ADHD ACROSS THE LIFE SPAN:

A Summary for Primary Care Physicians

CLINICAL PRACTICE GUIDELINES:

ATTENTION DEFICIT/HYPERACTIVITY DISORDER (AD/HD)

*The attached guidelines provide a broad perspective, drawn primarily from authoritative, published treatment and practice guidelines, research, and recent professional consensus statements. Source information is from the literature of multiple disciplines, including primary care, psychiatry, child psychiatry, child neurology, nursing, psychology, and education. Practitioners should refer to referenced original sources additional information or detail is needed. Recommended doses and side effects are thought to be accurate. However, this is a general reference only, and should not serve as a guideline for prescribing of medications. Please check the manufacturer’s product information sheet or the PDR for any changes in schedules or contraindications. Of course, no guideline should replace sound clinical assessment and treatment, and guidelines must be modernized as new data emerges.
CLINICAL PRACTICE GUIDELINES:
ATTENTION DEFICIT/HYPERACTIVITY DISORDER (AD/HD)

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ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (DSM-IV-TR)

A. Must have either (1) or (2); and B, C, D, & E:

1. Six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with development level:

   - (a) Often fails to give close attention to details or makes careless mistakes in work, schoolwork, or other activities
   - (b) Often has difficulty sustaining attention in tasks or play activities
   - (c) Often does not listen when spoken to directly
   - (d) Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
   - (e) Often has difficulty organizing tasks and activities
   - (f) Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
   - (g) Often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
   - (h) Is often easily distracted by extraneous stimuli
   - (i) Is often forgetful in daily activities

2. Six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with development level:

   - (a) Often fidgets with hands or feet or squirms in seat
   - (b) Often leaves seat in classroom or in other situations in which remaining seated is expected
   - (c) Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
   - (d) Often has difficulty playing or engaging in leisure activities quietly
   - (e) Is often “on the go” or often acts as if “driven by a motor”
   - (f) Often talks excessively
   - (g) Often blurts out answers before questions have been completed
   - (h) Often has difficulty awaiting turn
   - (i) Often interrupts or intrudes on others (e.g., butts into conversations or games)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g., at school [or work] and at home).

D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder (Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

* May require formal mental health evaluation

314.01 Attention-Deficit/Hyperactivity Disorder, Combined Type: If both Criteria A1 and A2 are met for the past 6 months.

314.00 Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type: If Criterion A1 is met but Criterion A2 is not met for the past 6 months.

314.10 Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type: If Criterion A2 is met but Criterion A1 is not met for the past 6 months.

314.9 Attention-Deficit/Hyperactivity Disorder, not otherwise specified: For subsyndromal cases that do not involve significant impairment.

* See below

ADHD TREATMENT & PRACTICE GUIDELINES


* For full text clinical monograph contact Blue Cross and Blue Shield of North Carolina or Magellan Behavioral Health.
**MEDICATIONS COMMONLY USED IN THE TREATMENT OF ADHD**

<table>
<thead>
<tr>
<th>Stimulants*</th>
<th>Noradrenergic Specific Agent*</th>
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<tbody>
<tr>
<td>Amphetamine Type</td>
<td>Amphetamine (Strattera)</td>
</tr>
<tr>
<td>- Short-acting (Dexedrine® tablets)</td>
<td></td>
</tr>
<tr>
<td>- Extended-release (Adderall®)</td>
<td></td>
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<tr>
<td>- Extsended-release (Adderall-ER™)</td>
<td></td>
</tr>
<tr>
<td>Methylphenidate Type</td>
<td>Antidepressant Type</td>
</tr>
<tr>
<td>- Short-acting (Ritalin®, Methylin)</td>
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</tr>
<tr>
<td>- Di-isomer (Dextroamphetamine, Adderall, Concerta®)</td>
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**Second Line Alternatives**

<table>
<thead>
<tr>
<th>Pediatric Augmenting Agents**</th>
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<tbody>
<tr>
<td>- Tricyclics (TCAs, e.g., imipramine)</td>
</tr>
<tr>
<td>- Venlafaxine (Effexor® XR)</td>
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</tbody>
</table>

**Prescribing tips**

Common stimulant side effects include appetite (but not growth) suppression, sleep problems, behavioral rebound, and transient headache or stomachache. Usually these can be addressed through patient/family reassurance and dosage adjustments before other agents are tried.

If the first stimulant isn’t working or if there are too many adverse side effects, try another stimulant before moving to a second line alternative.

Stimulant exacerbation of tics to a serious level is rare, but can be handled by reducing the dose, trying a different stimulant, or augmenting with an alpha adrenergic agonist, such as clonidine or guanfacine. Low dose clonidine at bedtime is also useful to address insomnia that is unresponsive to sleep hygiene rules and other methods.

Stimulants are now thought not to significantly affect seizure threshold, and can be used in combined pharmacy with anti-seizure medications.

Emergence of psychosis, mania, severe depression, euphoria, or hallucinations should lead to reduced/ended dosing and a referral to a specialist. Emerging dystonia/irritability can be addressed by trying a different agent, or considering the possibility of co-morbid depression.

ADHD with accompanying mild depression or mild anxiety should be treated with a psychostimulant, which may address those symptoms as well. Continued symptoms of mild anxiety/mild depression should then be addressed by switching to buproprion, atomoxetine, a TCA, or adding an SSRI, such as Zoloft®.

With patient history of drug abuse, or strong patient objection to psychostimulants, use atomoxetine or bupropion.

Adderall-ER™, Dexedrine Spansules®, Ritalin® LA™, & Metadate® CD can be sprinkled. TCAs require baseline ECGs, and should be used with extreme caution in patients with coronary artery disease.

* FDA approved for ADHD

**OR-label for ADHD

** INTERNATIONAL CONSENSUS STATEMENT ON ADHD (2002)**

Although often depicted as controversial in the public media, there is overwhelming agreement among scientists and clinicians involved in ADHD research regarding its validity and adverse impact. All major medical associations and government health agencies recognize ADHD as a genuine disorder, including the U.S. Surgeon General, the American Medical Association (AMA), the American Psychiatric Association, the American Academy of Child and Adolescent Psychiatry (AACAP), the American Psychological Association, and the American Academy of Pediatrics (AAP).

ADHD is a major public health problem and can have devastating consequences. Follow-up studies of clinical samples suggest that sufferers are far more likely to drop out of school (32-40%), fail to complete college (5-10%), have few or no friends (50-70%), perform at work (70-80%), engage in antisocial activities (40-50%), and use tobacco or illicit drugs more than normal. Children growing up with ADHD are more likely to experience teen pregnancy (40%), sexually transmitted diseases (16%), to spend excessively and have multiple car accidents, and as adults to experience depression (20-30%) and personality disorders (18-25%). Those with ADHD are more prone to physical injury and accidental poisonings.

Hundreds of scientific studies show that ADHD involves serious deficiencies in behavioral inhibition and sustained attention that lead to impairments in major life activities, including social relations, education, family functioning, occupational functioning, self-sufficiency, and adherence to social norms.

Numerous scientific studies link the central psychological deficits in people with ADHD to several specific brain regions (the frontal lobe, its connections to the basal ganglia, and their relationship to the central aspects of the cerebellum). Most neurological studies find that those with ADHD as a group have less brain electrical activity and show less reactivity to stimulation in one or more of these specific regions. Neuroimaging studies demonstrate that those with ADHD as a group have relatively smaller areas of brain matter and less metabolic activity of this brain matter than is the case for controls.

Across various countries and multiple continents, these same psychological deficits in inhibitory attention and sustained attention have been found in numerous studies of identical and fraternal twins to be primarily inherited. The genetic contribution to these traits is routinely found to be among the highest for any psychiatric disorder (70-85% of trait variation in the population). While hundreds of studies show the significant effectiveness of medications, many, although not all people with this disorder, need multiple therapies, such as educational, family, and other social interventions.


<table>
<thead>
<tr>
<th>Intervention</th>
<th>Description</th>
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<tbody>
<tr>
<td>Bibliotherapy</td>
<td>Supplies patient/family with readings/references; for information about ADHD &amp; for specific aspects of treatment which the patient/family will self-initiate.</td>
</tr>
<tr>
<td>Psychoeducation: patient/family</td>
<td>Provides specific information regarding the nature and course of the disorder, treatments, uses of professional, educational, and community resources.</td>
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<tr>
<td>Insight-oriented therapy</td>
<td>Therapy based on psychodynamic approach, aimed in part at change through gaining insight regarding past influences on present behavior. (e.g. play therapy, psychodynamic psychotherapy)</td>
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<tr>
<td>Cognitive-behavioral therapy</td>
<td>Therapy based upon principles of social learning and reinforcement applied to cognitive processes. Maladaptive self-talk and patterns of thinking are replaced by adaptive self-talk.</td>
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<tr>
<td>Contingency management</td>
<td>Application of principles of behavior control utilizing techniques of reinforcement, response-cost, and consequence management; aimed at increasing positive (e.g. prosocial) behavior and reducing inappropriate behavior.</td>
</tr>
<tr>
<td>Clinical behavior therapy</td>
<td>Uses contingency management and principles of social learning theory, but also includes a wide range of cognitive, activity-based, parent/family, or other forms of treatment as needed in specific contexts. Includes behavioral contracting for adolescents.</td>
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<tr>
<td>Group therapy</td>
<td>Uses small-group interactions to correct inappropriate social behavior. May use both cognitive and behavioral approaches. (e.g. social skills training)</td>
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<tr>
<td>Summer treatment program</td>
<td>Intensive and carefully structured program for teaching social and classroom coping skills, self-esteem, recreational and sports skills, and/or pharmacotherapy.</td>
</tr>
<tr>
<td>Family Therapy</td>
<td>May use cognitive, behavioral and medication treatment strategies.</td>
</tr>
<tr>
<td>Extracurricular activities</td>
<td>Activities selected for their value in addressing particular deficits and building specific competencies, such as social skills and age appropriate intellectual skills. Includes sports or other activities to build success experiences. (e.g., Boy scouts)</td>
</tr>
<tr>
<td>Training in time management</td>
<td>Provides specific instructions in prioritizing and managing daily activities at home, school, and work, using time management and organizational tools. (e.g., ADHD coaching, and organizational skills organizational tutoring)</td>
</tr>
<tr>
<td>School-based interventions</td>
<td>Includes consultation with teachers and staff regarding academic and/or classroom behavioral issues. May involve psychoeducational assessment and placement (e.g. special class or initiation of services. May include behavioral and cognitive interventions as well as liaison with home-based reward systems such as daily report card. Clinicians may want to consult the 1973 Federal Rehabilitation Act (public law 93-112) and the individuals with Disabilities Education Act (IDEA) (public law 101-476, revised 1997), specifically under category other health impaired.</td>
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**PSYCHOSOCIAL INTERVENTIONS FOR ADHD**

**COMMERCIALY AVAILABLE DIAGNOSTIC TOOLS**


This clinical practice guideline is not intended as a sole source of guidance for ADHD. Rather, it is designed to assist primary care clinicians by providing general information. It is not intended to replace clinical judgment or to establish a protocol for all ADHD patient recommendations. Clinical decisions should always be used in the context of the individual patient’s situation and the clinician’s judgment of all relevant factors.
INTRODUCTION

Scientific understanding of AD/HD (Attention Deficit/Hyperactivity Disorder) has increased dramatically during the last decade as data regarding the delivery of clinical services to this population has ballooned. Results from research on psychosocial treatments, combined consensus-based and data-based treatment algorithms using both pharmacologic intervention and psychosocial methods have been published. Convincing research has demonstrated the validity and reliability of behavior checklists that have been used on a clinical basis for many years, and new diagnostic tools have been developed. Effective new medications and medication delivery products are now available to treat the core symptoms of AD/HD; namely, extreme inattention, impulsivity, or hyperactivity across various settings or domains. The expanded knowledge base can enable clinicians across various disciplines (primary care, psychiatry, education, nursing, psychology, neurology) to be more effective as they assess, treat, educate, and follow AD/HD patients and their families. New research has also begun to demonstrate the relative importance of psychosocial interventions for individuals with AD/HD, combining medication management with educational, family, and other social accommodations.

Hundreds of scientific studies show that AD/HD involves serious deficiencies in behavioral inhibition and sustained attention. These deficiencies lead to impairments in major life activities including social relations, education, family functioning, occupational functioning, self-sufficiency, and adherence to social norms. Evidence indicates that patients with AD/HD are more prone to physical injury and accidental poisonings, are far more likely to drop out of high school (32-40%), rarely complete college (5-10%), have few or no friends (50-70%), under-perform at work (70-80%), engage in antisocial activities (40-50%), and to use tobacco or illicit drugs more than their non-AD/HD peers. Children growing up with AD/HD are more likely to experience teen pregnancy (40%) and sexually transmitted diseases (16%), to speed excessively, and to have multiple car accidents. In addition, follow-up data makes it clear that the disorder persists into adulthood and exists throughout the life span in a substantial number of cases. As AD/HD adults they are more likely to experience depression (20-30%) and personality disorders (18-25%).

A major clinical and public health problem, AD/HD is estimated to affect at least 5% of school-aged children, with as many as 50% of those with the disorder continuing to display some symptoms in adult life. Primary care physicians as well as a variety of other health care providers are frequently asked to assess, treat and follow children and adolescents with AD/HD. They are now commonly asked to provide these services to adult AD/HD patients as well. Studies indicate that adults with the disorder respond favorably to the same treatment methods as children with AD/HD, when these are modified for adult circumstances (see Appendix B).

Unfortunately, research shows that less than half of those with AD/HD are receiving treatment of any kind. However, there is the possibility of “false positives” that present for care, due to the symptom overlap that AD/HD has with other psychiatric disorders, and due to public media that may elicit requests for treatment from individuals without significant symptoms or true impairment. Concerns that psychotropics may be “overprescribed” to individuals with AD/HD symptoms also exist.

AD/HD is defined in the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) as a behavioral disorder of childhood onset (by the age of 7 years) characterized by symptoms of inattentiveness and impulsivity-hyperactivity. According to the to DSM-IV, criteria that satisfy the definition of AD/HD include an inability to concentrate, intrusiveness into others' conversations, and an inability to stay seated, are all criteria that satisfy the definition of AD/HD. On the basis of the symptoms that predominate, DSM-IV recognizes 3 subtypes of AD/HD: a predominantly inattentive subtype, a predominantly hyperactive/impulsive subtype, and a combined type in which both inattention and hyperactivity/impulsivity symptoms are present. In addition, DSM-IV recognizes the category of AD/HD not otherwise specified (NOS) for individuals presenting with atypical features (see Appendix A). There has been increasing recognition that AD/HD is highly heterogeneous and often associated with additional psychiatric disorders such as conduct disorder, oppositional defiant disorder, mood disorders (e.g., unipolar and bipolar depression), anxiety disorders, and learning disabilities. Social skill deficits and developmental disabilities are also commonly co-morbid with a diagnosis of AD/HD. The impact on society is
enormous with regard to financial cost, stress to families, challenges faced by the educational system, damage to the sufferer’s sense of self worth, and the increased risk that AD/HD patients face in terms of developing additional psychiatric disorders in adolescence and adulthood.

A growing collection of neuroimaging studies indicates that the key psychological deficits in those with AD/HD are linked to several specific neuroanatomical brain regions: (the frontal lobe, its connections to the basal ganglia, and their relationship to regions of the cerebellum). Although neuroimaging methods have not evolved to the point where they can be used for diagnosis with individual patients, neuroimaging studies of groups of those with AD/HD demonstrate relatively smaller areas of specific regions of the brain as well as hypometabolic activity from those areas in comparison to controls.

Studies of identical and fraternal twins conducted in various countries and across several continents have shown evidence that the psychological deficits of inhibition and inattention are inherited. In fact, the genetic contribution to these traits has been found to be among the highest for any psychiatric disorder. One gene has been reliably demonstrated to be associated with AD/HD and research is currently looking for additional genes that are likely to be involved, supporting the argument that the underlying psychological deficits associated with AD/HD are not solely or primarily the result of environmental factors. Genetic studies have implicated several candidate genes, including the dopamine D2 and D4 (DRD4-7) receptors as well as the dopamine transporter (DAT-1). Both dopamine and norepinephrine, neurotransmitters that are thought to mediate the response to anti-AD/HD pharmacotherapy, are potent agonists of the D4 receptor.

Statistics indicate that prescription rates for AD/HD medications have increased, that has paralleled increased and this has paralleled increased recognition and treatment. Unfortunately, an increase in methylphenidate abuse in pre-teens and adolescents has also occurred. This latter development clearly indicates the need for careful assessment to minimize over-diagnosis of the condition as well as prescribing procedures that will reduce non-therapeutic drug access. Diagnostic procedures that include good screening for substance abuse history screening, precise prescribing tailored to the needs of specific patients, and supervision of adolescent access to medication should all be emphasized. Some of the newer methylphenidate preparations, such as Concerta™, have limited abuse potential due to a novel delivery system and hard casing, while another newer agent, Strattera® is a norepinephrine re-uptake inhibitor that cannot easily be overdosed or snorted. The subjective effects of Strattera® provide little or no euphoria (see Appendix C).

CONSENSUS GUIDELINES & TOOLS

Media coverage of the disorder of AD/HD has occasionally given the impression that there is serious scientific disagreement about even the actual existence of AD/HD. In other instances, the media has portrayed those with the disorder as simply modern day “Huckleberry Finns.” Non-expert sources have sometimes had substantial visibility in such portrayals, with mainstream scientific evidence often minimized. As a result, the general public may be misinformed or poorly educated about AD/HD and the seriousness of its related impairment. A National Institutes of Health consensus panel convened in 1998 to address the nature and definition of AD/HD, and concluded that "there is sufficient evidence to support the existence of the disorder." However, the conference also indicated a need for better understanding of the pathophysiology of AD/HD, and, despite the publication of improved diagnostic reliability and validity studies, highlighted a lack of consensus across the country regarding the clinical and behavioral symptoms required for the diagnosis. Also reported were difficulties experienced by primary care physicians, pediatricians in particular, in properly evaluating, diagnosing and treating the condition. The conference lent credence to the argument that while AD/HD as a diagnosis may be missed in a child with problematic behavior, it may be overdiagnosed or overtreated as well.

As indicated by the International Consensus Statement on AD/HD, published last year by a large consortium of AD/HD scientists across the world, there is no significant scientific disagreement over whether AD/HD is a real medical condition. In terms of the health care professions, this disorder and its serious public health implications have been recognized by the U.S. Surgeon General, the American Medical Association (AMA), the American Psychiatric Association, the American Academy of Child and Adolescent Psychiatry (AACAP), the American Psychological Association, and the American Academy of Pediatrics (AAP).

As referenced in Appendix C, some of these organizations have issued guidelines for evaluation and management of AD/HD disorder for their membership. Comprehensive guidelines for the evaluation, diagnosis and treatment of AD/HD for both children and adults were first published in the Journal of the Academy of Child and Adolescent Psychiatry in 1997. In articles published in 2000 and 2001, the American Academy of Pediatrics presented its own set of guidelines. These were developed by the AAP Committee on Quality Improvement's Subcommittee on AD/HD, and included participation by the American
In addition, the AAP recently unveiled its *AD/HD Toolkit*, a collection of resources designed to aid the primary care pediatrician in the evaluation, diagnosis, and treatment of children aged 6 to 12 years with AD/HD. The toolkit contains parent and teacher questionnaires, diagnostic checklists, a collection of support services for parents, and an inventory of International Classification of Disease, 9th Revision, Clinical Modification (ICD-9-CM), and common procedural terminology (CPT) codes that can be used by physicians for appropriate billing of provided services (see Appendix D). The AAP guidelines and toolkit represent consensus by leaders in the field of behavioral and developmental pediatrics, and the guidelines were extended upwards for adult AD/HD patients. They have also served to stimulate other guideline preparations, including those published in 2002 (see Appendix G). These reports are quite valuable in terms of enabling practitioners to better understand the condition and optimize its treatment. Information about these various resources can be found in Appendices D, F, & G. The *AD/HD Toolkit* is available commercially, and also can be downloaded from the Internet (www.nichq.org).

The National Institute of Mental Health (NIMH) and the US Department of Education are presently conducting the MTA study (the Collaborative Multimodal Treatment Study of Children with Attention Deficit/ Hyperactivity Disorder), a comprehensive and ongoing investigation at multiple universities across the country. This project was designed to determine which interventions are most effective in treating AD/HD and how other areas of child functioning are affected by different treatments.

The MTA study is a longitudinal study and will follow the children for five years. The sample consists of more than 500 AD/HD children (ages 7 to 9.9) who were randomly assigned to four different groups: community treatment, medication management, intensive psychosocial intervention (see Appendix E), and combined medication management and psychosocial intervention. Initial published accounts indicated that the medication management and the combined treatment are more effective than either routine community care or psychosocial intervention alone. Children in the community care group also received medication in many cases. However, fewer and shorter office visits, less interaction with teachers and family members, and a much lower dosage level of medication appear to account for the decreased effectiveness of the treatment.

Initial reports do show that the combined treatment was consistently better than the community care control group in a variety of areas of functioning, including anxiety symptoms, academic performance, oppositionality, parent-child relations, and social skills. The medication management and psychosocial treatments alone did not exhibit these effects. Although the initial findings are based on only 14 months, the study should continue to review new information about treatment responsiveness and effectiveness. The finding that there is greater global impact with the combination of psychosocial and medication treatment has important implications for all clinicians and educators working with AD/HD patients.

The initial findings from the MTA study have already strongly influenced additional work. For example, the Texas Department of Mental Health and Mental Retardation (TDMHMR) has been developing evidence-based algorithms for the treatment of a variety of highly-prevalent psychiatric disorders, including AD/HD (see Appendix G). Several investigators from the MTA study served as national experts for the consensus process used by this group to develop the AD/HD treatment algorithms. However, this consensus panel also included other clinicians, administrators, consumers, and family members of AD/HD children. Specific tactics were developed for the use of medications for AD/HD, as well as for its primary co-morbid conditions, including psychosocial treatments, patient education, and pharmacotherapies. Medications involved included stimulants, antidepressants, mood stabilizers, alpha-agonists, and, where occasionally appropriate, anti-psychotics. Investigators examined how well practicing psychiatrists, patients, and their families were able to implement the algorithms in the initial investigatory settings. Later research showed that the algorithms could be implemented in general community settings as well. With caution, investigators also concluded that the algorithm group showed a greater degree of improvement relative to historical controls, with reduced polypharmacy.

**ASSESSMENT AND EVALUATION**

**Co-morbidity**

Because a high proportion of children with AD/HD have other related conditions, several investigators have assessed co-occurring conditions. As noted previously, a variety of investigators have published studies indicating that co-occurring disorders such as learning disabilities, oppositional defiant disorder, conduct disorder, and depressive and anxiety disorders were quite common. Diagnostic definitions of various disorders such as learning disabilities, as well as the use of the earlier
DSM-III-R criteria for AD/HD before the DSM-IV criteria were developed, have made comparisons difficult. However, practice guidelines published by the American Academy of Pediatrics in 2000 indicated prevalence rates of co-occurring conditions with AD/HD ranging from 9% to 38% across disorders, with the most prevalent co-occurring conditions being oppositional defiant disorder and anxiety disorder. Co-occurring or comorbid conditions are commonly seen in primary care centers as well as in psychiatric clinics. Therefore, when children present with symptoms that include inattention, hyperactivity, impulsivity, behavior problems, and academic underachievement, not only should AD/HD be considered as a part of the primary care assessment, but the evaluation should include assessment for other conditions that may co-occur with the disorder. The prevalence of each of these comorbidities depends on the individual's age, gender, AD/HD subtype, and educational setting.

The clinical interview should carefully screen for the presence of other disorders. Genetic risk factors should be considered and a history of familial AD/HD in close relatives should be elicited. Neuropsychological testing is often useful in complicated clinical presentations; however, such testing is to document learning disorders and is not sensitive to AD/HD per se. Screening questionnaires, examples of which are included in the AAP's AD/HD toolkit (see Appendix D), can help the primary care provider identify problem areas that may point to specific associated disorders. These problem areas need to be formally evaluated and treated in order to ensure the success of the overall treatment intervention.

AD/HD affects many areas of functioning, including academic, social, and behavioral domains. Symptoms diminish in novel or structured environments or in closely supervised settings. They worsen in other settings, especially those requiring sustained effort and attention to detail. There are a number of useful standardized scales to monitor severity and treatment outcomes (Appendix D). Rating scales provide comparative information on severity based on age and gender; however, such tests are not sufficiently diagnostic by themselves alone, and are not a substitute for the clinical interview.

According to the AAP, AD/HD should be suspected in a child who demonstrates any or all of the core symptoms of AD/HD, namely inattention, impulsivity, and academic underachievement. According to DSM-IV diagnostic criteria (see Appendix A), and the newer DSM-IV-TR, symptoms should be present before 7 years of age and be more severe and/or frequent than those typically seen in children of the same age. Symptoms must be present for more than 6 months and include at least 6 of 9 behaviors in the inattentive domain and/or 6 of 9 behaviors in the hyperactive-impulsive domain. Symptoms should be pervasive, existing in at least 2 settings (typically the home and school). Finally, significant clinical impairment in the child's social, academic, or occupational functioning must be present, although commonly this is what has lead to the referral in the first place.

**Behavior Rating Scales**

As noted previously, as many as 30% to 40% of children with AD/HD have a co-occurring disorder or comorbidity, most commonly oppositional defiant disorder, anxiety disorder, conduct disorder, or learning disorder. Behavior rating scales included in the American Academy of Pediatrics' AD/HD “Tool Kit”, can help the primary care provider identify problem areas that may point to specific associated disorders as well as facilitate measurement of specific treatment targets. Others are commercially available (see Appendix D). Many of these instruments can be classified into either broad-band checklists or AD/HD-specific measures. AD/HD-specific measures are those that specifically assess the core symptoms of the disorder (e.g., the AD/HD Rating Scale-IV), whereas broad-band checklists measure a variety of child behavior problems, across the entire spectrum of childhood psychopathology (e.g., Achenbach’s Child Behavior Checklist). Generally speaking, broad-band rating scales have less specific utility for assessment of AD/HD symptoms alone, but are quite valuable for picking up evidence of co-morbid conditions. Narrow-band rating scales have been in use for decades, and are quite familiar to most clinicians who have worked with AD/HD patients. Rating scales are helpful diagnostically and are also useful for obtaining baseline behavioral measures for medication follow-up and titration.

In an effort to differentiate between normal variations in behavior and behavioral abnormalities, the AAP produced the Diagnostic and Statistical Manual for Primary Care (DSM-PC) criteria. These criteria help differentiate behaviors that are normally found in children from the behavioral abnormalities typically observed in children with AD/HD and severely disturbed youngsters. The DSM-PC criteria can be helpful in determining whether a child suspected of AD/HD is displaying behavior within the normative range, may have AD/HD, or may have other behavioral or emotional disorders.
A number of diagnostic behavior rating scales exist for use with adult populations as well. These include the Brown Attention Deficit Disorders Scale, which is normed for all ages, the CAARS Adult ADHD Rating Scales, and the AD/HD Behavior Checklist for Adults (see also Appendix D).

**Medical Evaluation**

Most authorities agree that an assessment for AD/HD should include a complete medical history and a physical examination within the last year, and that the patient history include use of prescribed, over-the-counter, illicit drugs, and herbal preparations. If clinical or environmental risk factors are present, lead levels should be measured, with treatment as necessary. Vision and hearing screens should also be done. A number of years ago there was some discussion of the need for screening for thyroid dysfunction due to a relatively rare conditioned known as generalized thyroid hormone resistance; however this condition is not felt to be more common among AD/HD patients than the population as a whole. Thyroid function tests are indicated in the presence of suggestive findings of clinical hypothyroidism or hyperthyroidism, goiter, family history of thyroid disease, or decreased growth velocity on the medical history or physical examination. Other possible medical factors predisposing to AD/HD include fragile X syndrome, fetal alcohol syndrome, G6PD deficiency, and phenylketonuria. Risk factors, which account for only a small part of the variance, include pregnancy variables such as poor maternal health, young age, use of alcohol, smoking, toxemia or eclampsia, postmaturity, and extended labor. Health problems or malnutrition in infancy appear to contribute.

**When to Refer:**

The clinical findings may suggest speech and language evaluation. In special circumstances, occupational or recreational evaluation may provide supplementary information regarding motor clumsiness or adaptive skills. AD/HD is a clinical diagnosis; there is no test for AD/HD. Neuropsychological tests are useful to evaluate specific deficits suggested by history, physical examination, or basic psychological testing, but are not sufficiently helpful for diagnosis of AD/HD to be performed routinely. Psychological testing and educational testing can be particularly important to identify co-occurring learning disabilities and to assist with academic accommodations in school.

EEG or neurological consultation is indicated only in the presence of focal signs or clinical suggestions of seizure disorder or a degenerative condition. Although some children with AD/HD have impaired motor coordination, the measurement of neurological soft signs is not useful in the diagnosis of AD/HD.

Psychostimulants are known to increase blood pressure and pulse, so both adult and child AD/HD patients with a history of cardiovascular abnormalities need careful evaluation and monitoring before pharmacotherapy is initiated. Some authorities recommend periodic CBC, differential, and platelet counts for patients on long term psychostimulant therapy.

**Adult Attention Deficit/Hyperactivity Disorder (AD/HD)**

As noted previously, Attention-deficit/hyperactivity disorder (AD/HD) affects 30 to 50 percent of adults who had AD/HD in childhood. Accurate diagnosis of AD/HD in adults is challenging and requires attention to early development and symptoms of inattention, distractibility, impulsivity and emotional lability. Diagnosis is further complicated by the overlap between the symptoms of adult AD/HD and those of other common psychiatric conditions such as depression and substance abuse. While stimulants are a common treatment for adult patients with AD/HD, antidepressants may also be effective. Cognitive-behavioral skills training and psychotherapy are useful adjuncts to pharmacotherapy.

Because AD/HD is such a well-known disorder, adults with both objective and subjective symptoms of poor concentration and inattention are likely to present to family physicians for evaluation. While the symptoms of AD/HD have been extended developmentally upward to adults, most of the information about the etiology, symptoms and treatment of this disorder comes from observation and studies of children. Research on adult AD/HD is at an early stage. The criteria for AD/HD as specified in the Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (DSM-IV), are used for the diagnosis of adult AD/HD (Appendix A), although the presence of symptoms in early childhood can be difficult to determine conclusively. Additionally, there is growing evidence that the diagnostic features of AD/HD take a different form in adults. Family physicians may, therefore, be somewhat uncomfortable evaluating and treating adult patients with symptoms of AD/HD, but without a previously established AD/HD diagnosis. The behavioral criteria for AD/HD (e.g., Appendix A) cannot
be readily verifiable by an outside observer, as they can be for school children whose teachers as well as parents can provide observational and clinical data. The clinical history and interview information, therefore, becomes much more critical but can be contaminated by the patient's subjective report of symptoms. Although some standardized behavioral checklists (e.g., Adult AD/HD Behavior Checklist [Barkley, 1998]) are reworded to apply more directly to adults, cognitive symptoms of AD/HD in adults may differ greatly from those commonly seen in children. For example, most practitioners think mental restlessness is more common in adults with AD/HD, as opposed to the motoric restlessness often found in children. An additional concern is the potential to abuse psychostimulant medications, which are schedule II agents and can be diverted to the recreational drug market. Popular press coverage of AD/HD in adults may also lead to self-referrals of individuals who are contending with other disorders, rather than AD/HD.

The impairments often seen in AD/HD adults include those seen in children, such as chronic inattention and distractibility, restlessness, and even hyperactivity. Adults often report great difficulty concentrating while reading day-to-day materials, and complain about organizational problems, forgetfulness, procrastination, and difficulty with decision making and prioritizing. Problems with everyday memory, irritability and managing anger may be described. A range of psychiatric conditions in addition to, or instead of, AD/HD may be present in adults presenting for assessment and treatment. Problems with attention, concentration, affective lability, impulsivity and task completion are non-specific and can be associated with many forms of psychopathology. Depression, anxiety, post-traumatic stress disorder, substance abuse, personality disorders, and bipolar disorder may mimic or co-occur with AD/HD. Medical conditions can also present with AD/HD-like symptoms, such as sleep apnea, chronic fatigue, narcolepsy, thyroid disorders, and various neurological conditions. A thorough physical examination should, of course, be a part of the assessment.

A pattern of AD/HD symptoms, dating back to early childhood, should be uncovered during history taking. Patients with AD/HD may have difficulty accurately recalling relevant history. Some practitioners ask their adult patients to provide any available school records and gather information from parents and other adults who knew them as children. Because adults with AD/HD may not appreciate their symptoms, the patient's spouse or another significant person in the patient's life can sometimes be helpful during the interview.

Some self-report measures for adults are commercially available, including newly published behavior rating scales focusing on AD/HD impairment (see Appendix E [Brown, T., 1996]), core adult AD/HD symptoms (Barkley, 1998) and more global AD/HD scales (see Conners, 1997). Self-report instruments are useful for initial screening and sometimes for following adult medication responses, although they should not be used alone to diagnose adult AD/HD. High scores are likely in a variety of psychiatric conditions.

When To Refer:
Additional consultation for psychological testing, or psychiatric consultation can be helpful in ruling out other conditions or for confirmation of the existence of co-occurring disorders. Psychiatric consultation can be particularly useful when a medication regimen needs to be augmented, or when co-morbidities complicate the diagnostic picture.

TREATMENT SPECIFICS

Education of AD/HD patients and their families is not only the first step in the treatment process, but is often the most important first step in treatment. Such education should include facts about the scientific basis of the disorder and guidance on adapting tasks and support systems to accommodate the condition. Referrals to community support groups and the provision of authoritative literature can also be very important (see Appendix F) for parents of children with AD/HD, and adult AD/HD patients and their families. Education for other family members, such as siblings, can often create great benefit.

Recent studies such as the National Institute of Mental Health (NIMH) Collaborative Multisite Multimodal Treatment Study of Children With Attention-Deficit/Hyperactivity Disorder (MTA) document improvement of AD/HD with medication, behavioral therapy, and a combination of the two (Appendix G). However, this is an ongoing study with multiple layers of data analysis yet to be done, and initial reports cover only the earliest portions of the study. Scholarly criticisms of the study have also been published. Therefore, definitive conclusions about the degree of benefit from psychosocial treatments in particular, cannot yet be made. The effectiveness of psychostimulant medications, however, has continued to be supported from these early reports.
Comorbidity, specific target symptoms, the strengths and weaknesses of the patient and family, and the availability of resources in the school and community enter into the choice of intervention strategies. Parents, school personnel, and particularly for older children, patients themselves should be included in the discussion of treatment options and steps to take. AD/HD, like other handicapping conditions, is a condition for which educational accommodations are federally mandated (see Appendix F). Physicians working as a team with other providers, such as school psychologists, individual and family therapists, teachers, child therapists, school psychologists, and others can help the overall treatment be more robust. AAP guidelines indicate a primary role for the primary care physician as a member of such a team to create a comprehensive approach.

**When to Refer:**
Physicians would likely wish to refer a patient for additional specialty consultation or care for conditions indirectly related to or co-occurring with the AD/HD (e.g., sleep apnea, possible seizure disorder, substance abuse), or certainly in cases where a higher level of care might be needed (e.g., psychotic reaction, severe depression, suicidal ideation, etc.) for either medical reasons or psychiatric reasons.

Team treatment plans should be individualized, according to the pattern of target symptoms and strengths identified in the evaluation. One area of emphasis is to consider the “core symptoms” of AD/HD, namely, inattention, impulsivity, and hyperactivity, because these are the symptoms that are likely to respond directly to medication interventions. Related impairment such as social skill deficits, behavioral non-compliance at home and school, and academic deficiencies can also be addressed with a variety of psychosocial interventions (see Appendix E). Clinical experience suggests that more severe cases of AD/HD require an ongoing highly structured environment with contingencies that supplement the effects of pharmacotherapy and psychosocial treatments. As patients mature, treatment plans often must be adapted to respond to changing individual, family, and environmental conditions.

Some authorities indicate the need for immediate medication intervention in cases where problem behaviors, such as physical aggression or destructiveness, are severe or the AD/HD symptoms are particularly extreme. With some adult AD/HD patients, medication intervention may be the key or only treatment intervention, although patient education should always be a part of the initial intervention to the extent feasible, for all ages. If psychosocial treatment is impractical because of family dysfunction, transportation, lack of resources, or the family has a strong preference for a “medication only” intervention, referral for psychosocial treatment may not be effective.

In terms of psychosocial interventions, many authorities have reported that behavior management for parents and teachers appears to be the best-validated psychosocial intervention for AD/HD. In cases where there has been only marginal improvement with medication interventions, these types of interventions may be particularly important. Even children who respond positively to medication continue to show significant impairment in many areas. Specific learning disabilities, gaps in academic knowledge and skills due to inattention, and impaired organizational abilities may require educational remediation and other psychosocial interventions. Parent education and training in techniques of behavior management are often indicated. Social skills deficits and family pathology may need specific treatment with a variety of interventions beyond medication (see Appendix E).

**Medication Interventions**

The decision to medicate is based on the presence of a diagnosis of AD/HD and persistent target symptoms that are sufficiently severe to cause functional impairment at school, home or with peers. Psychostimulant therapy has been long recognized as the most powerful pharmacotherapy available for AD/HD, although each of the symptoms may not respond. The Food and Drug Administration (FDA) has approved several of the dextroamphetamine products in children 3 years and older (e.g., Dexedrine® and Adderall®), and methylphenidate in those six years and older; preparations from these two categories are the most commonly used drugs to treat AD/HD.
Sometimes compliance issues are a problem due to misunderstanding, parental worries about medications, family dynamic factors, or other issues. Some parents and patients (especially adolescents) are resistant to the use of medication, and some patients experience unacceptable side effects or limited efficacy. The careful clinician balances the risks of medication, the risks of the untreated disorder, and the expected benefits of medication relative to other treatments. A baseline for target symptoms is useful before starting medication; initial behavioral rating scale data can be very useful for this purpose. Re-administering these measures, keeping peaks and troughs in mind, can help monitor treatment efficacy (see Appendix F).

Sometimes medications that are frequently used and known to be effective for ADHD, but off-label in terms of FDA approval, such as Wellbutrin® (an antidepressant that works on the DA neurotransmitter system), can be used in situations where patients or parents are opposed to the use of stimulants, but pharmacotherapy is still warranted. A newer agent, Strattera®, is also an alternative that does have FDA approval for the treatment of AD/HD. Both of these agents are discussed below in more detail.

Some types of medication interventions are being used less commonly than they were years ago. For instance, many practitioners use a combination of a psychostimulant along with an SSRI (see Appendix C), to treat an AD/HD patient with significant symptoms of depression or anxiety. Years ago, the same practitioner might have chosen a TCA, such as imipramine or desipramine, for such a cluster of symptoms in either a child or adult AD/HD patient. However, SSRIs are generally better tolerated in both children and adults, and both doctors and families find the need for cardiac monitoring with TCA medicines to be cumbersome (an electrocardiogram is necessary before initiating TCA therapy and after the dosage is stabilized). Such studies are not needed with SSRIs. Also, TCAs are more toxic in overdose situations, and in the mid 1990s, there were five cases of unexplained death related to the use of desipramine. For TCA therapy, clinicians now favor nortriptyline and imipramine as the first choices among the tricyclics in the treatment of prepubertal children. These agents still require careful monitoring of therapeutic efficacy and of baseline and subsequent vital signs and ECG. Patient history of cardiac disease or arrhythmia or a family history of sudden death, unexplained fainting, cardiomyopathy, or early cardiac disease may be a contraindication to TCA use. In general, all psychotropics should be avoided in patients following an MI for at least four to six weeks.

Earlier, the psychostimulant pemoline (Cylert®), was considered a first-line agent for the treatment of AD/HD, and was attractive due to positive treatment impact, its long duration of effect, and the absence of drug abuse potential. Although routine liver function tests have long been needed for patients on Cylert®, links between this drug and rapidly developing hepatotoxicity are now known to be a risk. Both common practice and treatment guidelines recommend the use of this medication for AD/HD only when other medications have failed. When using pemoline, liver enzymes should be assessed before and during treatment, but because the onset of hepatitis is unpredictable and rapid, routine laboratory follow-up studies are not effective enough. In addition, parents and patients should be alerted to notify the physician immediately in case nausea, vomiting, lethargy, persistent abdominal discomfort, malaise, or jaundice appear.

Clonidine (Catapres®) is an alpha-2-adrenergic agent with ant-hypertensive efficacy that has been found to be effective in reducing the hyperarousal often seen among younger AD/HD children. It also has been shown to reduce distractibility and improve attention span, and is effective in the treatment of chronic tic disorders and Tourette’s syndrome. Clonidine comes in a transdermal patch (Catapres TTP™) as well as in an oral form, although it is an agent that is used off-label with AD/HD children. In the last several years, reports of death in children who had received clonidine plus methylphenidate led to heightened concerns about the cardiovascular safety of clonidine. However, due to many mitigating and extenuating circumstances, causality in these cases is uninterpretable. Moreover, in studies monitoring adverse effects of clonidine, no clinically meaningful ECG changes have been identified. At this time, such uncertainty dictates cautious and careful practice when clonidine and methylphenidate are warranted, as might be the case in very hyperactive ADHD children whose behavior is only under partial control with methylphenidate. Guanfacine (Tenex®) a similar alpha adrenergic agent, is another option for these types of cases, and is also generally less sedating than clonidine. However, use of these medications for hyperactivity is off-label for both agents.

**Monitoring Medication Efficacy**

When assessing medication impact upon AD/HD behaviors multiple outcome measures are essential, using more than one source, setting, and method of gathering data. Baseline behavior rating scales that are obtained during the initial assessment can often be re-administered as an instrument to use for follow-up monitoring. The prescribing physician should work closely with parents on dose adjustments and should obtain feedback from any academic testing and frequent reports from
teachers, especially when establishing the target dose. As noted previously, a brief behavior rating scale or behavior checklist such as may have been used during the diagnostic period, e.g., the AD/HD Rating Scale-IV, one of the Conners scales, such as the Conners Global Index-Parent Form, or the SNAP (Appendix D), can be invaluable in obtaining teachers' and parents reports of medication efficacy. A practical schedule includes once or twice weekly ratings from teachers and parents (remembering issues of peak effects—some practitioners use a.m. and p.m. rating forms from the teacher). Some clinicians also use a structured side effects checklist to be more systematic about side effect monitoring. The American Association of Pediatrics’ Resource Toolkit has multiple types of forms that are quite useful for monitoring medication outcomes (see Appendix D).

During a summer away from school, a child may not require medication. If school behavior and academic performance are stable, a carefully monitored trial off medication during the school year (but not at the beginning) will provide data on whether medication is still needed. The duration of medication treatment is determined individually by whether drug-responsive target symptoms are still present. Treatment may be required through adolescence and into adulthood.

Psychostimulants

No patient characteristics are helpful in suggesting which stimulant drug is best for a particular child. Minimum ages approved by the Food & Drug Administration (FDA) are not based on clinical or research data. Methylphenidate is the most commonly used and best studied drug and may be more effective in reducing motor activity than other stimulants. Dextro-amphetamine often has a slightly longer duration of action than methylphenidate, permitting less frequent doses or reducing gaps in medication effect between doses. Disadvantages of dextroamphetamine include negative attitudes of pharmacists (including some who are unwilling to stock it), and possibly some risk of a higher degree abuse potential by the patient or his peers or family. Dextroamphetamine may be more likely to cause appetite suppression and compulsive behaviors. Of boys with AD/HD tested on both methylphenidate and dextroamphetamine, 25% responded positively to one of the drugs but not to the other. Of the methylphenidate non-responders, 80% were positive dextroamphetamine responders, and 66% of the dextroamphetamine non-responders were positive responders to methylphenidate. Generally, if one stimulant is insufficiently effective with a patient’s AD/HD symptoms, another should be tried before using another drug class. At least 80% of children will respond to one of the stimulants if they are tried in a systematic way. Children who fail to show positive effects or who experience intolerable side effects on one stimulant medication should be tried on another of the recommended stimulant medications.

Stimulants have been demonstrated to improve cognitive function in children and adults with AD/HD as measured by tests of vigilance, impulsivity, reaction time, short-term memory, and learning of verbal and nonverbal material, and these treatment-related improvements also have been demonstrated in a simulated classrooms. The medicinal effects of the psychostimulants should be expected to work during the period of expected behavioral duration, as long as the medication is taken, although dosage changes are usually needed as the child develops. Many practitioners believe that the prescribing physician should aim to provide coverage for the complete portion of the waking day of AD/HD students, if at all possible.

Stimulant dosages are evenly correlated with weight. Prescribing clinicians should begin with a low dose of medication and titrate upward because of the marked individual variability in the dose-response relationship. The first dose that a child's symptoms respond to may not be the best dose to improve function. Clinicians should continue to use higher doses to achieve better responses. This strategy may require reducing the dose when a higher dose produces side effects or no further improvement. The best dose of medication for a given child is the one that leads to optimal effects with minimal side effects.

Dosing schedules vary depending on target outcomes; if there is a need for relief of symptoms only during school, with the psychostimulants, weekend dosages can be skipped. Some AD/HD patients, however, need a continuous day time response and therefore a 7-day schedule. Stimulants are generally considered safe medications, with few contraindications to their use. Side effects occur early in treatment and tend to be mild and short-lived. The most common side effects are decreased appetite, stomachache or headache, delayed sleep onset, jitteriness, or social withdrawal. Most of these symptoms can be successfully managed through adjustments in the dosage or schedule of medication. Sleep problems can often be successfully addressed by insuring a predictable and non-stimulating bedtime routine, but agents like clonidine, which have sedative effects as well as focusing effects, can often be very helpful.

Approximately 15% to 30% of children experience motor tics, most of which are transient, while on stimulant medications. In addition, approximately half of children with Tourette syndrome have AD/HD. The effects of medication on tics are unpredictable. The presence of tics before or during medical management of AD/HD is not an absolute contraindication to the use of stimulant medications. If tics are worsened or become cosmetically problematic, another agent (e.g., clonidine) should be considered. However, stimulants should be used with caution when there is patient or family history of tics. If AD/HD
symptoms cause functional impairment, and other medications are ineffective or have unacceptable side effects, and if parents are capable of close monitoring, a stimulant may be the first-choice medication, even with a history of tics. If tics appear or worsen, the usual response is to observe for a few days to a few weeks. If tics remain problematic, dose reduction or a different stimulant may be tried. Clinical judgment is required to balance the relative impairment from tics and from AD/HD symptoms, considering efficacy and safety of stimulants versus other medications or psychosocial treatments.

According to label warnings and the PDR medication package insert, methylphenidate is contraindicated in children with seizure disorders, a history of seizure disorder, or abnormal electroencephalograms. However, both clinical practitioners and research have supported the understanding that the use of methylphenidate does not result in an increase in seizure frequency or severity when it is added to appropriate anticonvulsant medications.

**When to Refer:**

Absence seizures have sometimes been mistaken for lapses of inattention seen in AD/HD children. Inquiries about blinking, lip, or mouthing movements in association with these episodes can be helpful information to obtain. A neurological referral would be appropriate when such concerns exist. AD/HD patients can also have seizure disorders, and such circumstances might lead to combined pharmacy for both conditions. Neurological consultation can also be helpful for patients with both AD/HD and chronic vocal or motor tics.

Children who receive too high a dose or who are overly sensitive to the effects of the psychostimulants may become overfocused on the medication or appear dull or overly restricted. Many times this side effect can be addressed by lowering the dose. Rarely, with high doses, some children experience psychotic reactions, mood disturbances, or hallucinations. In some cases, this may indicate the presence of a co-occurring difficulty that had not previously been detected.

No consistent reports of behavioral rebound, motor tics, or dose-related growth delays have been found in controlled studies, although they are reported clinically. Appetite suppression and weight loss are common side effects of stimulant medication, with no apparent difference between methylphenidate and dextroamphetamine. Concern for growth delay has been raised, but a prospective follow-up study into adult life has found no significant impairment of height attained. Studies of stimulant use have found little or no decrease in expected height, with any decrease in growth early in treatment compensated for later on. Many clinicians recommend drug holidays during summers, although no controlled trials exist to indicate whether holidays have gains or risks, especially related to weight gain. Summers or times when school is not in session can sometimes be a good time to assess the continuing need for medication or to make dosage changes without disrupting a student’s academic performance or classroom behavior.

Children who fail 2 stimulant medications can be tried on a third type or formulation of stimulant medication for the same reason. According to most authorities, a lack of response to treatment should lead clinicians to re-assess the original diagnosis and adherence to the treatment plan. At times, parent, teacher, and child positive or negative drug expectancies may be so significant that a blind placebo trial is required. This may be useful in circumstances where the treatment feedback is inconsistent, vague, or can’t be relied upon. Some practitioners use pre and post test CPT testing (continuous performance tests), which are sensitive to attention span changes, but the validity of this approach is in question and it is not widely accepted.

Long-acting preparations are appealing for children for whom the standard formulations act briefly (2½ to 3 hours), who experience severe rebound (return of AD/HD symptoms) or for whom administering medication every 4 hours is unworkable or creates significant inconvenience or exposure. The most commonly used and systematically studied long-acting stimulants are Ritalin-SR® (sustained release), Dexedrine® Spansule (dextroamphetamine), and Cylert® (pemoline). As noted previously, many practitioners have avoided Cylert due to concerns about the risks of rapidly developing hepatotoxicity.

Adderall® (a mixture of amphetamine salts) and Adderall XR™ are long-acting preparations that have been found to be very helpful in terms of extending the treatment impact for larger portions of the day. For some patients, Ritalin-SR® has been found to be unreliable, although it appears to be working well for others. The more recent Ritalin® LA™ may be a better choice for these patients. Dexedrine Spansule® appears to have more consistent results than standard methylphenidate and to be more effective some patients. Many practitioners have found it necessary to use a combination of short-acting and longer-acting medication forms in order to ensure complete coverage for particular patients for the entire day. AD/HD patients with irregular schedules, such as college students, may need both long-acting and short-acting medications in combination.
The usual range for methylphenidate is 0.3 to 0.7 mg/kg per dose, rounded to the nearest 2.5 or 5 mg. Dextroamphetamine doses usually are one half those of methylphenidate. Some instances of tolerance have been reported, although studies have not supported this report. Tolerance (“tachyphylaxis”) can sometimes be addressed by substituting another stimulant. The newer long-acting stimulant drugs may reduce the likelihood of this problem. Dosage schedules for most of the commonly used psychostimulants can be found in Table 1:

Table 1. Dosage Schedule for Commonly Used Psychostimulants

<table>
<thead>
<tr>
<th>DRUG NAME</th>
<th>DOSING</th>
<th>DURATION OF BEHAVIORAL EFFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adderall®</td>
<td>Start with 5 mg 1-2 times per day, increase by 5 mg each week until good control achieved. Maximum Recommended Daily Dosage: 40 mg.</td>
<td>About 4-6 hours depending on dose</td>
</tr>
<tr>
<td>Adderall XR™</td>
<td>Start at 10 mg in the morning and increase by 10 mg each week until good control is achieved. Maximum Recommended Daily Dosage: 40 mg</td>
<td>8-12 hours</td>
</tr>
<tr>
<td>Concerta®</td>
<td>Start at 18 mg each morning and increase by 18 mg each week until good control is achieved. Maximum Recommended Daily Dosage: 72 mg</td>
<td>8-12 hours</td>
</tr>
<tr>
<td>Dexedrine®</td>
<td>Tablet: Start with 5 mg 1-2 times per day and increase by 5 mg each week until good control is achieved. Maximum Recommended Daily Dosage: 40 mg</td>
<td>Tablet: 4-5 hours</td>
</tr>
<tr>
<td>Dexadrine® Spansule</td>
<td>Start at 5 mg in the morning and increase by 5 mg each week until good control is achieved. Maximum Recommended Daily Dosage: 45 mg</td>
<td>8-10 hours</td>
</tr>
<tr>
<td>Focalin™</td>
<td>Start with 2.5 mg 1-2 times per day, increase by 2.5 mg each week until good control achieved. May need third reduced dose in the afternoon Maximum Recommended Daily Dosage: 60 mg</td>
<td>3-4 hours</td>
</tr>
<tr>
<td>Metadate® CD</td>
<td>Start at 20 mg each morning and increase by 20 mg each week until good control is achieved. Maximum Recommended Daily Dosage: 60 mg</td>
<td>4-8 hours</td>
</tr>
<tr>
<td>Metadate® ER</td>
<td>Start at 10 mg in the morning and increase by 10 mg each week until good control is achieved. May need second dose or regular methylphenidate dose in the afternoon. Maximum Recommended Daily Dosage: 60 mg</td>
<td>4-8 hours</td>
</tr>
<tr>
<td>Methylin® ER</td>
<td>Start with 5 mg 1-2 times per day, increase by 5 mg each week until good control achieved. May need third reduced dose in the afternoon. Maximum Recommended Daily Dosage: 60 mg</td>
<td>3-4 hours</td>
</tr>
<tr>
<td>Methylin™</td>
<td>Start at 20 mg each morning and increase by 20 mg each week until good control is achieved. May need second dose or regular methylphenidate dose in the afternoon. Maximum Recommended Daily Dosage: 60 mg</td>
<td>4-8 hours</td>
</tr>
<tr>
<td>Ritalin®</td>
<td>Start with 5 mg 1-2 times per day, increase by 5 mg each week until good control achieved. May need third reduced dose in the afternoon. Maximum Recommended Daily Dosage: 60 mg</td>
<td>3-4 hours</td>
</tr>
<tr>
<td>Ritalin® LA™</td>
<td>Start at 20 mg each morning and increase by 20 mg each week until good control is achieved. May need second dose or regular methylphenidate dose in the afternoon. Maximum Recommended Daily Dosage: 60 mg</td>
<td>4-8 hours</td>
</tr>
<tr>
<td>Ritalin® SR</td>
<td>Start at 10 mg in the morning and increase by 10 mg each week until good control is achieved. May need second dose or regular methylphenidate dose in the afternoon. Maximum Recommended Daily Dosage: 60 mg</td>
<td>4-8 hours</td>
</tr>
</tbody>
</table>
Concerta™ uses an osmotic pump mechanism that creates an ascending profile of methylphenidate in the blood to provide effective extended treatment for 10-12 hours. It is available in 18, 27, 36, and 54 mg to approximate 2-3 times daily dosing of 5, 10, and 15 mg immediate-release methylphenidate. Metadate®-CD and Ritalin®-LA™ are capsules containing a mixture of immediate and delayed-release beads to provide effective methylphenidate treatment for 8-9 hours. In Metadate®-CD, 30% of the beads are immediate release and 70% delayed. Metadate®-CD is available in 20-mg capsules to approximate 10 mg twice daily dosing of immediate-release methylphenidate. By contrast, with Ritalin®-LA™, there is a 50:50 ratio of immediate and delayed beads. Ritalin®-LA™ is available in 20-, 30-, and 40-mg capsules to approximate 10, 15 and 20 mg twice daily dosing of immediate-release methylphenidate. Adderall XR™ is a capsule with a 50:50 ratio of immediate to delayed release beads designed to provide effective amphetamine treatment for 12 hours. Adderall XR™ is available in 10-, 20-, and 30-mg capsules to approximate 5, 10, and 15 mg twice daily dosing (0 and 4 hours where dose 2 is released 4 hours after dose 1) of Adderall®. Preparations of beads in capsules (all but Concerta™) may be used as sprinkle preparations for children unable to swallow pills.

Commercially available psychostimulants include methylphenidate (Ritalin®, Methylin®, Methylin® ER, Metadate® ER), D-amphetamine (Dexedrine®, Dexedrine Spansule™), D,L-amphetamine (Adderall®), and magnesium pemoline (Cylert®). These sympathomimetic compounds are structurally dissimilar but share a phenylethylamine backbone with endogenous catecholamines (e.g., dopamine and norepinephrine). The mechanism of action of psychostimulants is thought to be re-uptake blockade of catecholamines into presynaptic nerve endings, thereby preventing their degradation by monoamine oxidase. In addition, amphetamine compounds appear to cause retrograde release of catecholamines through the transporter as well as other actions on the vesicular storage of catecholamines.

Mild but variable appetite suppression is almost universal with stimulant medication, and may be addressed by giving medication after breakfast and lunch, although many AD/HD youngsters seem to need their first medication dose immediately upon awakening in order to avoid problems with attention and non-compliance first thing in the morning. A high-calorie snack after school or after dinner can be helpful as well as reducing the dose on weekends and during the summer. Persistent or severe side effects may require changing drugs.

Rebound effects, which patients sometimes experience, consisting of increased excitability, activity, talkativeness, irritability, and insomnia, beginning 4 to 15 hours after a dose, may be seen as the last dose of the day wears off or for up to several days after sudden withdrawal of high daily doses of stimulants. This can even result in responses that are worse than the original symptoms, although controlled trials have not been convincing in demonstrating this problem. Management strategies include increased structure after school, a dose of medication in the afternoon that is smaller than morning and midday doses, use of a long-acting formulation, or the addition of clonidine or guanfacine to the regimen.

Stimulants may either worsen or improve irritable mood. Persistent stimulant-related dysphoria may respond to a lower dose but may require switching to a different stimulant or to one of the antidepressant medications used to treat ADHD. Many authorities agree that mild symptoms of anxiety and depression should not lead immediately to an anti-depressant, but rather a psychostimulant, which may improve both the AD/HD symptoms and the anxiety/depression.

Growth retardation resulting from stimulant use is a concern, and needs to be distinguished from simpler appetite suppression, which is common. Decrease in expected weight gain is actually small, and the effect on height is negligible. The magnitude of effect is dose-related and may be greater with dextroamphetamine than with methylphenidate. It can be minimized by using drug-free periods, or trying alternative agents. Again, determining the cost versus medication benefit should be a part of the decision-making process. Adult height has not been shown to be reduced following methylphenidate treatment during childhood years. Some authorities assert that deficits in growth are transient maturational delays associated with AD/HD rather than with the medication for AD/HD. With persistent appetite suppression, nutritional supplements can be helpful.

Although, in general, there are no adverse cardiovascular effects of stimulants, there is some evidence that African-American male adolescents may be at higher risk for mild elevation in blood pressure, so it is prudent to monitor this variable in children as well as with adults who may be predisposed to hypertension. Some authorities report that children and adults with developmental disabilities are at greater risk for side effects from the psychostimulants, and certainly patients from this group are often less able to explain or describe their symptoms or reactions.

With methylphenidate, there is stereoselectivity in receptor site binding and its relationship to response. Because of some data indicating that the d-methylphenidate isomer is the active form of medication, the d isomer, Focalin™ or dexmethylphenidate has been marketed. Studies have shown dexmethylphenidate to be at least as effective as the regular methylphenidate, and is administered at half the dosage. Focalin™ is available in 2.5, 5, and 10 mg, to approximate 5, 10, and 20 mg of d,l
methylphenidate, and may be a better alternative for some patients who have troublesome side effects that have not responded to other interventions.

Stimulant-associated toxic psychosis appears to be rare but resembles a toxic phenomenon (e.g., visual hallucinosis) and unlike an apparent exacerbation of psychotic symptoms. While stimulants are abusable, some of the newer agents make this less likely (e.g., Concerta™), and there is some data to indicate that treatment for AD/HD actually makes students less like to abuse recreational substances. Nonetheless, appropriate education and monitoring is crucial to the safe prescription of psychostimulants in adolescents and adults.

Noradrenergic Specific Compounds: Strattera®

Approval for atomoxetine, a unique new agent for AD/HD marketed under the trade name Strattera®, was granted by the FDA in 2003. Unlike methylphenidate and amphetamines, it is not a stimulant, but rather acts indirectly, through blockade of the presynaptic norepinephrine transporter in the brain, resulting in inhibition of norepinephrine reuptake. Atomoxetine was originally called tomoxetine; the name was changed to avoid confusion with tamoxifen. Its effectiveness in both adult and child patients with AD/HD has been demonstrated and it has the advantage of having a medicinal impact continuously, since it operates as a NE re-uptake inhibitor. Therapy can be initiated at a dose of 0.1-0.4 mg/kg/day, and is given in two divided doses with increments at weekly intervals by 0.25 mg/kg/day as needed. Several weeks are needed to reach a full therapeutic effect, but this new agent represents a solid new alternative to psychostimulant medication that appears to be just as effective. The most commonly reported adverse effects have been were rhinitis (33%), headache (20%), anorexia (17%), and dizziness (17%). Mild appetite suppression was reported, but this is less than what is commonly found with methylphenidate products. Mild increases in diastolic blood pressure and heart rate have also been reported.

Antidepressants Used for ADHD: Wellbutrin®, Wellbutrin SR™

Bupropion, or Wellbutrin®, is an atypical antidepressant approved for the treatment of depression in adults. However, a number of studies over the years have shown that Wellbutrin® has efficacy of bupropion for improving AD/HD symptoms, likely because of its dopaminergic effects. Bupropion can sometimes assist with problems with AD/HD as soon as just a few days, and it has a peak plasma concentration of 2 hours. It may be particularly helpful with children or adults who have co-morbid symptoms of depression, although it should be avoided in patients with tic problems because it has been known to exacerbate tics. However, it also does not have the sexual and gastrointestinal effects that many of the other anti-depressants are known to have. Bupropion also offers an advantage over traditional stimulant therapy in patients with AD/HD who have had difficulties with substance abuse, and it may offer some advantage because it provides 24 hour coverage for AD/HD and other symptoms. Bupropion does not have the cardiovascular risks that antidepressants such as TCAs have, although there is some elevated seizure risk, so patients with a seizure or head injury history might be best treated with other agents.

Bupropion should also not be used with patients with eating disorders. The Wellbutrin SR™ preparation allows twice daily dosage, a significant advantage. The bupropion dose is 3 mg/kg per day for the first week, titrated to 6 mg/kg per day or 300 mg/day, whichever is smaller, by the third week. It may take as long as 4 weeks to observe maximum effects with bupropion, although sometimes improvement with AD/HD symptoms are seen the very first week. Bupropion may be a good choice to treat patients with AD/HD who have a family history of bipolar disorder or who have possibly had behavioral cycles that possibly represent a sub-clinical bipolar phenomenon.

Antidepressants Used for ADHD: Effexor® XR

Venlafaxine or Effexor® possesses both SSRI and TCA properties (noradrenergic and serotonergic), and is chemically unrelated to other antidepressants. Open-label studies in children and adults with AD/HD have indicated that this agent may be quite helpful for some AD/HD individuals with both symptoms of depression and AD/HD. Some practitioners indicate that higher doses of the agent are needed in order to obtain a significant focusing effect. Venlafaxine is an off-label medication, however, for AD/HD.
Antidepressants Used for ADHD: Tricyclics (TCAs)

Although psychostimulants have been convincingly demonstrated to be highly effective in treating AD/HD, a number of other effective medicines are available as well. TCAs (Tricyclic Antidepressants) have been used as effective treatments for depression in adults for many years. It has also been used effectively in low doses as a treatment for enuresis in children. Eventually, it was discovered that depressed individuals with AD/HD symptoms responded favorably to these agents and that children with depression and AD/HD symptoms did as well. Treatment for AD/HD children and adolescents lead to studies that clinical studies that showed such agents were effective for many AD/HD individuals. While desipramine is one of the best studied agents for improving attention span and reducing hyperactivity in AD/HD patients, in more recent years many practitioners have to prefer nortriptyline because it may affect the heart less than other TCAs.

TCAs are generally thought to be less effective than the psychostimulants in the treatment of AD/HD, but can be quite useful for patients who react poorly to the psychostimulants or in cases where more serious symptoms of depression persist. These agents also provide a continuous blood level effect, which can be quite helpful among patients for whom behavioral rebound is a serious concern. Disadvantages of using TCAs such as imipramine, desipramine, or nortriptyline is that they require baseline and follow-up ECGs, and they are quite lethal in overdose.

A number of years ago, five cases of unexplained sudden death during desipramine treatment were reported, although a causal relationship between the medication and the deaths was never established. Some authorities argue that the evidence suggests that treatment with desipramine in usual doses is associated with only slight added risk of sudden death beyond that occurring naturally. Desipramine may represent a greater risk than other TCAs, however. Because of these concerns, clinical practice now favors nortriptyline and imipramine as the first choices among the tricyclics, especially in the treatment of prepubertal children. In any case, TCAs should be used only for clear indications and with careful monitoring of therapeutic efficacy and of baseline and subsequent vital signs and ECG. Patient history of cardiac disease or arrhythmia or a family history of sudden death, unexplained fainting, cardiomyopathy, or early cardiac disease may be a contraindication to TCA use.

Pediatric Augmenting Agents: Clonidine and guanfacine

Clonidine (Catapres®), is an alpha2-adrenergic agonist that is believe to act through regulation of norepinephrine release from the locus ceruleus. Clonidine, one of the antihypertensive drugs occasionally used in the treatment of AD/HD, is often used on an off-label basis as an augmenting agent to one of the psychostimulants, especially to assist with co-occurring tic disorders, hyperarousal, or sleep disturbance. It can also be helpful in reducing aggressive behavior, and can be additionally helpful in treating hyperactivity in children with developmental disabilities. Some authorities report that clonidine is very useful for improving frustration intolerance among AD/HD children who are particularly highly aroused, hyperactive, defiant, and moody.

The typical dosing regimen for clonidine in AD/HD is 0.05 mg given orally each day. It is usually given at bedtime to minimize sedation and reduce the potential for orthostatic hypotension. Titration up to 0.4 mg/day (4-5 mcg/kg/day). The dose is often divided to enable coverage throughout the day. Once a stable dose is reached, one option is the transdermal clonidine patch (Catapres-TTS®), which is available to release about 5 days of dosages of either 0.1, 0.2, or 0.3 mg/day. Significant clinical response is not seen for as long as a month, and maximal effect may be delayed for another several months. When discontinuing clonidine, the dose should be tapered rather than stopped suddenly, to avoid a withdrawal syndrome consisting of increased motor restlessness, headache, agitation, elevated blood pressure and pulse rate, and possible exacerbation of tics.

Office visits are suggested regularly during clonidine titration to monitor blood pressure and pulse. Clonidine should be started as a single bedtime dose (0.05 mg) and carefully titrated up over a period of 2 to 4 weeks, as this minimizes side effects, particularly sedation. Common side effects include sedation (which decreases after several weeks), rebound hypertension with dosage non-compliance, dry mouth, and nausea. Caution is needed with the throw-away patches, which can be toxic for small children or animals.

Guanfacine hydrochloride, a long-acting alpha2-noradrenergic agonist with a longer half-life and a more favorable side effect profile than clonidine, recently has been used alone for children with AD/HD and Tourette's disorder whose tics worsen with use of a stimulant or in combination with a stimulant in the treatment of children with AD/HD who cannot tolerate the sedative
side effects of clonidine or in whom clonidine has too short a duration of action, leading to rebound effects. Its use for AD/HD patients is an off-label use. Guanfacine daily doses range from 0.5 to 4 mg/day, given on a schedule similar to that used for clonidine. Clonidine is an alpha-2 noradrenergic agonist, and guanfacine is a more selective alpha-2a noradrenergic agonist.

Recent reports of death in children who had received clonidine plus methylphenidate have led to heightened concerns about the cardiovascular safety of clonidine. However, due to many mitigating and extenuating circumstances, causality in these cases is uninterpretable. Moreover, in studies monitoring adverse effects of clonidine, no clinically meaningful ECG changes have been identified. At this time, such uncertainty dictates cautious and careful practice when clonidine and methylphenidate are warranted.

**Other Agents Used to Treat ADHD**

**Buspirone**

Buspirone (Buspar®), typically used in the management of anxiety and obsessive-compulsive disorders, may also be useful in AD/HD. Some studies in the literature have shown buspirone to be effective in the treatment of AD/HD behaviors even when used alone as a sole treatment.

**Selective Serotonin Reuptake Inhibitors (SSRIs)**

Although there has been considerable clinical interest in the use of the selective serotonin reuptake inhibitors (SSRIs) in the treatment of AD/HD, there is little data to indicate that this class of medications can be helpful, and it is generally agreed that the core issues of inattention, impulsivity, and hyperactivity do not respond to SSRIs. However, SSRIs can be quite helpful with co-occurring anxiety, depression, OCD, or social anxiety disorder, and these compounds are frequently combined with effective anti-AD/HD agents. Since many psychotropics are metabolized by the cytochrome P450 system, which in turn can be inhibited by the SSRIs, caution should be exercised when combining agents, such as the TCAs with SSRIs. Current commonly used SSRIs include citalopram, escitalopram, fluoxetine, fluvoxamine, paroxetine, and sertraline.

**Monoamine Oxidase Inhibitors (MAOIs)**

As a class, MAOIs are not commonly used in the treatment of AD/HD because of the dietary restrictions that these agents require. Possible drug interaction is also a concern, such that it is important to have a two week drug wash-out prior to using these medicines or before initiating their use if other agents were tried first. There have been reports of efficacy in ADHD patients, but these agents should only be tried for AD/HD patients who have responded poorly to other therapies.

A major limitation to the use of MAOIs is the potential for hypertensive crisis, which has been associated with dietetic transgressions (e.g., tyramine-containing foods [most cheeses]) and drug interactions (e.g., pressor amines, most cold medicines, amphetamines). A serotonergic syndrome may occur when MAOIs are combined with predominantly serotonergic drugs (e.g., SSRIs). A serotonergic syndrome is thought to result from excessive serotonergic activity and manifests as hyperthermia, rigidity, myoclonic movements, and, rarely, death. Currently, dietetic restrictions and potential drug-drug interactions limit the use of MAOIs in juvenile patients. Nonetheless, they may be important to consider in treatment-refractory AD/HD individuals. The ongoing development of reversible and transdermal preparations may lead to the development of MAOIs with a more favorable safety profile.

**Mood Stabilizers**

Lithium or divalproex sodium have been used successfully for the treatment of aggressive outbursts, and are the main treatments used for the treatment of bipolar disorder. Because patients can have both bipolar disorder and AD/HD, there are times when combination therapy with a mood stabilizer and another agent, such as Wellbutrin® or a psychostimulant may be appropriate when carefully monitored.
When to Refer:
Patients at risk for either a severe depression or a manic episode in bipolar illness should receive a psychiatric consultation. Bipolar disorders can mimic AD/HD, especially in children and adolescents, because there are several symptoms that appear in both diagnoses. Initial and follow-up clinical studies are also needed. With valproate treatment, another mood stabilizer, unresolved questions persist regarding the relationship between valproate treatment and polycystic ovary disease, particularly in female patients with obesity and in epileptic versus nonepileptic female patients. Female patients should have weight and menstrual cycles monitored; rapid weight gain or menstrual irregularity should trigger a referral for gynecological examination.

New generation Antipsychotics

Early studies suggested some usefulness of thioridazine or other major tranquilizers in the treatment of AD/HD, but they should be used only in the most unusual circumstances because of lesser effectiveness relative to other drugs, excess sedation and potential cognitive dulling, and risk of tardive dyskinesia or neuroleptic malignant syndrome.

There are no data to support the use of fenfluramine, benzodiazepines, or lithium in AD/HD, but new generations of these may be good for co-morbid conditions. Early studies suggested some usefulness of thioridazine or other major tranquilizers in the treatment of AD/HD, but they should be used only in the most unusual circumstances because of lesser effectiveness relative to other drugs, excess sedation and potential cognitive dulling, and risk of tardive dyskinesia or neuroleptic malignant syndrome. There are no data to support the use of fenfluramine, benzodiazepines, or lithium in AD/HD, but new generations of these may be good for co-morbid conditions.

Risperidone and other novel antipsychotic medications (“atypicals”) are very useful for the treatment of a variety of possible co-occurring difficulties, including severe OCD or severe hyperactivity, or for comorbid tics or aggression. However, these medications have not been promoted as medicinals for AD/HD. All children receiving antipsychotics should be monitored closely for extrapyramidal symptoms or akathisia. Treatment should continue for the shortest possible time, and the Abnormal Involuntary Movement Scale should be obtained at baseline and every 6 months, as well as within 1 month of antipsychotic discontinuation to screen for withdrawal dyskinesia. Weight gain can be problematic, particularly with risperidone, and fatty infiltration of the liver has been reported in 2 children with particularly marked increases in weight. Liver functions should be monitored in children who show very rapid weight gain with atypicals. There are also reports of emerging diabetes associated with atypicals in case reports, so this area should be watched carefully as well.

Nonpharmacologic Interventions

Psychosocial treatment methods broadly defined cover a range of psychosocial activities designed to make the environment more predictable and less distracting for ADHD patients. In terms of direct patient intervention, there are generally two main types of nonpharmacologic procedures used for AD/HD.

The first of these are known as operant programs. These stem from the work of B.F. Skinner and other operant psychologists who studied the use of reinforcement contingencies to control behavior. In the case of AD/HD children, operant programs typically involve application of contingency management procedures at home or school or both. Such programs, while varying in form and content (e.g., home-based contingency contracts, home-school daily report cards), commonly involve the following types of steps:

- Identifying specific target behaviors (e.g., compliance with adult directives, completion of classwork and homework, on-task behavior) to increase in frequency and intensity, and identifying those to decrease in frequency or intensity.
- Developing a menu of specific rewards and punishments (e.g., privilege gain and loss, time out from reinforcement)
- Establishing a "currency" system (e.g., points, stickers, tokens) to track a child's degree of success in meeting target behaviors and thereby signal the dispensing of rewards or punishments.
There is also a cognitive-behavioral variant of social learning theory that has been applied to children and families with disorders such as ADHD. These approaches have also varied in form and content, and has included the training of skills such as self-instruction, self-evaluation, self-monitoring, self-reinforcement, anger management, and social behavior. Such procedures train children to modify, via "self-talk," the cognitions that precede and accompany overt behavior, thereby helping to orient children to the task at hand, organize a behavioral strategy, and regulate performance until completed. For example, in problem-solving training (a self-instruction strategy), children are taught to identify the problem at hand, generate alternative solutions, consider the likely outcomes of each solution, monitor and evaluate such outcomes, and self-reward and self-punish successful or unsuccessful outcomes. These cognitive skills have been trained in individual and group formats, with role playing and modeling as the primary training tools. Their efficacy in treating ADHD patients is not firmly established, however.

*Behavioral Therapy Interventions*

Because of the high toll that the condition exerts on family life, behavioral therapy should be considered for most patients and families with AD/HD, whether pharmacotherapy is used or not. The typically high-energy, inattentive, and impulsive child with AD/HD demands constant attention and redirection. Children with this disorder often have difficulty understanding the consequences of their behavior or learning from punishment. They have difficulty learning from previous experiences and appear oblivious to the consequences of their actions. As a result, parents often feel frustrated, anxious, and angry that parenting techniques effective for other children appear useless in the child with AD/HD. They complain about having to hit a moving target. Siblings often take the brunt of their brother's or sister's physical aggression or impulsivity and often complain about receiving less attention than their AD/HD sibling. To complicate matters, about 30% to 40% of children with AD/HD have a parent with AD/HD. When undiagnosed or untreated, the parent may have greater difficulty using appropriate techniques to effectively manage his or her AD/HD child.

Behavioral therapy, defined as the broad set of specific interventions that modify the physical or social environment to promote changes in behavior, is usually effective in helping parents and family members manage the child with AD/HD. Behavior therapy involves creating an environment in which the child gets frequent feedback contingent on his or her behavior. Working with parents and teachers to change the child's environment is critical to the success of behavioral therapy. A long-term study has shown that behavioral therapy alone is not as effective as medical treatment, and was not as effective as the combination in reducing children's AD/HD symptoms. Core AD/HD symptoms were not significantly reduced for combined treatment over medication management, although the combined treatment may have yielded "modest advantages for non-AD/HD" symptoms and positive functioning.

Positive reinforcements and negative consequences can both be useful in providing the child with immediate feedback about his or her behavior. However, parents need to be reminded that a child's behavior, however appropriate or inappropriate, must be considered within the context of age and developmental competency with social-emotional tasks. Explaining the meaning of the child's behavior helps parents understand why the child acted as he or she did so that they can begin helping the child develop alternative behavioral strategies to deal with stressful, unfair, or difficult situations. When a child's behavior is inappropriate, parents need to be reminded to label the act and not the child and to avoid elaborate explanations, generalizations, and comparisons, especially with siblings.

Because positive reinforcement works better than delivering negative consequences (i.e., punishments), parents need to try to "catch their child being good" and praise their child for appropriate behavior. Desired behaviors need to be established clearly and concisely. Giving the child special time during which he or she can select a desired activity to share with the parents is an excellent reinforcement for appropriate behavior. Using a "token economy" in which the child earns points for good behavior that can be "cashed in" for special privileges is also helpful. Appropriate consequences for undesirable behaviors include ignoring, time-outs, loss of privileges, loss of points or tokens (when using a token economy), and job consequences.

Behavior therapy represents a broad set of specific interventions that have a common goal of modifying the physical and social environment to alter or change behavior. Along with behavior therapy, most clinicians, parents, and schools address a variety of changes in the child's home and school environment, including more structure, closer attention, and limitations of distractions. Such environmental modifications have not undergone careful efficacy assessment, but most treatment plans include them.
Behavior therapy usually is implemented by training parents and teachers in specific techniques of improving behavior. Behavior therapy then involves providing rewards for demonstrating the desired behavior (e.g., positive reinforcement) or consequences for failure to meet the goals (e.g., punishment). Repetitive application of the rewards and consequences gradually shapes behavior. Although behavior therapy shares a set of principles, it includes different techniques with many of the strategies often combined into a comprehensive program.

Behavior therapy should be differentiated from psychological interventions directed to the child and designed to change the child's emotional status (e.g., play therapy) or thought patterns (e.g., cognitive therapy or cognitive-behavior therapy). Although these psychological interventions have great intuitive appeal, they have little documented efficacy in the treatment of children with AD/HD, and gains achieved in the treatment setting usually do not transfer into the classroom or home. By contrast, parent training in behavior therapy and classroom behavior interventions have successfully changed the behavior of children with AD/HD.

Parent training typically begins with 8 to 12 weekly group sessions with a trained therapist. The focus is on the child's behavior problems and difficulties in family relationships. A typical program aims to improve the parents' or caregivers' understanding of the child's behavior and teach them skills to deal with the behavioral difficulties posed by AD/HD. Programs offer specific techniques for giving commands, reinforcing adaptive and positive social behavior, and decreasing or eliminating inappropriate behavior. Programs plan for maintenance and relapse prevention. Parent training improves the child's functioning and decreases disruptive behavior but (as with stimulant medications) does not necessarily bring the behavior of a child with AD/HD into the normal range on parent rating scales.

Classroom management also focuses on the child's behavior and may be integrated into classroom routines for all students or targeted for a selected child in the classroom. Classroom management often begins with increasing the structure of activities. Systematic rewards and consequences, including point systems or use of token economy are included to increase appropriate behavior and eliminate inappropriate behavior. A periodic (often daily) report card can record the child's progress or performance with regard to goals and communicate the child's progress to the parents, who then provide reinforcers or consequences based on that day's performance. Classroom behavior management also may improve a child's functioning but may not bring the child's behavior into the normal range on teacher behavior rating scales.

The MTA study (see Appendix G) found that the combined treatment (medication management with behavior therapy), compared with medication alone, offered improved scores on academic measures, measures of conduct, and some specific AD/HD symptoms (although not on global AD/HD symptom scales). Although these trends were consistent, and only few reached a satisfactory level of statistical significance, parents and teachers of children receiving combined therapy were significantly more satisfied with the treatment plan.

A wide range of clinicians, including psychologists, school personnel, community mental health therapists, or the primary care clinician, can implement behavior therapy directly or train others to implement behavior therapy. Many clinicians prefer to refer to community resources for behavior therapy because behavior therapy with parents is time-consuming and often does not lend itself to the structure and schedule of the primary care office. Schools may provide behavior therapy with teachers in the context of a Rehabilitation Act (Section 504) plan or an individual education plan. Where AD/HD has a significant impact on a child's educational abilities, Section 504 requires schools to make classroom adaptations to help children with AD/HD function in that setting. Adaptations may include preferential seating, decreased assignment and homework load, and behavior therapy implemented by the teacher.

**Self-Management Strategies**

Adults with AD/HD benefit considerably from direct education about the disorder. They can use information about their deficits to develop compensatory strategies. Planning and organization can be improved by encouraging patients to take advantage of organizational approaches and to seek educational experiences in effective work habits. Simple encouragement of computerized schedules, wall calendars, and factors that can influenced productivity can be extremely helpful. Some communities have “organizational coaches” as resources for individuals who have difficulty planning and prioritizing, and this can sometimes be very helpful for AD/HD patients. Teens, parents of AD/HD children, and adults with AD/HD should be educated about the elevated risk for drug and alcohol dependence, traffic accidents, and other problem areas.
Psychotherapy

Marital, family, and individual counseling and other psychosocial interventions (see Appendix E) are often essential portions of a patient’s treatment and usually address personal, family, and interactional issues beyond the AD/HD itself, but often influenced by it. Social skills training for children and adolescents and group therapy for older teens and adults can also be very helpful. AD/HD children and adults often have an extended history of low self-esteem, relationship difficulties, job failure, and other problems requiring psychotherapeutic interventions.

Community & School Interventions

Reports of behavior, attendance, grades and test scores are often needed in order to deter the degree of impairment or the severity of symptoms that a student who is being evaluated for AD/HD might have. Interventions in the school or community environment to reduce impairment, through teacher consultation, special program placement, parent or guidance counselor consultation, special behavior modification plans, referrals for additional tutoring, training, or therapy, are just some of the possible interventions (see Appendix E).

Teacher information or similar observations from caregivers at preschools or day care programs and other community settings can be important for needed information for diagnostic decision making and treatment planning. Standardized instruments (see Appendix D) can sometimes provide a greater degree of objectivity from informants such as parents, but also teachers, day care teachers, camp counselors, and other community workers. Practitioners need to consider all available data and recognize, however, that parents, teachers, or others can sometimes try to influence decision making to have a behavior-disturbed youngster removed from their program or placed on medication when that decision may not be the best one. More commonly however, such data is quite useful and leads to better decision making.

Psychoeducational or neuropsychological testing is sometimes indicated to assess intellectual ability or brain function, and to search for possible co-occurring learner disabilities that may complicate the diagnostic picture. Children with learning and developmental disabilities with and without ADHD often need special education services, and both parents and professionals may need to serve as advocates to assist the development of proper services where they may be lacking. Many students with ADHD and other handicaps are eligible for special services under the Individuals with Disabilities Education Act (IDEAS) or Section 504 of the Civil Rights Act. Children not qualifying can still benefit from teacher consultation, behavior modification programs in the classroom, and other services. College students and adults in the work place may also need special accommodations. In college, extended test time, modified exam schedules, or curriculum adjustments may be among those accommodations that can reduce impairment. Education for parents and children about their legal rights with the public school system and in college can be helped by such support groups as Children and Adults with Attention deficit Disorders (CHADD), and other organizations such as those listed in Appendix F.

REFERENCES


CLINICAL PRACTICE GUIDELINES: ATTENTION DEFICIT/HYPERACTIVITY DISORDER

A. Must have either (1) or (2); and B, C, D, & E:

1. Six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with development level:

   **Inattention**
   - Often fails to give close attention to details or makes careless mistakes in schoolwork, work or other activities
   - Often has difficulty sustaining attention in tasks or play activities
   - Often does not listen when spoken to directly
   - Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
   - Often has difficulty organizing tasks and activities
   - Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
   - Often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
   - Is easily distracted by extraneous stimuli
   - Is often forgetful in daily activities

2. Six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with development level:

   **Hyperactivity**
   - Often fidgets with hands or feet or squirms in seat
   - Often leaves seat in classroom or in other situations in which remaining seated is expected
   - Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)

   **Impulsivity**
   - Often blurts out answers before questions have been completed
   - Often has difficulty awaiting turn
   - Often interrupts or intrudes on others (e.g. butts into conversations or games)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g. at school [or work] and at home).

D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder (Schizophrenia, or other Psychotic Disorder and Developmental Disorder Schizophrenia, or other Psychotic Disorder) and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

* May require formal mental health evaluation *

314.01 Attention-Deficit/Hyperactivity Disorder, Combined Type: If both Criteria A1 and A2 are met for the past 6 months.

314.00 Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type: If Criterion A1 is met but not Criterion A2 for the past 6 months.

314.01 Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type: If Criterion A2 is met but Criterion A1 is not met for the past 6 months

314.9 Attention-Deficit/Hyperactivity Disorder, not otherwise specified: For subsyndromal cases that do involve significant impairment.

A. Must have either (1) or (2); and B, C, D, & E:

1. Six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with development level:

   **Inattention**
   - Often fails to give close attention to details or makes careless mistakes in schoolwork, work or other activities
   - Often has difficulty sustaining attention in tasks or play activities
   - Often does not listen when spoken to directly
   - Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
   - Often has difficulty organizing tasks and activities
   - Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
   - Often loses things necessary for tasks or activities (e.g. toys, school assignments, pencils, books, or tools)
   - Is easily distracted by extraneous stimuli
   - Is often forgetful in daily activities

2. Six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with development level:

   **Hyperactivity**
   - Often fidgets with hands or feet or squirms in seat
   - Often leaves seat in classroom or in other situations in which remaining seated is expected
   - Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)

   **Impulsivity**
   - Often blurts out answers before questions have been completed
   - Often has difficulty awaiting turn
   - Often interrupts or intrudes on others (e.g. butts into conversations or games)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g. at school [or work] and at home).

D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder (Schizophrenia, or other Psychotic Disorder and Developmental Disorder Schizophrenia, or other Psychotic Disorder) and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

* May require formal mental health evaluation *

314.01 Attention-Deficit/Hyperactivity Disorder, Combined Type: If both Criteria A1 and A2 are met for the past 6 months.

314.00 Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type: If Criterion A1 is met but not Criterion A2 for the past 6 months.

314.01 Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type: If Criterion A2 is met but Criterion A1 is not met for the past 6 months.

314.9 Attention-Deficit/Hyperactivity Disorder, not otherwise specified: For subsyndromal cases that do involve significant impairment.

* See below

ADHD TREATMENT & PRACTICE GUIDELINES


AMERICAN ACADEMY OF PEDIATRICS’ ADHD PRACTICE GUIDELINES (2000, 2001)*

Routine health examinations may assist in early recognition of ADHD, and primary care clinicians should initiate an evaluation for ADHD in children who present with inattention, hyperactivity, impulsivity, academic underachievement or behavior problems.

The diagnosis of ADHD requires that a child meet DSM-IV criteria; diagnostic tests are not routinely indicated to establish the diagnosis of ADHD.

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

Evidence directly obtained from other settings, such as the classroom teacher (or other school professional) regarding the core symptoms of ADHD, duration of symptoms, degree of functional impairment, and associated conditions should also be a part of the assessment.

Evaluation of the child with ADHD should include assessment for the commonly found associated (coexisting) conditions.

Epidemiologic studies reveal prevalence rates generally ranging from 4%-12% in the general population of 6 to 12 year olds and similar or slightly lower rates of ADHD exist in pediatric primary care settings.

Physicians should educate the family and child about ADHD as a chronic condition, serve as a source of information, provide resources, and coordinate health and other services as indicated. Development of child-specific treatment plans and goals, including plans for follow-up, are essential.

The core symptoms of ADHD (inattention, impulsivity, hyperactivity) can create impairment in many areas (home, school, community), and the main focus of treatment should be to maximize function. Realistic and measurable outcomes should be established such as improvements in relationships, self-esteem, and school performance, and a decrease is disruptive behaviors.

Psychostimulant medications comprise the first-line treatment. Second-line treatment includes antidepressants such as tricylic antidepressants (imipramine, desipramine) and bupropion. Physicians are advised to titrate upward from an initial low dose for better response. If side effects and/or no further improvement in response occur, titrating downward should be considered, with the aim being to find the dose that achieves the highest efficacy with minimal side effects.

If one psychostimulant does not work at the highest feasible dose, the physician should recommend another. Most ADHD children who do not respond to one stimulant will respond to an alternate one. A lack of response is an indication that the accuracy of the diagnosis should be reviewed and/or an additional evaluation for a coexisting comorbidity should be performed.

As a separate treatment modality or as an adjunct to medication, behavior therapy has proved to be a successful intervention—while it is implemented and maintained. The goal is to adjust the physical and social environments to change behavior, using one or more of the following techniques: positive reinforcement, time-out, response cost, or token economy. Parents or caretakers receive training in the various modalities and in conjunction with teachers, usually implement behavior therapy.

Both parent- and teacher-completed rating scales that specifically assess symptoms of ADHD in the diagnostic process have significant diagnostic and treatment follow-up utility.

When the selected management for a child with ADHD has not met target outcomes, physicians should evaluate the original diagnosis, use of all appropriate treatments, adherence to the treatment plan, and presence of coexisting conditions. A lack of response to treatment may be the result of unrealistic target symptoms, incorrect diagnosis, lack of information about the child’s behavior, not adhering to the therapeutic regimen, the presence of a coexisting condition, or treatment failure. True treatment failure includes lack of response to two or three stimulant medications and/or behavior therapy, and the existence of a coexisting condition.

The physician should periodically provide a systematic follow-up for the child with ADHD. Monitoring should be directed to target outcomes and adverse effects by obtaining specific information from parents, teachers, and the child. Follow-up office visits and continued communication with others involved (e.g., teachers, counselors) should be maintained. Behavior report cards and checklists are examples of two methods of obtaining ongoing information.

ADHD is now recognized as a life span disorder with similar treatment needs for ADHD adolescents and adults.

* See below

* For full text clinical monograph contact Blue Cross and Blue Shield of North Carolina or Magellan Behavioral Health.
This clinical practice guideline is not intended as a sole source of guidance for ADHD. Rather, it is designed to assist primary care clinicians by providing general information. It is not intended to replace clinical judgment or to establish a protocol for all ADHD patient recommendations. Clinical decisions should always be used in the context of the individual patient’s situation and the clinician’s judgment of all relevant factors.
If desired, use as an interview checklist

ATTENTION-DEFICIT/HYPERACTIVITY DISORDER*

A. Must have either (1) or (2); and B, C, D, & E

(1) Six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with development level:

Inattention
   (a) often fails to give close attention to details or makes careless mistakes in schoolwork, work or other activities
   (b) often has difficulty sustaining attention in tasks or play activities
   (c) often does not seem to listen when spoken to directly
   (d) often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
   (e) often has difficulty organizing tasks and activities
   (f) often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
   (g) often loses things necessary for tasks or activities (e.g. toys, school assignments, pencils, books, or tools)
   (h) is often easily distracted by extraneous stimuli
   (i) is often forgetful in daily activities

(2) Six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with development level.

Hyperactivity
   (a) often fidgets with hands or feet or squirms in seat
   (b) often leaves seat in classroom or in other situations in which remaining seated is expected
   (c) often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness.)
   (d) often has difficulty playing or engaging in leisure activities quietly
   (e) is often “on the go” or often acts as if “driven by a motor”
   (f) often talks excessively

Impulsivity
   (g) often blurts out answers before questions have been completed
   (h) often has difficulty awaiting turn
   (i) often interrupts or intrudes on others (e.g. butts into conversations or games)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g. at school [or work] and at home).

D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

* May require formal mental health evaluation *

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## ADHD PRESENTATIONS THROUGH THE LIFE CYCLE

<table>
<thead>
<tr>
<th>Developmental Stage</th>
<th>Characteristics of ADHD</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infancy</strong></td>
<td>Frequent crying; difficult to soothe, sleep disturbances; feeding difficulties</td>
<td>May cry to an extent that interferes with nutritional intake; may be excessively drowsy and unresponsive or sleep poorly due to over-reactivity and restlessness</td>
</tr>
<tr>
<td><strong>Preschool</strong></td>
<td>Motor restlessness, insatiable curiosity, vigorous and sometimes destructive play; demanding of parental attention; low-level compliance (especially with boys); excessive temper tantrums; difficulty completing developmental tasks; decreased and/or restless sleep; delays in motor or language development; family difficulties</td>
<td>Often difficult to distinguish from normal behaviors in children of this age; the child seems as if “driven by a motor;” climbs on and gets into things constantly; often accidentally breaks toys and household objects; accidental injuries are also common; severity, frequency &amp; duration of tantrums exceed those in normal children</td>
</tr>
<tr>
<td><strong>School Age Children</strong></td>
<td>Easily distracted; engages in off-task activities; unable to sustain attention; impulsive; displays aggression; acts as a “class clown;” social deficits include having difficulty waiting for a turn, following rules, losing gracefully, curbing temper, showing consideration for others; frequently becomes overly excited or may act very silly</td>
<td>May call out in class inappropriately, fidget excessively, have difficulty staying in seat; assignments are frequently messy and disorganized with many mistakes. Symptoms affect academic performance and cause increasing difficulty in peer relationships and social interactions as the child grows older; failures in these areas may lead to poor self-esteem and depression</td>
</tr>
<tr>
<td><strong>Adolescents</strong></td>
<td>Excessive motor activity (e.g., excessive running and climbing, not staying in seat) tends to decrease, although fidgetiness and inner restlessness may continue; problem behaviors include discipline problems, family conflict, anger and emotional lability, difficulty with authority; significant lags in academic performance; poor peer relationships; poor self-esteem; hopelessness; lethargy and lack of motivation; driving mishaps, speeding, accidents</td>
<td>Impulsive symptoms may lead adolescents to break rules and get into conflict with authority figures; increasing demands for organization and efficiency, especially in school, can create additional failure and distress; inattentive teens often fail to meet deadlines or be poorly prepared to assume more independent responsibility; accumulated distress can lead to poor coping methods, recreational substance abuse</td>
</tr>
<tr>
<td><strong>Adults</strong></td>
<td>Difficulty with concentration and performing sedentary tasks; disorganization; forgetfulness; losing things; failure to plan ahead; depending on others to maintain order; difficulty keeping track of several things at once; trouble both getting started on and finishing tasks; changing plans or jobs in midstream; being “absent-minded,” misjudging time; restlessness; impulsivity</td>
<td>May have employment difficulties, especially in desk jobs, which may lead to short durations of employment; higher incidence of antisocial acts and arrests than in the general population</td>
</tr>
</tbody>
</table>

## Medications Commonly Used in the Treatment of ADHD*

<table>
<thead>
<tr>
<th>Generic class (Brand name)</th>
<th>Daily dose (mg/kg)</th>
<th>Daily dosage schedule</th>
<th>Typical dosing** schedule</th>
<th>Adverse effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stimulants</strong>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Amphetamine</td>
<td>0.3-1.5</td>
<td>Twice or three times</td>
<td>5-30 mg b.i.d. to t.i.d.</td>
<td>Insomnia</td>
</tr>
<tr>
<td>o Short-acting</td>
<td>(Dexedrine® tablets)</td>
<td></td>
<td></td>
<td>Decreased appetite</td>
</tr>
<tr>
<td>o Intermediate-acting</td>
<td>(Adderall®, Dexedrine® spansules)</td>
<td>Once or twice</td>
<td>5-30 mg b.i.d.</td>
<td>Tic exacerbation</td>
</tr>
<tr>
<td>o Extended-release</td>
<td>(Adderall-XR™)</td>
<td>Once</td>
<td>10-30 mg q.d.</td>
<td>Rebound phenomena</td>
</tr>
<tr>
<td>- Methylphenidate</td>
<td>0.5-2.0</td>
<td>Twice to four times</td>
<td>5-40 mg to b.i.d. to q.i.d.</td>
<td>Insomnia</td>
</tr>
<tr>
<td>o Short-acting</td>
<td>(Ritalin®, Methylin)</td>
<td></td>
<td></td>
<td>Decreased appetite</td>
</tr>
<tr>
<td>o d- Isomer</td>
<td>(Focalin™)</td>
<td>Twice to four times</td>
<td>2.5-20 mg b.i.d. to q.i.d</td>
<td>Tic exacerbation</td>
</tr>
<tr>
<td>o Intermediate-acting</td>
<td>(Ritalin-SR®, Metadate® ER, Metadate® CD™, Ritalin® LA™)</td>
<td>Once or twice</td>
<td>10-60 mg q.d. to b.i.d.</td>
<td>Abdominal pain, Fever Anorexia, Nausea Depression, Anxiety Rebound phenomena</td>
</tr>
<tr>
<td>o Extended-release</td>
<td>(Concerta®)</td>
<td>Once</td>
<td>18-108 mg q.d.</td>
<td></td>
</tr>
<tr>
<td><strong>Antidepressants</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Tricyclics (TCA’s)</td>
<td>2.0-5.0</td>
<td>Once or twice</td>
<td>25-300 mg q.d. (25-150 mg q.d. NT)</td>
<td>Dry mouth Constipation Weight change Vital sign and ECG changes, Irritability Insomnia Risk of Seizures Contraindicated in Bulimics</td>
</tr>
<tr>
<td>e.g. Imipramine, Desipramine, Nortriptyline (NT)</td>
<td>1.0-3.0 for NT</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>- Bupropion</td>
<td>1.0-6.0</td>
<td>Once to three times</td>
<td>75-100 mg t.i.d. (short) 150-200 b.i.d. (SR)</td>
<td>Insomnia Nausea, GI Distress Agitation</td>
</tr>
<tr>
<td>(Wellbutrin®, short-acting and sustained release-SR™)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Venlafaxine</td>
<td>0.5-3</td>
<td>Twice</td>
<td>75-150 mg b.i.d.</td>
<td>Nausea, GI Distress</td>
</tr>
<tr>
<td>(Effexor® XR™)</td>
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<tr>
<td><strong>Antihypertensives</strong></td>
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<tr>
<td>- Clonidine</td>
<td>3-10 mcg/kg</td>
<td>Twice or three times</td>
<td>0.05-0.1 mg t.i.d.</td>
<td>Sedation, Dry mouth, Depression Confusion (high doses) Rebound hypertension Similar to clonidine but less sedation</td>
</tr>
<tr>
<td>(Catapres®)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Guanfacine</td>
<td>30-100 mcg/kg</td>
<td>Twice</td>
<td>0.5-1 mg t.i.d.</td>
<td>Nausea, GI Distress</td>
</tr>
<tr>
<td>(Tenex®)</td>
<td></td>
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</tr>
<tr>
<td><strong>Noradrenergic Specific Compounds</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>- Atomoxetine</td>
<td>0.5-1.4</td>
<td>Once or twice</td>
<td>5-40 mg b.i.d.</td>
<td>Nausea</td>
</tr>
<tr>
<td>(Strattera®)</td>
<td></td>
<td></td>
<td></td>
<td>GI distress</td>
</tr>
</tbody>
</table>

** see PDR for FDA approved indications and dosing; this column reflects common clinical dosing.
*** Desoxyn (methamphetamine), while indicated for ADHD is rarely used because of abuse potential. Cylert (magnesium pemoline) is an effective agent for ADHD but has a “black box” warning due to instances of liver failure.
Commercially Available Diagnostic Tools


## PSYCHOSOCIAL INTERVENTIONS

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bibliotherapy</td>
<td>Supplies patient or family with readings or references, for general information about ADHD or for specific aspects of treatment which the patient or family will self-initiate.</td>
</tr>
<tr>
<td>Psychoeducation for patient and family</td>
<td>Provides specific information regarding the nature and course of the disorder, its treatments; how to use professional, educational, and community resources.</td>
</tr>
<tr>
<td>Insight-oriented therapy</td>
<td>Therapy based on psychodynamic approach, aimed in part at change through gaining insight regarding past influences on present behavior. (e.g. play therapy, psychodynamic psychotherapy)</td>
</tr>
<tr>
<td>Cognitive-behavioral therapy or CBT</td>
<td>Therapy based upon principles of social learning and reinforcement applied to cognitive processes. Maladaptive self-talk and patterns of thinking are replaced by regular practice involving more successful mental habits.</td>
</tr>
<tr>
<td>Contingency management</td>
<td>Application of principles of behavior control utilizing techniques of reinforcement, response-cost, and consequence management; aimed at increasing positive (e.g. prosocial) behavior and reducing inappropriate behavior.</td>
</tr>
<tr>
<td>Clinical behavior therapy</td>
<td>Uses contingency management and principles of social learning theory, but also includes a wide range of cognitive, activity-based, parent/family, or other forms of treatment as needed in specific contexts. Includes behavioral contracting for adolescents.</td>
</tr>
<tr>
<td>Group therapy</td>
<td>Uses small-group interactions as basis for correcting inappropriate social behavior. May use both cognitive and behavioral approaches. (e.g. social skills training)</td>
</tr>
<tr>
<td>Parent training</td>
<td>Teaches a set of specific skills involving parent-child interactions such as effective communication, positive attending, and use of reward, punishment, and time-out.</td>
</tr>
<tr>
<td>Summer treatment program</td>
<td>A highly intensive and carefully structured program for in teaching social and classroom coping skills, self-esteem, recreational and sports skills, and/or pharmacotherapy. May use cognitive, behavioral and medication treatment strategies.</td>
</tr>
<tr>
<td>Family Therapy</td>
<td>Therapy which involves the family and/or patient, usually dealing with structural issues within the family, but also dealing with family conflict, family responsibilities, and interactions affecting the patient, including marital therapy.</td>
</tr>
<tr>
<td>Extracurricular activities</td>
<td>Activities selected for their value in addressing particular deficits and building specific competencies, such as social skills and age appropriate intellectual skills. Includes sports or other activities to build success experiences. (e.g. sports, Boy Scouts)</td>
</tr>
<tr>
<td>Training in time management and organizational skills</td>
<td>Provides specific instructions in prioritizing and managing daily activities at home, school, and work, with specific attention to using pen and paper or computerized time management and organizational tools. (e.g. “ADHD Coaching,” organizational tutoring)</td>
</tr>
<tr>
<td>School-based interventions</td>
<td>Includes consultation with teachers and staff regarding academic and/or classroom behavioral issues. May involve psychoeducational assessment and placement (e.g. special class) or initiation of supportive services. May include behavioral and cognitive interventions as well as liaison with home-based reward systems such as daily report card. Clinicians may want to consult the 1973 Federal Rehabilitation Act (public law 93-112) and the individuals with Disabilities Education Act (IDEA) (public law 101-476, revised 1997), specifically under category other health impaired (OHI).</td>
</tr>
</tbody>
</table>

ADHD RESOURCES

Internet Information

ADDitude Magazine for People with ADHD
http://www.additudemag.com

ADDvance Online Resource for Women & Girls with ADHD
http://www.addvance.com

American Academy of Child and Adolescent Psychiatry
http://www.psych.med.umich.edu/web/aacap

American Academy of Family Physicians (AAFP)
http://www.aafp.org

American Academy of Pediatrics (AAP)
http://www.aap.org

American Medical Association (AMA)
http://www.ama-assn.org

Attention-Deficit Disorder Association (ADDA)
http://www.add.org

Children & Adults With Attention-Deficit/ Hyperactivity Disorder (CHADD)
http://www.chadd.org

National Institute of Mental Health (NIMH)
http://www.nimh.nih.gov/publicat/adhdmenu.cfm

Educational References & Accommodations

American Association of People with Disabilities (AAPD)
http://www.aapd.com

Consortium for Citizens With Disabilities
http://www.c-c-d.org

Council for Learning Disabilities
http://www.cldinternational.org

ECAC-The Exceptional Children’s Assistance Center
http://www.ecac-parentcenter.org

Educational Resources Information Center (ERIC)
http://www.ericir.syr.edu

Federal Resource Center for Special Education
http://www.dsse.org/frc

Internet Resource for Special Children
http://www.irsc.org

Learning Disabilities Association of America
http://www.ldanatl.org

National Information Center for Children and Youth with Disabilities (NICHCY)
http://www.nichcy.org

Parent Advocacy Coalition for Educational Rights (PACER) Center
http://www.pacer.org

US Department of Education
http://www.ed.gov

Books for Parents & Adults with AD/HD


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**Books for Professionals**


**TOOLS & FORMS**


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**American Academy of Family Physicians (AAFP)**  
http://www.aafp.org

**American Academy of Pediatrics (AAP)**  
http://www.aap.org

**American Medical Association (AMA)**  
http://www.ama-assn.org

**Attention-Deficit Disorder Association (ADDA)**  
http://www.add.org

**Children & Adults With Attention-Deficit/Hyperactivity Disorder (CHADD)**  
http://www.chadd.org

**National Institute of Mental Health (NIMH)**  
http://www.nimh.nih.gov/publicat/adhdmenu.cfm
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http://www.dssc.org/frc

**Internet Resource for Special Children**  
http://www.irsc.org

**Learning Disabilities Association of America**  
http://www.ldanatl.org

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### Books for Parents & Adults with AD/HD


Books for Professionals


Books for Children & Adolescents


