AN APPROACH TO RECOGNIZE AND MANAGE ATTENTION DEFICIT HYPERACTIVITY DISORDER IN PEDIATRIC PRIMARY CARE SETTINGS

By

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The members of the committee appointed to examine the clinical project of ELIZABETH ANN HARTLEY-KEITH find it satisfactory and recommend that it be accepted.

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AN APPROACH TO RECOGNIZE AND MANAGE ATTENTION DEFICIT HYPERACTIVITY DISORDER

Abstract

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Attention deficit-hyperactivity disorder (ADHD) is the most common early-onset psychopathological condition and affects 4-10% of school aged children. Impulsive, inattentive, or overactive children are frequently referred to pediatric health care providers for evaluation and treatment. Attention deficit-hyperactivity disorders are chronic neurobehavioral disorders that can interfere with the child’s ability to inhibit behavior (impulsivity), function effectively in goal-oriented activities (inattention), or regulate their activity levels (hyperactivity), in developmentally appropriate ways. ADHD is the most common reason for referral to a child psychiatrist. It is now a major public health problem and is responsible for 30% to 50% of referrals to mental health services for children. Studies have shown that untreated mental health problems lead to high rates of medical services and place children at high risk for psychosocial morbidity. The goal of this project is to develop an approach to recognize and manage Attention Deficit Hyperactivity Disorder (ADHD) in pediatric primary care settings.
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Chapter One

Introduction to the Problem

Attention deficit-hyperactivity disorder (ADHD) is the most common early-onset psychopathologic condition affecting 4-10% of school-aged children (Miller & Castellanos, 1998). Impulsive, inattentive, or overactive children are frequently referred to pediatric health care providers for evaluation and treatment.

Attention deficit-hyperactivity disorders are chronic neurobehavioral disorders that can interfere with the child’s ability to inhibit behavior (impulsivity), function effectively in goal-oriented activities (inattention), or regulate their activity levels (hyperactivity), in developmentally appropriate ways. Newer data and recommendations now support that a distinct subgroup of patients have attention deficit without hyperactivity or impulsivity (American Psychiatric Association, 1994). Classically ADD had been associated with hyperactivity, school-aged children and male gender, with male to female ranges from 8:1 to 4:1 among children with the hyperactive form ADD-H and female to male gender 2:1 reported among children with the inattentive form ADD-I (Wolraich, Hannah & Pinnock, 1996).

ADHD is the most common reason for referral to a child psychiatrist (A.S.Unis, Associate Professor, Psychiatry and Behavioral Sciences, University of Washington, 1997). It is now a major public health problem and is responsible for 30% to 50% of referrals to mental health services for children (Greenhill, 1998).
Statement of the Problem

Psychiatric disorders occur in 14% to 20% of American children and adolescents (Brandenburg, Friedman & Silver, 1990) and are a leading cause of disability among them. Fewer than one in five of these disorders in children are recognized. ADHD, anxiety disorders, depression, substance abuse disorders, and conduct disorders are the most common psychiatric disorders presenting to pediatric health care providers. Studies have shown that untreated mental health problems lead to high rates of medical services (Kelleher, 1990) and place children at high risk for chronic psychological morbidity, including antisocial and self-injurious behavior (Kessler, Foster, & Saunders, 1995). Children are more likely to be recognized and treated if their behavior upsets and annoys adults and if their symptoms lead to school failure or poor functioning at home. Children who are poor and homeless are less likely to be diagnosed or treated due to their irregular school attendance, itinerant lifestyle, and their caregiving adults are often preoccupied and less attentive to their behavior and needs. A clinical plan to diagnose and treat such children would be very useful to psychiatric and pediatric nurse practitioners.

The goal of this project is to develop and evaluate an approach/plan to recognize and manage ADHD in pediatric primary care settings, since it is the most common mental disorder among school-aged children. The plan includes a clinical diagnosing approach including history taking, performing a physical exam (including neurological exam, vision, hearing and speech/language screening), parent and school
rating scales and an approach to comprehensive, multidisciplinary, treatment planning including pharmacological management.

Statement of the Purpose

The purpose of this project is to suggest a clinical approach for diagnosing ADHD that is straightforward and comprehensive. The goal of the project is to provide a diagnostic plan and treatment plan for psychiatric and pediatric nurse practitioners to use in a pediatric primary care setting.

Literature Review

Attention deficit /hyperactivity disorder (ADHD) is a behavioral disorder of uncertain etiology that is always evident first in childhood (Greenhill, 1998) with symptoms that continue to be present into adulthood in up to 70% of cases (Miller & Castellanos, 1998). Within the past several years, those who study ADHD have found that it may have a genetic basis and arise as a developmental failure in the brain circuitry that influences inhibition and self-control. The loss of self-control impairs other important brain functions necessary for maintaining attention, including the ability to defer immediate rewards for later, greater gain. Over the past ten years, imaging studies suggests involvement of the prefrontal cortex, part of the cerebellum, and at least two of the deep clusters of nerve cells deep in the brain that are known as the basic ganglia.

In a 1996 study at the National Institute of Mental Health (Castellanos, Giedd, Marsh, et al.) it was found that the right prefrontal cortex and two basal cell ganglia called the caudate nucleus and the globus pallidus are significantly smaller
than normal in children with ADHD. In 1998, Castellanos's group found that the
vermis region of the cerebellum is also smaller in ADHD children.

Current classification of ADD by DSM-IV is into three categories: ADD with
predominant hyperactivity and impulsivity (ADD-H; the overactive child who
displays minimal inattentiveness), ADD with predominant inattentiveness (ADD-I;
the quiet, out-of-focus, daydreaming child), and combined ADD (ADD-C; a
categorization more consistent with the DSM-IV, 1994). See Appendix for
diagnostic criteria from the DSM-IV, 1994.

Diagnostic Testing

No chemical, serologic, or imaging tests are available to diagnose ADHD.
The time available to observe the child's behavior is also limited during office visits.
To diagnose ADHD, clinicians must judge the duration, frequency, intensity,
pervasiveness, and maladaptive nature of these behaviors while excluding countless
other possible causes (Block, 1998).

Therefore, the ADHD diagnosis is a clinical diagnosis (Cantwell, 1996). This
is a diagnosis that is based on a clinical picture that originates early in life, is
persistent over time, is prevalent across different settings, causing functional
impairment at school, at home, and in leisure time activities. The diagnosis process
to determine the presence of ADHD in a child is dependent upon careful history
taking and observation. Ideally these procedures require several visits to be done
thoroughly. Data must be gathered to determine if the child meets the diagnostic
criteria. Both the parent(s) and teacher should be interviewed by the nurse practitioner, results of any developmental screening test, achievement test or IQ test already done should be obtained and a neurologic status and comprehensive physical exam should be accomplished (Greenhill, 1998). Psychometric tests should cover four essential areas: visuo-spatial skills, Sequential-analytic skills, language skills, and motor planning and execution skills (Nelson, 1996). Management of these children is rarely altered by the results of the physical exam because most of these children are generally healthy (Block, 1998).

Parent and School Rating Scales

Parents and teachers may also be asked to complete some scales to rate the presence of ADHD symptoms prior to the first visit. These scales may be narrow range scales focused on just the symptoms of ADHD or broadband (checklists covering the symptoms for many disorders). While these scales are useful for estimating the severity of the symptoms or may be used to measure treatment response in controlled drug trials, none of the behavioral rating scales used can provide a diagnosis of ADHD.

The scales for this project are the Devereux Scales of Mental Disorders (Naglieri, Lebuffe, & Pfeiffer, 1994). The Devereux Scales of Mental Disorders (DSMD) identifies behavioral or emotional problems in children and adolescents based on DSM-IV criteria. There are two versions of the test, one for ages 5-12 years and one for ages 13-18 years. The scales indicate whether a child or adolescent is experiencing or is at risk for an emotional or behavioral disorder. The DSMD are
especially designed for treatment planning and evaluation of treatment effectiveness. Raters may be parents or others who observe the child/youth in a home-like setting, teachers or others who observe the child/youth in an educational setting, and raters should be able to read at the sixth grade level.

Items in the scales reflect a range of psychopathology based on DSM-IV categories, including Externalizing disorders (Conduct and Attention/Delinquency scales), Internalizing disorders (Anxiety and Depression scales), and Critical Pathology disorders (Autism and Acute problems scales). Persons who purchase and administer these tests must complete a professional qualifications form to verify that they have a masters-level degree in Psychology or Education or the equivalent in a related field with relevant training in assessment. All of the DSMD scores are based on T-Scores, which have a mean of 50 and a standard deviation of 10. As an individual’s scores increase over 50, the ratings become less typical and more like those earned by individuals experiencing significant psychopathology. The test manual recommends a cutoff score of 60T for determining when a youngster’s scores on the DSMD depart substantially from the average for the standardization sample and therefore indicating that significant problems were reported by the rater.

Comprehensive History

A developmentally oriented, comprehensive history is essential to clarify the core symptoms and any related disorders. Information from the following areas should be assessed: source of referral, chief complaint, present illness/problems, past medical history, birth history, feeding history, previous illnesses/operations/injuries,
childhood illnesses, immunization history, current medications and allergies. The child's physical growth and developmental stages since birth should be reviewed and recorded. A social history should include toileting habits, sleeping patterns, security objects, fears, speech, type of sexual information known/given, schooling, habits, discipline methods/responses, temperament/personality, and relationships with peers and family. The family history should include the ages and health status of immediate family members, familial diseases, congenital conditions, occupations and education of parents and living conditions of family. School history should address classroom functioning, development of academic skills, and remedial or special education and retention.

Physical Exam

Neurological Exam

The purpose of the neurological evaluation is to assess the integrity of the central nervous system. A comprehensive history and neurological exam can accomplish this. The onset of any symptoms such as sensory loss, weakness or seizures should be carefully documented in chronological order with a thorough description of their frequency, duration and characteristics. After listing the chief complaint and history of present illness, a careful review of the pregnancy, labor and delivery is conducted. Note any viral illnesses the mother was exposed to during the pregnancy as well as her rubella immune status. Include information about the quantity of cigarette and alcohol consumption and drug use, both legal and illicit. The birth weight, length and head circumference and Apgar score should be recorded.
along with any history of breathing, sucking, or feeding problems. Congenital microcephaly, suspected asphyxia, lack of spontaneous breathing, and poor/uncoordinated suck are all indicators of neurological dysfunction in term infants. Since children with ADHD usually have normal neurological exams, a careful neurological exam can diagnose comorbid conditions such as oppositional defiant disorder and help establish any differential diagnoses.

Because the most important component of the neurological history is the child's developmental assessment, a careful evaluation of the child's developmental milestones since birth must be included (Nelson, 1996). A developmental abnormality present from birth suggests an intrauterine or perinatal cause. When the rate of acquiring skills in later infancy and childhood slows, an acquired abnormality of the nervous system is implied. A loss of skills or regression of skills over time suggests a degenerative central nervous system disease. The accuracy with which parents are able to recall their child's developmental milestones varies. Guidelines are provided in Table 1 that gives the upper range of normal skills that parents can usually recall and if not yet present are a red flag to the examiner.

**Multidisciplinary Treatment Planning**

Once a diagnosis of ADHD is confirmed by the history and scoring of the behavior scales, a multimodal treatment approach is recommended (Findley & Dogin, 1998). A team approach to treatment should be established during the assessment process. The team should include the child, the family, health care providers, school personnel and any others involved in the assessment or treatment (Miller &
Table 1

**Screening Scheme for Developmental Delay: Upper Range (Nelson, 1996)**

<table>
<thead>
<tr>
<th>Age (Months)</th>
<th>Gross Motor</th>
<th>Fine Motor</th>
<th>Social Skills</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Supports weight on forearms</td>
<td>Opens hands spontaneously</td>
<td>Smiles appropriately</td>
<td>Coos, laughs</td>
</tr>
<tr>
<td>6</td>
<td>Sits momentarily</td>
<td>Transfers objects</td>
<td>Shows likes and dislikes</td>
<td>Babbles</td>
</tr>
<tr>
<td>9</td>
<td>Pulls to stand</td>
<td>Pincer grasp</td>
<td>Plays patty-cake, peek-a-boo</td>
<td>Imitates sounds</td>
</tr>
<tr>
<td>12</td>
<td>Walks with one hand held</td>
<td>Releases an object on command</td>
<td>Comes when called</td>
<td>1-2 meaningful words</td>
</tr>
<tr>
<td>18</td>
<td>Walks upstairs with assistance</td>
<td>Feeds from a spoon</td>
<td>Mimics actions of others</td>
<td>At least six words</td>
</tr>
<tr>
<td>24</td>
<td>Runs</td>
<td>Builds a tower of six blocks</td>
<td>Plays with others</td>
<td>2-3 word sentences</td>
</tr>
</tbody>
</table>
Castellanos, 1998). The team approach is essential to gain cooperation of the family and school personnel and to demystify this chronic condition and the individual management necessary for each affected student. Once the child and family have been educated about the diagnosis, a team meeting should be scheduled by the nurse practitioner to discuss the treatment plan. The child and his family must eventually become the expert managers of this biologically based disorder. The physician or nurse practitioner is the case manager and should always provide education to the team about the types of interventions needed. The goals of treatment should consider behavioral, emotional, academic and medical issues. Identified problems should be prioritized for management, reasonable expectations set, and achievable goals targeted. The child's concerns should be addressed and his/her suggestions should be incorporated into the treatment plan.

Behavioral interventions may include training the parents and school personnel about managing the child and in behavior modification. This training may be done during or after the team meetings by the health care provider. Providing increased structure, giving clear directions and using developmentally appropriate techniques are basic ADHD management strategies. Behavior modification targets specific maladaptive behavior patterns at school such as meeting deadlines or at home such as behavioral limits, and uses strategies to diminish less desirable behaviors. Social skills training may benefit the child if he can learn to use these skills independently.
Emotional interventions are used to address emotional, psychological, social or family issues and prevent secondary complications. Self-esteem can be improved and reinforced by developing areas of competence through organized group activities such as scouts and through hobbies or sports. Recreational activities and participation in support groups can provide positive social interactions.

At least 25% of children with ADHD have specific learning disabilities and academic underachievement is very common (Miller & Castellanos, 1998). They commonly have disorders of memory, language, cognition, and higher cortical functioning. In secondary school their problems with productivity, organization and inconsistent performance increase. Most students with ADHD can be taught within the mainstream but may require resource room support, tutoring, appropriate academic programming, effective classroom management and good communication with school personnel.

ADHD is considered a disability under federal law and under The Individuals with Disabilities Education Act may qualify under the “Other Health Impaired” category for special education or other services. Children who have ADHD but do not require special education services may qualify for accommodations within standard education settings under section 504 of the Rehabilitation Act of 1973, civil rights legislation that prohibits discrimination against persons who have disabilities. The Americans with Disabilities Act (1990) may provide individuals who have ADHD with reasonable accommodations in secular private schools, postsecondary
education, and the workplace. Examples of educational accommodations that can be used in general classrooms are shown in Table 2.

Medical interventions include identifying and treating medical problems that imitate ADHD such as depression disorders, insuring adequacy of sleep, nutrition and exercise and considering medication when indicated. When academic, behavioral or social functioning is impaired significantly the use of medication may be indicated. The health care provider must provide accurate information about any medications as children, parents and teachers may have excessive expectations or unrealistic fears learned from the popular press.

The psychostimulants have a unique place in pediatric pharmacology. Numerous studies have documented the safety, efficacy and tolerability of these agents in young children with ADHD (Findling & Dogin, 1998). Stimulants have been shown to be effective in school-aged children as well as pre-school children and adolescents. Stimulants should generally be considered first when starting medication for ADHD because of their documented safety and efficacy. Stimulants act by increasing the intrasynaptic availability of dopamine and norepinephrine indirectly (Miller & Castellanos, 1998). Table 3 summarizes dosing information for stimulant medication used for ADHD.

Nonstimulant medications such as clonidine (Catapres) and bupropion (Wellbutrin) have not been approved by the United States Food and Drug Administration for advertising as safe and effective treatment for ADHD, but
Table 2

**Examples of Educational Accommodations**

*Provide a structured learning environment*

*Repeat and simplify instructions about in-class and homework assignments*

*Supplement verbal instructions with visual instructions*

*Use behavior management techniques (e.g., daily report cards)*

*Adjust class schedules*

*Modify test delivery (extended time, less distracting setting)*

*Use tape recorders, computer-aided instruction, and other audiovisual equipment*

*Select modified textbooks or workbooks*

*Tailor homework assignments*

*Consult special resources*

*Use one-on-one tutorials*

*Provide classroom aides and note takers*

*Involve “services coordinator” to oversee implementation*

*Modify nonacademic times such as lunchroom, recess and physical education*
controlled studies and clinical data support cautious "off-label" use. Children who experience unacceptable side effects to stimulants or respond poorly to them may benefit from medication with the nonstimulant medications. Table 4 summarizes dosing information for nonstimulant medications used for ADHD.

The three stages of pharmacotherapy are initial titration, maintenance and termination. After identification of specific target symptoms that are expected to improve (hyperactivity, inattentiveness) has been made, a discussion of the limitations of medication should be considered with the child and parents.

Conclusion

When a treatment team concept is established for the ADHD child the goals of treatment can more easily be attained. The team identifies the problems and prioritizes them into goals to be targeted. Reasonable expectations are set with the child's concerns addressed and her suggestions incorporated into the plan. The team and especially the child and family should develop a chronic condition management perspective as ADHD may persist into adulthood. Follow-up visits should be individualized and usually will involve 2 to 4 visits a year depending on which medications/treatment interventions are being used. Medical evaluation may include laboratory studies, weight, height, blood pressure and pulse. Repeating behavior scales ratings periodically can also be helpful to assess effectiveness of treatment and make medication adjustments. The ultimate treatment goal is to instill a sense of competence and hope.
<table>
<thead>
<tr>
<th>Medication</th>
<th>Dose Schedule</th>
<th>Dose Range</th>
<th>Onset/Duration</th>
<th>Potential Side Effects/CAUTIONs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Methylphenidate (MPH)</strong></td>
<td>Initial: 5 mg or 0.3 mg/kg</td>
<td>5 to 80 mg/d</td>
<td>Onset: 20 to 30 min</td>
<td>• Anorexia, insomnia, stomach aches, headaches, irritability, &quot;rebound,&quot; flattened affect, social</td>
</tr>
<tr>
<td>Ritalin® or generic</td>
<td>per dose</td>
<td>0.3 to 0.8 mg/kg per dose</td>
<td>Duration: 3 to 5 h</td>
<td>withdrawal, weepiness, tics, weight loss, reduced growth velocity</td>
</tr>
<tr>
<td>5-, 10-, 20-mg tablets</td>
<td>Increase: 2.5 mg to 5 mg</td>
<td></td>
<td></td>
<td>• Avoid decongestants</td>
</tr>
<tr>
<td></td>
<td>weekly</td>
<td></td>
<td></td>
<td>• Monitor height, weight, blood pressure, and pulse</td>
</tr>
<tr>
<td></td>
<td>Frequency: 2 to 3 doses/d</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ritalin SR® or generic</strong></td>
<td>Initial: 20 mg</td>
<td>20 to 80 mg/d</td>
<td>Onset: 60 to 90 min</td>
<td>• Same as regular MPH. May release unevenly</td>
</tr>
<tr>
<td>20-mg sustained-release</td>
<td>Increase: 20 mg</td>
<td>0.6 to 2 mg/kg per dose</td>
<td>Duration: 5 to 8 h</td>
<td>• Do not chew or cut in half</td>
</tr>
<tr>
<td>tablets only</td>
<td>Frequency: 1 or 2 doses/d</td>
<td></td>
<td></td>
<td>• 20 mg SR may be equivalent to 12 to 15 mg regular released over 5 to 8 h</td>
</tr>
<tr>
<td></td>
<td>Sometimes combined with</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>regular in morning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dextroamphetamine (DEX)</strong></td>
<td>Initial: 2.5 to 5 mg</td>
<td>2.5 to 40 mg/d</td>
<td>Onset: 20 to 60 min</td>
<td>• Anorexia, insomnia, stomach aches, headaches, irritability, &quot;rebound,&quot; tics, stereotypy,</td>
</tr>
<tr>
<td>Dexedrine® 5-mg tablets</td>
<td>(0.15 mg/kg per dose)</td>
<td>0.15 to 0.4 mg/kg per dose</td>
<td>Duration: 4 to 6 h</td>
<td>weight loss/reduced growth velocity</td>
</tr>
<tr>
<td>Dexedrine® 5-, 10-mg</td>
<td>Increase: 2.5 mg to 5 mg</td>
<td></td>
<td></td>
<td>• Avoid decongestants</td>
</tr>
<tr>
<td>tablets</td>
<td>weekly</td>
<td></td>
<td></td>
<td>• Monitor height, weight, blood pressure, and pulse</td>
</tr>
<tr>
<td>Ellixir no longer available</td>
<td>Frequency: 2 to 3 doses/d</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dexedrine Spansules®</strong></td>
<td>Initial: 5 mg in AM</td>
<td>5 to 40 mg/d</td>
<td>Onset: 60 to 90 min</td>
<td>• Anorexia, insomnia, stomach aches, headaches, irritability, social withdrawal, weepiness,</td>
</tr>
<tr>
<td>5-, 10-, 15-mg capsules</td>
<td>(0.3 mg/kg per dose)</td>
<td>0.5 to 0.8 mg/kg per dose</td>
<td>Duration: 6 to 10 h</td>
<td>stereotypy, tics, weight loss, reduced growth velocity</td>
</tr>
<tr>
<td>no generic available</td>
<td>Increase: 5 mg weekly</td>
<td></td>
<td></td>
<td>• Avoid decongestants</td>
</tr>
<tr>
<td></td>
<td>Frequency: 1 to 2 doses/d</td>
<td></td>
<td></td>
<td>• Monitor height, weight, blood pressure, and pulse</td>
</tr>
<tr>
<td><strong>Methylphenidate Salts</strong></td>
<td>Initial: 2.5 to 5 mg in AM</td>
<td>2.5 to 40 mg/d (?)</td>
<td>Onset: 30 min (?)</td>
<td>• Presumed to be similar to dextroamphetamine</td>
</tr>
<tr>
<td>Adderall® 5, 10, 20, 30 mg</td>
<td>Increase: 2.5 to 5 mg weekly</td>
<td></td>
<td>Duration: 5 to 7 h (?)</td>
<td>• Appears to be tolerated by some</td>
</tr>
<tr>
<td>(limited data available)</td>
<td>Frequency: 1 to 2 doses/d</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pemoline</strong></td>
<td>Initial: 37.5 mg in AM</td>
<td>18.75 to 112.5 mg/d</td>
<td>Onset: 2 h (not weeks)</td>
<td>• Insomnia, anorexia, stomach aches, irritability, headaches, choreoathetoid movements, liver</td>
</tr>
<tr>
<td>Cyler® 18.75-, 37.5-, 75-mg</td>
<td>Increase: 18.25 mg weekly</td>
<td>2 mg/kg per day</td>
<td>Duration: 7 to 10 h</td>
<td>dysfunction, rare fulminant liver failure</td>
</tr>
<tr>
<td>tablets</td>
<td>Frequency: 1 to 2 doses/d</td>
<td></td>
<td></td>
<td>• Monitor height, weight, blood pressure, and pulse</td>
</tr>
<tr>
<td>37.5-mg chewable tablets</td>
<td>Must be taken daily</td>
<td></td>
<td></td>
<td>• Obtain liver function tests at baseline and 2 to 3 x/y</td>
</tr>
</tbody>
</table>

*Medications approved by the FDA for use in children who have AD/HD.*
## Nonstimulant Medications for AD/HDs*

<table>
<thead>
<tr>
<th>MEDICATION</th>
<th>INDICATIONS</th>
<th>DOSE SCHEDULE</th>
<th>RANGE</th>
<th>SIDE EFFECTS/MONITORING</th>
</tr>
</thead>
</table>
| Imipramine | • Alternative to stimulant  
Tofranil or generic 10-, 25-, 50-mg tablets | Initial: 10 to 25 mg or 0.5 mg/kg bedtime  
Increase: 10 to 25 mg every 5 to 7 d up to 3 mg/kg per day  
Frequency: 2 to 3 doses/d  
Must be taken daily. Stop slowly | 20 to 100 mg/d  
1 to 3 mg/kg per day | • Constipation, fatigue, stomach upset, dry mouth, blurry vision, dizziness, tachycardia  
• May affect cardiac conduction rate  
• Increased levels with MPH  
• Baseline ECG  
• ECG and blood level with dose changes  
• Monitor blood pressure and heart rate |
| Desipramine | • Alternative to stimulant  
Norpramin or generic 10-, 35-, 50-, 75-mg tablets | Initial: 25 mg in morning  
Increase: 25 mg every 5 to 7 d  
Frequency: 2 to 3 doses/d  
Must be taken daily. Stop slowly | 25 to 100 mg/d  
1 to 4 mg/kg per day | • Tachycardia, dizziness, fatigue, stomach upset, dry mouth, blurry vision  
• May affect cardiac conduction rate  
• Increased levels with MPH  
• Baseline ECG  
• ECG and blood level with dose changes  
• Monitor blood pressure and heart rate |
| Nortriptyline | • Alternative to stimulant  
Pamelor or generic 10-, 25-, 50-, 75-mg tablets  
10 mg/5 mL liquid | Initial: 10 to 25 mg at bedtime  
Increase: Up to 2 mg/kg per day  
Frequency: Once or twice a day | 1.0 to 2.0 mg/kg per day | • Dry mouth, constipation, weight gain  
• Baseline ECG  
• ECG and blood level at steady-state  
• Monitor blood pressure and heart rate |
| Bupropion | • Alternative to stimulant  
Wellbutrin 150 mg  
Wellbutrin SR 100, 150 mg | Initial: 100 SR QD  
Increase: 50 mg every 1 to 2 wk  
Frequency: 2 doses/d  
Must be taken daily. | 150 to 300 mg/d  
for ADHD in adolescents | • Agitation, dry mouth, insomnia, headaches, nausea, constipation, tremor  
• Lowers seizure threshold  
• Contraindicated in patients who have eating disorders or tics |
| Clonidine | • Alternative to stimulant  
Tenex 1, 2, 3 (transdermal patches) | Initial dose: 0.5 mg HS  
Increase: 0.05 mg every 3 to 7 d  
Frequency: 2 to 4 doses/d for AD/HD  
(Generally AM, after school, HS)  
Must be taken daily  
Maximum effect may take several weeks  
Start and stop slowly | 0.1 to 0.4 mg/d  
Usual therapeutic dose: 0.2 mg/d | • Sedation (50%), dizziness, nausea, orthostatic hypotension, clinical major depression, nightmares  
• Sedation tends to decrease over time  
• Rebound hypertension if stopped abruptly  
• Monitor blood pressure: baseline, after dose adjustment, and at follow-up |
| Guanfacine | • Same as clonidine  
Tenex or generic 1-, 2-mg tablets (limited data available) | Initial dose: 0.5 mg HS  
Increase: 0.5 mg/wk  
Give us one to two doses/d  
Takes several days to weeks to take effect | 0.5 to 3 mg/d | • Same as clonidine tablets  
• May be less sedating  
• Contact dermatitis common; erythema fades after several days  
• Discontinue if blistering occurs  
• Not affected by routine bathing  
• May not adhere well in humid weather  
• Dispose of patches carefully  
• Monitor blood pressure: baseline, after dose adjustment, and at follow-up. Stop slowly |

*Medications not approved by United States Food and Drug Administration for use in children to treat AD/HDs, but controlled studies and clinical data support careful “off-label” use.*


APPENDIX
Appendix.

Diagnostic criteria for Attention-Deficit/Hyperactivity Disorder

A. Either (1) or (2):

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

Inattention
(a) often fails to give close attention 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 developmental 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 trouble 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).

Code based on type:
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, Predominately Inattentive Type: if Criterion A1 is met but Criterion A2 is not met for the past 6 months
314.01 Attention-Deficit/Hyperactivity Disorder, Predominately Hyperactive-Impulsive Type: if Criterion A2 is met but Criterion A1 is not met for the past 6 months

Coding note: For individuals (especially adolescents and adults) who currently have symptoms that no longer meet full criteria, “In Partial Remission” should be specified.

(Diagnostic and Statistical Manual-IV, 1994)