tomography (PET); metabolic evaluation
78609	Brain imaging, positron emission tomography (PET); perfusion evaluation
78610	Brain imaging, vascular flow only
78811	Positron emission tomography (PET) imaging; limited area (eg, chest, head/neck)
78814	Positron emission tomography (PET) with concurrently acquired computed tomography (CT) for attenuation correction and anatomical localization imaging; limited area (eg, chest, head/neck)
92548	Computerized dynamic posturography
95803	Actigraphy testing, recording, analysis, interpretation, and report (minimum of 72 hours to 14 consecutive days of recording)
95812	Electroencephalogram (EEG) extended monitoring; 41-60 minutes
95813	Electroencephalogram (EEG) extended monitoring; greater than 1 hour
95816	Electroencephalogram (EEG); including recording awake and drowsy
95819	Electroencephalogram (EEG); including recording awake and asleep
95827	Electroencephalogram (EEG); all night recording
95930	Visual evoked potential (VEP) testing central nervous system, checkerboard or flash
95957	Digital analysis of electroencephalogram (EEG) (eg, for epileptic spike analysis)
95961	Functional cortical and subcortical mapping by stimulation and/or recording of electrodes on brain surface, or of depth electrodes, to provoke seizures or identify vital brain structures; initial hour of attendance by a physician or other qualified healthcare professional
95962	Functional cortical and subcortical mapping by stimulation and/or recording of electrodes on brain surface, or of depth electrodes, to provoke seizures or identify vital brain structures; each additional hour of attendance by a physician or other qualified healthcare professional (List separately in addition to code for primary procedure)
96020	Neurofunctional testing selection and administration during noninvasive imaging functional brain mapping, with test administered entirely by a physician or other qualified healthcare professional (i.e. psychologist), with review of test results and report

HCPCS Codes	Description
P2031	Hair analysis (excluding arsenic)
S8035	Magnetic source imaging
S8040	Topographic brain mapping

Treatment

CPT* Codes	Description
90785†	Interactive complexity (List separately in addition to the code for primary procedure)
90832†	Psychotherapy, 30 minutes with patient and/or family member
90833†	Psychotherapy, 30 minutes with patient and/or family member when performed with an evaluation and management service (List separately in addition to the code for primary procedure)
90834†	Psychotherapy, 45 minutes with patient and/or family member
90836†	Psychotherapy, 45 minutes with patient and/or family member when performed with an evaluation and management service (List separately in addition to the code for primary procedure)
90837†	Psychotherapy, 60 minutes with patient and/or family member
90838†	Psychotherapy, 60 minutes with patient and/or family member when performed with an evaluation and management service (List separately in addition to the code for primary procedure)
90867	Therapeutic repetitive transcranial magnetic stimulation (TMS) treatment; initial, including cortical mapping, motor threshold determination, delivery and management
90868	Therapeutic repetitive transcranial magnetic stimulation (TMS) treatment;; subsequent delivery and management, per session
90901	Biofeedback training by any modality
92065	Orthoptic and/or pleoptic training with continuing medical direction and evaluation
97112	Therapeutic procedure, one or more areas, each 15 minutes; neuromuscular reeducation of movement, balance, coordination, kinesthetic sense, posture, and/or proprioception for sitting and/or standing activities
97532	Development of cognitive skills to improve attention, memory, problem solving (includes compensatory training), direct (one-on-one) patient, each 15 minutes
97533	Sensory integrative techniques to enhance sensory processing and promote adaptive responses to environmental demands, direct (one-on-one) patient contact, each 15 minutes
97810	Acupuncture, 1 or more needles; without electrical stimulation, initial 15 minutes of personal one-on-one contact with the patient
97811	Acupuncture, 1 or more needles; without electrical stimulation, each additional 15 minutes of personal one-on-one contact with the patient, with re-insertion of needle(s) (List separately in addition to code for primary procedure)
97813	Acupuncture, 1 or more needles; with electrical stimulation, initial 15 minutes of personal one-on-one contact with the patient
97814	Acupuncture, 1 or more needles; with electrical stimulation, each additional 15 minutes of personal one-on-one contact with the patient, with re-insertion of needle(s) (List separately in addition to code for primary procedure)
98940	Chiropractic manipulative treatment (CMT); spinal, one to two regions
98941	Chiropractic manipulative treatment (CMT); spinal, three to four regions
98942	Chiropractic manipulative treatment (CMT); spinal, five regions
98943	Chiropractic manipulative treatment (CMT); extraspinal, one or more regions

HCPCS Codes	Description
G0176	Activity therapy, such as music, dance, art or play therapies not for recreation, related to the care and treatment of patient's disabling mental health problems, per session (45 minutes or more)
H0046†	Mental Health Services, not otherwise specified
H2014†	Skills training and development, per 15 minutes
H2017†	Psychosocial rehabilitation services, per 15 minutes
H2018†	Psychosocial rehabilitation services, per diem
H2019†	Therapeutic behavioral services, per 15 minutes
H2020†	Therapeutic behavioral services, per diem

†**Note:** Experimental, investigational, unproven and not covered when provided for intensive behavioral programs (e.g., early intensive behavior intervention [EIBI] intensive behavior intervention [IBI], Lovaas therapy, applied behavior analysis [ABA]).

Educational in nature, not medically necessary and not covered for the assessment and/or treatment of ADHD:

CPT* Codes	Description
96116	Neurobehavioral status exam (clinical assessment of thinking, reasoning and judgment, eg, acquired knowledge, attention, language, memory, planning and problem solving, and visual spatial abilities), per hour of the psychologist's or physician's time, both face-to-face time with the patient and time interpreting test results and preparing the report
96118	Neuropsychological testing (eg, Halstead-Reitan Neuropsychological Battery, Wechsler Memory Scales and Wisconsin Card Sorting Test), per hour of the psychologist's or physician's time, both face-to-face time administering tests to the patient and time interpreting these test results and preparing the report
96119	Neuropsychological testing (eg, Halstead-Reitan Neuropsychological Battery, Wechsler Memory Scales and Wisconsin Card Sorting Test), with qualified health care professional interpretation and report, administered by technician, per hour of technician time, face-to-face
96120	Neuropsychological testing (eg, Wisconsin Card Sorting Test), administered by a computer, with qualified health care professional interpretation and report

HCPCS Codes	Description
G0177	Training and educational services related to the care and treatment of patient's disabling mental health problems per session (45 minutes or more)
H2027	Psychoeducational service, per 15 minutes
S9445	Patient education, not otherwise classified, nonphysician provider, individual, per session
S9446	Patient education, not otherwise classified, nonphysician provider, group, per session
T1018	School-based individualized education program (IEP) services, bundled

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