Diagnosis and Treatment of ADHD in School-age Children in Primary Care Settings: A Synopsis of the AAP Practice Guidelines

Martin T. Stein MD,*
James M. Perrin, MD†

Introduction
Attention-deficit/hyperactivity disorder (ADHD) is one of the most common chronic conditions of childhood and the most common neurobehavioral disorder in child health. This article describes the developmental process and content of two recent American Academy of Pediatrics (AAP) Clinical Practice Guidelines: Diagnosis and Evaluation of the Child With Attention-Deficit/Hyperactivity Disorder and Treatment of the School-Aged Child With Attention-Deficit/Hyperactivity Disorder. (1)(2) Readers are urged to refer to the original documents for a more thorough presentation.

Initiating the Process of Guideline Development
Underlying the AAP development of these guidelines were: 1) a commitment to a multidisciplinary approach, 2) a focus on diagnosis and management in primary care settings, 3) use of the best available evidence, and 4) attention to opportunities to improve practice. (3) The AAP gathered an outstanding group of clinicians that included experts in general pediatrics, developmental-behavioral pediatrics, child and adolescent psychiatry, child psychology, child neurology, developmental pediatrics, family practice, education, and clinical research methodology and data analysis.

Recognizing the limitations of the research literature, the Committee limited its review to school-age children (6 to 12 years old). Studies of practice patterns suggested that most of the children who had ADHD seen by primary care clinicians also were in this age group. Despite an emerging literature, the available evidence for diagnosis and treatment among adolescents and preschool children was insufficient to develop firm evidence-based recommendations. Similarly, the research literature regarding ADHD in primary care settings provided limited evidence regarding the diagnosis and management of children who had major coexisting conditions; the Committee, therefore, limited the guidelines to children who did not have coexisting conditions.

The Committee used two major systematic evidence reviews supported by the federal Agency for Healthcare Research and Quality (4)(5) and another systematic review conducted by University of British Columbia investigators for the Canadian Coordinating Office for Health Technology. (6) A recent multisite trial, supported by the National Institute of Mental Health, the Multimodal Treatment Study of ADHD (MTA), provided additional substantial research information on treatment. (7) The Committee heard from representatives of the MTA study directors and carried out substantial review of the research literature itself.

ADHD and Its Prevalence
Children who have behavior patterns similar to what is now called ADHD have been described in the medical literature for more than 100 years, although the definition and name of the condition have changed several times during this period. In contemporary clinical practice and research, children who have ADHD are identified as having three core behavioral symptoms: hyperactivity, impulsivity, and inattention. The degree to which each symptom manifests in an individual child may vary significantly.

The evidence for the rates of ADHD in school-age children differs from the 3% to 5% typically mentioned in textbooks and other reviews. (4) Studies in primary care or community samples indicate rates of 4% to 12%, with meta-analyses indicating 6% to 7%. (These studies reflect careful criterion-based diagnoses rather than the rates of diagnoses
made by primary care clinicians in their practices or communities. These studies indicated generally a 3:1 male predominance, with slightly higher rates in community samples (compared with school samples) and higher rates using the more recent American Psychiatric Association Diagnostic and Statistical Manual of Mental Health Disorders, 4th edition (DSM-IV) criteria (compared with DSM-III-R).

Only a very small number of studies have examined rates of coexisting conditions among children who have ADHD in primary care or community settings; most studies of coexisting conditions come from psychiatric referral populations. Combining the few studies indicates rates of about 35% for oppositional defiant disorder, 26% for conduct disorder, 26% for anxiety, and 18% for depressive disorders. Although the guidelines do not pertain directly to children who have coexisting conditions, they provide some information about these conditions and potential methods of identifying them in primary care practice.

**Identifying Children Who Have ADHD and Documenting Behaviors**

**Recommendation 1:** In a child 6 to 12 years old who presents with inattention, hyperactivity, impulsivity, academic underachievement, or behavior problems, primary care clinicians should initiate an evaluation for ADHD. Children who have ADHD exhibit a number of behavioral symptoms that occur along a spectrum ranging from normal variations in behavior to frank and compelling problems. Questions regarding school performance, peer relationships, and behavior at home may help to guide clinicians in considering whether an evaluation for ADHD is warranted.

**Recommendation 2:** The diagnosis of ADHD requires that a child meet DSM-IV criteria. The diagnosis of ADHD has been informed by the DSM-IV. (8) Current criteria include: 1) documentation of at least six of nine behaviors in the hyperactive/impulsive domain and/or in the inattentive domain, 2) the presence of these behaviors in two or more settings (eg, home and school) for at least 6 months, 3) the presence (by history) prior to 7 years of age, and 4) significant impairment in learning and/or social interactions (Table 1). The Committee reviewed alternative methods for diagnosing ADHD and concluded that DSM-IV provides the best and most reliable current guidance.

**Recommendation 3:** The assessment of ADHD requires evidence directly obtained from parents or caregivers regarding the core symptoms of ADHD in various settings, the age of onset, duration of symptoms, and degree of functional impairment. **Recommendation 3A:** Use of (ADHD-specific) scales is a clinical option when evaluating children for ADHD. **Recommendation 3B:** Use of broadband scales is not recommended in the diagnosis of children for ADHD, although they may be useful for other purposes. Physicians should document in their charts the specific behaviors that parents report. Additional critical criteria include the presence of symptoms prior to age 7 years and that the symptoms are not only present, but impair the child’s functioning. In other words, a child who has the requisite number of behavioral symptoms, but who gets good grades and interacts without problems with friends and classmates does not meet DSM-IV criteria for ADHD.

Behavior questionnaires for parents, which are specific for the diagnosis of ADHD, help clinicians make the diagnosis in office practice. These behavior scales ask questions about each of the 18 behaviors in the DSM-IV criteria for ADHD. Several published forms are available, including ones in the AAP toolkit for clinicians (see “Implementing the Guidelines”). There are several broadband or global behavior rating scales that are not specific for ADHD, but they have been used less in primary care settings. Careful examination of these broader psychological tests indicates that they have low sensitivity and specificity for diagnosing ADHD, and the guideline recommends that they not be used for this purpose. (1) Some clinicians may find these broadband measures useful for determining other conditions that coexist with ADHD (eg, oppositional behaviors, anxiety, and depression). Specific rating scales help with the diagnostic efforts, although other forms of data gathering also may help, including open-ended questions (eg, “What are your concerns about your child’s behavior in school?”), focused questions about specific behaviors, and semistructured interview schedules. The original guideline provides information on several ADHD-specific and global rating scores. (1)

**Recommendation 4:** The assessment of ADHD requires evidence directly obtained from the classroom teacher (or other school professional) regarding the core symptoms of ADHD, the duration of symptoms, the degree of functional impairment, and coexisting conditions. A physician should review any reports from a school-based multidisciplinary evaluation where they exist, which will include assessments from the teacher or other school-based professional. **Recommendation 4A:** Use of (ADHD-specific) rating scales is a clinical option when diagnosing children for ADHD. **Recommendation 4B:** Use of teacher global questionnaires and rating scales is not recommended in the diagnosis of children for ADHD, although they may be useful for other purposes. The diagnosis of ADHD requires that symptoms occur in more than one setting, and the guidelines...
recommend that clinicians have direct contact with the school to determine the child’s performance there. Information from the child’s teacher or other school personnel who have observed the child in the classroom may be obtained from a verbal narrative, telephone calls (not easily accomplished in a busy office practice, although preferred by some clinicians), written narrative, or rating scales. As with parent rating scales, ADHD-specific scales...
may help in the diagnosis; more global rating scales appear less sensitive and specific and should not be used. Specific rating scales have the advantage of assessing all 18 ADHD behaviors; the teacher narrative has the advantage of providing a description of the child that gives the clinician more insight into a particular child’s behavior and learning style and the classroom experience.

Recommendation 5: Evaluation of the child with ADHD should include assessment for coexisting conditions.

While considering the diagnosis of ADHD, clinicians should search for the possibility of related or coexisting conditions that may mimic or complicate ADHD. Although current methods for diagnosing these conditions in primary care practice are limited, the AAP toolkit provides some guidance and questions that may lead clinicians to have more or less concern about coexisting conditions. Common coexisting conditions include oppositional defiant disorder, conduct disorder, anxiety disorder, depression, and learning disabilities (Table 2). (9) Determining the presence of learning disability particularly requires interaction with the school to share their assessment of the child’s learning compared with his or her abilities.

Recommendation 6: Other diagnostic tests are not routinely indicated to establish the diagnosis of ADHD. Although some clinicians use laboratory tests as part of a diagnostic evaluation for ADHD, current evidence does not support the routine use of other diagnostic tests to establish the diagnosis. No laboratory tests or imaging techniques clearly distinguish children who have ADHD and those who do not. Laboratory tests that have been found not to be useful in the evaluation of a child who has ADHD include hematocrit, blood lead levels, thyroid hormone levels, brain imaging studies, electroencephalography, and continuous performance tests (CPT) (computer-generated data on inattention and vigilance).

(4) Although children who have had high lead levels in preschool years have an increased likelihood of behavioral symptoms, their lead levels will be normal by school age. There is a very rare condition of thyroid hormone resistance in which ADHD coexists, but children who have this syndrome exhibit other signs of thyroid dysfunction well before school age.

Current imaging techniques in some studies indicate statistically significant differences between populations of children who do and do not have ADHD, but these techniques are not yet sufficiently sensitive or specific for use in diagnosis. Similarly, CPT may distinguish affected populations, but the tests are not sufficiently sensitive or specific for use in clinical practice.

### Treatment and Long-term Care

The treatment guideline outlines the primary principles of care for children who have a chronic condition, all of which apply to children who have ADHD: (10)

- Provide parents and child with information about the condition
- Update and monitor family knowledge and understanding periodically
- Counsel about family response to the condition
- Provide developmentally appropriate education of child about ADHD, with updates as the child grows
- Be available to answer family questions
- Ensure coordination of health and other services
- Help families set specific goals in areas related to child’s condition and its effects on daily activities
- Link affected families who have children who have similar chronic conditions as needed and when available

Studies of children and adults who have several chronic conditions indicate better adherence to treatment, improved health and disease status, and higher

### Table 2. Prevalence of Selected Coexisting Conditions in Children Who Have ADHD

<table>
<thead>
<tr>
<th>Coexisting Condition</th>
<th>Estimated Prevalence (%)</th>
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<tbody>
<tr>
<td>Oppositional defiant disorder</td>
<td>35.2</td>
</tr>
<tr>
<td>Conduct disorder</td>
<td>25.7</td>
</tr>
<tr>
<td>Anxiety disorder</td>
<td>25.8</td>
</tr>
<tr>
<td>Depressive disorder</td>
<td>18.2</td>
</tr>
</tbody>
</table>

Adapted from Green et al, 1999.
levels of satisfaction in the context of a comprehensive treatment plan that has specific goals, follow-up activities, and monitoring. (11)

Recommendation 2: The treating clinician, parent, and child, in collaboration with school personnel, should specify appropriate target outcomes to guide management. The development of a list of at least three to six target outcomes, agreed upon by the parents, child, and teacher, can be of enormous help following the diagnosis of a child who has ADHD. Target outcomes make the treatment goals with the parents and child precise and direct the follow-up process for a child who has a chronic condition. For the child who has ADHD, target outcomes should reflect key symptoms that the child manifests and the specific impairments that these symptoms cause. Impairments and problem behaviors differ greatly from child to child. Examples of target outcomes include improving written and verbal communication; improving academic performance (e.g., completing homework, handling a greater volume of work, strengthening efficiency and accuracy); decreasing disruptive behaviors; improving self-esteem; reducing the degree of supervision needed at school or in the community; and enhancing safety, such as in crossing streets or riding bicycles. Additional goals may address improving the core symptoms of inattention, hyperactivity, and impulsivity. The goals should be realistic, attainable, and measurable.

Recommendation 3: The clinician should recommend stimulant medication and/or behavior therapy as appropriate to improve target outcomes in children with ADHD.

Medication: More than 150 randomized, controlled clinical trials of school-age children who have ADHD support the benefit of stimulant medications (methylphenidate and dextroamphetamine). Documented benefits are seen not only in core ADHD symptoms, but in many cases, stimulants improve a child’s ability to follow rules and improve relationships with peers and parents. Although most of the medication studies provide only short-term data, the MTA study demonstrated a persistent effect of decreasing core ADHD symptoms for at least 14 months. (12) More recent MTA findings indicate positive results to at least 24 months. Stimulants are available in short-acting, intermediate-release, and extended-release forms. Approximately 70% to 80% of school-age children who have ADHD respond to either methylphenidate or dextroamphetamine. A review of 22 “head-to-head” comparison studies showed no differences between methylphenidate and dextroamphetamine (or different forms of these stimulants) in their effect on core ADHD behaviors. (5) Many children who do not respond to appropriate doses of one stimulant respond to the other stimulant group or even to different preparations of the same stimulant. A practical guide to the initiation and maintenance of stimulant medications in children who have ADHD that is consistent with the recommendations of the AAP evidenced-based treatment guideline was published recently. (13)

Other medications for children who have ADHD have been studied much less, although there have been studies of tricyclic antidepressants, bupropion, and some antihypertensives. Current AAP recommendations focus on the use of stimulants in almost all cases, especially in primary care settings, because they are effective in a very high percentage of cases. Use of stimulants does not require hematologic, biochemical, or electrocardiographic monitoring.

Behavior therapy: The recommendation to include behavior therapy is based on empiric support of the efficacy of parent training in behavior therapy and teacher training in classroom interventions. (14) The guideline defines behavioral therapy as a program with “specific interventions that have a common goal of modifying the physical and social environment to alter or change behavior... (it) 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.” (2) Pediatricians should differentiate behavior therapy from other forms of psychological interventions designed to change a child’s emotional status, such as cognitive therapy, psychotherapy, and play therapy. These interventions may be useful with some of the conditions that may coexist with ADHD, but they have not been shown to be effective with the core ADHD behaviors.

Well-designed studies that support the use of behavior therapy characteristically include 8 to 12 weekly group sessions with a trained therapist. Focusing on the child’s behavior and difficulties in family relationships, these programs attempt to improve a parent’s understanding of a child’s behaviors and teach specific skills of behavior modification (e.g., techniques for giving commands, reinforcing adaptive and positive social behaviors, and decreasing or eliminating inappropriate behavior).

Most pediatricians are neither trained to provide a formal behavior modification program for children who have ADHD nor have office personnel available to carry out such a program. When a referral is not available or when the target behaviors are not too severe, behavior modification can be initiated by pediatricians, an office nurse, or other office personnel who have training and experience in behavior modification. The treatment
Pediatricians and other clinicians who treat children who have ADHD generally recommend a multimodal approach that includes medication, parent and child education about ADHD, behavior management, and classroom accommodations. Most studies comparing behavior therapy with stimulants alone show a much stronger effect from stimulants than from behavior therapy. (5) The MTA study showed that combined treatment (medication and behavior management) had similar effects on core ADHD behaviors as did medication alone. (12) However, potential benefits in those in the combined group included improved scores on some academic measurements, conduct, and anxiety symptoms. In addition, parents and teachers of children who received the combined treatment were more satisfied with the treatment. (15)(16)

**Recommendation 4:** When the selected management for a child with ADHD has not met target outcomes, clinicians should evaluate the original diagnosis, use of all appropriate treatments, adherence to the treatment plan, and the presence of coexisting conditions. Implied in this recommendation is the framework found in the first recommendation—that the child who has ADHD should be managed in the context of chronic care. Continuing lack of response to treatment may be due to: 1) unrealistic target symptoms that need re-evaluation; 2) an incorrect diagnosis; 3) a coexisting condition affecting treatment, especially an undiagnosed anxiety disorder or depression or a learning disability that is not recognized or not receiving proper intervention; or 4) lack of adherence to the treatment regimen.

**Recommendation 5:** The clinician 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 parent, teacher, and the child. Although clear research evidence describing specific times for follow-up visits does not exist, the monitoring of any child who has a chronic condition requires periodic reassessment. This periodic monitoring should be guided by a plan that includes obtaining information about target behaviors, adherence, and adverse effects of medications. It builds on the first recommendation for teamwork among parents, clinicians, the schools, and the child. A system for periodic communication with parents and teachers should be established at the initiation of treatment. The frequency of monitoring through office visits and phone calls depends on the degree of dysfunction and adherence to the treatment plan. The monitoring plan should account for normal developmental changes in behavior over time, educational expectations that increase with each grade, and changes in the home and school environment. It is useful to separate the “titration” phase (the initial establishment of the most effective medication regimen and monitoring of adverse effects) and the “maintenance” phase. The former period, which may last a few weeks or up to 1 to 2 months, usually requires frequent (often weekly) communication with parent, teacher, and the child. The maintenance phase likely requires two to four visits per year. The medical record can be organized as a flow sheet or in progress notes to record all monitoring data systematically, including phone calls and medication refills.

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**Table 3. Effective Behavioral Techniques for Children Who Have Attention-Deficit/Hyperactivity Disorder**

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive reinforcement</td>
<td>Providing rewards or privileges contingent on the child's performance.</td>
<td>Child completes assignment and is permitted to play on the computer.</td>
</tr>
<tr>
<td>Time-out</td>
<td>Removing access to positive reinforcement contingent on performance of unwanted or problem behavior.</td>
<td>Child hits sibling impulsively; required to sit for 5 minutes in corner of the room.</td>
</tr>
<tr>
<td>Response cost</td>
<td>Withdrawing rewards or privileges contingent on the performance of unwanted or problem behavior.</td>
<td>Child loses free time for not completing homework.</td>
</tr>
<tr>
<td>Token economy</td>
<td>Combining positive reinforcement and response cost. Child earns rewards and privileges contingent on desired behaviors and loses the rewards and privileges based on undesirable behavior.</td>
<td>Child earns stars for assignments and loses stars for getting out of seat. Child cashes in the sum of stars at the end of the week for a prize.</td>
</tr>
</tbody>
</table>

**Needed Research**

The work that led to the development of the AAP guidelines also identified multiple areas needing more evidence and stronger clinical data. The diagnosis of ADHD relies on the DSM-IV. This categorization provides the same criteria for the diagnosis of ADHD for all ages, and the next version of the manual likely will provide better guidance for criteria to use at different ages. Increasing evidence indicates that the primarily inattentive form of ADHD may have very different manifestations and potential causes from the other types, and the next version of DSM may change the taxonomy of ADHD.

Although medications and behavior therapy both improve ADHD symptoms and impairment, they often do not improve the child’s functioning to normal levels. Thus, there is a need for new treatments that may achieve better outcomes, including better medications and targeted and more effective behavior therapies. Multiple alternative treatments have been proposed for ADHD, but essentially none has undergone careful safety and efficacy testing. This area also merits careful attention. Additional research needs include more information on the long-term outcomes of children who have treated or untreated ADHD and better data about the required duration of treatment. Finally, it will be important to study the biological and social causes of ADHD and to find opportunities for prevention.

**Implementing the Guidelines**

The Committee recognized that implementation of the diagnostic and treatment guidelines requires an intensive education effort through publications, continuing medical education programs, and practice support. As an extension of the guideline development, the AAP has developed a toolkit* to enable pediatricians and other primary care clinicians to diagnose and manage children who have ADHD efficiently and productively in a primary care office. The toolkit includes specific suggestions for the creative use of office personnel, maintenance of office records, communication with school personnel, and monitoring effects of medication (and their adverse effects), behavior management, and target behaviors.

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**References**

7. Pelham WE, Wheeler T, Chronis A. Empirically supported psychosocial treatments for attention deficit hyperactivity disorder. *Arch Gen Psychiatry*. 1999;56:1072–1086