IDENTIFYING AND TREATING ATTENTION DEFICIT HYPERACTIVITY DISORDER:

A RESOURCE FOR SCHOOL AND HOME

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Identifying and Treating Attention Deficit Hyperactivity Disorder:

A Resource for School and Home

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CONTENTS

IDENTIFYING AND TREATING ATTENTION DEFICIT HYPERACTIVITY DISORDER: A RESOURCE FOR SCHOOL AND HOME

We have all had one of these experiences at one time or another. Perhaps it was at the grocery store, watching frustrated parents call their children's names repeatedly and implore them to "put that down." Maybe it was a situation at school with a child who could not seem to sit still and was always in motion. Maybe we noticed a child who appears always to be daydreaming in class—the student who will not focus on an activity long enough to finish it. Possibly the child is bored with a task, seemingly as soon as it has begun, and wants to move on to something else. We all puzzle over these challenging behaviors.

Attention Deficit Hyperactivity Disorder (ADHD) has many faces and remains one of the most talked-about and controversial subjects in education. Hanging in the balance of heated debates over medication, diagnostic methods, and treatment options are children, adolescents, and adults who must manage the condition and lead productive lives on a daily basis.

What is ADHD?
• Definition • Core Categories • Comorbidity • Social Impact • Prevalence

Attention Deficit Hyperactivity Disorder (ADHD) is a neurological condition that involves problems with inattention and hyperactivity-impulsivity that are developmentally inconsistent with the age of the child. We are now learning that ADHD is not a disorder of attention, as had long been assumed. Rather, it is a function of developmental failure in the brain circuitry that monitors inhibition and self-control. This loss of self-regulation impairs other important brain functions crucial for maintaining attention, including the ability to defer immediate rewards for later gain (Barkley, 1998a). Behavior of children with ADHD can also include excessive motor activity. The high energy level and subsequent behavior are often misperceived as purposeful noncompliance when, in fact, they may be a manifestation of the disorder and require specific interventions. Children with ADHD exhibit a range of symptoms and levels of severity. In addition, many children with ADHD often are of at least average intelligence and have a range of personality characteristics and individual strengths.

Children with ADHD typically exhibit behavior that is classified into two main categories: poor sustained attention and hyperactivity-impulsiveness. As a result, three subtypes of the disorder have been proposed by the American Psychiatric Association in the fourth edition of the *Diagostic and Statistical Manual of Mental Disorders (DSM-IV):* predominantly inattentive, predominantly hyperactive-impulsive, and combined types (Barkley, 1997). A child expressing hyperactivity commonly will appear fidgety, have difficulty staying seated or playing quietly, and act as if driven by a motor. Children displaying impulsivity often have difficulty participating in tasks that require taking turns. Other common behaviors may include blurting out answers to questions instead of waiting to be called and flitting from one task to another without finishing. The inattention component of ADHD affects the educational experience of these children because ADHD causes them to have difficulty in attending to detail in directions, sustaining attention for the duration of the task, and misplacing needed items. These children

often fail to give close attention to details, make careless mistakes, and avoid or dislike tasks requiring sustained mental effort.

Although these behaviors are not in themselves a learning disability, almost one-third of all children with ADHD have learning disabilities (National Institute of Mental Health [NIMH], 1999). Children with ADHD may also experience difficulty in reading, math, and written communication (Anderson, Williams, McGee, & Silva, 1987; Cantwell & Baker, 1991; Dykman, Akerman, & Raney, 1994; Zentall, 1993). Furthermore, ADHD commonly occurs with other conditions. Current literature indicates that approximately 40–60 percent of children with ADHD have at least one coexisting disability (Barkley, 1990a; Jensen, Hinshaw, Kraemer, et al., 2001; Jensen, Martin, & Cantwell, 1997). Although any disability can coexist with ADHD, certain disabilities seem to be more common than others. These include disruptive behavior disorders, mood disorders, anxiety disorders, tics and Tourette's Syndrome, and learning disabilities (Jensen, et al., 2001). In addition, ADHD affects children differently at different ages. In some cases, children initially identified as having hyperactive-impulsive subtype are subsequently identified as having the combined subtype as their attention problems surface.

These characteristics affect not only the academic lives of students with ADHD, they may affect their social lives as well. Children with ADHD of the predominantly hyperactive-impulsive type may show aggressive behaviors, while children of the predominantly inattentive type may be more withdrawn. Also, because they are less disruptive than children with ADHD who are hyperactive or impulsive, many children who have the inattentive type of ADHD go unrecognized and unassisted. Both types of children with ADHD may be less cooperative with others and less willing to wait their turn or play by the rules (NIMH, 1999; Swanson, 1992; Waslick & Greenhill, 1997). Their inability to control their own behavior may lead to social isolation. Consequently, the children's self-esteem may suffer (Barkley, 1990a).

In the United States, an estimated 1.46 to 2.46 million children (3 percent to 5 percent of the student population) have ADHD (American Psychiatric Association, 1994; Anderson, et al., 1987; Bird, et al., 1988; Esser, Schmidt, & Woemer, 1990; Pastor & Reuben, 2002; Pelham, Gnagy, Greenslade, & Milich, 1992; Shaffer, et al., 1996; Wolraich, Hannah, Pinock, Baumgaertel, & Brown, 1996). Boys are four to nine times more likely to be diagnosed, and the disorder is found in all cultures, although prevalence figures differ (Ross & Ross, 1982).

What Causes ADHD?

ADHD has traditionally been viewed as a problem related to attention, stemming from an inability of the brain to filter competing sensory inputs such as sight and sound. Recent research, however, has shown that children with ADHD do not have difficulty in that area. Instead, researchers now believe that children with ADHD are unable to inhibit their impulsive motor responses to such input (Barkley, 1997; 1998a).

It is still unclear what the direct and immediate causes of ADHD are, although scientific and technological advances in the field of neurological imaging techniques and genetics promise to clarify this issue in the near future. Most researchers suspect that the cause of ADHD is genetic or biological, although they acknowledge that the child's environment helps determine specific behaviors.

Imaging studies conducted during the past decade have indicated which brain regions may malfunction in patients with ADHD, and thus account for symptoms of the condition (Barkley,

1998a). A 1996 study conducted at the National Institutes for Mental Health (NIMH) found that the right prefrontal cortex (part of the cerebellum) and at least two of the clusters of nerve cells known collectively as the basal ganglia are significantly smaller in children with ADHD (as cited in Barkley, 1998a). It appears that these areas of the brain relate to the regulation of attention. Why these areas of the brain are smaller for some children is yet unknown, but researchers have suggested mutations in several genes that are active in the prefrontal cortex and basal ganglia may play a significant role (Barkley, 1998a). In addition, some nongenetic factors have been linked to ADHD including premature birth, maternal alcohol and tobacco use, high levels of exposure to lead, and prenatal neurological damage. Although some people claim that food additives, sugar, yeast, or poor child rearing methods lead to ADHD, there is no conclusive evidence to support these beliefs (Barkley, 1998a; Neuwirth, 1994; NIMH, 1999).

How Do We Identify ADHD?

Although toddlers and preschoolers, on occasion, may show characteristics of ADHD, some of these behaviors may be normal for their age or developmental stage. These behaviors must be exhibited to an abnormal degree to warrant identification as ADHD. Even with older children, other factors (including environmental influences) can produce behaviors resembling ADHD.

The criteria set forth by the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)* are used as the standardized clinical definition to determine the presence of ADHD (see DSM-IV Criteria for ADHD). A person must exhibit several characteristics to be clinically diagnosed as having ADHD:

Severity. The behavior in question must occur more frequently in the child than in other children at the same developmental stage.

Early onset. At least some of the symptoms must have been present prior to age 7.

Duration. The symptoms must also have been present for at least 6 months prior to the evaluation.

Impact. The symptoms must have a negative impact on the child's academic or social life.

Settings. The symptoms must be present in multiple settings.

The specific DSM-IV criteria are set forth in the following chart.

DSM-IV Criteria for Attention Deficit/Hyperactivity Disorder

A. According to the DSM-IV, a person with Attention Deficit/Hyperactivity Disorder must have either (1) or (2):

(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 developmental level:

Inattention

(a) often fails to give close attention to details or makes careless mistakes in school work, 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 or 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, Disassociative Disorder, or a Personality Disorder).

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

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

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

Source: American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders,* Fourth Edition. Washington, DC, American Psychiatric Association, 1994.

LEGAL REQUIREMENTS FOR IDENTIFICATION OF AND EDUCATIONAL SERVICES FOR CHILDREN WITH ADHD

Two important federal mandates protect the rights of eligible children with ADHD—the Individuals with Disabilities Education Act (IDEA) and Section 504 of the Rehabilitation Act of 1973 (Section 504). The regulations implementing these laws are 34 CFR sections 300 and 104, respectively, which require school districts to provide a "free appropriate public education" to students who meet their eligibility criteria. Although a child with ADHD may not be eligible for services under IDEA, he or she may meet the requirements of Section 504.

The requirements and qualifications for IDEA are more stringent than those of Section 504. IDEA provides funds to state education agencies for the purpose of providing special education and related services to children evaluated in accordance with IDEA and found to have at least one of the 13 specific categories of disabilities, and who thus need special education and related services. Attention Deficit Hyperactivity Disorder may be considered under the specific category of "Other Health Impairment" (OHI), if the disability results in limited strength, vitality, or alertness, including a heightened alertness to environmental stimuli that results in limited alertness with respect to the educational environment and that is due to chronic or acute health problems.

Under IDEA, each public agency—that is, each school district—shall ensure that a full and individual evaluation is conducted for each child being considered for special education and related services. The child's individualized education program (IEP) team uses the results of the evaluation to determine the educational needs of the child. The results of a medical doctor's, psychologist's, or other qualified professional's assessment indicating a diagnosis of ADHD may be an important evaluation result, but the diagnosis does not automatically mean that a child is eligible for special education and related services. A group of qualified professionals and the parent of the child determine whether the child is an eligible child with a disability according to IDEA. Children with ADHD also may be eligible for services under the "Specific Learning Disability," "Emotional Disturbance," or other relevant disability categories of IDEA if they have those disabilities in addition to ADHD.

After it has been determined that a child is eligible for special education and related services under IDEA, an IEP is developed that includes a statement of measurable annual goals, including benchmarks or short-term objectives that reflect the student's needs. The IEP goals are determined with input from the parents and cannot be changed without the parents' knowledge. Although children who are eligible under IDEA must have an IEP, students eligible under Section 504 are not required to have an IEP but must be provided regular or special education and related aids or services that are designed to meet their individual educational needs as adequately as the needs of nondisabled students are met.

Section 504 was established to ensure a free appropriate education for all children who have an impairment—physical or mental—that substantially limits one or more major life activities. If it can be demonstrated that a child's ADHD adversely affects his or her learning—a major life activity in the life of a child—the student may qualify for services under Section 504. To be considered eligible for Section 504, a student must be evaluated to ensure that the disability requires special education or related services or supplementary aids and services. Therefore, a child whose ADHD does not interfere with his or her learning process may not be eligible for

special education and related services under IDEA or supplementary aids and services under Section 504.

IDEA and Section 504 require schools to provide special education or to make modifications or adaptations for students whose ADHD adversely affects their educational performance. Such adaptations may include curriculum adjustments, alternative classroom organization and management, specialized teaching techniques and study skills, use of behavior management, and increased parent/ teacher collaboration. Eligible children with ADHD must be placed in regular education classrooms, to the maximum extent appropriate to their educational needs, with the use of supplementary aids and services if necessary. Of course, the needs of some children with ADHD cannot be met solely within the confines of a regular education classroom, and they may need special education or related aids or services provided in other settings.

Components of a Comprehensive Evaluation
• Behavioral • Educational • Medical

A diagnosis of ADHD is multifaceted and includes behavioral, medical, and educational data gathering. One component of the diagnosis includes an examination of the child's history through comprehensive interviews with parents, teachers, and health care professionals. Interviewing these individuals determines the child's specific behavior characteristics, when the behavior began, duration of symptoms, whether the child displays the behavior in various settings, and coexisting conditions. The American Academy of Pediatrics (AAP) stresses that since a variety of psychological and developmental disorders frequently coexist in children who are being evaluated for ADHD, a thorough examination for any such coexisting condition should be an integral part of any evaluation (AAP, 2000).

Behavioral Evaluation

Specific questionnaires and rating scales are used to review and quantify the behavioral characteristics of ADHD. The AAP has developed clinical practice guidelines for the diagnosis and evaluation of children with ADHD, and finds that such behavioral rating scales accurately distinguish between children with and without ADHD (AAP, 2000). Conversely, AAP recommends **not** using broadband rating scales or teacher global questionnaires in the diagnosis of children with ADHD. They suggest using ADHD-Specific rating scales including:

CPRS-R:L-ADHD Index
(Conners Parent Rating Scale—1997
Revised Version: Long Form, ADHD Index Scale)

CTRS-R:L-ADHD Index
(Conners Teacher Rating Scale—1997
Revised Version: Long Form, ADHD Index Scale)

CPRS-R:L-DSM-IV Symptoms
(Conners Parent Rating Scale—1997
Revised Version: Long Form, DSM-IV Symptoms Scale)

CTRS-R:L-DSM-IV Symptoms
(Conners Teacher Rating Scale—1997
Revised Version: Long Form, DSM-IV Symptoms Scale)

SSQ-O-1
(Barkley's School Situations Questionnaire—Original Version, Number of Problem Settings Scale)

SSQ-O-II
(Barkley's School Situations Questionnaire—Original Version, Mean Severity Scale) (Taken from Green, Wong, Atkins, et al. (1999). *Diagnosis of Attention Deficit/Hyperactivity Disorder.* Technical Review 3. Rockville, MD: U.S. Department of Health and Human Services, Agency for Health Care Policy and Research, as cited in AAP, 2000).

As with all psychological tests, child-rating scales have a range of measurement error. Appropriate scales have satisfactory norms for the child's chronological age and ability levels.

Collecting information about the child's ADHD symptoms from several different sources helps ensure that the information is accurate. Appropriate sources of information include the child's parents, teachers, other diagnosticians such as psychologists, occupational therapists, speech therapists, social workers, and physicians. It is also important to review both the child's previous medical history as well as his or her school records.

Educational Evaluation

An educational evaluation assesses the extent to which a child's symptoms of ADHD impair his or her academic performance at school. The evaluation involves direct observations of the child in the classroom as well as a review of his or her academic productivity.

Behaviors targeted for classroom observation may include:

- Problems of inattention, such as becoming easily distracted, making careless mistakes, or failing to finish assignments on time;
- Problems of hyperactivity, such as fidgeting, getting out of an assigned seat, running around the classroom excessively or striking out at a peer;
- Problems of impulsivity, such as blurting out answers to the teacher's questions or interrupting the teacher or other students in the class; and
- More challenging behaviors, such as severe aggressive or disruptive behavior.

Classroom observations are used to record how often the child exhibits various ADHD symptoms in the classroom. The frequency with which the child with ADHD exhibits these and other target behaviors are compared to norms for other children of the same age and gender. It is also important to compare the behavior of the child with ADHD to the behaviors of other children in his or her classroom.

It is best to collect this information during two or three different observations across several days. Each observation typically lasts about 20 to 30 minutes.

In order to receive special education and related services under Part B of IDEA, a child must be evaluated to determine (1) whether he or she has a disability and (2) whether he or she, because of the disability, needs special education and related services. The initial evaluation must be a full and individual evaluation that assesses the child in all areas related to the suspected disability and uses a variety of assessment tools and strategies. As discussed in the section on Legal Requirements (above), a child who has ADHD may be eligible for special education and related services because he or she also meets the criteria for at least one of the disability categories, such as specific learning disability or emotional disturbance. It is important to note that the assessment instruments and procedures used by educational personnel to evaluate other disabilities—such as learning disabilities—may not be appropriate for the evaluation of ADHD. A variety of assessment tools and strategies must be used to gather relevant functional and developmental information about the child.

An educational evaluation also includes an assessment of the child's productivity in completing classwork and other academic assignments. It is important to collect information about both the percentage of work completed as well as the accuracy of the work. The productivity of the child with ADHD can be compared to the productivity of other children in the class.

Once the observations and testing are complete, a group of qualified professionals and the parents of the child will review the results and determine if the child has a disability and whether the child needs special education and related services. Using this information, the child's IEP team, which includes the child's parents, will develop an individualized educational program that directly addresses the child's learning and behavior. If the child is recommended for evaluation and determined by the child's IEP team not to meet the eligibility requirements under IDEA, the child may be appropriate for evaluation under Section 504.

Medical Evaluation

A medical evaluation assesses whether the child is manifesting symptoms of ADHD, based on the following three objectives:

- To assess problems of inattention, impulsivity, and hyperactivity that the child is currently experiencing;
- To assess the severity of these problems; and
- To gather information about other disabilities that may be contributing to the child's ADHD symptoms.

Part B of IDEA does not necessarily require a school district to conduct a medical evaluation for the purpose of determining whether a child has ADHD. If a public agency believes that a medical evaluation by a licensed physician is needed as part of the evaluation to determine whether a child suspected of having ADHD meets the eligibility criteria of the OHI category, or any other disability category under Part B, the school district must ensure that this evaluation is conducted at no cost to the parents (OSEP Letter to Michel Williams, March 14, 1994, 21 IDELR 73).

In May 2000, the American Academy of Pediatrics (AAP) published a clinical practice guideline that provides recommendations for the assessment and diagnosis of school-aged children with ADHD. The guideline, developed by a committee comprised of pediatricians and experts in the fields of neurology, psychology, child psychiatry, child development, and education, as well as

experts in epidemiology and pediatrics, is intended for use by primary care clinicians who are involved in the identification and evaluation process. The recommendations are designed to provide a framework for diagnostic decisionmaking and include the following:

- Medical evaluation for ADHD should be initiated by the primary care clinician. Questioning parents regarding school and behavioral issues, either directly or through a pre-visit questionnaire, may help alert physicians to possible ADHD.
- In diagnosing ADHD, physicians should use DSM-IV criteria.
- The assessment of ADHD should include information obtained directly from parents or caregivers, as well as a classroom teacher or other school professional, regarding the core symptoms of ADHD in various settings, the age of onset, duration of symptoms, and degree of functional impairment.
- Evaluation of a child with ADHD should also include assessment of co-existing conditions such as learning and language problems, aggression, disruptive behavior, depression, or anxiety.

What Are the Treatment Options?

Although at present no cure for ADHD exists, there are a number of treatment options that have proven to be effective for some children. Effective strategies include behavioral, pharmacological, and multimodal methods.

Behavioral Approaches

Behavioral approaches represent a broad set of specific interventions that have the common goal of modifying the physical and social environment to alter or change behavior (AAP, 2001). They are used in the treatment of ADHD to provide structure for the child and to reinforce appropriate behavior. Those who typically implement behavioral approaches include parents as well as a wide range of professionals, such as psychologists, school personnel, community mental health therapists, and primary care physicians. Types of behavioral approaches include behavioral training for parents and teachers (in which the parent and/or teacher is taught child management skills), a systematic program of contingency management (e.g. positive reinforcement, "time outs," response cost, and token economy), clinical behavioral therapy (training in problem-solving and social skills), and cognitive-behavioral treatment (e.g., self-monitoring, verbal self-instruction, development of problem-solving strategies, self-reinforcement) (AAP, 2001; Barkley, 1998b; Pelham, Wheeler, & Chronis, 1998). In general, these approaches are designed to use direct teaching and reinforcement strategies for positive behaviors and direct consequences for inappropriate behavior. Of these options, systematic programs of intensive contingency management conducted in specialized classrooms and summer camps with the setting controlled by highly trained individuals have been found to be highly effective (Abramowitz, et al., 1992; Carlson, et al., 1992; Pelham & Hoza, 1996). A later study conducted by Pelham, Wheeler, and Chronis (1998) indicates that two approaches—parent training in behavior therapy and classroom behavior interventions—also are successful in changing the behavior of children with ADHD. In addition, home-school interactions that support a consistent approach are important to the success of behavioral approaches.

The use of behavioral strategies holds promise but also presents some limitations. Behavioral strategies may be appealing to parents and professionals for the following reasons:

- Behavioral strategies are used most commonly when parents do not want to give their child medication;

- Behavioral strategies also can be used in conjunction with medicine (see multimodal methods);
- Behavioral techniques can be applied in a variety of settings including school, home, and the community; and
- Behavioral strategies may be the only options if the child has an adverse reaction to medication.

The research results on the effectiveness of behavioral techniques are mixed. While studies that compare the behavior of children during periods on and off behavior therapy demonstrate the effectiveness of behavior therapy (Pelham & Fabiano, 2001), it is difficult to isolate its effectiveness. The multiplicity of interventions and outcome measures makes careful analysis of the effects of behavior therapy alone, or in association with medications, very difficult (AAP, 2001). A review conducted by McInerney, Reeve, and Kane (1995) confirms that the effective education of children with ADHD requires modifications to academic instruction, behavior management, and classroom environment. Although some research suggests that behavioral methods offer the opportunity for children to work on their strengths and learn self-management, other research indicates that behavioral interventions are effective but to a lower degree than treatment with psychostimulants (Jadad, Boyle, & Cunningham, 1999; Pelham, et al., 1998).

Behavior therapy has been found to be effective only when it is implemented and maintained (AAP, 2001). Indeed, behavioral strategies can be difficult to implement consistently across all of the settings necessary for it to be maximally effective. Although behavioral management programs have been shown to enhance the academic performance and behavior of children with ADHD, followup and maintenance of the treatment is often lacking (Rapport, Stoner, & Jones, 1986).

In fact, some research has shown that behavioral techniques may fail to reduce ADHD's core characteristics of hyperactivity, impulsivity, and inattention (AAP, 2001; U.S. Department of Health and Human Services [DHHS], 1999). Conversely, one must consider that the problems of children with ADHD are seldom limited to the core symptoms themselves (Barkley, 1990a). Children frequently demonstrate other types of psychosocial difficulties, such as aggression, oppositional defiant behavior, academic underachievement, and depression (Barkley, 1990a). Because many of these other difficulties cannot be managed through psychostimulants, behavioral interventions may be useful in addressing ADHD and other problems a child may be exhibiting.

Pharmacological Approaches

Pharmacological treatment remains one of the most common, yet most controversial, forms of ADHD treatment. It is important to note that the decision to prescribe any medicine is the responsibility of medical—not educational—professionals, after consultation with the family and agreement on the most appropriate treatment plan. Pharmacological treatment includes the use of psychostimulants, antidepressants, anti-anxiety medications, antipsychotics, and mood stabilizers (NIMH, 2000). Stimulants predominate in clinical use and have been found to be effective with 75 to 90 percent of children with ADHD (DHHS, 1999). Stimulants include Methylphenidate (Ritalin), Dextroamphetamine (Dexedrine), and Pemoline (Cylert). Other types of medication (antidepressants, anti-anxiety medications, antipsychotics, and mood stabilizers) are used primarily for those who do not respond to stimulants, or those who have coexisting disorders. The results of the Multimodal Treatment Study (MTA), which are discussed in further detail in the next section, confirm research findings on the use of pharmacological treatment for patients

with ADHD. Specifically, the study found that the use of medication was almost as effective as the multimodal treatment of medication and behavioral interventions (Edwards, 2002).

Administering Medication at School

- Develop a plan to ensure that medication is administered in accordance with doctor's recommendation
- Include this plan in the child's IEP
- Maintain child and parent rights to medical confidentiality

Researchers believe that psychostimulants affect the portion of the brain that is responsible for producing neurotransmitters. Neurotransmitters are chemical agents at nerve endings that help electrical impulses travel among nerve cells. Neurotransmitters are responsible for helping people attend to important aspects of their environment. The appropriate medication stimulates these underfunctioning chemicals to produce extra neurotransmitters, thus increasing the child's capacity to pay attention, control impulses, and reduce hyperactivity. Medication necessary to achieve this typically requires multiple doses throughout the day, as an individual dose of the medication lasts for a short time (1 to 4 hours). However, slow- or timed-release forms of the medication (for example, Concerta) may allow a child with ADHD to continue to benefit from medication over a longer period of time. Doctors, teachers, and parents should communicate openly about the child's behavior and disposition in order to get the dosage and schedule to a point where the child can perform optimally in both academic and social settings, while keeping side effects to a minimum. If it is determined that the child should receive medication during the school day, it is important to develop a plan to ensure that medication is administered in accordance with the plan. Such a plan would be an appropriate component of the child's IEP. In addition, schools must ensure that the child's and parent's rights to medical confidentiality are maintained.

Although the positive effects of the stimulant medication are immediate, all medications have side effects. Adjusting the dosage of the medicine can diminish some of these side effects. Some of the more common side effects include insomnia, nervousness, headaches, and weight loss. In fewer cases, subjects have reported slowed growth, tic disorders, and problems with thinking or with social interaction (Gadow, Sverd, Sprafkin, Nolan, & Ezor, 1995). Medication also can be expensive, depending upon the medicine prescribed, the frequency of administration, and the subsequent frequency of refills. Stimulant medicines do not "normalize" the entire range of behavior problems, and children under treatment may still manifest higher levels of behavioral problems than their peers (DHHS, 1999). Nonetheless, the American Academy of Pediatrics (AAP) finds that at least 80 percent of children will respond to one of the stimulants if they are administered in a systematic way. Under medical care, children who fail to show positive effects or who experience intolerable side effects on one type of medication may find another medication helpful. The AAP reports that children who do not respond to one medication may have a positive response to an alternative medication, and concludes that stimulants may be a safe and effective way to treat ADHD in children (AAP, 2001).

In January 2003, a new type of nonstimulant medication for the treatment of children and adults with ADHD was approved by the FDA. Atomoxetine, also known as Straterra, may be prescribed by physicians in some cases.

Multimodal Approaches

Research indicates that for many children the best way to mitigate symptoms of ADHD is the use of a combined approach. A recent study by the NIMH—the Multimodal Treatment Study of Children with ADHD (MTA)—is the longest and most thorough study of the effects of ADHD interventions (MTA Cooperative Group, 1999a, 1999b). The study followed 579 children between the ages of 7 and 10 at six sites nationwide and in Canada. The researchers compared the effects of four interventions: medication provided by the researchers, behavioral intervention, a combination of medication and behavioral intervention, and no-intervention community care (i.e., typical medical care provided in the community).

Multimodal intervention improves . . .

- Academic performance
- Parent-child interaction
- School-related behavior

and reduces . . .

- Child anxiety
- Oppositional behavior

Of the four interventions investigated, the researchers found that the combined medication/behavior treatment and the medication treatment work significantly better than behavioral therapy alone or community care alone at reducing the symptoms of ADHD. Multimodal treatments were especially effective in improving social skills for students coming from high-stress environments and children with ADHD in combination with symptoms of anxiety or depression. The study revealed that a lower medication dosage is effective in multimodal treatments, whereas higher doses were needed to achieve similar results in the medication-only treatment.

Researchers found improvement in the following areas after using a multimodal intervention: child anxiety, academic performance, oppositional behavior, and parent-child interaction. Positive results also were found in school-related behavior when multimodal treatment is coupled with improved parenting skills, including more effective disciplinary responses, and appropriate reinforcements (Hinshaw, et al., 2000). These findings were replicated across all six research sites, despite substantial differences among sites in their samples' sociodemographic characteristics. The study's overall results appear to apply to a wide range of children and families identified as in need of treatment services for ADHD (NIMH, 2000). Other studies demonstrate that multimodal treatments hold value for those children for whom treatment with medication alone is not sufficient (Klein, Abikoff, Klass, Ganeles, Seese, & Pollack, 1997).

In October 2001, the AAP released evidence-based recommendations for the treatment of children diagnosed with ADHD. Their guidelines state that:

- Primary care clinicians should establish a treatment program that recognizes ADHD as a chronic condition;
- The treating clinician, parents, and the child, in collaboration with school personnel, should specify appropriate target outcomes to guide management;
- The clinician should recommend stimulant mediation and/or behavioral therapy as appropriate to improve target outcomes in children with ADHD;

- 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; and
- The clinician should periodically provide a systematic followup for the child with ADHD. Monitoring should be directed to target outcomes and adverse effects, with information gathered from parents, teachers, and the child.

The AAP report stressed that the treatment of ADHD (whether behavioral, pharmacological, or multimodal) requires the development of child-specific treatment plans that describe not only the methods and goals of treatment, but also include means of monitoring over time and specific plans for followup. The process of developing target outcomes requires careful input from parents, children, and teachers as well as other school personnel where available and appropriate. The AAP concluded that parents, children, and educators should agree on at least three to six key targets and desired changes as requisites for constructing the treatment plan. The goals should be realistic, attainable, and measurable. The AAP report found that, for most children, stimulant medication is highly effective in the management of the core symptoms of ADHD. For many children, behavioral interventions are valuable as primary treatment or as an adjunct in the management of ADHD, based on the nature of coexisting conditions, specific target outcomes, and family circumstances (AAP, 2001).

HOW DOES ADHD AFFECT SCHOOL PERFORMANCE?

The school experience can be challenging for students with ADHD. Students usually are identified only after consistently demonstrating a failure to understand or follow rules or to complete required tasks. Other common reasons for referral include frequent classroom disruptions and poor academic performance.

Studies found that students with ADHD, compared to students without ADHD, had persistent academic difficulties that resulted in the following: lower average marks, more failed grades, more expulsions, increased dropout rates, and a lower rate of college undergraduate completion (Weiss & Hechtman as cited in Johnston, 2002; Ingersoll, 1988). The disruptive behavior sometimes associated with the disorder may make students with ADHD more susceptible to suspensions and expulsions. A study by Barkley and colleagues (1990b) found that 46 percent of their student study group with ADHD had been suspended and 11 percent had been expelled.

ADHD's core symptoms—inattention, hyperactivity, and impulsivity—make meeting the daily rigors of school challenging (Zentall, 1993). Difficulty sustaining attention to a task may contribute to missing important details in assignments, daydreaming during lectures and other activities, and difficulty organizing assignments. Hyperactivity may be expressed in either verbal or physical disruptions in class. Impulsivity may lead to careless errors, responding to questions without fully formulating the best answers, and only attending to activities that are entertaining or novel. Overall, students with ADHD may experience more problems with school performance than their nondisabled peers.

Helpful Hints

This section highlights a few evidence-based hints for addressing the specific learning needs of children with ADHD. More detailed information about the effective strategies can be found in a

companion guide, *Teaching Children with Attention Deficit Hyperactivity Disorder: Instructional Strategies and Practices.* Information regarding the complete set of materials is available on page 21.

Numerous studies have found that positive results occur when the major stakeholders in a student's education collaborate to address a child's ADHD (Blazer, 1999; Bos, 1999; Bos, Nahmias, & Urban, 1999; Nahmias, 1995; Williams & Carteledge, 1997). Effective collaboration and communication between home and school provide structure across the two major settings in the child's life. Common rewards, reinforcement strategies, and language help to promote consistency across settings.

Bos et al. (1999) reported that collaborative partnerships between home and school were especially important during the initial assessment of the child's disability and educational needs, the development of behavior modification plans, the evaluations of medication, and the coordination of assignments. Parents and teachers can share information with one another if they work together to plan behavioral and academic strategies for the student. Parents can offer information about the child—including the child's medical history, hobbies and interests, effective reinforcers, and behavior in other settings—that may inform the decisions made by the teacher and other members of the IEP team. The teacher can keep parents informed about their child's progress, performance, and behavior in school. If the child is taking medication, the teacher can offer feedback to parents regarding how the medication affects the student's performance and the duration of the medicine's effectiveness. This information also can be used to help medical professionals make more informed decisions about the child with ADHD.

If a child exhibits patterns of disruptive or aggressive behavior, best practice research indicates that the child may benefit from a positive behavioral intervention plan that clearly delineates expectations and includes positive supports. The process to develop an effective plan should be collaborative and involve the parents and those other individuals who are most familiar with the child.

Students also can take some of the responsibility for their educational and behavioral adaptations. Blazer (1999) reported that students as young as 5 years old can communicate ways to make their school experience more pleasurable and learning easier. Student input also helps to promote a sense of ownership and responsibility for the new strategies and adaptations.

The following are some suggestions for practices that may be helpful for parents and teachers working with a child with ADHD.

Tips for Home

Caring for children with ADHD may be challenging, but it is important to remember that these children can learn successfully. It is critical that parents remember that some of their child's disruptive behavior is a manifestation of the disability and that the challenge is finding ways to help their child change the inappropriate behavior. Key to this is remembering to focus on the need for structure and routine for your child's daily schedule and thereby reinforcing the importance of learning self-control and self-regulation. The following are suggestions for parents:

- Focus on discrete rewards and consequences for appropriate and inappropriate behavior:
  - Tangible rewards and treats;
  - Movie night for a good week at school;

    - Removal of privileges; and
    - Time-out from reinforcing activities: the child is essentially removed from situations that foster inappropriate behavior.
- Set a daily routine and stick to it. Bedtime and preparation for school are much easier if there is a structure already in place.
- Have tangible reminders:
    - A big clock in the bedroom;
    - Charts for chores;
    - Assignment pad to record homework and a specific folder to put work in upon completion; and
    - Gain the child's attention before speaking to him or her. Have the child repeat back directions for things that are really important.
- Avoid the following:
    - Repeating patterns of inappropriate behavior followed by ineffective punishment;
    - Administering consequences without prior warning or without the child understanding why he or she is receiving them; and
    - Responding inconsistently to inappropriate behaviors.

Tips for School

A student with ADHD can present unique challenges in the classroom. Inattention, hyperactivity, or impulsivity can be the source of frustration, but there are ways teachers can help students with ADHD to improve the educational experience and control the symptoms of the disorder. It is important for teachers to be aware of coexisting conditions such as learning disabilities, as well as reinforcing the importance of classroom and instructional structure.

The following are tips for teachers:

- Work on the most difficult concepts early in the day;
- Give directions to one assignment at a time instead of directions to multiple tasks all at once;
- Vary the pace and type of activity to maximize the student's attention; and
- Structure the student's environment to accommodate his or her special needs. For example, the student can be seated away from potentially distracting areas (such as doors, windows, and computers) or seated near another student who is working on a shared assignment.

This guide is the first in a series of three publications that address issues related to the instruction of children with ADHD. The two additional guides are *A Resource Directory for ADHD* and *Teaching Children with Attention Deficit Hyperactivity Disorder: Instructional Strategies and Practices.* Teachers and others are encouraged to consult these publications and to use them in conjunction with *Identifying and Treating Attention Deficit Hyperactivity Disorder: A Resource for School and Home.* As the documents become available, they will be listed on the Office of Special Education and Rehabilitative Services/Office of Special Education Programs Web site (www.ed.gov/offices/OSERS/OSEP).

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