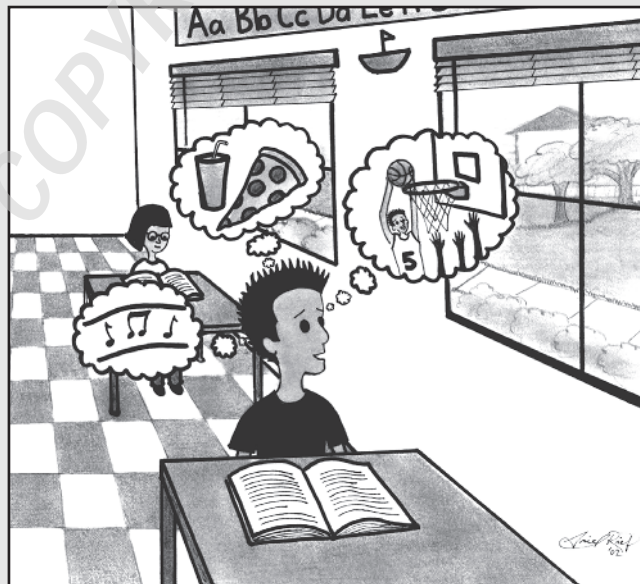


Understanding, Diagnosing, and Treating ADHD



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Please note that a lot of the content of these lists has been adapted and updated from my other books, published by Jossey-Bass/Wiley, which you may be interested in exploring for further information, tools, and strategies:

Rief, S. (2003). *The ADHD book of lists: A practical guide for helping children and teens with attention deficit disorders*. San Francisco: Jossey-Bass.

Rief, S. (2005). *How to reach & teach children with ADD/ADHD: Practical techniques, strategies and interventions* (2nd ed.). San Francisco: Jossey-Bass.

Rief, S. (2008). *The ADD/ADHD checklist: A practical reference for parents and teachers* (2nd ed.). San Francisco: Jossey-Bass.

1.1 ADHD: Definitions and Descriptions

Some of the definitions and descriptions of attention-deficit/hyperactivity disorder (ADHD) have been changed or refined as a result of all that we have learned in recent years from neuroscience, brain imaging, and clinical studies, and likely will continue to do so in the future. Until recently, ADHD was classified as a neurobehavioral disorder, characterized by the three core symptoms of inattention, impulsivity, and sometimes hyperactivity.

It is now recognized that ADHD is a far more complex disorder, involving impairment in a whole range of abilities related to self-regulation and executive functioning (*Lists 1.2, 1.4*). This more recent understanding of ADHD is reflected in some of the following descriptions, as shared by leading ADHD authorities Dr. Russell A. Barkley, Dr. Thomas E. Brown, Dr. Sam Goldstein, and others. Some of the following descriptions are from *Children and Adults with Attention-Deficit/Hyperactivity Disorder (CHADD)*, as well as the National Institute of Mental Health (NIMH), and other expert sources.

What Is ADHD?

- ADHD (attention-deficit/hyperactivity disorder) is the term now used for a condition that has had several names over the past hundred years.
- ADHD is a chronic neurobiological disorder affecting children and adults that causes difficulty with self-control and goal-directed behavior.
- ADHD is one of the most common and most studied neurodevelopmental disorders of childhood. It is usually first diagnosed in childhood or adolescence and often lasts into adulthood.
- ADHD is a neurobiological disorder characterized by chronic and developmentally inappropriate degrees of inattention, impulsivity, and in some cases hyperactivity, and is so pervasive and persistent that it interferes with a person's daily life at home, school, work, or other settings
- ADHD is a disorder of self-regulation and executive functions.
- ADHD is a brain-based disorder involving a wide range of executive dysfunctions that arises out of differences in the central nervous system—both in structural and neurochemical areas.
- ADHD is a neurobiological disorder characterized by a pattern of behavior, present in multiple settings, that can result in performance issues in social, educational, or work environments.
- ADHD represents a condition that leads individuals to fall to the bottom of a normal distribution in their capacity to demonstrate and develop self-control and self-regulatory skills.
- ADHD is a developmental impairment of the brain's self-management system. It involves a wide range of executive functions linked to complex brain operations that are not limited to observable behaviors.
- ADHD is a performance disorder—a problem of being able to produce or act on what one knows.
- ADHD is a neurological inefficiency in the area of the brain that controls impulses and is the center of executive functions.
- ADHD is a dimensional disorder of human behaviors that all people exhibit at times to certain degrees. Those with ADHD display the symptoms to a significant degree that is maladaptive and developmentally inappropriate compared to others at that age.

- ADHD is a common although highly varied condition. One element for this variation is the frequent co-occurrence of other conditions.
- ADHD is a medical condition caused predominantly by genetic factors that result in certain neurological differences. It comes in various forms.

Lists throughout this book, particularly *Lists 1.2, 1.4, and 1.7*, will clarify what these definitions mean and explain our understanding at this time about ADHD, executive functions, and the neurodevelopmental brain differences previously referred to.

Descriptions of ADHD: Explaining It to Children

As noted, ADHD is a disorder of executive functions. Of the executive functions (*List 1.2*), the primary one is inhibition—a person’s “behavioral brakes.” Poor inhibition is seen in the inability to resist or ignore distractions (inattention), to delay gratification, be able to stop long enough to think about possible consequences before acting or reacting (impulsivity), and slow down or stop physical activity (hyperactivity).

One way to explain ADHD to children is through the analogy of a race car with poor brakes.

- Dr. Edward (Ned) Hallowell (n.d.) tells children with ADHD: “You have an amazing brain with a Ferrari engine. It’s very powerful. You are a champion in the making. But there’s one problem . . . you have bicycle brakes.” He then explains that he is a brake specialist and together they are going to strengthen those brakes so in time the child will be able to slow down or stop when he or she needs to and win races instead of spinning out at the curve.
- Dr. Patricia Quinn and Judith Stern (2009) tell children to imagine a sleek sports car speeding around the curves of a track. But, the race car has no brakes. It can’t slow down or stop when it wants to and may get off the track or even crash. They explain that with ADHD, they may be like that racing car—with a good engine (lots of thinking power), a strong body, but brakes that don’t work very well. The poor brakes cause problems being able to keep still, stay focused, or stop themselves from doing something, even when they know they should.

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1.2 ADHD and the “Executive Functions”

Based on extensive research, ADHD is now recognized as a disorder in the development of executive functions—a person’s self-management and self-regulatory abilities. The current belief is that impairment of executive functions is the underlying problem causing the symptoms associated with ADHD. People with ADHD experience a wide range of executive dysfunction issues that can vary from person to person. What are the executive functions, and how is executive function (EF) impairment related to ADHD?

Definitions of Executive Function (EF)

EFs have been described in many ways:

- The management functions (overseers) of the brain or the management system of the brain
- Cognitive control skills
- The self-directed actions individuals use to help maintain control of themselves and accomplish goals
- The range of central control processes in the brain that activate, organize, focus, integrate, and manage other brain functions and cognitive skills
- The higher-order cognitive processes involved in the self-regulation of behavior
- A term used to describe the complex nature of cognitive processes involved in identifying, setting, maintaining through, and meeting goals despite distractions and problems along the way
- Cognitive processes or brain functions that enable a person to engage in problem-solving and goal-directed behaviors
- The brain’s control center that orchestrates resources in memory, language, and attention to achieve a goal
- Broad set of cognitive skills used to organize, self-monitor, control, and direct our behavior toward purposeful goals
- The neuropsychological processes needed to sustain problem-solving toward a goal

EF Analogies and Metaphors

- *Conductor of a symphony orchestra.* Thomas E. Brown and others use this popular analogy of EFs having a role like that of the conductor of a symphony orchestra—responsible for integrating and managing all of the different components for a successful performance. If the conductor fails to do his or her job well, even with very skilled musicians, the performance will be poor.
- *Chief executive officer (CEO).* Many experts explain the role of executive functions as being similar to that of a successful corporate CEO: analyzing a task, planning, prioritizing, being flexible, making mid-course corrections as needed, being able to assess risk, able to delay immediate gratification to achieve long-term goals, keeping an eye on the big picture, making informed decisions, and completing tasks in a timely way (Silver, 2010; Willis, 2011).
- *Iceberg.* Chris Zeigler Dendy (2002, 2011), Dr. Martin Kutscher (2010), and others share the analogy when describing ADHD as an iceberg with the visible core symptoms (inattention, impulsivity, hyperactivity) just the tip. Looming under the surface

are often the most challenging aspects of ADHD: the executive function impairment and co-occurring conditions.

- *Air traffic control center.* Just like air traffic control coordinates all of the different planes coming and going, the executive functions involve managing a lot of information, resisting distractions, inhibitory control, mental flexibility, and so forth. (Center on the Developing Child, Harvard University, n.d.).

EF Components

It has not as yet been determined exactly what constitutes all of the executive functions. However, most experts agree they involve the following:

- *Inhibition* (impulse control, ability to stop, put on the brakes, and think before making a response, being able to resist temptations and distractions); this is considered by many to be the main executive function because inhibitory control is necessary for all of the other EFs to adequately develop
- *Working memory* (holding information in mind long enough to act on it, to complete a task or do something else simultaneously, a mental desk top for holding information active while working with other information)
- *Planning and prioritizing* (thinking through what needs to be done, structuring an efficient approach to accomplish those tasks, and making good decisions about what to focus on)
- *Organization* (imposing order and structure to manage information, efficiently communicate one's thoughts, carry out goal-directed behavior)
- *Arousal and activation* (being able to arouse effort and motivation to start or initiate tasks and activities, particularly those that are not intrinsically motivating)
- *Sustaining attention* (maintaining alertness and focus, resisting distractions, especially when the task is tedious or not of interest)
- *Emotional self-control* (modulating or self-regulating one's frustrations and emotions)
- *Time awareness* (being aware of how much time has passed, how long things take, keeping track of time and planning and acting accordingly)
- *Goal-directed persistence* (perseverance, maintaining the effort and motivation to follow through with actions needed to achieve goals)
- *Shifting and flexibility* (adaptability and making adjustments when needed, mentally shifting information around, making transitions, ending one task to move to the next)
- *Self-monitoring and metacognition* (being aware of and self-checking one's own behavior, thought processes, strategies, and comprehension; evaluating one's own performance, strategy monitoring, and revising)
- *Self-talk and private speech* (using your inner voice, mentally talking to yourself to control and guide your behavior, work through a problem)

EF Dysfunction in ADHD

- Research has found that children and teens with ADHD lag in their development of EF skills by approximately 30 percent compared to other children their age. So, expect that a ten-year-old with ADHD will have the EF maturity of a seven-year-old, and a fifteen-year-old to have the EF skills of a ten- or eleven-year-old. It is very

important for teachers and parents to be aware of this developmental delay in executive skills and adjust their expectations for self-regulation and self-management accordingly.

- EF weaknesses can be expected to cause some academic and work-related challenges to varying degrees (mild to severe), irrespective of one's intelligence.
- The frontal lobes (particularly the prefrontal cortex and extended neural networks) are the primary center of executive functions. This region of the brain has been found to be underactive, smaller, and less mature in people with ADHD than in those without ADHD (*Lists 1.4, 1.7*).
- For all people, the prefrontal cortex (PFC) matures and develops gradually from childhood into adulthood (the late twenties), with most rapid development occurring during school years. The PFC is the last part of the brain to fully mature, and for those with ADHD, it is delayed in development by a few years.
- It is not just the prefrontal cortex that is involved in executive functions. The brain's executive system is complex as other regions of the brain and neural networks interact with the PFC. (*Lists 1.4, 1.7*).
- Kutscher (2010) explains that the ability to modulate our behavior comes largely from our frontal and prefrontal lobes. In ADHD, the frontal lobe brakes and other executive functions are "asleep on the job".

Models Explaining Executive Function Impairment in ADHD

Russell Barkley and Thomas Brown, two world-renowned researchers and authorities on ADHD, have been key leaders in the field and their work and teachings have fundamentally changed our understanding of ADHD to being that of a disorder of executive functioning—our self-management system. Both Barkley and Brown have developed their own conceptual models of ADHD as a disorder of executive functions, which are best understood by going directly to their books, websites, and other resources, some of which are provided in the "Sources and Resources" section of this list.

Barkley's Model of EF and ADHD

According to Barkley, each of the executive functions is actually a type of self-regulation—a special form of self-directed action that people do to themselves (usually mentally and not visible to others). These self-directed actions are what people do in order to modify their own behavior so that they are more likely to attain a goal or change some future consequence to improve their welfare.

Barkley says that there are five or six things people do to themselves for self-regulation:

- Self-direct their attention (self-awareness)
- Visualize their past to themselves
- Talk to themselves in their minds
- Inhibit and modify their emotional reactions to events
- Restrain themselves (self-discipline)
- Play with information in their mind (take it apart, manipulate it in various ways, and recombine it to form new arrangements)

See Barkley (2005, 2011a, 2011b, 2012, 2013) in the “Sources and Resources” section of this list and his website at www.russellbarkley.org/.

Brown’s Model of EF and ADHD

Brown’s conceptual model is that of six clusters of executive functions that are impaired in ADHD. These symptoms of impairment often appear and work together in various combinations in people with ADHD.

- *Activation.* Organizing, prioritizing, and activating work
- *Focus.* Focusing, sustaining, and shifting attention to task
- *Effort.* Regulating alertness, sustaining effort, and processing speed
- *Emotion.* Managing frustration and modulating emotions
- *Memory.* Using working memory and accessing recall
- *Action.* Monitoring and self-regulating action

See Brown (2005, 2008, 2013) in the “Sources and Resources” section of this list and his website at www.drthomasebrown.com.

Both doctors have also developed executive function assessment tools: Barkley Deficits in Executive Functioning Scale—Children and Adolescents (BDEFS-CA) and Brown ADD Rating Scales for Children, Adolescents and Adults. See these, along with the Behavior Rating Inventory for Executive Function (BRIEF) in *List 1.15*.

Other Interesting Information about Executive Functions

- Executive dysfunction is not exclusive to ADHD. EF impairment to some degree is also common in learning disabilities, autism spectrum disorders, obsessive-compulsive disorder, bipolar, and some other developmental or psychiatric disorders, and can also be acquired by damage to the prefrontal cortex, such as by traumatic brain injury or strokes.
- Studies have shown that self-discipline has a bigger effect on academic performance than does intellectual talent (Duckworth & Seligman, 2005; Tangney, Baumeister, & Boone, 2004).
- A growing body of research has demonstrated that children’s EFs (along with their skills in modulating emotion) are central to school readiness in early childhood (Raver & Blair, 2014).
- EFs may be a better predictor of school readiness than one’s IQ or entry level reading or math skills (Diamond, Barnett, Thomas, & Munro, 2007).
- There is growing evidence that because of neuroplasticity, a person’s self-regulation and executive skills can be strengthened with practice.
- Tools of the Mind is one early childhood school program that has been studied by researchers and has shown impressive results. In this program, teachers spend most of each day promoting EF skills with their preschool and kindergarten children (Diamond, Barnett, Thomas, & Munro, 2007). See www.toolsofthemind.org and *Lists 2.15 and 7.4*.

School-Related EF Difficulties

EF weaknesses interfere with most all aspects of school success and result in a number of challenges. Weak executive skills are the reason that students with ADHD often struggle with the following:

- *Controlled attention* (focusing and resisting distractions, maintaining on-task behavior, and shifting attention as needed)
- *Time awareness and time management* (significantly underestimating how much time is needed to perform tasks, missing deadlines and due dates or scrambling last minute to complete homework and projects, tardiness to class, chronic lateness)
- *Organization* (messy papers, notebooks, desks, and lockers; unprepared with needed materials and supplies; losing homework and belongings; lack of organized flow and sequence on essays and other assignments)
- *Planning and follow-through* (failing to think through systematically all of the steps or components of a task, experiencing great difficulty with long-term assignments and projects)
- *Self-control and inhibition* (blurting out in class, curbing inappropriate behavior or speech, not putting on the brakes long enough to think things through or get things done)
- *Memory and forgetfulness* (not following all parts of the directions, not turning in homework even when they have it in their notebook or backpack completed, poor recall of information)
- *Work production* (requiring a high degree of positive feedback, cues, and structural supports and incentives to keep on task and motivated, far more than needed by other students)
- *Handling negative emotions* (having low frustration tolerance, getting stuck on things that are bothering them, overreacting when upset, dealing with anger, and other feelings)
- *Homework, independent classwork, study, and test-taking skills*
- *Making many careless errors* (not checking work, not noticing details such as punctuation marks, math processing signs, and decimal points)
- *Reading comprehension, written expression, mathematical problem solving* (and other complex or lengthy academic tasks that require a heavy working memory load, planning and organization of thoughts and information, and self-monitoring or self-correction throughout the process)
- *Processing speed* (being very slow, taking a lot longer than average time to process information or complete tasks and assignments)

See Lists 1.5, 4.1, 4.4, 5.1, 5.6, and 5.13 for related executive dysfunction symptoms and manifestations.

What Parents and Teachers Should Keep in Mind

- EF weaknesses cause academic challenges to some degree (mild to severe), irrespective of one's intellectual and academic capabilities. Every individual with ADHD will be affected differently in EF areas of strength and weakness.

- Many highly intelligent, gifted children and teens with ADHD (even those who manage to get good grades) struggle in their daily functioning because of their EF impairment (*List 7.10*).
- Most students with ADHD will need supportive strategies and some accommodations to compensate for their deficit in EF, whether they are part of a formal plan (IEP or 504 accommodation plan) or not (*Lists 6.3, 6.4, 6.5*).
- Every aspect of schooling involves a high level of EF. From the beginning of a school day to the end, a student is employing EF in order to get to school on time, respond appropriately to peers and adults, follow directions, initiate work, recall and organize information, find and organize materials, comprehend and complete assignments, and meet deadlines.
- When students have executive dysfunctions, support from teachers and parents and efforts to teach and strengthen EF skills are critical for school success. There are many proactive strategies and interventions that can be helpful—supporting the development of their executive functions as well as compensate for their weaknesses.
- Many students with ADHD manage to do well in elementary school because of the high degree of support provided by teachers and parents (who often take on the role of the younger child's prefrontal cortex). But by middle and high school, the executive demands for organizing, planning, time management, problem solving, and other EF skills can become overwhelming. As students with ADHD move up in the grades, the expectations for self-management and independence are often unrealistic, and many teens who did well in elementary school fall apart at this time.
- Dendy (2011) reminds us that, unfortunately, kids with ADHD and EF deficits are often mistaken for being lazy "because it can seem as if he or she has chosen not to get started on or complete work; and they are often admonished to try harder. In reality, these children and teens may work very hard, but because of attention and executive function deficits, their productivity does not match their greater level of effort" (p.39).

What Parents, Teachers, and Other Supportive Adults Can Do to Help

Numerous strategies, supports, and accommodations for helping students with ADHD compensate for their EF impairments and strengthen skill development are found throughout this book. The following points describe a few general ways to help:

- Environmental structuring to provide a great deal of external structure, such as visual and auditory cues, prompts, reminders, and clear organization of the classroom and home environment (*Lists 2.1, 2.2, 2.3, 2.6, 2.12, 2.13, 2.15, 2.16, 3.2, 3.3, 3.4, 3.7, 4.1, 4.2, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 7.4, 7.5, 7.8, and examples in appendix*).
- Explicit teaching of executive skills to model and provide a high degree of guided and independent practice with clear feedback and reinforcement. Executive skills such as planning, organizing, time management, goal setting, and self-monitoring need to be taught with lots of practice opportunities. The same applies for explicitly teaching of learning strategies and study skills that are typically affected by EF weaknesses, such as note taking, test-taking strategies, and memorization (*Lists 4.1, 4.2, 4.3, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10*).

- Management techniques and strategies that enable procedures, routines, and transitions to become smooth and automatic; clear rules and expectations that are effectively taught, practiced, and reinforced at the point of performance—each environment, task, or activity where and when those rules and expectations are expected to be used (*Lists 2.1, 2.2, 2.4, 2.6, 2.8, 2.10, 2.12, 2.13, 2.15, 2.16, 2.17*)
- Supports and accommodations to compensate for memory weaknesses, such as use of checklists, recorded messages, visual aids, tools of technology (*Lists 3.5, 4.1, 4.2, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10*)
- Academic assistance or intervention in areas affected by working memory or other EF weaknesses (*Lists 4.1, 4.2, 4.3, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 5.3, 5.4, 5.5, 5.7, 5.8, 5.9, 5.11, 5.12, 5.13, 5.14, 7.6*)
- Reenergize the brain by providing frequent breaks in activities (brain breaks) and physical exercise to avoid cognitive fatigue (*Lists 2.12, 2.13, 3.2, 3.3, 3.4, 3.6, 3.7, 4.9, 7.7*)
- Strategies and supports for focusing attention, initiating tasks, and maintaining on-task behavior (*Lists 2.12, 3.2, 3.3, 3.4, 3.5*)
- Supports and strategies for dealing with frustrations, regulating emotions, and for teaching, practicing, and motivating use of self-control (*Lists 2.9, 2.13, 2.15, 2.16*)
- Supports and accommodations as needed for organization, time management, classroom work production, and homework difficulties, particularly for long-term projects and assignments (*Lists 4.5, 4.6, 4.7, 4.8, 4.9, 4.10*)

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1.3 The Official Diagnostic Criteria for ADHD (*DSM-5*)

- The cornerstone of an ADHD diagnosis is meeting the criteria as described in the most current edition at this time of the *Diagnostic and Statistical Manual of Mental Health Disorders*, published by the American Psychiatric Association. The *DSM* is the source for diagnosing ADHD as well as other developmental and mental health disorders. The *DSM* has been updated and revised over the years, with different editions. The fifth edition (*DSM-5*) is the most current at this time, published in 2013 and replacing *DSM-IV* and text-revised *DSM-IV-TR*.
- Although much remains the same in *DSM-5*, there were some significant changes to the diagnostic criteria in the fifth edition, which are explained in "Changes to the *DSM*."
- For a diagnosis of ADHD, a person must show a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development.
- When evaluating for ADHD, the doctor, mental health professional, or other qualified clinician must collect and interpret data from multiple sources, settings, and methods to determine if *DSM-5* criteria are met.

DSM-5 Criteria

- The *DSM-5* (as in previous editions) lists nine specific symptoms under the category of inattention and nine specific symptoms under the hyperactive-impulsive category.
- To be diagnosed with ADHD, the evaluator must determine that the person often presents with a significant number of symptoms in either the *inattentive* category or the *hyperactive-impulsive* category or in *both* categories.
- Children through age sixteen must often display six out of nine symptoms (in either one or in both of the categories). For individuals seventeen years old and above, only five symptoms out of the nine must be present.

Nine Inattentive Symptoms

- Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or with other activities
- Often has trouble holding attention on tasks or play activities
- Often does not seem to listen when spoken to directly
- Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (for example, loses focus, gets sidetracked). *Note:* This is not because of oppositional behavior or failure to understand instructions.
- Often has trouble organizing tasks and activities
- Often avoids, dislikes, or is reluctant to do tasks that require mental effort over a long period of time (such as schoolwork or homework)
- Often loses things necessary for tasks and activities (for example, school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones)
- Is often easily distracted
- Is often forgetful in daily activities

Nine Hyperactive-Impulsive Symptoms

- Often fidgets with or taps hands or feet or squirms in seat
- Often leaves seat in situations when remaining seated is expected
- Often runs about or climbs in situations when it is not appropriate (adolescents or adults may be limited to feeling restless)
- Often unable to play or take part in leisure activities quietly
- Is often on the go, acting as if driven by a motor
- Often talks excessively
- Often blurts out an answer before a question has been completed
- Often has trouble waiting his or her turn
- Often interrupts or intrudes on others (for example, butts into conversations or games)

Three Presentations of ADHD

Based on the specific symptoms, three types or what are now called *presentations* of ADHD can occur:

- *Predominantly inattentive presentation.* If enough symptoms of inattention but not hyperactivity-impulsivity were present for the past six months
- *Predominantly hyperactive-impulsive presentation.* If enough symptoms of hyperactivity-impulsivity but not inattention were present for the past six months
- *Combined inattentive and hyperactive-impulsive presentation.* If enough symptoms in the category of inattention and in the category of hyperactivity-impulsivity were present for the past six months

Note: Because symptoms can change over time, the presentation may change over time as well. For example, a young child may be diagnosed with predominantly hyperactive-impulsive ADHD and later be reclassified as having the combined presentation of the disorder as inattentive symptoms become more significantly out of norm compared to other children the same age.

Other Criteria That Must Be Met

- Several symptoms need to be present in two or more settings (for example, at both home and school or other settings).
- The symptoms are inappropriate for their developmental level (compared to others their age).
- Symptoms are to the degree that they interfere with or reduce the quality of their functioning (for example, school, social, or work functioning).
- Other disorders (such as anxiety or depression) or conditions do not better account for these symptoms.

Changes in the *DSM* Criteria

- In the previous editions of the *DSM*, the criteria was designed to help clinicians diagnose ADHD in children. As the research has proven that ADHD is not just

a childhood disorder, it became clear that the criteria did not reflect adequately the experiences of adults with the disorder. *DSM-5* adapted the criteria to more effectively diagnose adults, as well as children.

- ADHD is no longer in the "Disruptive Behavior Disorders" section of the *DSM*. It is now found in the "Neurodevelopmental Disorders" section.
- As symptoms tend to be reduced with age, *DSM-5* accounts for this by reducing the number of required symptoms for diagnosis in individuals over seventeen to five out of nine (rather than six out of nine).
- The age of onset changed in the criteria, reflecting our understanding that not all symptoms are evident at a young age. Now symptoms need to occur by age twelve, instead of the previous requirement that symptoms must occur before seven years old. (See *List 1.12* about the common later onset of symptoms in girls.)
- The impairment criteria and wording changed. It used to be a requirement that symptoms must cause *impairment* in at least two settings. This has been changed to "... clear evidence that the symptoms *interfere with, or reduce the quality of, social, academic, or occupational functioning.*"
- Although the nine symptoms in each category stayed the same, *DSM-5* added additional descriptions to the symptoms—including what the symptoms may look like in teens and adults. Examples in *DSM-IV* were only of what symptoms may look like in children.
- Instead of being referred to as the three *types* of ADHD, the wording is now three *presentations* of ADHD.
- Now people with Autism Spectrum Disorder can also be diagnosed with ADHD. It is now recognized that Autism Spectrum Disorder can be a coexisting disorder with ADHD (*List 1.8*).
- There is now a severity level of ADHD (mild, moderate, severe) that is to be specified under the new *DSM-5* criteria.

See *List 1.15* for information about the diagnostic process for ADHD in determining if *DSM-5* criteria is met.

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1.4 What Is Currently Known and Unknown about ADHD

We Know ...

- ADHD has been the focus of a tremendous amount of research, particularly during the past three decades. Literally thousands of studies and scientific articles have been published (nationally and internationally) on ADHD.
- ADHD is very common not just in the United States but throughout the world. On average it affects 5 percent of school-age children around the world and 4 percent of adults. In the United States, prevalence rate of ADHD in school-age children is estimated to range between 5 and 11 percent (*List 1.6*).
- There is no quick fix or cure for ADHD, but it is treatable and manageable.
- ADHD is not a myth. It has been recognized as a very real, valid, and significant disorder by the US Surgeon General, the National Institutes of Health, the US Department of Education, the Centers for Disease Control and Prevention, and all of the major medical and mental health associations.
- Proper diagnosis and treatment can substantially decrease ADHD symptoms and impairment in functioning (*Lists 1.15, 1.19, 1.20, 1.22*).
- ADHD is a neurobiological disorder that is a result of different factors—the most common cause by far being genetic in origin (*1.7*).
- Regardless of the underlying cause, there are on average differences in both the size and function of certain areas of the brain in individuals with ADHD (Wolraich, & DuPaul, 2010).
- ADHD exists across all populations, regardless of race, ethnicity, gender, nationality, culture, and socioeconomic level.
- ADHD symptoms range from mild to severe.
- There are different types or presentations of ADHD with a variety of characteristics. No one has all of the symptoms or displays the disorder in the exact same way (*Lists 1.3, 1.5*).
- Approximately 75 percent of individuals with ADHD have additional coexisting disorders or conditions. People with ADHD commonly have other mental health disorders, for example, oppositional defiant disorder, anxiety disorder, or depression; developmental disorders, such as dyslexia or other learning disabilities; and other conditions, such as sleep disorders (*List 1.8*).
- Many children, teens, and adults with ADHD slip through the cracks without being identified or receiving the intervention and treatment they need. This is particularly true of racial and ethnic minorities and girls.
- ADHD is diagnosed at least two to three times more frequently in boys than girls, although many more girls may actually have ADHD. Because they often have less disruptive symptoms associated with hyperactivity and impulsivity, girls are more likely to be overlooked (*List 1.12*).
- The challenging behaviors that children with ADHD exhibit stem from neurobiological differences. Their behaviors are not willful or deliberate. Children with ADHD are often not even aware of their behaviors and their impact on others (*List 1.7*).

- The prognosis for ADHD can be alarming if it is not treated. Without interventions, those with this disorder are at risk for serious problems in many domains: social, emotional, behavioral, academic, health, safety, employment, and others (*List 1.6*).
- Children with ADHD are more likely than their peers to be suspended or expelled from school, retained a grade or drop out of school, have trouble socially and emotionally, and experience rejection, ridicule, and punishment (*List 1.6*).
- ADHD is typically a lifelong disorder. The majority of children with ADHD (approximately 80 percent) continue to have the disorder into adolescence, and 50 to 65 percent will continue to exhibit symptoms into adulthood. In the past, ADHD was believed to be a childhood disorder. We now know that this is not the case (*Lists 1.6, 1.11, 7.5*).
- Although ADHD is most commonly diagnosed in school-age children, it can be and is diagnosed reliably in younger children and adults (*Lists 1.3, 1.15, 7.4*).
- The prognosis for ADHD when treated is positive and hopeful. Most children who are diagnosed and provided with the help they need are able to manage the disorder. Parents should be optimistic because ADHD does not limit their child's potential. Countless highly successful adults in every profession and walk of life have ADHD.
- ADHD has been recognized by clinical science and documented in the literature since 1902 (having been renamed several times). Some of the previous names for the disorder were *minimal brain dysfunction*, *hyperactive child syndrome*, and *ADD* with or without hyperactivity.
- Children with ADHD can usually be taught effectively in general education classrooms with proper management strategies, supports, and accommodations, and engaging, motivating instruction.
- ADHD is not the result of poor parenting.
- ADHD is not laziness, willful misbehavior, or a character flaw.
- Medication therapy and behavioral therapy are effective treatments for ADHD (*Lists 1.19, 1.20, 1.22*).
- Medications used to treat ADHD are proven to work effectively for reducing the symptoms and impairment in 70 to 95 percent of children diagnosed with ADHD. They are effective in adults as well (*Lists 1.19, 1.20*).
- Behavioral interventions and programs, such as a token economy or a daily report card system between home and school, are beneficial for students with ADHD (*Lists 1.22, 2.8, 2.9*). *Note:* See other lists in section 2, as well, and examples of daily report cards for children and teens in the appendix.
- A number of other conditions, disorders, or factors (for example, learning, medical and health, social, emotional) may cause symptoms that look like but are not ADHD (*List 1.9*).
- A number of factors can intensify the problems of someone with ADHD or lead to significant improvement, such as the structure in the environment, support systems in place, or level of stress.
- ADHD can be managed best by a multimodal treatment and a team approach. We know that it takes a team effort of parents, school personnel, and health and mental health professionals to be most effective in helping children and teens with ADHD. Other supports and interventions such as exercise and ADHD coaching also are helpful in managing ADHD (*Lists 1.23, 2.17, 7.1, 7.3, 7.6, 7.7*).

- No single intervention effectively manages ADHD for most people with the disorder. Various treatments or supports are typically needed, and these change at different times in the person's life. It takes vigilance and ongoing monitoring of the interventions in place for their effectiveness.
- The teaching techniques and strategies that are necessary for the success of children with ADHD are good teaching practices and typically helpful to all students.
- There are many resources available for children, teens, and adults with ADHD as well as those living with and working with individuals with ADHD. (See lists throughout this book.)
- There is need for better diagnosis, education, and treatment of this disorder that affects so many lives.
- We are learning more and more each day through the efforts of the many researchers, practitioners (educators, mental health professionals, physicians), and others committed to improving the lives of individuals with ADHD.

We Do Not Yet Know Enough About ...

Further and future research will hopefully shed light on the following:

- All of the causes. We have learned a lot, particularly since the 1990s about delayed maturation and underactivity in some regions of the brain. There is still much to be learned, for example, the precise areas of the brain affected, the reasons for any alteration or differences in the brain, which genes are affected, and possible environmental causes.
- How to prevent ADHD or minimize the risk factors and negative effects
- Diagnosing and treating the disorder in certain populations (very young children, females, adults, and racial and ethnic minorities), as the majority of research in past decades was studying ADHD in school-age Caucasian boys.
- More conclusive tests for diagnosing ADHD
- More targeted treatment options
- Long-term treatment effects
- The inattentive type of ADHD
- What may prove to be the best, most effective treatments and strategies for helping individuals with ADHD

Note: Still in its infancy at this stage, a different, distinct attention disorder that resembles the inattentive presentation of ADHD is being observed by researchers. It is currently called *sluggish cognitive tempo (SGT)*, although Russell Barkley advocates for a change of name to *concentration deficit disorder (CDD)*.

The symptoms of this possible other disorder or different subtype of ADHD include excessive daydreaming, easily confused, stares a lot, slow moving or sluggish, persistent difficulty concentrating, appears spacey, lacks energy, and is drowsy, easily fatigued, slow to complete tasks, withdrawn, and doesn't process information as quickly or accurately as others.

Early research is finding that this group of children does not have the self-regulation difficulties associated with ADHD.

Evidence to date indicates that SCT is a distinct disorder of attention from ADHD, yet one that may overlap with it in about half of all cases (Barkley, 2014).

Much more research needs to be done. SGT or CDD is not something that many professionals in the field have even heard about at this time. Currently, there is not a separate disorder or classification and it is not found in the *DSM-5*. It is currently being studied by scientists, so we undoubtedly will be learning and hearing much more about this in the future.

Reputable, leading scientists, such as Barkley and Dr. Rosemary Tannock, have written about this and are reliable sources of information (Barkley, 2013, 2014; Tannock, 2014).

Sources and Resources

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Wolraich, Mark L., & DuPaul, George J. (2010). *ADHD diagnosis and management: A practical guide for the clinic and the classroom*. Baltimore, MD: Paul H. Brookes.

See CHADD www.chadd.org and National Resource Center on AD/HD <http://help4adhd.org/> for up-to-date information as per the research in the field, as well as some of the other sources that are found in the "Sources and Resources" sections at the end of the other lists throughout section 1.

1.5 Signs and Symptoms of ADHD

In making a diagnosis of ADHD, a qualified clinician does so based on the criteria set forth in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*, published in 2013 by the American Psychiatric Association, which is described in detail in *List 1.3*.

The *DSM-5* lists nine specific symptoms under the *inattention* category and nine specific symptoms under the *hyperactive-impulsive* category. Part of the diagnostic criteria for ADHD is that the child, teen, or adult often displays a significant number of symptoms of *either* the inattentive *or* the hyperactive-impulsive categories *or* in both categories.

Following are behaviors or observable symptoms that are common in children and teens with ADHD. The eighteen symptoms that are found in the *DSM-5* criteria are *italicized*. Additional symptoms associated with ADHD are also included, but they are not italicized.

All people exhibit these behaviors at times. If a child or teen frequently exhibits several of these symptoms and they are affecting his or her functioning and causing him or her problems (e.g., at school or socially), it is a red flag that an evaluation for ADHD is appropriate. The evaluation determines if all of the *DSM-5* criteria have been met in order to receive the diagnosis of ADHD (*Lists 1.3, 1.15*).

Symptoms of Inattention and Associated Problems

- *Easily distracted by extraneous stimuli* (for example, sights, sounds, movement in the environment)
- *Does not seem to listen when spoken to directly*
- Difficulty remembering and following instructions
- *Difficulty sustaining attention in tasks and play activities*
- Difficulty concentrating and is easily pulled off task
- Difficulty sustaining sufficient level of alertness and effort needed to get through nonpreferred tasks (homework, chores) or any that are tedious, lengthy, or perceived as boring
- *Forgetful in daily activities*
- *Does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace* (not because of oppositional behavior or failure to understand instructions)
- Tunes out; may appear spacey
- Daydreams (thoughts are elsewhere)
- Requires a lot of adult prompts and refocusing to complete tasks
- Appears confused
- Easily overwhelmed
- Difficulty initiating or getting started on tasks
- Has many incomplete assignments and unfinished tasks
- *Avoids, dislikes, or is reluctant to engage in tasks requiring sustained mental effort* (such as schoolwork or homework)
- Difficulty working independently; needs a high degree of supervision and redirecting attention to task at hand

- Gets bored easily
- Poor listening and communication: not following directions, pulled off topic in conversations, not focusing on the speaker
- *Fails to pay attention to details and makes many careless mistakes*
- Many errors with academic tasks requiring attention to details and accuracy (such as math computation, spelling, and written mechanics)
- Unaware of mistakes and errors made
- Difficulty staying focused while reading as seen by losing his or her place, missing words and details, spotty comprehension, and needing to reread the material (sometimes a few times)
- Poor study skills, such as test-taking and note-taking skills
- Off topic in writing—losing train of thought
- Many written errors in capitalization and punctuation; difficulty editing own work for such errors
- Numerous computational errors in math because of inattention to operational signs (plus, minus, multiplication, division), decimal points, and so forth
- Slow, minimal written work production and output (taking often two to three times longer or more than classmates to complete homework or class assignments)
- Appears to have slower speed of processing information (for example, responding to teacher questions or keeping up with class discussions)
- Inconsistent performance—one day is able to perform a task, the next day cannot
- *Loses things necessary for tasks or activities (for example, toys, school assignments, pencils, books, or tools)*
- *Difficulty organizing tasks and activities (for example, planning, scheduling, preparing)*
- Fails to record assignments and bring home necessary materials for homework
- Missing verbal and nonverbal cues, which affects social skills
- Lack of or minimal class participation

Predominantly Inattentive ADHD

- As described in *List 1.3*, there are three types or presentations of ADHD. The predominantly inattentive ADHD is what some people prefer to call ADD because those diagnosed with it do not have the hyperactive symptoms. They may show some but not a significant amount of symptoms in the hyperactive-impulsive category.
- These children and teens often slip through the cracks and are not as easily identified or understood. Because they do not exhibit the disruptive behaviors associated with ADHD, it is easy to overlook these students and misinterpret their behaviors and symptoms as “not trying” or “being lazy.” Many girls have the predominantly inattentive presentation of the disorder (*List 1.12*).
- Most people display any of these behaviors at times and in different situations to a certain degree. Those who truly have the disorder have a history of frequently exhibiting many of these behaviors (far above the normal range developmentally when compared to their peers), in multiple settings (such as home, school, social, work), and to the degree that they interfere with or reduce the quality of their functioning (*List 1.3*).

- Be aware that people with ADHD who have significant attention difficulties are often able to be focused and sustain attention for long periods of time when they play video games or are engaged in other high-interest, stimulating, and rapidly changing activities. In fact, many hyper-focus on such activities and have a hard time disengaging from them.

Symptoms of Hyperactivity and Impulsivity and Associated Problems

The nine italicized symptoms are found in the *DSM-5* criteria (*List 1.3*).

- Much difficulty in situations that require waiting patiently
- Difficulty with raising one's hand and waiting to be called on
- *Interrupts or intrudes on others* (for example, butts into conversations or games)
- *Blurts out answers before questions have been completed*
- *Has difficulty waiting for his or her turn in games and activities*
- Cannot keep hands and feet to self
- Knows the rules and consequences but repeatedly makes the same errors or infractions of rules
- Gets in trouble because he or she cannot stop and think before acting (responds first, thinks later)
- Difficulty standing in lines
- Does not think or worry about consequences, so tends to be fearless or gravitate to high-risk behavior
- Accident prone and breaks things
- Difficulty inhibiting what he or she says, making tactless comments; says whatever pops into his or her head and talks back to authority figures
- Begins tasks without waiting for directions (before listening to the full directions or taking the time to read written directions)
- Hurries through tasks, particularly boring ones, and consequently makes numerous careless errors
- Gets easily bored and impatient
- Does not take time to correct or edit work
- Disrupts, bothers others
- *On the go or acts as if driven by a motor*
- Highly energetic, almost nonstop motion
- Engages in physically dangerous activities (for example, jumping from heights, riding bike into the street without looking); hence, a high frequency of injuries
- *Leaves seat in classroom or in other situations in which remaining seated is expected*
- *Fidgets with hands or feet or squirms in seat*
- Cannot sit still in chair (is in and out of chair, rocks and tips chair over, sits on knees, or stands by desk)
- Inability to sit still long enough to perform required tasks
- *Runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)*

- A high degree of unnecessary movement (pacing, tapping feet, leg bouncing, pencil tapping, drumming fingers)
- Seems to need something in hands; finds or reaches for nearby objects to play with or put in mouth
- Is not where he or she is supposed to be (for example, roams around the classroom)
- *Talks excessively*
- *Difficulty playing or engaging in leisure activities quietly*
- Intrudes in other people's space; difficulty staying within own boundaries
- Overall difficulty regulating motor activity
- Cannot wait or delay gratification; wants things immediately
- Constantly drawn to something more interesting or stimulating in the environment
- Hits when upset or grabs things away from others (not inhibiting responses or thinking of consequences)
- Becomes overstimulated and excitable and has difficulty calming oneself or settling down
- Appears to live in the moment, acting without foresight or hindsight
- Easily pulled off task, affecting work performance and class participation
- A greater challenge to motivate and discipline (not responding as well to typical rewards or punishments effective for most students)

Predominantly Hyperactive-Impulsive ADHD

- Individuals with this presentation of ADHD have a significant number of hyperactive-impulsive symptoms. They may have some but not a significant number of inattentive symptoms that are developmentally inappropriate.
- Hyperactive-impulsive ADHD (without the inattention) is most commonly diagnosed in early childhood. Children receiving this diagnosis are often reclassified as having the combined type or presentation of ADHD when they get older, and the inattentive symptoms emerge more and become developmentally significant.
- Although all people will exhibit these behaviors at times to a certain degree, for those with ADHD, the symptoms far exceed that which is normal developmentally (in frequency, level, and intensity) and are evident and problematic in multiple settings.

Note: The combined presentation of ADHD (having a significant number of symptoms in both categories) is most common.

Other Common Difficulties Experienced by Children and Teens with ADHD

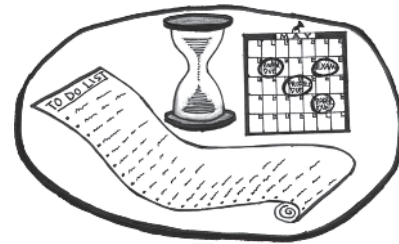
In addition to symptoms related to inattention, hyperactivity, and impulsivity, other challenges related to executive function and self-regulation weaknesses, as well as common coexisting conditions (such as learning disabilities), are often evident in individuals with ADHD.

Social and Emotional

- A high degree of emotionality (for example, temper outbursts, quick to anger, gets upset, irritable, moody)
- Easily upset or frustrated and has a hard time coping with or managing feelings
- Overly reactive—easily provoked to fighting and uses inappropriate means of resolving conflicts
- Difficulty with transitions and changes in routine or activity
- Displays aggressive behavior
- Receives a lot of negative attention and interaction from peers and adults
- Difficulty working in cooperative groups or getting along with peers in work or play situations
- Gets along better with younger children
- Immature social skills
- See *Lists 1.2, 2.15, 2.16, 2.17*.

Organization and Time Management

- Disorganized—frequently misplaces or loses belongings; desks, backpacks, lockers, and rooms extremely messy and chaotic
- Unprepared with materials and books needed for schoolwork and homework
- Poorly organized work, such as writing assignments
- Little or no awareness of time; chronic lateness, often underestimates length of time a task will require to complete or how long it takes to get somewhere
- Procrastinates
- Great difficulty with long-term assignments and projects—scrambling last minute to complete important assignments
- Misses deadlines and due dates
- See *Lists 1.2, 4.4*.



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Other Executive Skills

- Forgetfulness (such as not remembering to turn in homework even when completed)
- Difficulty with tasks requiring a heavy memory load
- Poor planning for assignments and projects
- Difficulty prioritizing
- See *Lists 1.2, 4.1*.

Learning, Language, Academic, Other

- Learning and school performance difficulties; not achieving or performing to level that is expected given his or her apparent ability
- Language and communication problems (for example, not sticking to topic, not fluent verbally)

- Inefficient learning strategies
- Poor handwriting and fine-motor skills
- Problem-solving difficulties
- Variability of performance and output (one day can do the task, the next day cannot)
- If learning disabilities such as dyslexia coexist, then difficulty with basic reading skills (word recognition and fluency, writing, spelling, and other academic difficulties) will be more significant.
- See *Lists 4.3, 5.1, 5.6, 5.13*.

Note: See lists throughout this book describing executive function difficulties, social, emotional, and academic challenges, symptoms in girls, and other lists that provide more information on this topic. Also, coexisting conditions each have their own set of signs and symptoms. *List 1.11* describes more symptoms across the lifespan. Every individual with ADHD has his or her own profile of specific weaknesses or symptoms as well as numerous strengths (*List 1.10*).

See information in *List 1.4* regarding sluggish cognitive tempo (SCT).

Source and Resource

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM)* (5th ed.). Washington, DC: Author.

1.6 ADHD Statistics: Prevalence and Risk Factors

ADHD places those who have this disorder at risk for a host of serious consequences, which raises the urgency for early identification, diagnosis, and proper treatment. Numerous studies have shown the increased risk of negative outcomes associated with those who have ADHD. Compared with peers of the same age, youth with ADHD experience the following:

- More serious accidents, hospitalizations, and significantly higher medical costs
- More school failure and dropout
- More delinquency and altercations with the law
- More engagement in antisocial activities
- More teen pregnancy and sexually transmitted diseases
- Earlier experimentation with and higher use of alcohol, tobacco, and illicit drugs
- More trouble socially and emotionally
- More rejection, ridicule, and punishment
- More underachievement and underperformance at school or work

Prevalence of ADHD

The number of people estimated to have ADHD varies, depending on the source, which can be confusing. Here are some of the reported prevalence rates:

- The American Psychiatric Association states in the *DSM-5* that 5 percent of children have ADHD (American Psychiatric Association, 2013). However, studies in the United States have estimated higher rates in community samples (CDC, n.d.; CHADD, n.d.-a, n.d.-b).
- The prevalence of ADHD in children ranges from 5 to 11 percent, depending on the age group (CDC, n.d.-a; CHADD, n.d.-b).
- Approximately 11 percent of children four to seventeen years of age (6.4 million) have ever been diagnosed with ADHD as of 2011, according to the results surveys that asked parents whether their child received an ADHD diagnosis from a health care provider (CDC, n.d.-a).
- Based on the CDC analysis of data from the National Survey of Children's Health, which has been collected every four years since 2003, the percentage of children diagnosed with ADHD increased from 7.8 percent in 2003 to 9.5 percent in 2007 and to 11.0 percent in 2011 (CDC, n.d.-a).
- The worldwide prevalence of ADHD for children is approximately 5 percent, based on a review of over one hundred studies comprising subjects from all world regions (Polanczyk et al., 2007).
- ADHD is found in about 5.8 percent of all children worldwide, about 7.8 percent of US children. (Barkley, 2013).
- Studies throughout the world have reported the occurrence of ADHD in school-age children as being between 5 and 12 percent. This means that on average there are at least one to three children in every class with ADHD (Centre for ADHD Awareness, Canada, n.d.).

- There is variation geographically across the country (different states and communities) with regard to the number of children diagnosed with ADHD, which can be seen at the CDC website (www.cdc.gov/ncbddd/adhd/data.html).
- The prevalence of ADHD in US adults is 4.4 percent, according to a study by the National Institute of Mental Health (Kessler et al., 2006).

More Statistics

- The CDC survey (CDC, n.d.; Visser et al., 2014) also showed that the percentage of children four to seventeen years of age taking medication for ADHD, as reported by parents, increased by 28 percent between 2007 and 2011. See other interesting results from the data of this large-scale survey at www.cdc.gov/ncbddd/adhd/data.html and www.cdc.gov/ncbddd/adhd/features/key-findings-adhd72013.html.
- The steady increase in prevalence of ADHD and medication use for treating ADHD is unclear, but mostly attributed to greater awareness about the disorder among parents, health care professionals, and teachers, resulting in more evaluations and treatment in recent years; however, other factors likely are involved as well. Dr. Stephen Hinshaw and Dr. Richard Scheffler explore the science-based evidence and various factors for the rise in ADHD diagnosis and medication use in their book *The ADHD Explosion*, listed in the resources below.
- Up to 80 percent of school-age children with ADHD will continue to have the disorder in adolescence and between 50 and 65 percent or more will have it into adulthood (Barkley, 2013).

Statistics Regarding Risks Associated with ADHD

- Having ADHD increases the risk for other disorders as well. At least 75 percent of children and teens with ADHD have at least one other coexisting disorder (CHADD, n.d.-a). Over 50 percent also have a third coexisting disorder (Barkley, 2013).
- The most prevalent co-occurring disorder with ADHD is oppositional defiance disorder (ODD), appearing 41 percent of the time (CHADD, n.d.-a). See *Lists 1.8 and 2.14* for more on ODD.
- Compared to individuals without the disorder, people with ADHD have more than six times a greater risk of developing a substance use disorder (Teplin, 2012).
- Individuals with ADHD are at increased risk for cigarette smoking compared to their peers who do not have ADHD, and those with ADHD start smoking at an earlier age compared to the general population (Kollins, 2012).

According to Russell Barkley (2013), one of the world's leading ADHD experts and researchers, the following statistics are also found:

- Up to 58 percent of youth with ADHD may be retained in a grade in school at least once.
- As many as 35 percent fail to complete high school.
- For half of children with ADHD, social relationships are seriously impaired.
- More than 25 percent of ADHD youth are expelled from high school because of serious misconduct.

- More than 30 percent of youth with ADHD have engaged in theft.
- More than 40 percent of youth with ADHD drift into early tobacco and alcohol use.
- Adolescents and young adults with a diagnosis of ADHD have nearly four to five times as many traffic citations for speeding, two to three times as many auto accidents, and accidents that are two to three times more expensive in damages or likely to cause bodily injuries as young drivers without ADHD.
- As many as 20 to 30 percent of those diagnosed with ADHD may be experimenting with or abusing substances, such as alcohol, nicotine, and marijuana.

Note: Compared to the general population as a whole, people with ADHD are at greater risk than others for negative outcomes (as described). However, provided with supports and effective treatments and intervention, risks for children with ADHD are reduced substantially. Parents should maintain a positive mind-set and be optimistic about their child's future.

See *Lists 1.4, 1.7, and 1.12* for more related topics.

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1.7 Causes of ADHD

ADHD has been researched extensively in the United States and a number of countries throughout the world. Sophisticated brain-imaging technologies and genetic research in recent years, has dramatically increased our knowledge of the probable causes of ADHD.

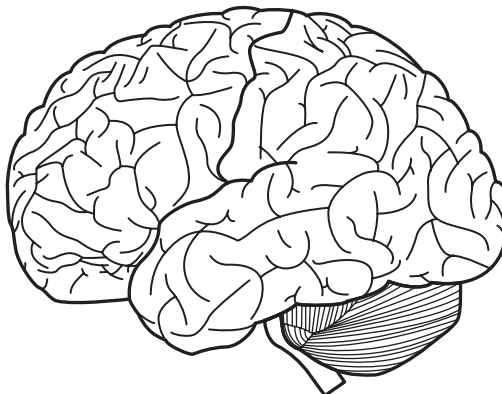
We now know there are multiple causes, although we certainly do not know all of them. Based on hundreds of well-designed and controlled scientific studies, the evidence clearly suggests that ADHD is the result of brain differences: abnormalities in size, maturation, and levels of activity in the regions of the brain involved in executive functions and self-regulation.

Heredity is the main known cause of ADHD, accounting for most cases. In other cases, there are problems and factors that occur prenatally, during birth, or in childhood that might interfere with a child's brain development and be contributing causes of ADHD.

Heredity

- Based on the evidence, heredity is the most common cause of ADHD, accounting for approximately 75 to 80 percent of children with this disorder (Barkley, 1998, 2013a).
- ADHD is known to run in families, as found by numerous studies (twin studies with identical and fraternal twins, adopted children, family studies, molecular genetic studies). For example, in studies of identical twins, if one has ADHD there is as high as a 75 to 90 percent chance that the other twin will have ADHD as well (Barkley, 2013a).
- It is believed that a genetic predisposition to the disorder is inherited. Children with ADHD will frequently have a parent, sibling, grandparent, or other close relative with ADHD—or whose history indicates they had similar problems and symptoms during childhood.
- ADHD is a complex disorder, which is undoubtedly the result of multiple interacting genes in most cases (National Resource Center on AD/HD, 2008).
- Genetic research involving several methods have so far identified at least nine genes that link to ADHD—at least three involving the regulation of dopamine levels (two dopamine receptor genes and a dopamine transporter gene) (Barkley, 2013a).
- Other genes have also been identified that affect brain growth, how nerve cells migrate during development to arrive at their normal sites, and the way in which nerve cells connect to each other (Barkley, 2013a).
- The genetic contribution to ADHD has been thought to reflect differences in certain brain structures, brain chemistry, as well as the interaction of the two (Goldstein, 2007).
- Research suggests that certain genes or alterations in some genes may be inherited and influence the development or maturation of certain areas of the brain or affect the regulation or efficiency of certain brain chemicals. Other researchers suggest that children who carry certain genes may be more vulnerable than other children to various environmental factors associated with ADHD symptoms.

What Are These Brain Differences Associated with ADHD?



Delayed Brain Maturation and Structural Differences

Recent research has shown delayed maturation in specific areas of the brain to play a significant part in ADHD. According to Thomas Brown (2013c):

Those with ADHD have been shown to differ in the rate of maturation of specific areas of the cortex, in the thickness of cortical tissue, in characteristics of the parietal and cerebellar regions, as well as in the basal ganglia, and in the white matter tracts that connect and provide critically important communication between various regions of the brain. Recent research has also shown that those with ADHD tend to have different patterns in functional connectivity, patterns of oscillations that allow different regions of the brain to exchange information.

- Dr. Philip Shaw and other researchers at the National Institutes of Mental Health used brain imaging technology to study the brain maturation of hundreds of children and teens with and without ADHD and reported their findings in 2007. They found that in youth with ADHD, the brain matures in a normal pattern, but there is approximately a three-year delay in some regions compared to other children, particularly in the frontal cortex (American Psychological Association, 2008; Shaw et al., 2007).
- Neuroimaging studies have found that on average, children with ADHD have about a 5 percent reduction in total volume and a 10 to 12 percent reduction in the size of four or five key brain regions involved in higher-order control of behavior (Nigg, 2006).
- Russell Barkley (2013a) reports that a team of international scientists published a review of research studies measuring the gray matter volume of the brain, which showed that those with ADHD have significantly smaller brain sizes, particularly in the caudate region (part of the basal ganglia). They also found, interestingly, that these differences in brain volume improved with age and with the length of time children take stimulant medication (implying that medication may actually facilitate maturation in brain size).

Diminished Activity and Lower Metabolism in Certain Brain Regions

- Numerous studies measuring electrical activity, blood flow, and brain activity have found differences between those with ADHD and those without ADHD:
 - Decreased activity level in certain regions of the brain (mainly the frontal region and basal ganglia). These underactivated regions are responsible for controlling activity level, impulsivity, attention, and executive functions.
 - Lower metabolism of glucose (the brain's energy source) in the frontal region
 - Decreased blood flow to certain brain regions associated with ADHD
 - Less electrical activity in these key areas of the brain
- These differences have been identified using brain activity and imaging tests and scans: functional magnetic resonance imaging (fMRIs), single photon emission computed tomography (SPECT), positron emission tomography (PET), and electroencephalograms (EEGs).
- Although imaging and other brain tests are used in researching ADHD, they are not used in the diagnosis of ADHD (*List 1.15*).

Brain Chemical (Neurotransmitter) Inefficiency

- There is significant evidence that those with ADHD have a deficiency or inefficiency in brain chemicals (neurotransmitters) operating in certain brain regions associated with ADHD. The two main neurotransmitters involved in ADHD are dopamine and norepinephrine. Other brain chemicals also play a part in the disorder and are being studied.
- Dopamine is involved in regulating, among other things, attention, inhibition, motivation, motor activity, and emotional responses. It plays a major role in ADHD. As noted, genetic research has found that some of the dopamine receptor and transporter genes are altered or not working properly.
- Neurotransmitters are the chemical messengers of the brain. The neurons in the brain are not connected. They have a synapse or tiny gap between them where nerve impulses are sent from one neuron to another. The neurotransmitters help carry messages between two neurons by being released into the synapse and then being recycled or reloaded once the message gets across. It is believed that with ADHD, those essential brain chemicals may not be efficiently releasing and staying long enough in the synapse in order to do their job of getting the message across effectively in those key regions and circuits of the brain.
- Research indicates that individuals with ADHD may have disturbances in their dopamine signaling systems.
- Brown (2013b) explains that the problem with ADHD is not one of a generalized chemical deficiency or imbalance. "The primary problem is related to chemicals manufactured, released, and then reloaded at the level of synapses, the trillions of infinitesimal junctions between certain networks of neurons that manage critical activities within the brain's management system" (p. 8).

Other Causes of ADHD

Maternal or Childhood Exposure to Certain Toxins

- Certain substances the pregnant mother consumes or exposes the developing fetus to are believed to increase risk factors and be a cause for ADHD in some children.

This includes fetal exposure to alcohol, tobacco, and high levels of lead. Mothers who smoke cigarettes and those who drink alcohol while pregnant increase the risk that their child will have ADHD.

- Children who carry certain genes may be more vulnerable when exposed to environmental toxins than other children.
- Of concern to many people are the unknown effects of all the chemicals in our environment and other toxins. Most are as yet not studied. It is reasonable to assume that some may be identified in future research that affect brain development or brain processes in children and possibly contribute to ADHD or other disorders.

Birth Complications, Illnesses, and Brain Injury

These are other factors that raise the risk for and may lead to the development of ADHD:

- Premature birth and significantly low birth weight
- Trauma or head injury to the frontal part of the brain
- Certain illnesses that affect the brain, such as encephalitis

Other Environmental Factors

- It is generally believed in the scientific community that environmental factors influence the severity of ADHD symptoms, but are not the cause of ADHD.
- "Research does not support the popularly held views that AD/HD arises from excessive sugar intake, excessive television viewing, poor child management by parents, or social and environmental factors such as poverty or family chaos. Of course, many things, including these, might aggravate symptoms, especially in certain individuals" (National Resource Center on AD/HD, n.d.).

See *List 1.4* for related information.

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1.8 ADHD and Coexisting Disorders

ADHD is often accompanied by one or more other conditions or disorders: psychiatric, psychological, developmental, or medical. Because symptoms of these various disorders commonly overlap, diagnosis and treatment can be complex. The word *comorbidity* is the medical term for having coexisting disorders (co-occurring and presenting at the same time as ADHD).

- As many as two-thirds of children with ADHD have at least one other coexisting condition such as learning disabilities, oppositional defiant disorder, anxiety disorder, conduct disorder, Tourette syndrome, or depression (MTA Cooperative Group, 1999; National Resource Center on AD/HD, 2003).
- Coexisting disorders can cause significant impairment above and beyond the problems caused by ADHD.
- Coexisting conditions make diagnosis, intervention, and management more complicated.
- In order to effectively treat the child or teen, an accurate diagnosis must first be made. That is why it is so important for the clinician to be skilled and knowledgeable about ADHD and coexisting conditions. It will be important to tease out what may be ADHD and what may be something else.
- There are also conditions that produce similar symptoms that mimic ADHD (*List 1.9*).
- Determining the proper diagnosis requires that the clinician is thorough in obtaining information and data about the child from multiple sources and perspectives and carefully reviews the history and behaviors. Effective intervention will require treatment for the ADHD and the other conditions.
- It can take time for all of the pieces of the puzzle to come together, and parents, teachers, and clinicians need to monitor the child's development and any emerging concerns.
- As Dr. Ari Tuckman (2010) points out, "Overlapping symptoms can make it more difficult to get the diagnosis right, but a skilled clinician can tease them apart. It's worth the extra effort to get an accurate diagnosis, because treatment can only be as good as the diagnosis it's based on" (p.19).
- In addition to disorders that may coexist with ADHD, there are also a number of conditions, disorders, or other factors that cause a person to look like they may have ADHD—for example, that cause behaviors or symptoms such as inattention or hyperactivity (*List 1.9*). There are children and adults who are misdiagnosed as having ADHD when in fact they do not have this disorder.
- The most common conditions comorbid with ADHD in childhood are oppositional defiant disorder (ODD) and conduct disorder (CD). In adulthood the most common comorbid conditions with ADHD are depression and anxiety (Goldstein, 2009).

Common Coexisting Conditions and Disorders

- The prevalence of specific coexisting conditions and disorders accompanying ADHD varies depending on the sources. Most sources indicate the following ranges:
 - *Oppositional defiant disorder (ODD)*. From 40 to 65 percent of children and teens have this disorder (National Resource Center on AD/HD, 2003). It occurs eleven

times more frequently in children with ADHD than in the general population (Barkley, 2013).

- *Anxiety disorder.* Approximately 25 to 30 percent of children and 25 to 40 percent of adults have this disorder (National Resource Center on AD/HD, 2003).
- *Conduct disorder.* Approximately 10 to 25 percent of children, 25 to 50 percent of adolescents, and 20 to 25 percent of adults have this disorder (National Resource Center on AD/HD, 2003).
- *Bipolar.* Up to 20 percent of people with ADHD may manifest bipolar disorder (National Resource Center on AD/HD, 2003).
- *Depression.* Approximately 10 to 30 percent in children and up to 47 percent in adolescents and adults have this disorder (National Resource Center on AD/HD, 2003, 2008a).
- *Tics, Tourette syndrome.* About 7 percent of those with ADHD have tics or Tourette syndrome, but 60 percent of Tourette syndrome patients also have ADHD (National Resource Center on AD/HD, 2008c).
- *Learning disabilities.* A range from 20 to 60 percent, with most sources estimating that between one-quarter and one-half of children with ADHD have a coexisting learning disability.
- *Obsessive-compulsive disorder.* Up to one-third of people with ADHD may have OCD (Goodman, 2010; Kutscher, 2010).
- *Sleep disorders.* One-quarter to one-half of parents of children with ADHD report that their children suffer from a sleep problem, especially problems with falling asleep and staying asleep (National Resource Center on AD/HD, 2008d).

Other Disorders and Conditions

- Nearly 20 to 30 percent of children and teens with ADHD also have some form of challenge in the area of language, and 25 to 50 percent of students who have speech-language disability also have ADHD (Spencer, 2013).
- Autism spectrum disorder (ASD) is now recognized as a possible coexisting disorder with ADHD and was added to the *DSM-5* as such (*List 1.3*).
- ASD symptoms are more common in children with ADHD than in the general population. In some studies nearly 50 percent of youth with autism spectrum disorders meet diagnostic criteria for ADHD (Goldstein, 2010).

Note: The website of the National Resource Center on AD/HD (www.help4adhd.org) is a good source of up-to-date and reliable information about coexisting disorders with ADHD.

Identifying and Treating Coexisting Disorders

- Most children with ADHD have school-related achievement, performance, or social problems. It is important that they receive the educational supports and interventions they need.
- Because a high percentage of children with ADHD also have learning disabilities, such as dyslexia, the school district should evaluate the student when a possible learning disability is suspected. Parents are advised to request an evaluation if concerned that their child may have coexisting LDs (*Lists 6.1, 6.2, 6.3, 6.4*).

Note: Information regarding dyslexia and dysgraphia (two common learning disabilities) are found in *Lists 5.1, 5.6, and 5.11.*

- Parents, educators, and medical and mental health care providers should be alert to signs of other mental health disorders that may exist or emerge, often in the adolescent years, especially when current strategies and treatments being used with the ADHD child or teen are no longer working effectively.
- Anxiety disorder and depression can easily go unrecognized and overlooked. There is a high rate of these internalized disorders, particularly among teenage girls (*List 1.12*).
- Early identification of ADHD and implementing appropriate interventions can help significantly in all respects, reducing the risk for future problems developing and increasing overall successful outcomes.

About Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD)

These two behavioral disorders are believed to probably lie on a continuum. ODD emerges first and can develop into conduct disorder (with more serious and problematic symptoms and behaviors) over time.

Oppositional Defiant Disorder

ODD usually starts before age eight, but no later than early adolescence (CDC, 2011). To be diagnosed with ODD, a child presents with many of these behaviors or symptoms:

- Often loses temper
- Often argues with adults
- Often actively defies or refuses to comply with adults' requests or rules
- Often deliberately annoys people
- Often blames others for his or her mistakes or misbehavior
- Is often touchy or easily annoyed by others
- Is often angry and resentful
- Is often spiteful or vindictive

The symptoms show a pattern of negative, defiant, disobedient, and hostile behavior toward authority figures that is exhibited more frequently than in other children of the same age, lasting at least six months, and resulting in significant difficulties in school, at home, and with peers (National Resource Center on AD/HD, 2008b).

CD is a behavioral pattern characterized by aggression toward others and serious violations of rules, laws, and social norms. It involves serious behaviors associated with juvenile delinquency, such as destruction of property, lying, stealing, and skipping school. It also may include aggression toward people or animals (CDC, 2011; National Resource Center on AD/HD, 2008b).

Theory about ADHD and Comorbidity

- Thomas Brown (2009) suggests that ADHD is not just one more among other mental health disorders, but instead it may be foundational in the sense that a person with

ADHD-related impairments of executive functioning is more vulnerable to other psychiatric disorders.

- Sam Goldstein (2009, p. 32) describes this as well: "As a condition reflecting impaired self-regulation or poor executive functioning, the core deficits of ADHD likely act as catalysts increasing the risk of the development of other problems and fueling the severity of these problems when they occur."

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1.9 ADHD Look-Alikes

Not everyone who displays symptoms of ADHD has the disorder. There are a number of other conditions and factors (medical, psychological, learning, psychiatric, emotional, social, and environmental) that can cause inattentive, hyperactive, and impulsive behaviors. The following list identifies some disorders or conditions that might coexist with ADHD or that may produce some symptoms that look like or mimic ADHD:

- Learning disabilities
- Sensory impairments (hearing, vision, or motor problems)
- Substance use and abuse (of alcohol and drugs)
- Oppositional defiant disorder (ODD)
- Conduct disorder
- Allergies
- Posttraumatic stress disorder (PTSD)
- Anxiety disorder
- Depression
- Obsessive-compulsive disorder
- Sleep disorder
- Bipolar disorder
- Thyroid problems
- Rare genetic disorders (for example, Fragile X syndrome)
- Seizure disorders
- Sluggish cognitive tempo
- Lead poisoning
- Hypoglycemia
- Anemia
- Fetal alcohol syndrome/fetal alcohol effects
- Chronic illness
- Language disorders
- Auditory processing disorders
- Visual processing disorders
- Tourette syndrome
- Autism spectrum disorder
- Developmental delays
- Sensory integration dysfunction
- Low intellectual ability
- High intellectual ability or giftedness
- Chronic ear infections
- Severe emotional disturbance
- Side effects of medications being taken (such as antiseizure medication, asthma medication)

Emotional and environmental factors that have nothing to do with ADHD can also cause a child or teen to be distracted, unable to concentrate, and have acting-out or aggressive behaviors, for example, if the child or teen is living in high-stress situations such as the following:

- Experiencing or witnessing abuse or violence
- Family stresses (for example, divorce and custody battles, death of a loved one, financial difficulties)
- Bullying or peer pressure and other social issues
- A chaotic, unpredictable, unstable, or neglectful home life with inappropriate expectations placed on the child

Inattention and disruptive classroom behaviors can be school related (having nothing to do with ADHD). Students may display those behaviors if they are in a school environment with these characteristics:

- A pervasive negative climate
- Poor instruction and low academic expectations
- Nonstimulating and unmotivating curriculum
- Ineffective classroom management

Source and Resource

Porter, Eloise. (2012). Misdiagnosis: Conditions that mimic ADHD. Retrieved from www.healthline.com/health/adhd/adhd-misdiagnosis#1

1.10 Positive Traits and Strengths

So many children, teens, and adults with ADHD are very bright and talented. It is important to recognize and appreciate the numerous strengths and positive traits that are so common in individuals with ADHD. Parents and teachers need to highlight and focus on the positive with children and do whatever is possible to nurture their interests, strengths, and talents.

Kids and adults with ADHD often have these characteristics:

- Energetic
- Spontaneous
- Creative
- Persistent
- Innovative
- Imaginative
- Tenacious
- Big-hearted
- Accepting and forgiving
- Enterprising
- Ready for action
- Independent thinking
- Inquisitive
- Adventurous
- Resilient
- Resourceful
- Risk taking
- Entrepreneurial
- Inventive
- Observant
- Empathetic
- Charming
- Full of ideas and spunk
- Intelligent
- Enthusiastic
- Outgoing, gregarious
- Optimistic
- Charismatic
- Good sense of humor
- Playful
- Passionate
- Willing to take a chance and try new things
- Good at improvising
- Able to find novel solutions

- Good in crisis situations and thinking on their feet
- Talented in certain skills and areas (artistic, musical, athletic)
And they typically
 - Know how to live in and enjoy the present
 - Make and create fun
 - Are never boring

1.11 Developmental Course of ADHD across the Life Span

It is now known that ADHD is not just a childhood disorder. In approximately 80 percent of cases, a child with ADHD will continue to have the disorder as a teenager, and the majority of children with ADHD will have it into adulthood (*Lists 1.4, 1.6*).

Infancy and Toddler Stages

ADHD is typically diagnosed in school-age children. However, there is evidence that even in infancy, toddler, and early childhood years there are indicators that a child may be at risk for eventually being diagnosed with ADHD (or another developmental disorder). "Difficult temperaments" characterize many infants and toddlers who may later experience childhood problems and be diagnosed with ADHD or some other disorder.

The following are signs to watch for in infancy that may be symptomatic of possible future difficulties:

- Irritability
- Shrill, frequent crying
- Overactive and restless
- Sleep problems
- Fussy eater
- Difficulty adapting well to changes in the environment
- Difficulty nursing and feeding
- Colicky
- Hard to please
- Hard to establish and maintain on a schedule

In the toddler years, early indicators may include the following:

- Excessively active
- Picky eater
- Sleep problems
- Fussiness and irritability
- Higher degree of crying, temper tantrums, and noncompliant behavior than is typical for children that age
- Poorly adapting to changes
- Clumsiness and being accident prone
- Speech and language problems

What to Do?

It is recommended that when children in these very early years show signs of a difficult temperament and possible developmental disorders, early intervention should be initiated

in order to reduce the risk of future problems developing. This would involve doing the following:

- Parents receiving guidance on positive strategies and supports to implement in the home (for example, behavioral, learning, language, motor, environmental)
- Parents sharing their concerns with their child's pediatrician and inquiring about Child Find, which is a mandate in the federal law, Individuals with Disabilities Education Act (IDEA) (*List 6.4*). Child Find requires states to identify, locate, and evaluate all children suspected of having a disability, from birth through age twenty-one.

Preschool and Kindergarten Years

- See *List 7.4* for information and strategies specific to children of preschool and kindergarten age range.
- When a young child is in social and educational environments with other children for half-day or full-day programs, more signs and symptoms of possible ADHD, learning disabilities, or other developmental disorders may become evident.
- Parents, teachers, pediatricians, and day-care providers should be alert to children in this age group who exhibit a number of the following difficulties that are more excessive and problematic when compared to other children that age.

Symptoms and Indicators in Preschool and Kindergarten

- Very short attention span (much more apparent than in the average child that age)
- Trouble sitting and staying with the group (such as circle time with class on the rug)
- Can't listen for more than a brief amount of time to stories
- Uncooperative and noncompliant behaviors
- Excessively active
- Overly reactive (cries easily, frequent and intense temper tantrums)
- Poor self-control when frustrated or angry
- Highly impulsive
- Aggressiveness
- Clumsy or accident prone
- Fearless behavior
- Trouble adapting to changes of routine or new environments
- Difficulty following class rules and teacher directions
- Has trouble following one- or two-step directions
- Jumps from one task to another—can't stick with any for more than a brief amount of time
- Not interested in playing with other children or has great difficulty doing so
- Difficulty holding and using a crayon, pencil, or scissors
- Avoids writing or any fine-motor task
- Argumentative
- Moodiness
- Persistently demanding
- Speech and language difficulties (understanding or expressing self in language)

- Motor-skill problems
- Seems overly sensitive to noise or touch
- Seems to get easily overstimulated and has trouble calming

According to Russell Barkley (2013), at least 40 to 80 percent of preschool children with ADHD (especially boys) may be seriously defiant or oppositional. Unfortunately, many preschool children with ADHD are asked to leave their preschools (kicked out) because the school does not know how to manage the child's behaviors.

What to Do?

- Parents should share their concerns with their child's pediatrician and may want to consult with a developmental pediatrician or a child psychiatrist. A qualified clinician may evaluate the child for possible ADHD and other disorders if indicated and refer for other evaluations such as speech-language or occupational therapy.
- Young children can be diagnosed with ADHD, and there are guidelines by the American Academy of Pediatrics for primary care clinicians to diagnose and treat ADHD in children ages four to five (*List 1.15*). The first line of treatment for children of this age group is behavior therapy. Research shows that many preschool children improve symptoms with behavior therapy alone (which typically involves parent training and teacher training of effective behavioral management strategies) (*Lists 1.19, 1.22*).
- Parents should work with the preschool or kindergarten teacher in identifying problems, implementing strategies, and obtaining any needed help.
- The state's Child Find mandate applies even in private preschools. Children showing signs of a possible disorder should be referred for screening (whatever the state policy and local procedures are for Child Find and early intervention programs).
- It is very important for parents to seek support, guidance, and information—beginning the journey of learning about ADHD and how to best help their child.
- See *List 7.4* for information about ADHD in young children (ages three to five).

Elementary School Years

- ADHD is typically diagnosed in the elementary school years when the expectations for academic and behavioral and social performance (following rules, sitting quietly, paying attention, working cooperatively and productively, and so on) become problematic.
- Elementary school children with ADHD have been the subject of a great deal of research—the bulk of research worldwide on ADHD. All of the information and lists in this book are relevant to children in this age range.

Middle School Years

For many youngsters, these are very difficult and painful years:

- There is rapid growth and development, causing many to feel awkward and unattractive in their changing bodies.
- The overriding concern is to fit in with peers and be accepted.
- Children are trying to gain more independence, so they challenge their parents' authority.

- They must also cope with the expectations of multiple teachers and harder academic and self-management demands (being an independent learner, more organized and responsible, and having mastered their basic skills).

In addition, middle-schoolers with ADHD may have the following:

- All the usual struggles as their peers who do not have ADHD, but theirs present a much greater challenge—affecting their social and school success
- Most of the same challenges as the elementary school child with ADHD and often the executive function–related difficulties become more problematic at this time
- Developed antisocial symptoms by this age and may have existing ODD or CD

What to Do?

See *List 7.5* for more information and strategies to help this age group of preteens with ADHD; other lists throughout this book provide numerous strategies, supports, and interventions that help.

High School and Teen Years

During this period, teens with ADHD generally have a change in their symptoms. For example, the overt hyperactivity is now manifested as restlessness and fidgetiness. Executive function impairments often become a more significant problem because of the high executive skill demands and expectations placed on teens (*Lists 1.2, 7.5*). By teenage years, coexisting disorders (*List 1.8*) are common, as are engaging in behaviors that can have serious consequences (*List 1.6*).

Adolescence is a period that can be challenging for all kids (and their parents and teachers). Similar to preteens, teenagers assert their independence, trying to establish their identity, face numerous social pressures, and also are coping with their physical changes and lots of other stressors.

The following signs and symptoms are commonly seen in teens with ADHD:

- Time-awareness and time-management issues (lateness, procrastination)
- Forgetfulness
- Disorganization
- Difficulty waking up and falling asleep
- Easily bored (and falls asleep in class)
- Impulsive (the many behaviors related to poor self-control and not considering future consequences of actions)
- Difficulty paying attention and staying on task
- Immaturity (social, emotional, behavioral)
- Poor planning and goal-directed behavior
- Irritability
- High rate of noncompliance and oppositional behavior
- Restlessness and fidgetiness (tapping pencils, pacing, squirming in seat)
- Gravitates to high-risk behaviors and associates with peers with similar problems and behaviors
- Argumentative, talks back to authority figures

- Emotionally reactive
- Higher-than-average amount of speeding tickets, traffic violations, and accidents
- Academic difficulties
- Significant problems in school keeping up with projects and managing the work load
- Behavior and social problems in out-of-school functions and activities

See additional symptoms related to impulsivity, inattention, and executive function weaknesses often seen in teenagers with ADHD (*Lists 1.2, 1.5, 4.1, 4.4*). Studies show that by adolescence, over half of those with ADHD may have a history of failure in academic performance and marked difficulties in social relationships (*List 1.6*).

A common issue and source of conflict in homes is that teens with ADHD require far more supervision, monitoring, and help from parents than others their age at a developmental stage in which they desire additional freedom and independence (National Resource Center on AD/HD, 2008).

What to Do?

- See *List 7.5* for more information and strategies specific to adolescents with ADHD.
- If the teen has not yet been diagnosed, it is very important to have a comprehensive evaluation by a skilled clinician who is experienced with diagnosing and treating adolescents with ADHD and coexisting conditions (*Lists 1.8, 1.14, 1.15*).
- See the many other lists throughout this book for strategies, supports, and interventions that are beneficial for teens with ADHD, including ADHD coaching (*List 7.6*).

Adults

It has only been in recent years that ADHD in adulthood has been studied, and that attention has been focused on the diagnosis and treatment of the disorder in this population.

- Approximately 50 to 65 percent of children diagnosed with ADHD continue to have ADHD as adults.
- ADHD is a disorder that persists across the lifespan.

Many adults with ADHD were never diagnosed as children and spent their lives struggling, mislabeled, and misunderstood. Many parents realize that they themselves have the disorder when their child is evaluated and diagnosed with ADHD. Now that it is recognized that ADHD is an adult disorder as well, *DSM-5* diagnostic criteria has changed (*List 1.3*). Now many adults are benefiting from diagnosis and treatment.

In addition to symptoms related to inattention, impulsivity, more subtle hyperactivity (restlessness), and executive function difficulties (*Lists 1.2, 1.3, 1.5*), common symptoms in adults include the following:

- Chronic time-management difficulties (procrastination, lateness)
- Pattern of short-lived interests
- Poor memory and forgetfulness
- Emotional volatility
- Excessively impatient
- Undertakes many projects simultaneously

- Difficulty staying focused in conversations
- Drawn to situations of high intensity

Adults with ADHD, especially if untreated over the years, commonly have additional coexisting disorders and problems, such as the following:

- Antisocial behavior
- Educational underattainment
- Vocational underattainment
- Depression
- Anxiety
- Substance abuse
- Low frustration tolerance
- High levels of stress
- Long-term relationship problems
- Employment difficulties
- Frequent moves and job changes
- Sleep-arousal problems
- Money-management problems (such as impulsive purchases, poor budgeting)
- See *List 1.6*.

What to Do?

- As with children and teens, effective intervention starts with a thorough evaluation that identifies coexisting conditions as well as ADHD and then to learn about treatment options, strategies, and supports from reputable sources.
- See the many excellent resources available geared for helping adults with ADHD, such as the national organizations Attention Deficit Disorder Association (ADDA) (www.add.org), Children and Adults with Attention-Deficit/Hyperactivity Disorder (CHADD) (www.chadd.org), and other resources in *List 7.12*.

Points to Keep in Mind

- Even though ADHD generally persists from childhood throughout adulthood, it does not have to limit one's future. There are countless adults with ADHD who are highly successful in every profession and walk of life.
- Many people with ADHD are able to use their strengths and talents to excel in their chosen careers and hobbies.
- It is a fact that individuals with ADHD have a much greater likelihood than others in the general population for a host of negative outcomes, and that is why this disorder must be taken very seriously. But it certainly does not mean that those negative outcomes will occur—particularly if the child or teen is receiving treatment and has a team of support.
- With diagnosis and intervention, ADHD can be managed properly, significantly minimizing the risk factors. This is a time of good fortune for those with ADHD. We understand so much more than in the past about how to help—the strategies, supports, and treatments that enable those with ADHD (children, teens, and adults) to succeed.

Sources and Resources

Barkley, Russell A. (2013). *Taking charge of ADHD: The complete, authoritative guide for parents* (3rd ed.). New York: Guilford Press.

National Resource Center on AD/HD. (2008). ADHD and teens: Information for parents. *What We Know, 20B*. Retrieved from <http://help4adhd.org/documents/WWK20B.pdf>

Rief, Sandra. (2001). *Ready ... start ... school: Nurturing and guiding your child through pre-school and kindergarten*. Paramus, NJ: Prentice Hall.

See CHADD (www.chadd.org), National Resource Center on AD/HD (<http://help4adhd.org>), and ADDA (www.adda.org) for information on ADHD across the lifespan.

There are excellent webinars available through *ADDitude Magazine* (www.additude.com/webinars/), CHADD (<http://www.chadd.org/Support/Ask-the-Expert-Online-Chats.aspx>), and the National Resource Center on AD/HD (www.help4adhd.org), and other sources with expert speakers presenting on topics related to ADHD as it presents in various age groups (preschoolers, teenagers, adults).

There are also several books that are specific to certain age groups, such as this first book of evidence-supported early intervention with children ages two to five years who have or are at risk for ADHD:

DuPaul, George J., & Kern, Lee. (2011). *Young children with ADHD: Early identification and intervention*. Washington, DC: American Psychological Association.

See other sources and recommended resources for specific age groups in *Lists 7.4 and 7.5*.

1.12 Girls with ADHD

- Girls with ADHD often go undiagnosed and untreated because they frequently do not have the typical hyperactive and disruptive symptoms seen in boys that signal a problem and lead to a referral.
- Girls tend to be teacher pleasers and often put a lot of effort into trying to hide their problems, which is another reason their ADHD is often undetected.
- Many girls are labeled and written off as being "space cadets," "ditzzy," or "scattered."
- The unrecognized struggles of girls with ADHD and their need for proper diagnosis and treatment places them at high risk for a number of serious negative outcomes (academic and learning problems; social, behavioral, and emotional problems; demoralization; low self-esteem; and more).
- Many girls don't receive an evaluation for ADHD because parents, teachers, and physicians are often unaware that ADHD symptoms manifest differently in girls than boys. When they are evaluated (often in their preteens and teen years), girls may be misdiagnosed or a coexisting condition (commonly anxiety disorder or depression) may be identified, missing the primary disorder of ADHD that existed first.
- Girls being evaluated for ADHD also may have been undiagnosed because the *DSM* criteria until very recently required that significant symptoms be evident by age seven. We now know that symptoms may emerge later, particularly in girls. Fortunately, the new *DSM-5* criteria has acknowledged this later onset of symptoms and changed the criteria so that now symptoms must occur by age twelve, instead of seven (*List 1.3*).
- Most of the research on ADHD over the years has been on boys or has had very few girls participating in the studies.
- In recent years, much more attention has been paid to gender differences, thanks to the work, leadership, and advocacy of Patricia Quinn, Dr. Kathleen Nadeau, Dr. Ellen Littman, and others. The scientific community is now looking at gender issues in ADHD. There have been some significant studies on ADHD in females, such as by the research teams of Dr. Joseph Biederman and Stephen Hinshaw. Much more research still needs to be done to understand the impact of ADHD in females and the best ways to help girls and women with this disorder.

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What We Have Learned

According to Nadeau (2000a, 2000b, 2004a, 2004b), Quinn (2008, 2009, 2012), Littman (2000, 2012), Nadeau, Littman, and Quinn (2000, 2015), and Quinn and Nadeau (2000, 2004), girls with ADHD present symptoms in these ways:

- Commonly have the inattentive presentation (type) of ADHD
- Often have impaired social skills
- Often experience academic difficulties and underachievement
- Often experience peer rejection (generally more so than boys with ADHD and are more devastated by rejection from their peers)
- Often unleash frustrations at home that were kept hidden at school; parents may see behaviors in their daughter such as temper tantrums and meltdowns that would never be exhibited at school
- Have a greater likelihood of anxiety and depression

- Often feel a sense of shame
- Have more internalized and less externalized (observable) symptoms
- Have verbal expression and processing problems that are more problematic than they are in boys because so many of girls' interactions rely heavily on verbal communication and demands
- Experience a lot of difficulty with executive function impairment (disorganization, prioritization, poor time management, working memory difficulties, and so forth)
- Tend to experience a lot of worry, stress, and dread from concerns about the following:
 - Not feeling liked and accepted by other girls
 - Not being able to keep up with all that is expected of them
 - Fear of failure and embarrassment at school

Girls with the inattentive presentation (type) of ADHD often present with these characteristics:

- Shy, timid, withdrawn
- Introverted
- Passive daydreamers
- Reluctant to participate in class
- Quick to give up when frustrated
- Often overwhelmed
- Disorganized
- Forgetful
- Self-critical
- Exhibiting anxiety-related behaviors (pulling hair, biting nails, picking at cuticles)



Girls with the combined presentation (type of ADHD) present with these symptoms:

- Stand out, because their behavior is significantly out of norm for other girls that age
- Show hyperactive and impulsive symptoms that often look different than is commonly seen in boys
- Begin to have social problems as early as preschool
- Are at greater risk for consequences stemming from poor self-control combined with lower self-esteem; impulsivity in girls can lead to high-risk activities, such as smoking, drinking, drugs, sexual promiscuity, engaging in unprotected sex, or binge eating (*List 1.6*)
- Are at a much higher risk for self-harm—suicide attempts and self-injury (Hinshaw et al., 2012)

Girls with hyperactivity and impulsivity often present with these symptoms:

- Hypervocal and hypersocial (cannot stop talking, chatting, commenting on everything)
- Much giggling, "silly," and immature behavior
- Emotional over-reactivity (lots of drama)
- Disruptive behavior (as is also seen in boys with ADHD)

We also know that for girls the following often occurs:

- Symptoms get worse at puberty with hormonal changes.
- Premenstrual syndrome, for example, presents additional problems, worsening ADHD symptoms by adding to irritability, low frustration, mood swings, and emotionality.
- They often work exceptionally hard (compulsively so) to achieve academic success and cover up their difficulties.
- Low self-esteem is evident and begins at a young age.
- They commonly develop anxiety disorder or depression by their teen years.
- They tend toward addictive behaviors offering immediate gratification in terms of self-medication and peer acceptance (Littman, 2012).
- Female social rules place a greater value on cooperating, listening, caretaking, and maintaining relationships. According to Giler (2001), ADHD females appear to have specific problems in five areas that may cause them to struggle socially:
 - Appearing uninterested because of poor listening skills
 - Displaying poor management or expression of anger or moods
 - Bragging or being outspoken and appearing self-involved
 - Forgetting appointments or being late
 - Failing to show interest by not remembering or checking with their friends about their feelings, relationships, or reactions to events that have occurred in their friends' lives

With regard to teenage girls with ADHD, Nadeau (2004b) reminds us that "high school years can be very challenging and to meet these challenges, girls with ADHD need support from peers, parents, and schools, combined with appropriate medical and psychological treatment, depending on their particular needs and issues. With the right supports and interventions, these girls can make the crucial transition from the chaos and self-doubt of adolescence to a sense of growing strength, efficacy, and competence as they enter their young adult years."

Research on Girls with ADHD

- Biederman and colleagues (1999) conducted the first major research study on girls with ADHD, shedding new light on the subject. Dendy (2011) summarized the results of more recent research conducted by Biederman and his research team, which followed a group of almost two hundred girls (about half with ADHD) for eleven years. The Biederman et al. (2010) results showed that girls with ADHD were two and a half times more likely to have a learning disability, sixteen times more likely to have repeated a grade, and ten times as likely to be in special education classes, although their IQ and academic achievement test scores were not much lower than those of their non-ADHD peers.
- Quinn (2008) reports that girls with ADHD are four to five times more likely to be diagnosed with a major depression and three times more likely to be treated for depression prior to their ADHD diagnosis.

Note: For more in-depth information about the issues and treatment of girls with ADHD, see the excellent books and other publications by Nadeau, Littman, and Quinn

(some of which are listed in the "Sources and Resources" section) as well as the ADDvance website (www.ADDvance.com), founded by Quinn and Nadeau and dedicated to helping girls and women with ADHD.

Sources and Resources

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- Dendy, Chris A. Zeigler (2011). *Teaching teens with ADD, ADHD and executive function deficits*. Bethesda: Woodbine House.
- Giler, Janet Z. (2001). Are girls with AD/HD socially adept? *Attention Magazine*, 7(4), 28–31.
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- Nadeau, Kathleen. (2000a). Elementary school girls with AD/HD. *Attention Magazine*, 7(1) 44–49.
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- Nadeau, Kathleen G. (2004a). Helping your daughter with ADD (ADHD) to feel good about herself. Retrieved from <http://addvance.com/help/women/daughter.html>
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- Nadeau, Kathleen, Littman, Ellen, & Quinn, Patricia O. (2000). *Understanding girls with AD/HD*. Silver Spring, MD: Advantage Books.
- Nadeau, Kathleen, Littman, Ellen, & Quinn, Patricia. (2015). *Understanding girls with AD/HD Updated and Revised: How they feel and why they do what they do*. (2nd ed.) Silver Spring, MD: Advantage Books.
- Note:* This is the new edition to the original groundbreaking book by Nadeau, Littman, and Quinn and is a must source about the needs and issues of girls with attentional problems: why they are often undiagnosed, how they are different from boys, and what their special needs are in school, in their social world, and at home. It also contains age-related checklists from preschool to high school and a girl's self-report scale to help parents and professionals better identify and help girls with ADHD.
- Quinn, Patricia O. (2008). AD/HD in women and girls. *Attention Magazine*, 15(6), 20.
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Quinn, Patricia, & Nadeau, Kathleen. (2000). Understanding preschool girls with AD/HD. *Attention Magazine*, 6(5), 42–45.

Quinn, Patricia, & Nadeau, Kathleen. (2004). ADD (ADHD) checklist for girls. Retrieved from http://addvance.com/help/women/girl_checklist.html

Books Specifically for Girls with ADHD

Quinn, Patricia. (2009). *Attention Magazine, girls! A guide to learn about your AD/HD*. Washington, DC: Magination Press. (for ages 8–13)

Roberts, Barbara. (2010). *The adventures of Phoebe Flower*. Silver Spring, MD: Advantage Books. (for ages 8–11).

Walker, Beth (2004). *The girls' guide to AD/HD*. Bethesda, MD: Woodbine House. (for teenage girls)

For Information on Women with ADHD

There are also numerous resources that are very beneficial for women with ADHD. Some of the leading authors and authorities on women with ADHD are Patricia Quinn, Kathleen Nadeau, Ellen Littman, Sari Solden, Terry Matlen, and Zoë Kessler. The national organizations of Children and Adults with Attention-Deficit/Hyperactivity Disorder (CHADD) (www.chadd.org) and Attention Deficit Disorder Organization (ADDA) (www.add.org) are great sources of information on females with ADHD as well as *ADDitude Magazine* (www.additudemag.com).

1.13 ADHD and Its Effects on the Family

It is important to be aware of the challenges that exist in the home when one or more children have ADHD because this disorder has a significant impact on the entire family. Unfortunately, teachers and others are generally unaware or underestimate the struggles these families face. Typically, families with members who have ADHD must cope with a much higher degree of stress than in the average family for these reasons:

- There are generally major issues surrounding homework as well as morning and evening routines (getting ready for school and bedtime).
- It is common for parents to disagree about treatment, discipline, management, structure, and other issues.
- Parents may blame one another for the child's problems or be highly critical of one another in their parenting role. This discord causes a great deal of marital stress and a higher rate of separation and divorce than is typical.
- Often it is the mother who must cope with the brunt of the issues throughout the day, which is physically and emotionally exhausting.
- As any parent of a toddler knows, having a child who needs constant supervision and monitoring is very time-consuming and interferes with the ability to get things done as planned (for example, housework and other chores).
- A child with ADHD who also has serious oppositional, defiant, and aggressive behaviors can be a major source of parenting stress that affects the whole family.
- Parents of children who have ADHD are constantly faced with needing to defend their parenting choices as well as their child. They must listen to negative press about this disorder and reject popular opinion in order to provide their child with necessary interventions and treatment.
- Parents must deal with criticism and advice from relatives, friends, and acquaintances regarding how they should discipline and parent their child. This causes a lot of parental self-doubt and adds to the stress they are already living with day in and day out.
- Frequently the family must deal with such social issues as the exclusion of the child from out-of-school activities. It is painful when your child is not invited to birthday parties or has difficulty finding someone to play with and keeping friends.
- Siblings are often resentful or even jealous of the central role their sibling with ADHD plays in the family's schedule, routines, and activities as well as the extra time and special treatment this child receives. In addition, siblings are acutely aware of and feel hurt and embarrassed when their brother or sister has acquired a negative reputation in the neighborhood and school.
- Parents of children with ADHD may feel unsupported from extended family and also experience social isolation.
- Parents have a much higher degree of responsibility in working with the school and being proactive in the management of their child than is typical for most parents. Furthermore, they must educate themselves about ADHD, research-validated treatments, their child's educational rights under the law, and other things in order to successfully advocate their child's needs.

Important Points to Keep in Mind

- It is likely that more than one family member (a parent or sibling) also has ADHD.
- In many cases, other family members who have ADHD were never diagnosed and have been struggling to cope with their own difficulties without proper treatment and support. That is why the clinicians who specialize in treating children with ADHD say it is important to view treatment in the context of the family. Learning about the family (for example, the ways the members communicate and their disciplinary practices) helps in designing a treatment plan that is most effective for the child.
- Commonly a parent may recognize for the first time that he or she has been suffering with undiagnosed ADHD for years when a son or daughter is diagnosed with the disorder. This realization can result in a positive change in the family dynamics.
- Without question, families of children with ADHD need support and understanding. Fortunately, there are many supports now available to parents. See *Lists 7.3, 7.9, and 7.11* for more related information on this topic.

1.14 Pursuing an Evaluation for ADHD: Tips for Parents

Many symptoms associated with ADHD are common in and of themselves (*List 1.5*). They do not mean the child has a disorder. But when your child is exhibiting inattentive, hyperactive, or impulsive behaviors that seem to be much more excessive than you see in other children and that are causing problems for your child at home, school, and elsewhere, you may wish to pursue an evaluation.

- It is common for parents to become concerned about their child's problematic behaviors once the child starts school and faces the demands of an academic environment. For many children, it is not until third or fourth grade that they start to struggle in school as the academic demands get much harder, and expectations for on-task behavior, work production, and self-control intensify.
- Some children have significant behavior problems and ADHD symptoms that are evident from early childhood, with lots of difficulty functioning in preschool and kindergarten (*Lists 1.11, 7.4*).
- Other children with ADHD do not have hyperactive and disruptive behaviors that raise concerns and get the attention of teachers and parents. There are many children with ADHD who manage to function adequately in an elementary school setting with the high degree of support and structure provided by parents and teachers, but fall apart in middle school and high school with the increased academic demands and expectations for self-management (*Lists 1.11, 7.5*).
- You may have had teachers, relatives, friends, or others express concerns or share observations that indicate your child may have ADHD.
- When you decide to seek an evaluation for your child, it is a very important step for you and your family (*List 1.15*).

Finding a Professional to Evaluate Your Child

- Parents are advised to share concerns with their child's pediatrician or other primary care physician and let the doctor know you want your child evaluated and why. You may request a referral to a specialist or the primary care doctor may inform you that he or she can do the evaluation.
- Parents need to be proactive and not be embarrassed to ask the doctor about his or her experience evaluating for ADHD and what will be involved in the diagnostic process. You may want to ask as well about possible treatment approaches if your child does have ADHD (*List 7.2*).
- If you feel you are being hurried and not listened to carefully or your concerns are brushed off and questions are not satisfactorily answered, you should probably find a different professional to evaluate your child.
- In finding the professional, it helps to have recommendations. You may wish to speak with other parents of children who have ADHD (for example, through the local chapter of CHADD—Children and Adults with Attention Deficit/Hyperactivity Disorder) regarding recommended professionals in the community. These parents often know which professionals have expertise in diagnosing and treating ADHD. School nurses and school psychologists are also excellent resources and knowledgeable in most cases about health care providers in the community who have expertise in diagnosing ADHD and coexisting conditions (*List 7.9*).

- Local university medical hospitals or children's hospitals are often good resources you may want to explore as well.

A School-Based Evaluation

- It is always important to communicate with your child's teachers regarding any of your concerns. You likely have been doing so prior to reaching this decision to pursue an evaluation for ADHD. If not, the first step should be to set up an appointment and have a conference with the teacher.
- The next step is often a school multidisciplinary team meeting to discuss your child, concerns, and strategize a plan of support and intervention. This team goes by various names such as student support team (SST), student assistance team (SAT), child study team (CST), and others. It may also be the Response to Intervention (RTI) team in your child's school (*Lists 6.1, 6.2*).
- At the meeting, share your concerns and ask for input regarding your child's performance from teachers and other staff who know your son or daughter and observe his or her functioning in the classroom and other settings.
- The SST meeting is especially helpful when considering an evaluation for ADHD because the school can share with you its role in the assessment and obtain your written permission to begin gathering relevant data from school for the evaluation (*Lists 1.16, 1.18*). It is more likely that efforts will be coordinated when a school team is informed and involved.
- A plan of support (strategies and other school interventions) should be developed to address some of the difficulties your child is experiencing at school if not already in place. Your school may follow an RTI process for doing so (*List 6.1*).
- For any appropriate clinical ADHD evaluation, the school will be called on to supply the necessary data (such as records, reports, observations, behavior rating scales, work samples) to the physician or other licensed medical or mental health professional conducting the evaluation. The teacher and other various members of the school's SST may be involved in gathering and providing this data (*List 1.16*).
- Parents have the right to request an evaluation at any time (even if your school follows the RTI model and asks for other interventions to be implemented first). For more on pursuing an evaluation to determine eligibility for special education and related services under federal law IDEA or for a Section 504 accommodation plan, see *Lists 6.3, 6.4, and 6.5*.
- If your child is experiencing problems with learning and appears to be underachieving, be aware that a high percentage of children who have ADHD also have a coexisting learning disability, such as dyslexia, and should be evaluated. Others also are developmentally delayed in their language skills or motor skills and should be evaluated by the school district for possible speech-language therapy, occupational therapy, adapted physical education, or other special services (*Lists 3.6, 5.1, 5.6, 6.1, 6.3, 6.4, 6.5, 7.2*).
- Some schools take a very active role in the diagnosis of ADHD and perform a comprehensive evaluation (*List 1.18*).

1.15 Diagnosing ADHD in Children and Teens

The diagnosis of ADHD is not a simple process. There is no single laboratory test or measure to determine if a person has ADHD, and no particular piece of information alone can confirm or deny the existence of ADHD. Nevertheless, ADHD can be diagnosed reliably. Perhaps in future years, we may see the use of genetic testing, brain imaging, or other more conclusive tools and methods recommended to be used for diagnostic purposes, but currently this is not the case.

The Diagnosis

- The cornerstone of an ADHD diagnosis is meeting the criteria described in the most current edition of the *Diagnostic and Statistical Manual of Mental Health Disorders*, fifth edition (*DSM-5*), published by the American Psychiatric Association in 2013 (*List 1.3*), which replaced the previous editions (American Psychiatric Association, 1994, 2000).
- The diagnosis is made by gathering and synthesizing information obtained from a variety of sources in order to determine if there is enough evidence to conclude that the child meets all of the criteria for having ADHD. Basically, the clinician needs to determine the following:
 - The child has a significant number of specific symptoms of inattention, hyperactivity-impulsivity, or both.
 - The symptoms are to a degree that are out of norm for what is developmentally appropriate (compared to other children that age).
 - The symptoms are evident in at least two settings (typically home and school) and negatively affecting the child's life. They are serious enough to interfere with successful functioning (such as social, behavioral, academic).
 - The child does not have another disorder or condition that better accounts for these symptoms

See *List 1.3* for more specifics regarding *DSM-5* criteria.

- An appropriate evaluation for ADHD takes substantial time and effort. It is not sufficient for a child to be seen by a community physician for a brief office visit. An ADHD evaluation cannot be done without gathering and analyzing the necessary diagnostic data from a variety of sources.
- The clinician needs to gather data from parents or guardians, teachers, and others involved in the child's care to determine that ADHD diagnostic criteria have been met.
- If the school has not been communicated with and has not provided the evaluator information about the student's current functioning, and teacher input and observations have not been provided, then an appropriate assessment for ADHD cannot be made (*Lists 1.16, 1.17, 1.18, 7.1*).
- A diagnostic evaluation for ADHD also should include instruments (rating scales or questionnaires) completed by parents, teachers, and sometimes others who interact frequently with the child.
- Evaluation of the child should include screening or assessment when indicated for conditions that mimic (produce similar-looking symptoms) or may coexist with ADHD (*Lists 1.8, 1.9*).

In 2011, the American Academy of Pediatrics (AAP) published guidelines for primary care doctors for the diagnosis, evaluation, and treatment of ADHD. These guidelines were revised and updated from the initial guidelines of 2000. The current guidelines (AAP, 2011) for primary care physicians state the following:

- Doctors should evaluate children four through eighteen years of age for ADHD if they present with academic or behavioral problems and symptoms of inattention, hyperactivity, or impulsivity.
- To make a diagnosis of ADHD, all *DSM* criteria must be met.
- Any alternative cause for the symptoms (other than ADHD) should be ruled out, and the evaluation should include, if indicated, assessment for other conditions that might coexist with ADHD (emotional, behavioral, developmental, physical).

Who Is Qualified to Diagnose ADHD?

- A number of professionals have the qualifications to assess children for ADHD: child psychiatrists, pediatricians, neurologists, psychologists, social workers, family practitioners, and other licensed medical and mental health professionals.
- Specialists in childhood medical and mental health, such as child psychiatrists, child psychologists, child neurologists, and developmental or behavioral pediatricians, have the most training and are recommended for complex cases.
- A key qualification is the professional's knowledge and experience evaluating children and teens for ADHD. If the child is being evaluated by his or her pediatrician, that doctor should be following the American Academy of Pediatrics ADHD guidelines and *DSM-5* diagnostic criteria. Not all primary care doctors are aware of or follow these, and if not, parents should seek another professional to evaluate their child (*Lists 1.3, 1.14*).

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Components of a Comprehensive Evaluation for ADHD

Clinical Interview

- This is the single most important feature of the evaluation process, during which the clinician spends a significant amount of time speaking with parents to obtain the following information:
 - The child's medical history (for example, fetal development, birth, illnesses, injuries), developmental history (approximate dates of milestones reached in language, motor, self-help, learning skills), and school history
 - The family history (of medical, psychiatric, psychological problems and diagnoses of parents and other family members—particularly looking for known or possible ADHD and coexisting conditions in parents, siblings, grandparents, or other relatives)
 - Information about any significant family circumstances or stressors (which may be causing some of the symptoms), such as death or serious illness in the family, parental separation or divorce, and so forth
 - Parents' perceptions, insights, and observations regarding, for example, the following:
 - The child's difficulties in learning, behavior, health, and social relationships

- The child's strengths, interests, and motivators
- Responses to discipline and disciplinary techniques used in the home
- How the child responds when upset, angry, or frustrated
- How the child gets along with siblings, neighborhood children, and others
- The child's feelings (worries, fears, frustrations)
- The interview also involves talking with and observing the child (at what length the evaluator interviews the child or teen, and questions that will be asked vary, of course, depending on the child's age).
- An interview with the teacher is also recommended. By directly speaking with the teacher, the evaluator will be able to obtain a much better picture of the child's functioning and performance at school (academic, behavioral, social-emotional) and teacher's observations of the child compared to other students in the classroom.
- Questionnaires (such as Russell Barkley's home and school situations questionnaires) or rating forms that may have been sent to parents and teachers prior to the evaluation may be reviewed with further questions asked of parents, the child, or teachers during the interview process.
- It is helpful if prior to the evaluation, parents be prepared before meeting with the evaluator by having the information readily available (particularly the child's history).

Behavior Rating Scales

- These are very useful in determining the degree to which various ADHD-related behaviors or symptoms are observed in different key environments (for example, home and school). In addition to information from teachers and parents, rating scales may be filled out by others who spend time with the child, such as the school counselor, special education teacher, child care provider, or other relative.
- The evaluation typically involves filling out one or more rating scales. A variety of scales and questionnaires can be used as part of the ADHD process for obtaining information from parents and teachers. Those that provide information specific to the *DSM-5* diagnostic criteria for ADHD include the Vanderbilt Parent and Teacher Assessment Scales, Conners Parent and Teacher Rating Scales, Attention Deficit Disorders Evaluation Scale (ADDeS), Swanson, Nolan, and Pelham (SNAP-IV-C), the ADHD Rating Scale-IV, and others.

More about Rating Scales

- There are other broad band rating scales that may be used in addition to but not instead of the ADHD rating scales that may pick up on anxiety, depression, and other possible mental health disorders.
- There are also scales for executive functioning that the clinician may use for obtaining additional information, such as the Comprehensive Executive Function Inventory (CEFI; Naglieri & Goldstein), Behavior Rating Inventory of Executive Function (BRIEF), Barkley Deficits in Executive Functioning Scale—Children and Adolescents (BDEFS-CA), and Brown Attention Deficit Disorder Scales (BADDS).
- Rating scales list a number of items that teachers or parents rate according to the frequency they observe the child exhibiting those specific behaviors or problems. Sometimes the ratings range from "never" to "almost always" or from "not at all" to "very much." Some rating scales are numerical (ranging from 1–5 or 0–4). The scales

are standardized and enable the evaluator to compare a child's behavioral symptoms with those of other children of that age or developmental level.

- In some of the instruments, various situations in the home or school are described, and parents or teachers rate if they see the child presenting difficulty in any of those situations and to what degree (mild to severe).
- Teachers may be asked to rate the student in comparison to others in the class on the existence or degree of disruptive behavior, moodiness, oppositional behavior, distractability, organization skills, forgetfulness, on-task behavior, activity level, aggressiveness, ability to display self-control, paying attention, and so forth.

Physical Exam

- A clinical evaluation for ADHD generally includes a routine examination to rule out other possible medical conditions that could produce ADHD symptoms or that may require medical management.
- The routine exam may include measuring the child (height, weight, head circumference), vision or hearing screening to rule out poor vision or chronic ear infections, screen for gross motor skills, or neurological signs of a developmental disorder.
- Based on the child's physical exam, as well as medical history (through interview and questionnaire), a physician may look for evidence of other possible causes for the symptoms or additional issues that may need to be addressed, such as sleep disturbances, allergies, bed-wetting, or anxiety.
- Other medical tests (blood work or imaging scans such as CT, SPECT, PET, EEGs) are not done in an evaluation for ADHD.
- It is the doctor's responsibility to determine the need for additional medical testing or referral to other specialists if indicated.

Observations

- Directly observing the child's functioning in a variety of settings can provide helpful diagnostic information. Most useful are observations in natural settings where the child spends much of his or her time, such as school. How a child behaves and performs in an office visit is not indicative of how that same child performs and behaves in a classroom, on the playground, in the school cafeteria, or other natural setting. School personnel may provide this information (*Lists 1.16, 1.18*).

Note: School personnel may not share *any* information unless the required release of information forms have been filled out and are on file—which grants the school permission to do so.

Academic and Intelligence Testing

- An evaluator should have at least a general indication of a child's academic achievement levels and performance, as well as a rough estimate of his or her cognitive (thinking and reasoning) ability. Some means of obtaining this information is through a review of the student's report cards, standardized test scores, classroom work samples, or curriculum-based assessment, or through informal screening measures. Information can also be gleaned from the child, teacher, and parent interview.
- If there is indication of possible learning disabilities, a request for a psycho-educational evaluation is appropriate and recommended. This evaluation assesses

cognitive and processing abilities, academic achievement levels, and information about how the child learns. Parents may request this evaluation from the school, which is the beginning of the individualized education program (IEP) process. See *Lists 1.16, 5.1, 5.6, 6.1, 6.2, 6.3, 6.4, and 7.2* for information related to this topic.

Performance Tests

- Additional tests are sometimes used by some evaluators to obtain more information about how a child functions on various performance measures. Some clinicians use computerized tests that measure the child's ability to inhibit making impulsive responses and to sustain attention to tasks. These tests, however, are not standard practice or routinely done in ADHD assessments. They are not necessary for making the diagnosis.

More Tips and Information

- A thorough history is critical in making an accurate diagnosis of ADHD, which is obtained through the interview, use of questionnaires, and a review of medical and school records. With regard to the school history, a great deal of useful data is located in the student's school records, which might include past report cards, IEPs, district and state achievement testing and other school evaluations (such as psycho-educational, speech and language), referrals to the school team, and so forth. Parents may provide some of this information or the school.
- See *List 1.14* for recommendations of steps parents should take in pursuing an evaluation for their child and finding a suitable professional to do so.
- See *Lists 1.16, 1.17, and 1.18* for information about the school's role in the diagnostic process and what teachers should be prepared to share with the professional who is diagnosing the child for ADHD.

A proper diagnosis is the most important step in getting the necessary help and intervention a child with ADHD needs in order to achieve success and minimize risks of any negative outcomes. Parents are advised not to wait and see when they have concerns, especially if the child is struggling in learning, behavior, or social skill competence.

Sources and Resources

American Academy of Pediatrics (AAP). (2011). ADHD: Clinical practice guidelines for the diagnosis, evaluation, and treatment of attention-deficit/hyperactivity disorder in children and adolescents. *Pediatrics*, 128(5), 1007–1022.

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American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.) (*DSM-IV-TR*). Washington, DC: American Psychiatric Association.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.) (*DSM-5*). Washington, DC: American Psychiatric Association.

Centers for Disease Control and Prevention (CDC). (n.d.). Diagnosing ADHD in children. Retrieved from www.cdc.gov/ncbddd/adhd/diagnosis.html

Children and Adults with Attention-Deficit/Hyperactivity Disorder (CHADD) and the National Resource Center on AD/HD (www.help4adhd.org/) offer online information regarding ADHD diagnosis, available at these links:

www.chadd.org/Understanding-ADHD/Parents-Caregivers-of-Children-with-ADHD/Evaluation-and-Treatment.aspx

<http://help4adhd.org/en/treatment/guides>

<http://help4adhd.org/en/treatment/guides/keycomponents>

www.chadd.org/Understanding-ADHD/Parents-Caregivers-of-Children-with-ADHD/Evaluation-and-Treatment/Professionals-Who-Diagnose-and-Treat-ADHD.aspx

University of Maryland Medical Center. (n.d.). Diagnosing ADHD in children. Retrieved from <http://umm.edu/health/medical/reports/articles/attention-deficit-hyperactivity-disorder>

The following are resources on practical advice for parents regarding what to expect in the diagnostic process for a comprehensive evaluation, how to prepare, and the struggles many families have in obtaining the diagnosis of ADHD (with coexisting conditions):

Barkley, Russell A. (2013). *Taking charge of ADHD: The complete, authoritative guide for parents* (3rd ed.). New York: Guilford Press.

Barrow, Karen. (2014). What's up, doc? *ADDitude Magazine*, 14(3), 36–39.

Carpenter, Deborah. (2007). The diagnostic puzzle. *ADDitude Magazine*, 7(3), 32–35.

Engler, Natalie. (2006). The AD/HD road map. *ADDitude Magazine*, 6(2), 39–42.

McCarthy, Laura Flynn. (2009). Knowing. *ADDitude Magazine*, 10(1), 35–39.

1.16 The School's Role and Responsibilities in the Diagnosis of ADHD

Information about Current School Functioning

- As described in *List 1.15*, the diagnosis of ADHD is dependent on gathering sufficient information from multiple sources to get a clear picture of how ADHD symptoms are affecting a child's functioning in more than one setting. School is a key setting—where the child spends much of his or her life.
- No one is in a better position than the teacher to report on the child's school performance compared to other students of that age and grade. This includes the teacher's observations and objective information indicating the student's academic productivity and social, emotional, and behavioral functioning.
- The teacher should be prepared to share information regarding the student's ability to exhibit self-control, stay focused and on task, interact with peers and adults, initiate and follow through on assignments, and other behaviors.
- In an appropriate evaluation for ADHD, teachers will be asked to report their observations about the student through standardized behavior rating scales, questionnaires, narrative statements, phone interviews, or other measures.
- Other indicators of a student's current school performance (academic and behavioral) may be helpful as well—for example, disciplinary referrals (among the records of guidance counselors or administrators) and work samples.
- Direct observations of the student's performance in the classroom and other settings (such as the playground or cafeteria) also provide useful evidence of problems the child may be exhibiting (with work production, social interactions, disruptive or off-task behavior, and disorganization) compared to peers. Evaluators should have observational data from the school, which of course are more beneficial than just observing the child in the unnatural environment of a doctor's office.

Information about the School History

- Data indicating the existence of symptoms in previous school years, when those symptoms started to become apparent, and difficulties the student experienced in prior grades can be obtained from the school records and interviewing the parents or school personnel.
- A great deal of useful data is located in the student's records, which might include past report cards, district and state achievement testing, other evaluations (psycho-educational, speech and language), referrals to the school's multidisciplinary team, or any school-based support or intervention plans that may have been generated by the SST (*List 6.2*), RTI (*List 6.1*), or IEP (*List 6.4*) team.

Points to Keep in Mind

- In addition to the presence of symptoms, the evaluator must determine that the symptoms are causing the student difficulties and interfering with the child's functioning (for example, with social success and interpersonal relationships, academic productivity, or disruptive behavior problems), and to what degree. Teachers and other school personnel who interact and observe the child on a daily basis are best able to provide this information (*Lists 1.3, 1.15*).

- Parents have a right to expect the school to be supportive and responsive in the diagnostic process. Schools need to provide information requested by the child's physician or mental health professional conducting a clinical evaluation for ADHD (*List 1.18*).
- It will be necessary for parents to sign a release-of-information form before school personnel can communicate with other professionals outside of school or provide documentation and data regarding the child. Make sure this is on file with the school district before sharing information requested by a doctor or other evaluator.
- School personnel should be prompt and thorough in providing any information requested for an evaluation (such as behavioral rating scales).
- It is also helpful (and may be requested) that the teacher write a paragraph or two indicating how he or she views the child in relation to other students in the classroom (regarding behavior, social skills, work production and output, and so on).
- It is highly recommended that schools provide information to the physician in a manner that takes into account the physician's limited time. A one- or maximum of two-page summary of the child's school history and current performance is helpful (*Lists 1.17, 1.18*).
- Teachers should be willing to speak and confer with whomever is conducting the evaluation if they are asked to do so. It is beneficial (but rare) for physicians to call to speak directly with teachers (*List 1.15*).
- If a student is receiving a clinical evaluation for ADHD and the school is not requested to send information, and no attempt is made to communicate with or obtain input from the school, it is an *inappropriate evaluation* for ADHD. See *Lists 1.3, 1.14, and 1.15*.
- School personnel need to be alert and aware of the high rate of coexisting conditions and disorders with ADHD (*List 1.8*). Often those students who exhibit very significant behavioral challenges have ADHD and another coexisting mental health disorder needing treatment. It is important for the school to communicate about all issues with parents and help facilitate referrals to appropriate community agencies and medical or mental health-care professionals, when indicated.
- The school is responsible for determining educational impairment of a suspected or known disability. Schools have the responsibility of initiating and following through with a comprehensive evaluation if the student is suspected of having ADHD or any other disability impairing educational performance. (This includes behavioral, not just academic, performance.) If the student meets eligibility criteria, the school is then responsible for providing supports and services under either of the two federal laws: IDEA or Section 504 of the Rehabilitation Act of 1973 (*Lists 6.3, 6.4, 6.5*).
- Approximately 25 to 50% of students with ADHD also have coexisting learning disabilities. If a student with ADHD is struggling academically (for example, in learning to read or write), the school should consider the probability of learning disabilities (such as dyslexia or dysgraphia) and provide a more comprehensive psycho-educational evaluation to determine his or her learning needs (*Lists 5.1, 5.6, 6.1, 6.3, 6.4*).
- See *List 1.17* for tips on what teachers should do if they suspect a student has ADHD and would like to recommend evaluation.
- See *List 1.18* for information regarding a school-based evaluation for ADHD, which is conducted in some school districts (not all).
- See *Lists 6.1 and 6.2* on the RTI and SST processes in schools, which are problem-solving team approaches and means of identifying students in need of support and providing appropriate intervention.

1.17 If You Suspect a Student Has ADHD: Recommendations for Teachers and Other School Personnel

- When you observe a student displaying inattentive, hyperactive, and impulsive behavior in the classroom, you should automatically attempt to deal with those behaviors by using strategies known to help with those issues. These strategies include, for example, environmental structuring, cueing and prompting, organization and study skills assistance, and behavior-modification techniques. Obviously this is simply good teaching practice because all students who display the need should be provided with behavioral and academic help and support.
- Of course, teachers should communicate with parents about difficulties the student may be experiencing.
- It is also good practice if concerned about a student to keep records on strategies and interventions you are using in your attempt to help the student, anecdotal records regarding the student's behaviors and classroom performance, work samples, as well as any phone contacts, conferences, or other communication you have had with parents.
- Consult informally with appropriate support staff (such as school counselor, school nurse, psychologist, or special education teacher). Share your concerns and ask for advice and assistance as needed.
- You may also want to communicate with the previous year's teacher(s) to see if your areas of concern were also of issue the prior year, and if so, find out what strategies and interventions were used successfully or unsuccessfully by that teacher.
- Most schools use a student support team (SST) or Response to Intervention (RTI) team process for the next step (*Lists 6.1, 6.2*). This team process may go by other names such as student intervention team, instructional support team, or others.
- The SST or RTI team, which generally includes school professionals (teacher, administrator, support staff) and parents of the student meet to share and identify problems the student is experiencing as well as other relevant information and data. They strategize and try to problem solve together.
- Information about the child's strengths and interests are also presented as well as concerns.
- There is team effort in designing a plan of targeted actions to address difficulties the student is having at school (academic, behavioral, social, or other). See *List 6.1*, which describes tier 1 and tier 2 interventions under an RTI model.
- If ADHD symptoms and resulting problems are evident, and the school feels an ADHD evaluation should be recommended, it may do so at this time (or in a follow-up meeting) with parents.
- The team may share information or resources about ADHD (such as literature or websites) and inform parents about the diagnostic process (clinical or school-based screening or assessment), if interested. See *Lists 1.15 and 1.18*.



Caution and Tips for Teachers

- It is important that school professionals are careful how they express to parents their concerns that a child might have ADHD because there are liabilities that may be incurred if it is not communicated properly. For example, school districts do not want teachers telling parents that their child needs to have a medical evaluation because the district may be asked to pay for it. It is, however, an astute and helpful teacher who alerts parents to problems that lead to the successful diagnosis and treatment of many children with ADHD. So, teachers do have a professional obligation to alert parents.
- It is generally best to discuss with parents the possibility that their child may have a medical reason or disorder causing the problems he or she is experiencing through a team forum. At minimum, one other school professional (the school nurse, guidance counselor, administrator, or school psychologist, for example) should join the classroom teacher in doing so.
- Do not tell parents that you think their child has ADHD or make statements that sound as if you have concluded the child must have this disorder.
- Do not attempt to diagnose ADHD. You are not qualified to do so.
- Do not tell parents that their child *needs* to be evaluated for ADHD.
- Never tell parents that their child needs medication for ADHD.
- Share with parents the positives about the student (strengths, talents, character traits, behaviors), not just your concerns.
- Emphasize the difficulties (learning, academic, social) the symptoms or behaviors are causing *their child*, not the problems they are causing *you*.
- Be very explicit in describing objectively the behaviors of concern, and ask parents if they have seen any of the same behaviors at home.
- Following are some possible statements to use in communicating with parents:
 - "These are the behaviors I have been observing that have been causing your child difficulty at school and affecting his learning and relationships with the other children."
 - "Sometimes there are physiological reasons or medical causes for these kinds of difficulties (with paying attention, self-control, impulsive behavior, being highly active and restless . . .)."
 - "You may want to share these concerns with your child's doctor or consider an evaluation."

It is usually okay to make a statement such as, "I have had students in the past with similar behaviors and some of them were diagnosed with ADHD. The only way to know if that's the case for your child would be through a professional evaluation."

1.18 School-Based Assessment for ADHD

- In some school districts, a school-based evaluation is conducted for ADHD—for educational purposes and interventions.
- Schools that do such evaluations generally follow certain procedures and steps, which are completed in stages.

Referral

- The evaluation begins with referral and information documented about presenting concerns.

Screening

- The teacher shares information briefly about the student's performance in the classroom and some strategies that have been tried so far.
- The teacher can complete an ADHD behavior rating scale using some initial screening methods to measure the number of presenting symptoms of inattention, hyperactivity, and impulsivity (*List 1.15*).
- If there are a sufficient number of presenting ADHD symptoms on the rating form, a comprehensive assessment would be initiated.

Comprehensive Assessment

This involves multiple measures, such as the following:

- Parent interview for obtaining information about the child's developmental, medical, and academic history, family history, eliciting parents' input regarding the child's functioning, when they started noticing symptoms, and the degree to which they are affecting the child's life
- Teacher interview to obtain information about the student's academic, behavioral, and social functioning at school; the teacher may be asked to share information such as how and to what degree the symptoms and behaviors are causing the student impairment and interfering with success, the most problematic times and environments (for example, transition times, the playground), the child's strengths, interests, and motivators, the interventions that have been tried, and their degree of success
- Behavior rating scales and other scales or questionnaires filled out by parents, teachers, and others who know the child well or who observe and interact with the child frequently, such as a school counselor or special education teacher
- Direct observation of the student in the classroom (by someone other than the classroom teacher) and in other school settings (such as the playground or cafeteria)
- Review of cumulative school records (including report card grades and teacher comments, standardized assessment, diagnostic reports, school behavioral referrals)
- Academic measures, such as curriculum-based assessment, observation of student independent work performance, checking for number of assignments missing or incomplete
- Vision and hearing screening may be done at school.
- Other assessments, as indicated

Interpreting the Data and Next Steps

- Once the data is gathered it needs to be reviewed and interpreted—looking to see if *DSM-5* diagnostic criteria have been met for ADHD.
- For educational purposes, such as eligibility for a 504 accommodation plan, that is often sufficient. The ADHD screening and assessment procedures previously described are sufficient for determining if a student has “a physical or mental condition that significantly limits a major life activity,” which would meet the criteria under Section 504 to offer reasonable accommodations (*Lists 6.3, 6.5*).
- ADHD is a clinical diagnosis. In some school districts, the school psychologist or other professional is qualified to make the diagnosis for the purpose of determining eligibility for special education and related services under the special education law IDEA (*Lists 6.3, 6.4*).
- Other school districts require a physician’s statement in writing that the child has ADHD in order to be considered eligible for special education under OHI—other health impaired—criteria (*Lists 6.3, 6.4*). The school’s assessment data and summary is sent to the physician, who then makes the official ADHD diagnosis.
- The physician may also be asked to describe how the symptoms, which led to the diagnosis, might adversely affect the student’s educational performance.
- If the school team (which includes parents) determines that the ADHD symptoms are having an adverse impact on the student’s educational performance, the student would qualify under the federal law IDEA to special education and related services (*Lists 6.3, 6.4*).
- See *Lists 1.15, 1.16, and 1.17* for more related information.

Sources and Resources

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- Dendy, Chris A. Zeigler, Durham, Mary, & Teeter Ellison, Anne. (2006). *CHADD educator’s manual on ADHD*. Landover, MD: CHADD. (Section on stages of a comprehensive assessment of ADHD in the schools)

1.19 Multimodal Treatment for ADHD

Once a child is diagnosed with ADHD, there are many ways to help the child and family. ADHD is not something that can be cured, but it can be treated and managed effectively. A multifaceted or multimodal treatment approach is the most effective. It is important to keep the following points in mind:

- Parents are the primary case managers for their children. Once they receive the diagnosis, parents need to start the journey of becoming an ADHD expert—learning all they can about the disorder and research-based treatment options. Parents who become educated about ADHD are able to make the best-informed decisions regarding their child’s care and management.
- Most positive outcomes for youngsters with ADHD are achieved when parents, teachers, other involved school professionals, and treating medical and mental health providers have good communication and collaborate well (*Lists 7.1, 7.3, 7.8*).
- All parties involved in the care and education of the child with ADHD should be working together in establishing target outcomes (goals), formulating plans to reach the goals, and monitoring the effectiveness of the interventions being used.
- The two research-validated interventions known to be most effective at this time are *medication* and *psychosocial (or behavioral) therapy*. One, the other, or combination of both are the main treatments for ADHD. The scientific evidence clearly shows these are the treatments that make the biggest difference with regard to improvement of symptoms and degree of impairment. These interventions have been extensively tested with controlled studies and proven effective in managing ADHD (*Lists 1.4, 1.20, 1.22*).
- Educational supports and interventions are a critical component in the success of students with ADHD as well, which are described in lists throughout this book.
- There are additional complementary supports and interventions to enhance the plan and benefit the individual with ADHD (*Lists 1.23, 7.6, 7.7*).
- ADHD is recognized as a chronic condition (such as asthma) and follows a chronic care plan of action (AAP and NICHQ, 2002). This means looking at the long-term picture. Various supports and treatments may be needed throughout one’s lifetime or employed at different times in life as needed (for example, treatment from medical and mental health professionals, various school interventions, out-of-school tutoring or coaching). In addition, because of the long-term management involved, the treatment plan requires vigilance on the part of parents, educators, and health providers in monitoring and following up on the effectiveness of the plan and adjusting as needed.

Multimodal Intervention

Parent Training

This is a key and crucial component of ADHD treatment. Parents must learn and be provided with the following information to help them help their child:

- Accurate and reliable information about ADHD in order to understand the impact and developmental course of the disorder, the treatment options, and available resources
- A new set of skills for managing their child’s challenging behaviors

- Training in effective behavioral techniques and how to structure the home environment and other aspects of their child's life
- How to best navigate the educational and health care systems

Note: The Parent to Parent training program offered through CHADD is highly recommended. See www.chadd.org.

Medication Therapy (Pharmacological Intervention)

Pharmacological treatment is the use of medication to manage ADHD symptoms. Stimulant medications have been proven effective in treating approximately 70 to 90 percent of children with ADHD (Barkley, 2013; Brown, 2005). These medications work to increase the action of the neurotransmitters (brain chemicals) available in certain brain regions and circuits that are not working efficiently in individuals with ADHD. Some FDA-approved nonstimulant medications are also used successfully in ADHD treatment. Appropriate medical treatment requires well-managed and carefully monitored use of medication(s) for ADHD. When there are coexisting disorders, various medications may be prescribed in the treatment of those other conditions as well. See *Lists 1.4, 1.7, 1.8, 1.20, and 1.21*.

Behavior Therapy

- Behavior modification and specific behavioral strategies implemented at home and school are very important interventions for managing ADHD. This involves parents and teachers learning skills and strategies to manage the challenging behaviors of children with ADHD, such as how to provide clear, consistent structure and follow-through, effective use of rewards (to increase desired behaviors) and negative consequences (to decrease unwanted, undesirable behaviors).
- Behavior therapy provides specific techniques and interventions adults can implement, such as a token economy system or home-school daily report cards, and help in recognizing and adjusting the antecedents or triggers to problem behavior. Among the research-validated behavioral interventions for children with ADHD is the use of daily report cards (DRCs). See *List 2.9* for detailed information about implementing DRCs and other individualized behavioral interventions, examples of DRCs and other management forms in the appendix, and the many behavioral supports and strategies for parents and teachers found in lists throughout section 2.
- The research-based behavioral interventions for children with ADHD include those learned through parent training and implemented at home, those provided at school by teachers and other school personnel, and ones that the child learns to improve peer relationships. See *Lists 1.22 and 2.17*.

Educational Interventions

- *Differentiated instruction.* Teachers who recognize that one size does not fit all embrace the challenge of using multiple approaches in teaching the curriculum and enabling students to demonstrate their learning (*Lists 3.7, 3.8*).
- *Accommodations.* Teachers should provide accommodations (environmental, academic, instructional, behavioral) as needed to enable students to achieve success, whether they are done informally or as per a student's IEP or Section 504 accommodation plan (*Lists 6.4, 6.5* and lists throughout sections 2, 3, 4, 5, and 7 and lists throughout this book).

- *Special education and related services.* Some students with ADHD qualify for special education and receive an IEP and related services provided through the school district (*Lists 6.3, 6.4*).
- *Other school interventions.* Various supports and safety nets may be available at the school that students in general education are able to access, such as homework or organizational assistance, mentoring, peer or adult tutoring, school counseling, and RTI tier 1 and tier 2 academic and behavioral interventions (*List 6.1*).
- *Tutoring or academic supports.* Parents may pursue private tutoring or other academic interventions to help their child in specific areas of academic weakness, such as reading.

Other Psychosocial Interventions

- *Family counseling.* The whole family is often affected by issues relating to children with ADHD. Family therapy can address concerns that affect parents and siblings and improve family relationships.
- *Individual counseling.* Counseling can teach the child coping techniques, problem-solving strategies, and how to deal with stress or anger.
- *Social skills training.* This training is usually provided in small groups with curriculum addressing specific skills that children with ADHD tend to have difficulties with in their interpersonal relationships. The children then practice the skills they have learned in natural settings, receiving feedback and reinforcement (*List 2.17*).
- *Psychotherapy for teens and adults.* This counseling helps the person with ADHD who has a history of school, work, personal, or relationship problems talk about his or her feelings and deal with self-defeating patterns of behavior.
- *Vocational counseling.* This can be a helpful intervention for teens and adults.

Other Helpful Interventions

- *ADHD coaching.* This is a service that many teens and adults find beneficial in learning and applying strategies to be more focused and productive and to help them with organization and time management. Coaching generally assists with scheduling, breaking work tasks down into reasonable short-term goals, checking in regularly (for example, over the phone, Skype, or by text or e-mail), and keeping the ADHD client on target with his or her individual short- and long-term goals (*List 7.6*).
- *Support groups and opportunities to share with others and network.* Support organizations such as CHADD and the Attention Deficit Disorder Association (ADDA) are highly recommended resources. CHADD has local chapters throughout the United States, and such groups are an excellent source of information and support. Online chat groups and other vehicles to interact with others with similar concerns and experiences can also be very helpful (*Lists 7.9, 7.12*).
- *Exercise.* It is important for children and teens with ADHD to engage in sports, dance, or other physical activities. There are numerous benefits of exercise, such as enhancing mood, alertness, and self-regulation, having an outlet for their need to move, and others (social, recreational, self-image) derived from the challenge and gaining of new skills and competencies (*List 7.7*).
- *Develop and nurture their strengths and interests.* Very important to the child's happiness and successful future is to enable them to participate in activities such as arts and crafts, music, dance, sports, performing arts, scouts, or other areas of interest.

This is a very important part of a multimodal and therapeutic plan for children with ADHD—to help them find their strengths, and have areas in their life in which they shine (*List 7.7*).

- *Healthy diet and lifestyle.* Environmental factors can worsen ADHD symptoms. All children and teens (including those with ADHD) should be health conscious and have a well-balanced diet, high in nutrition (plenty of protein, fruits, vegetables). Nutritionists point out that a balanced diet can help control behavioral swings related to surges in blood sugar or hunger. Getting a good night's sleep is also very important but often problematic for many children and teens with ADHD. More outdoor activities as opposed to indoor ones (glued to a screen of some type) are good choices for everyone and may be even more important for those with ADHD (*List 7.7*).

Complementary Interventions

- There are some complementary treatments that may also be beneficial for some children, teens, and adults in a multimodal treatment plan, (such as mindfulness practices, neurofeedback and other brain training technology, and some dietary factors). See *Lists 1.23* and *7.7* for more on this topic.

Additional Points to Keep in Mind

- The intervention plan should be designed not just to focus on areas of weakness but also to help the child or teen recognize and build on his or her strengths (*List 1.10*).
- Parents need to become well-educated about evidence-based treatments for ADHD as well as their legal rights in the educational system. This is necessary in order to advocate effectively for their child in both the educational and health care systems.
- Children, especially teens, should be included as active partners in their treatment program so that they will be willing participants and cooperate. They need to understand the disorder, the reason for various interventions, and how those treatments are intended to have a positive effect on their daily lives.

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1.20 Medication Treatment for Managing ADHD

- Medications have been used safely for decades to treat ADHD. They do not cure the disorder but do help in controlling and reducing the symptoms. The most commonly used medications for treating ADHD are stimulants.
- There continues to be much attention (media sensationalism and public controversy) regarding the use of stimulant medication in treating children with ADHD. A great deal of misinformation exists, which makes it difficult for parents trying to make an informed decision.
- Parents need to consult with their physician or other medical professionals about any medication issues, questions, or concerns. This list of information is meant only as a general reference.

Stimulant Medications in the Treatment of ADHD

- Stimulant medications (the methylphenidates) have been regularly used since the 1960s in the treatment of children and adolescents with ADHD (although it was not called ADHD at that time). Stimulants have been studied more extensively than any other psychoactive drug prescribed for children. Hundreds of controlled scientific studies demonstrating their effectiveness in treating children with ADHD have been conducted.
- Stimulants have been used safely with millions of children for at least fifty to sixty years.
- Stimulants have been proven to work for 70 to 90 percent of children with ADHD. They are also effective in adults. There are very few people with ADHD who do not respond to stimulant medications, and the results can be very dramatic.
- Because the scientific evidence so strongly supports the effectiveness of stimulants in managing the symptoms and reducing impairment, they are recommended as the first choice of medications used in treating children with ADHD.
- There are two main classes of stimulants: the *methylphenidate* formulas (for example, Ritalin, Concerta, Methylin, Daytrana) and the *amphetamine* formulas (Adderall, Dexedrine, Vyvanse).

How Stimulants Are Believed to Work

- Researchers suspect that stimulant medications act to normalize biochemistry in the parts of the brain involved in ADHD (primarily the prefrontal cortex and related brain areas).
- Stimulants increase (or stimulate) the production of neurotransmitters, which are the brain chemicals, to a more normalized level in these key brain regions.
- The brain chemicals involved are dopamine and norepinephrine. Scientists believe that medications that increase the availability of these neurotransmitters help nerve-to-nerve communication, thereby boosting the signal between neurons.
- The stimulants are thought to be working within the system involved in the release of these brain chemicals into the synapse (the gap between two neurons), and their

reuptake or reabsorption out of the synapse. Stimulants are believed to help in keeping the proper level of these neurotransmitters in the synapse long enough to do the job of transmitting messages from one neuron to the next efficiently.

- Stimulants (while in the bloodstream) work to activate the areas of the brain that are underactive and not working efficiently in those with ADHD. These are the regions responsible for attention, inhibition of behavior, regulation of activity level, and executive functions.
- *See Lists 1.2, 1.4, and 1.7* for more on this topic of brain differences in individuals with ADHD.

Stimulant Medications Prescribed for Treating ADHD

There are several stimulant medications. In the following list, the italicized name is the generic name, and the names in parentheses are the brand names. Also, SR stands for "sustained release," LA is "long acting," and ER and XR mean "extended release."

The Stimulants

- *Methylphenidate* (Ritalin, Ritalin LA, Ritalin SR, Concerta, Metadate CD, Metadate ER, Methylin, Methylin ER, Quillivant XR, Daytrana patch)
 - *Dexmethylphenidate* (Focalin, Focalin XR)
 - *Dextroamphetamine* (Dexedrine, Dexedrine Spansule, DextroStat, ProCentra)
 - *Mixed amphetamine salts* (Adderall, Adderall XR)
 - *Lisdexamfetamine dimesylate* (Vyvanse)
- Methylphenidates are among the most carefully studied drugs on the market. Thousands of children have been involved in research evaluating their use in the treatment of ADHD.
 - Each of the stimulants has a high response rate. A child who does not respond well (in symptom improvement) to one stimulant medication will often respond well to another.
 - Physicians have a number of possibilities of stimulants to choose from. The initial choice is generally a matter of doctor and parent preference. Some of the stimulant medications come in tablets or capsules to swallow whole, some are chewable or can be dissolved in liquid, others can be sprinkled on food like applesauce. Daytrana is a patch adhered to the skin, and ProCentra is a liquid.
 - The different stimulant prescriptions vary in their onset (when they begin working), how they are released into the body (immediately or over an extended or sustained period), and how long the effects last (from a few hours to as many as twelve hours).
 - The short-acting and immediate release formulas of the stimulants (such as Ritalin or Methylin) do the following:
 - Start to work about twenty to thirty minutes from the time the medication is taken
 - Metabolize quickly and are effective for approximately three to four hours
 - Reach their peak effect within one to three hours
 - Generally require an additional dosage to be administered at school

- May require a third dose (often a smaller one) to enable the child to function more successfully in the late afternoon and evening hours
- May be prescribed as an additional booster dose later in the day when a longer-acting stimulant wears off (to provide symptom relief in the late afternoon and evening)
- The longer-acting, extended release stimulants have a time-release delivery system. They work differently. These medications:
 - Take longer for the effect to begin
 - Vary from approximately five to eight hours of coverage for some of the medications to lasting as long as ten to twelve hours for others
 - Provide a smoother, sustained level of the drug throughout the day
 - Minimize fluctuations (peak and trough) in blood levels
 - Minimize rebound phenomena (a worsening of symptoms as the effects of the drug wear off)
 - Eliminate the need for a midday dose at school, which is very beneficial for many children and teens, particularly those who are forgetful or embarrassed to take medication at school

About Stimulant Medications

- They take effect quickly (generally within thirty to sixty minutes).
- For some children, their initial prescription and dosage will work well. But many others require adjustments in dosage or trying others among the stimulant medications and formulas to get the best effect.
- For most children with ADHD taking a stimulant medication, once the optimal dosage has been found, they experience improvement (often very significant) in behavior and symptoms.
- Stimulants are found to improve the core symptoms (hyperactivity, impulsivity, inattention) and many of the secondary or associated problems these children experience (for example, oppositional behavior, difficult interpersonal relationships, and lack of work production and school performance).
- On a therapeutic dosage of stimulant medication, there are many positive effects that often occur: reduced disruptive behavior, emotionality, improved ability to get started on and complete assignments, paying attention, staying focused, producing work, following directions, interacting with others, tolerating frustration, as well as improved handwriting and academic accuracy.
- If a child isn't showing improved symptoms when treated with a stimulant medication, the physician will typically prescribe a different stimulant (among the several on the market)—which often does produce a positive response.

Side Effects of Stimulant Medications

- The side effects that are most common are appetite suppression, weight loss, and mild sleep disturbances. Some children may also experience headaches, stomachaches, irritability, moodiness, agitation, an emergence of tics, and a rebound effect (a worsening of symptoms as the medication wears off, such as irritability, less compliance, more activity).

- A small number of children develop or unmask latent tics (involuntary muscle movements) in the form of facial grimaces, sniffing, coughing, snorting, or other vocal sounds. *Note:* These are rare and in most cases tics do not continue if the medication is stopped.
- Most side effects from stimulant medications are mild, diminish over time, and respond to changes in dosage or the particular stimulant prescribed.
- Stimulant medication may cause some minimal growth suppression (one to three pounds lighter, one-quarter to one-half inch shorter), most notably during the first couple of years taking the medicine. However, research also indicates that by the third year of taking the medication, growth patterns tend to normalize, and most children will ultimately achieve normal height and weight as young adults.

The Titration Process

- Medication treatment begins with a titration phase: a trial period when the physician is trying to determine the appropriate medication and dosage. The correct dosage of a stimulant is determined not by the child's weight or age, but according to how efficiently his or her body metabolizes the medication, which varies in every child or teen.
- The titration process involves the following steps:
 - Starting with a very low dosage and raising it gradually while observing the effects
 - Close monitoring of symptoms and behavioral changes (at home and school) while progressively changing the dosages and sometimes adjusting the timing of medication administered
 - Trying to achieve the most improvement in symptoms and optimal effects from the medication with a minimum of side effects
- Parents and teachers must communicate with the physician and provide the feedback necessary for the doctor to determine the child's response to the medication so that benefits are being achieved at each dosage level and side effects are minimized (*List 1.21*).

Nonstimulants

- *Atomoxetine* (brand name *Strattera*) is the first nonstimulant approved by the Food and Drug Administration and was released in 2002.
- *Atomoxetine* works differently from stimulants. It is a selective norepinephrine reuptake inhibitor, believed to work by blocking the reuptake or recycling of norepinephrine and increasing the availability of this brain chemical in the affected areas of the brain. Whereas stimulants mostly work to improve the level of dopamine, *Strattera* works on increasing the norepinephrine level and activity.
- *Atomoxetine* has demonstrated effectiveness for improving ADHD symptoms in children and adults and may also help with oppositional and defiant behavior and anxiety.
- *Atomoxetine* has the advantage of providing smooth, continuous coverage for twenty-four hours. It can help functioning around the clock. It also is easier to reorder the medication because it is not a controlled substance.

- *Atomoxetine* takes weeks of daily use before it shows its benefits. Most common side effects are upset stomach (nausea, vomiting), sleep problems, fatigue, nervousness, and dry mouth.

Other Medications

- *Antihypertensives* (alpha agonists) are another type of drugs that are sometimes used in the treatment of ADHD. They include *guanfacine* (Tenex) and extended release *guanfacine* (Intuniv) and *clonidine* (Catapres) and extended release *clonidine* (Kapvay). Intuniv and Kapvay are more commonly prescribed for children.
- These medications may improve oppositional, defiant behavior, anxiety, aggression, and tics as well as ADHD symptoms.
- *Antidepressants*. Certain antidepressants have also been found effective in treating ADHD, particularly if a child is not responding to the stimulant or nonstimulant or shows signs of depression, anxiety, or tics, as well as ADHD. They are not, however, FDA approved as an ADHD medication.
- These antidepressants include the tricyclic antidepressants: *imipramine* (Tofranil), *amitriptyline* (Elavil), *desipramine* (Norpramin), *nortriptyline* (Pamelor and Aventyl) and the atypical antidepressant *bupropion hydrochloride* (Wellbutrin).
- The tricyclic antidepressants take some time to build up in the bloodstream and reach a therapeutic level.
- Besides helping improve symptoms of hyperactivity and impulsivity, they also help with insomnia, mood swings, anxiety, depression, tics, sleep disturbances, and emotionality.
- Some side effects of the tricyclic antidepressants are fatigue, stomachache, dry mouth, rash, dizziness, accelerated heart rate, and possible risk of cardiac arrhythmias.

Note: These are not all the possible side effects for the various medications in this list. Parents need to discuss risks and side effects of any medication with their doctor and other medical resources.

Additional Information

- Every child has a unique response to medication, and it takes fine-tuning and patience to get it right.
- It is important that the medical professional parents choose to treat their child is very knowledgeable about ADHD and the various medications used in treatment for this disorder.
- Children with ADHD and coexisting disorders require more complex medical treatment, which may involve use of a combination of medications. Generally a specialist, such as a child and adolescent psychiatrist, with expertise in treating these complex cases is recommended.
- All medications can have adverse side effects. Parents need to be well informed of the risks versus benefits in any medical treatment.
- Dr. Kalikow (2013) offers this advice to parents in making a decision whether or not to try medication:
 - Start with a good evaluation by a trusted professional.

- Consider how your child might benefit from medicine.
- Get accurate information regarding the side effects.
- Don't feel rushed to make a decision. You have time to do your research and consider your decision.
- Know that your decision is reversible. If your child does not benefit from a trial of medicine, or experiences intolerable side effects, the medicine can be stopped.
- There are excellent resources about medication treatment for ADHD, including those listed below. Consult with your physician or other medical professionals.

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1.21 If a Child or Teen Is Taking Medication: Advice for School Staff and Parents

What Teachers Need to Know

- Parents do not easily make the decision to try their child on medication. They often are fearful of the long-term effects. In addition, they are frequently made to feel guilty by well-meaning relatives, friends, or acquaintances who are uneducated about proven treatments or biased against the use of medication because of misinformation.
- The school's role is to support any student receiving medication treatment and cooperate fully. School personnel need to communicate their observations so the doctor can determine the child's response to the medication. These observations and frequent feedback to the doctor are necessary particularly in the titration process when a new medication is started. This is critical for the physician to determine the right medication and dosage—one that is providing the desired symptom improvement with minimal side effects. During the titration stage, in which medication dosage (and sometimes timing) is increased every few days until the optimal dosage is determined, teachers will be asked for their feedback each time the dosage is adjusted.
- The teacher is an integral part of the therapeutic team because of his or her unique ability to observe the child's performance and functioning (academically, socially, and behaviorally) on medication during most of the day. Teachers will need to monitor and observe students on medication carefully and report changes observed, such as in these areas:
 - Work production (starting on and completing assignments)
 - Attention and on-task behavior
 - Listening and following directions
 - Focus and concentration
 - Restlessness and activity level
 - Impulsive behavior and self-control
 - Interpersonal relationships
- All students on medication for ADHD (regardless of how long they may be on the medication) need to be monitored for the effects of the medication during school hours. This is necessary to ensure that the child or teen is benefiting from the medication. For these students, teachers should also be prepared to share their feedback on the student's functioning (which will occur much less frequently than during titration periods).
- Physicians (or their office personnel) should be initiating contact with the school for feedback on how the treatment plan is working. Generally this is done through follow-up behavioral rating scales or other observational forms teachers are asked to complete.
- The doctor's office may send the teacher rating forms directly or parents may deliver the rating scales or medication forms to the school.
- Generally it is the school nurse who acts as the liaison between the parent and teacher in helping to manage the medication at school as appropriate. Coordination and communication between all parties involved is important for optimal results.

- Medications, dosages, and times to be administered are often changed or adjusted until the right combination is found for the child. It is important to communicate with parents and report noticeable changes in a student's behaviors. Sometimes parents do not disclose to the school that their child has started taking medication (or has had a change of medication or dosage) and are waiting to hear if the teacher notices any difference.
- Children metabolize medication at different rates. To ensure that the medication is providing coverage throughout the school day, take note of changes of behavior or problems occurring at certain times of the day (for example, in the afternoon).
- Teachers need to let parents (and school nurse, if available) know about any concerns that may be side effects of a medication. Children taking ADHD medications should be showing improved functioning and behavior and not experience a change in personality or appear sedated or lethargic. If so, the dosage may be too high or the child needs a different medication. It is important to share these observations so that the parent can let the physician know.
- Stimulant medications suppress appetite, and students with ADHD who take stimulants may not be eating much breakfast or lunch. They may get hungry at different times and would benefit from being allowed a snack if needed.
- Most students with ADHD who are prescribed medication are now taking the longer-acting, sustained release medications (*List 1.20*). This has helped significantly in terms of school responsibility and management of ADHD medications. Most schools no longer have a line of students in the office at lunch time to be administered their second dose of medication as was seen in the past (when other medication options were not available).
- There are still students who do take the short-acting stimulant medications. For those students, in which a dosage must be taken during school hours, it is important that the medication be given on time (as prescribed by the doctor).
- Be aware that some children experience a rebound effect when the medication wears off. When the next prescribed dose is not given on time, these children may be found crying, fighting, or otherwise in trouble on the playground or cafeteria, and disruptive on returning to the classroom. It takes approximately thirty minutes for the next dose of medication to take effect. Careful timing to avoid this rebound effect helps considerably.
- Students with ADHD have a hard time remembering to go to the office at the designated time for medication because of the very nature of ADHD and executive function impairment. It is the responsibility of the teacher or other school staff to help remind them discretely. Strategies for doing so may include a beeper watch or vibrating alarm, private signals from the teacher, pairing the medication time with a natural transition at that time (for example, on the way to the cafeteria), coded verbal reminders, as well as a sticker chart where the medication is dispensed, rewarding the child for remembering.
- Schools have specific policies and procedures for administering medication, for example, a signed consent form on file, medication in the original, labeled prescription container stored in a locked place, maintaining careful records of the dosage, time of dispensing, and person administering the medication.
- It helps if parents are reminded well before the school's supply of medication runs out so they have plenty of time to renew the prescription and deliver it to school.

- Teachers should see symptom improvement if a child is being treated with medication for his or her ADHD. However, medical treatment is just one leg of multimodal intervention for children and teens with ADHD (*List 1.19*). Educational interventions are critical to school success, and include the array of classroom supports and strategies (behavioral, instructional, academic) and other school-based interventions discussed throughout this book.

What Parents Need to Know

- If a child is taking medication, it is important that the child receives it as prescribed in the morning—on time and consistently—under parent supervision.
- Close monitoring and management of the medication is crucial. If it is administered inconsistently, the child is better off without it.
- Because appetite suppression is a common side effect, it is best to seek advice from the doctor regarding how to manage this, for example, planning for breakfast and other meals at times your child is most likely to have an appetite.
- When a child is on a long-acting medication, and the school isn't involved in administering a midday dose, some parents may be tempted not to inform the school that the child is taking a medication for ADHD. This is not advised. It is best to inform the school of any medical treatment for the disorder and not keep it a secret.
- It requires teamwork and close communication among the home, school, and physician for a child to receive the most benefits from medication treatment. Parents should be prepared to lead this communication effort to make sure that the doctor receives the necessary feedback from the school regarding their child's functioning on medication (*Lists 7.1, 7.2, 7.3*).
- Follow-up visits with the child's doctor are necessary for monitoring the medication's effectiveness.
- For appropriate medical care, the doctor needs to obtain feedback from you *and the school* when your child is on medication.
- As discussed in *List 1.20*, when a child is started on medication therapy, there is always a trial period when the physician is trying to determine the most effective medication and dosage. Some children are fortunate to quickly have that determined to give them significant symptom improvement. Others will take longer, and some will not benefit from or be able to tolerate the medication. However, in 70 to 90 percent of children with ADHD, medication is found to be effective. Parents should be prepared that this process will likely take some time to get it right and therefore should be patient. If one of the medications doesn't seem to work, chances are that another one will.
- Because the commonly prescribed stimulants are classified by the Drug Enforcement Administration as schedule II medications, there are strict laws regarding how they are prescribed and dispensed. The FDA has restrictions that pharmacists must follow. This makes it more difficult for refilling prescriptions. For example, the medication cannot be called in, and doctors can only write a prescription for one month at a time.
- It is important that parents pay close attention and communicate with the school nurse to make sure the school has the medication on hand if it is a short-acting stimulant prescription.

- See *Lists 1.4, 1.7, and 1.20* for research evidence regarding the effectiveness of medication therapy in the treatment of ADHD and about how medications are believed to work within the brain to relieve symptoms and improve functioning.
- Children should be counseled about their medication and why they are taking it. They should be aware that the medication is not in control of their behavior—they are, but that medication helps them (pay attention, get school and homework done, put on the brakes so they can make better choices, and so forth). There are various resources available that can help children better understand ADHD and why they are taking medication to treat it. Some wonderful books geared for children and teens that explain ADHD in kid-friendly, age-appropriate ways are shown in the “Sources and Resources” section of this list.
- Parents must educate themselves about medication treatment as well as the other multimodal interventions that are effective in managing ADHD (*Lists 1.19, 1.22, 1.23, 7.6, 7.7*). With regard to medication questions, parents should talk to their physician and ask all the questions they need as well as check other reliable resources, such as those in *List 7.12* and at the end of *List 1.20*.

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1.22 Behavior Therapy (Psychosocial Interventions) for Managing ADHD

- Behavior therapy is one of the two research-validated interventions proven most effective in the management of ADHD. Medication alone may be sufficient in reducing symptoms of ADHD and problematic behavior for some children. Behavioral therapy combined with medication therapy is often the optimal intervention for many children with ADHD, providing the greatest improvement in the child's functioning, behavior, and relationships. For any child not receiving medication, behavior therapy is essential to treat and manage the disorder.
- According to the American Academy of Pediatrics guidelines for treating ADHD in children (AAP, 2011), primary care physicians should prescribe behavior therapy as the first line of treatment for preschool-age children (four through five years of age), and for children ages six through eleven, the physician should prescribe FDA-approved medications for ADHD or evidence-based behavior therapy (administered by parents and the teacher) as treatment for ADHD—preferably both.
- Behavior therapy requires training of the parent and teacher in behavior modification techniques and the commitment of the adult to implement strategies learned. This is not easy; it takes time and effort, but the benefits are worth it.
- Behavior therapy helps adults improve children's behavior by learning behavioral principles and strategies to implement in managing problem behavior, with professional guidance.
- Behavior treatments work by teaching new skills to parents, teachers, and the children for handling problems and interacting with others. Adults teach the child or adolescent new ways of behaving by changing the ways they themselves respond to the child's or teen's behaviors (National Resource Center on AD/HD, 2004b).
- Behavioral and psychosocial interventions for ADHD may include the following:
 - Proactive parenting and classroom management and effective discipline practices at home and school (*Lists 2.1, 2.2*)
 - Parents and teachers using behavior modification techniques effectively (*Lists 2.8, 2.9*)
 - Communicating in ways to increase compliance—that is, helping the child listen to and follow parent and teacher directions (*List 2.4*)
 - Structuring the environment and being aware of antecedents or triggers to misbehavior to prevent problems at home and school (*Lists 2.3, 2.11*)
 - Using strategies to best deal with the challenging behaviors associated with ADHD in school environments and inside and outside the home (*Lists 2.6, 2.10, 2.13, 2.14, 2.15, 2.16*)
 - Classroom and schoolwide behavioral and social-emotional learning programs and supports (*Lists 2.15, 2.17*)
 - Improving the child's peer interactions and social skills (*List 2.17*)
 - Use of well-designed behavioral programs such as daily charts and school-to-home report cards, token economy programs, and individual behavioral contracts (*List 2.9* with examples in the appendix). *Note:* There are some of the behavioral charts from the appendix that can be accessed online and customized before printing.

General Principles of Behavior Modification

- Behavior modification techniques are a cornerstone of behavioral intervention for ADHD.
- It is based on the three-part A-B-Cs of behavior: A—antecedent, B—behavior, C—consequence. In general, the antecedent (A) is the situation, event, or stimulus that triggers the behavior (B). The consequence (C) is what occurs immediately after the behavior (B) is demonstrated. The consequence will either increase or decrease the likelihood of that behavior occurring again.
- Behavior modification is based heavily on learning how to recognize and adjust the antecedents or triggers that set off behavioral problems and thereby reduce or avoid them. It also works by learning to effectively use consequences to increase those positive behaviors we want to continue and encourage and decrease those negative, undesirable behaviors we want to reduce or eliminate.
- Techniques of behavior modification use incentive systems (such as points or token systems). Rewards are very important in improving behavior. They are particularly necessary for children with ADHD, who require more external motivation than other children typically need. Children and teens with ADHD also need more frequent rewards because their internal controls are less mature and they have trouble delaying gratification (*List 2.7*).
- Negative consequences or punishments are also effective and important in changing behavior, particularly use of time-out procedures and loss of privileges when they are implemented correctly and judiciously (*Lists 2.1, 2.2*).

Home-Based Behavioral Treatment

- Parents of children with ADHD must become far more knowledgeable and skilled in behavior management principles and techniques than other parents. They need training in how to cope with and handle the daily challenges and behavioral difficulties resulting from the child's disorder.
- Parent training is key to understanding the disorder and how to best manage it. Parent training programs incorporate techniques to improve parent-child interactions, decrease noncompliance, reduce behavior problems, and facilitate family communication patterns (Teeter, 2000).
- Parents learn preventive strategies (adjusting or manipulating the antecedents to misbehavior), instructive strategies (directed at providing the child with different and more appropriate ways to accomplish a goal), and consequence-based strategies, including effective use of rewards and punishments (Wolraich & DuPaul, 2010).
- Parent education can be conducted in group format or with individual sets of parents in training sessions over a series of weeks.
- Behavior modification training is typically for parents managing the behaviors of preschool and elementary school children. With adolescents, other techniques and skills such as behavioral contracting and problem solving are taught to parents and the teen (Wolraich & DuPaul, 2010).
- Parent trainings are generally provided in eight or more weekly or biweekly sessions, with specific strategies parents are to implement as homework between sessions.

- Parents typically learn strategies such as establishing daily routines, organizing and structuring for success at home, praising and giving positive attention for appropriate behaviors, giving effective directions and commands to increase compliance and cooperation, effective use of rewards and negative consequences, avoiding power struggles and conflicts, use of incentive systems (daily charts, point and token systems, school-home note systems).
- In order to effectively change their child's behavior, parents must also understand how behavioral principles operate on their own behavior. For example, frustrated parents often respond to children's misbehavior by giving consequences that actually increase rather than decrease that problem behavior's occurrence.
- CHADD offers a unique educational program called Parent to Parent (P2P), which is given in the community, online, and on demand, and is facilitated by a P2P trainer. (See www.chadd.org and information in *Lists 7.1 and 7.9*.)
- See Russell Barkley's book *Taking Charge of ADHD* (3rd ed.) (2013b) for an excellent summary of his recommended steps in parent training and his program for clinicians in *Defiant Children: A Clinician Manual for Assessment and Parent Training* (3rd ed.) (2013a).
- Some other model programs for parent training:
 - COPE (Community Parent Education Program) (Cunningham, Bremner, Secord, & Harrison, 2009)
 - Triple P (Positive Parenting Program) (www.triplep.net/glo-en/home/)
 - Incredible Years Parenting Program (<http://incredibleyears.com/programs/parent/>)
 - Parent-Child Interaction Therapy (www.pcit.org/)

School-Based Behavioral Treatment

There are a number of school-based behavioral approaches that have been found effective in decreasing problem behavior in children.

- School-based behavioral interventions are implemented by the teacher in most cases and involve the following actions:
 - Proactive classroom management (*List 2.1*)
 - Creating an ADHD-friendly classroom environment (*List 2.3*)
 - Preventing behavior problems during transitions and other challenging times of the school day (*List 2.10*)
 - Using class (group) behavior management systems (*List 2.8*)
 - Implementing individualized behavioral programs, supports, and interventions, such as daily report cards and behavioral contracts (*List 2.9*)
 - Implementing targeted strategies to help students with inattentive, off-task, impulsive, or hyperactive behaviors (*Lists 2.12, 2.13*)
 - Effectively managing students' anger, frustration, and poor self-regulation (*List 2.15*)
- School districts throughout the United States are shifting their focus toward promoting positive behavior and away from reacting to negative behavior in a systematic and structured whole-school effort. This involves modeling and teaching in all classrooms and schoolwide the rules and expected behaviors, creating a supportive and

consistent environment for all students, and employing a number of early intervention strategies (*The Special Edge* editors, 2014).

- Many schools are now implementing a multitiered system of support (MTSS), which is a continuum of increasingly intense supports for students. Schools that use an RTI model and a Positive Behavioral Interventions and Supports (PBIS) model, which are both MTSS models, are well designed to provide effective behavioral treatment to students in need. See *List 6.1* on RTI and *Lists 2.9 and 2.17* on PBIS.
- PBIS schools, for example, teach and reinforce prosocial behaviors as a tier 1 intervention for all students, and provide more targeted and intense supports (tier 2 and tier 3) as needed by individual students, with close monitoring of student responses to the interventions to ensure that all students receive the level of help they need.
- An effective program for preschool is Teaching Pyramid, developed at Vanderbilt University Center for Social and Emotional Learning (<http://csefel.vanderbilt.edu>). It promotes the healthy social-emotional development of young children (*Lists 2.17, 7.4*).
- For an outstanding program and model proven highly effective in transforming public schools in communities with high levels of needs, see Turnaround (<http://turnaroundusa.org/>). Turnaround creates a partnership with schools that accomplishes the following:
 - Builds a high-capacity student support system that gets all children, including those with intense needs, help either in school or in partnership with a community-based mental health provider
 - Trains all teachers in proven classroom strategies that foster a safe, engaging learning environment and strong student-teacher relationships
 - Works with school leaders to drive schoolwide improvement, aligned to Common Core State Standards and district guidelines, and creates a high-performing culture that involves the entire school community
- Another very useful school-based behavioral intervention is a functional behavior assessment (FBA), which is a procedure to gather and analyze data to determine the ABCs of the student's problem behavior. Then, based on that information, a behavioral intervention plan (BIP) is designed. Strategies address the antecedents (such as adjustments made in the environment, skill, performance demand, or teacher-student interactions) in order to prevent problems. The plan also addresses the consequences to the problem behavior (changing the responses or reactions to the behavior) and teach the student more appropriate replacement behaviors to use instead of what they are doing. See *List 6.6* for more on FBAs and BIPs.

Child-Based Behavioral Treatment

- Child-based interventions focus on peer relationships. They usually occur in group settings, such as classrooms, small groups at school, in office clinics, and summer camps (National Resource Center on AD/HD, 2004).
- Child-based treatments involve coaching, modeling, role-playing, feedback, rewards, and consequences. They all involve a lot of practice of skills taught in natural settings in which the child is interacting with peers (*List 2.17*).
- Research-validated child-based interventions involve teaching, practicing, and reinforcing prosocial skills and behaviors. They do not include play therapy and talk therapy approaches.

Note: A leading authority on psycho-social (behavioral) interventions for children with ADHD is Dr. William Pelham, Jr. It is recommended to listen to or read the transcript for his CHADD Ask the Expert chat (with the link below) and view the free resources that Pelham and his team developed, available online at http://ccf.buffalo.edu/resources_downloads.php

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1.23 Alternative and Complementary Treatments

Based on decades of research and scientific evidence, medication and behavior therapy are proven most effective in the treatment of ADHD and are, therefore, the primary treatments recommended by the experts and the major national professional organizations and associations. There are many other treatments parents may also hear about that supposedly cure or significantly help children with ADHD. It can be quite enticing to parents who hear that a certain nonmedical product or treatment can improve their child's behaviors and symptoms.

- Complementary treatments are those that are used *in addition to* the standard treatment of FDA-approved ADHD medication and behavioral therapy for added benefit and improved functioning. There are several complementary interventions that may be helpful for individual children and teens and could be part of his or her multimodal treatment plan.
- Complementary interventions that are recommended by experts include a well-balanced diet, exercise and some of the other healthy, therapeutic ways to help manage symptoms and feel good, such as meditation and mindfulness practices, and outdoor green time (*List 7.7*), and interventions such as ADHD coaching (*List 7.6*), academic tutoring, or study skills training as needed.
- Alternative treatments, however, are those that are used *instead of* the proven ADHD treatments of medication therapy or behavior therapy and most likely will not have a significant positive effect on the child's symptoms and functioning.
- Many parents are reluctant or opposed to treating their child with medication. The many advertisements in magazines, TV, radio, or the Internet making claims about various products or treatments that cure ADHD symptoms can sound very convincing and believable.
- Parents need to be cautious and informed consumers when considering alternative treatments. Be aware of the following:
 - Most make their claims based on a small sample of people supposedly studied.
 - Most tend to use testimonials in their advertisement of the product and do not have reputable scientific evidence to support its effectiveness or back up their claims.
 - Although they may cite a few studies as evidence, these studies are not controlled research that meets the scientific standards for evaluating treatment effectiveness. This would require, among other things, proper controls and random assignment of test subjects, measurement techniques enabling the scientific community to evaluate the findings, peer reviews by other professionals prior to publication of results in scientific journals, and replicated studies by other teams of researchers to see if they achieve similar results.
 - Various so-called natural products may be harmful because they have not been through rigorous scientific testing for safety.
 - Any treatment that is advertised as miraculous or groundbreaking is generally bogus.
 - Some of these treatments have been discredited, some lack the scientific evidence to back up their claims, and some show promise but warrant further study and for now remain unproven.

- It is very important to talk to your doctor about any alternative or complementary treatment you are considering for your child.
- A number of alternative treatments have been claimed to be effective in treating ADHD. Those without scientific evidence or that have been disproven include: supplements of megavitamins and antioxidants, chiropractic adjustment and bone realignment, optometric vision training, antimotion sickness medication, vestibular stimulation, herbal remedies, treatment for Candida yeast infection, and others.

Other Complementary Treatments That May Have Benefit for Children and Teens with ADHD

Neurofeedback (EEG Biofeedback)

- Neurofeedback, also called EEG (electroencephalogram) biofeedback, has been used as a complementary or alternative treatment for ADHD for a number of years.
- "Neurofeedback is based on findings that many individuals with ADHD show low levels of arousal in frontal brain areas, with excess of theta waves and deficit of beta waves. Supporters of this treatment suggest that the brain can be trained to increase the levels of arousal (increase beta waves and reduce theta waves) and thereby reduce ADHD symptoms" (National Resource Center on AD/HD, 2008b).
- Brain exercises take place during a series of treatment sessions in which the child wears headgear lined with electrodes and performs video games and computerized tasks while brain wave activity in the frontal lobe (the part of the brain that is under-aroused in those with ADHD) is measured. The treatment is supposed to increase the activation of brain waves in that part of the brain and train patients to eventually produce the brain wave patterns associated with focus on their own.
- During neurofeedback, the brain is observed from moment to moment through an EEG. The information is shown back to the person through a video game that reflects the brain wave activity.
- Neurofeedback is intended to train the child with ADHD to increase and decrease various types of brain wave activity associated with ADHD (such as sustained attention).
- Neurofeedback has been controversial because of limited scientific support from controlled studies and random assignment of subjects.
- In recent years there has been more controlled research support with emerging evidence that neurofeedback may be beneficial in reducing symptoms of ADHD. Dr. Rabiner (2014) reports on two recent studies (Duric et al., 2012; Meisel et al., 2014) that he says provides strong new support.
- Although there is not yet sufficient scientific proof, and research is not conclusive, there is growing support and a number of experts in the field believe that neurofeedback does hold promise (particularly as a complementary treatment, when used along with medication).
- Neurofeedback for ADHD generally involves about forty to eighty sessions, in thirty-minute time frames, and is an intensive, expensive treatment.

- For more on this topic, see the National Resource Center on AD/HD information on neurofeedback (EEG biofeedback) and ADHD (<http://help4adhd.org/documents/WWK6A.pdf>) and other sources and resources provided in the "Sources and Resources" section of this list.

Other Brain Training Technology Interventions

In recent years various software programs and technologies have been developed to help train and strengthen certain cognitive skills that are weak in children with ADHD. These programs are based on the principles of neuroplasticity—that the brain and our cognitive functioning are not fixed but are malleable and changeable (like plastic) and can improve through systematic, intensive training.

Although still in its infancy, and much more research is needed to validate their positive effects, these types of programs show promise as possible useful complementary interventions. The following describe some brain-training programs that are being used at this time.

Cogmed Working Memory Training Program

- Cogmed (www.cogmed.com) is a well-known and well-researched computer-based program. The software is downloaded on the child's home or school computer. For five weeks, five days a week, an hour a day, the child completes exercises in a video game format.
- The video games, which are programmed to become increasingly harder, require the child to use cognitive skills involving working memory, for example, recalling a series of numbers in reverse order.
- This program was developed from research on Swedish cognitive neuroscientist Dr. Torkel Klingberg, a cofounder of Cogmed. RoboMemo is another name for the Cogmed program.
- Cogmed is used by a range of licensed professionals, including clinical psychologists and psychiatrists as well as educators and is used at home with coaching support from a trainer who calls once a week to check in, troubleshoot, and encourage the child. (*ADDitude Magazine* editors, 2008b, Gilbert, n.d.; Jackson, n.d.).

Activate by C8 Sciences

- The Activate program (www.c8sciences.com) also uses video games, combined with physical exercise, engaging the functions of the brain that are deficient in children with ADHD, such as attention, following directions, and response inhibition. It is available for home or school use (Barrow, 2013).
- Play Attention (www.playattention.com) is another computer-based program involving games. This differs in that it has an armband users wear that measures attention brain activity. Children can activate the cognitive games by applying full attention to get started. Then they can actually move game characters by focusing their attention. If they lose attention, the game will stop until they fully apply themselves again. It is played one hour a week at home, and there are telephone training and support.

iFocus Jungle Rangers

- Jungle Rangers (www.focusededucation.com) is at the core of iFocus, an interactive kids computer game called Jungle Rangers. Playing the game involves cognitive exercises to improve an aspect of attention or working memory.

Brainology by Mindset Works

- Brainology (www.mindsetworks.com/) is web-based interactive program that teaches students “growth mind-sets”—to see their abilities as malleable and to view mistakes and setbacks as learning experiences. Students participate in a series of lessons guided by middle-school-age animated characters and a brain scientist character that teaches them about the functions of the human brain, how thinking occurs, and how learning and memory work. It also teaches students about how they can change their own brains for better learning and school success (Katz, 2008).

Interactive Metronome Training

- Interactive metronome training is a relatively new intervention for individuals with ADHD. It is a computerized version of a simple metronome that produces a rhythmic beat that individuals attempt to match with hand or foot tapping. Auditory feedback is provided, which indicates how well the individual is matching the beat. It is suggested that improvement in matching the beat over repeated sessions reflects gains in motor planning and timing skills (National Resource Center on AD/HD, 2008a).

Regarding Brain Training Programs

- All of these programs are intended as adjunct, complementary interventions to be used in addition to, not instead of, medication or behavior therapy to target skills that may not be adequately addressed with standard ADHD treatment.
- Parents and educators are advised to do their own research before purchasing or using any of these programs.

Dietary Factors and Interventions

- The popular belief that ADHD is because of too much sugar has been studied extensively. Research, however, since the mid-1980s shows that there is no significant link between sugar and ADHD (Barkley, 2013). Common sense would suggest that reducing sugar consumption would be a healthy choice for all children as well as adults.
- “Several dietary factors have been researched in association with ADHD, including sensitivities to certain food chemicals, deficiencies in fatty acids (compounds that make up fats and oils) and zinc, and sensitivity to sugar. No clear evidence has emerged, however, that implicates any of these nutritional factors as risk factors for developing ADHD” (University of Maryland, 2013).
- A substantial amount of research testing the theory that chemical food additives and preservatives may cause ADHD has not produced evidence that normal children develop ADHD by consuming such substances or that children with ADHD are made considerably worse by eating them (Barkley, 2013).
- The conclusion of the scientific community based on research to date is that artificial food dyes are not a major factor in ADHD, although a small subset of people

diagnosed with ADHD who also have food hypersensitivities may respond well to a diet eliminating food dyes or other irritating foods (Hughes, 2011).

- Food sensitivities do not appear to be a specific problem for most patients with ADHD, but more recent studies suggest a small effect for all children regardless of whether or not they have ADHD (Goodman, 2008).
- Because some children may have food sensitivities, such as to gluten, eggs, nuts, soy, or dairy, parents who suspect their child may be sensitive to certain foods may want to experiment with an elimination diet of those suspected culprits to see if behavior improves when doing so. According to Dr. Sandy Newmark (2012), eliminating certain foods from the diet can significantly help some children with ADHD. He also says that this approach should be part of a program that is used in conjunction with ADHD medication and other interventions. It is advised that parents consult with their child's physician before trying an elimination diet.
- There are dietary approaches that are beneficial for children and teens with ADHD and are recommended by many doctors and other experts.

A Well-Balanced Diet

This is important of course for all children. Because ADHD medications may cause loss of appetite, some children may not be eating enough of the foods that provide them with all of the nutrients they need. Parents should speak with their physician or a nutritionist in this regard.

Proteins

- Protein is digested more slowly than carbohydrates and stabilizes blood sugars. Proteins can prevent surges in blood sugar, which may increase hyperactivity (Barrow, 2008).
- Foods rich in protein are used to make neurotransmitters, the chemicals released by our brain cells to communicate with each other. Protein in the morning for breakfast is highly recommended (*ADDitude Magazine* editors, 2008a).
- A child who eats some protein at breakfast will have more stable blood sugar levels in the morning compared with children who eat only carbohydrates and fat, which should help a child focus in the classroom (Newmark, 2013).

Omega-3 Fatty Acids

- Omega-3 fatty acids are important in brain and nerve cell function and increase the level of dopamine in the brain. It seems to improve mental focus in people (*ADDitude Magazine* editors, 2008a; Barrow, 2008).
- There may be some evidence supporting Omega-3 fatty acid supplements as beneficial for individuals with ADHD (Barrow).
- We must get Omega-3s from food and supplements regularly because our bodies are unable to synthesize them on their own. Edward (Ned) Hallowell (2013) recommends that if you use a fish oil, make sure it is pharmaceutical grade and free of contaminants.
- Again, consult with your doctor first before adding a supplement.

Vitamins and Minerals

- Deficiencies of several minerals (zinc, iron, and magnesium) can worsen symptoms of inattention, impulsivity, and hyperactivity. Zinc is involved in the regulation

of dopamine (*ADDitude Magazine* editors, 2008a). If concerned, consult with your child's doctor. Do not take zinc supplements without supervision of a doctor.

- Iron is necessary for producing dopamine. A small study indicated that low levels of iron correlate with inattention (*ADDitude Magazine* editors, 2010). If you suspect your child has low levels of iron, talk with your doctor. The safest way to increase your child's iron level is through diet, not supplements.
- Vitamin C helps regulate the synapse action of dopamine, a key neurotransmitter needed in treating ADHD (Hallowell, 2013). Hallowell advises that it is best to get vitamin C from food. Because vitamin C may affect how ADHD medication is being absorbed, consult with your child's physician in this matter.
- A daily multivitamin that contains the recommended daily allowance of key vitamins and minerals may be the best way to ensure that a child is getting sufficient nutrients. This is a regular, simple multivitamin—not megavitamins (which may be harmful).

Note: Again, parents are advised to consult with their physician and other resources before embarking on any alternative or complementary treatments.

Sources and Resources

For reliable information regarding alternative and complementary interventions, go to these websites: National Resource Center on AD/HD (www.help4adhd.org) and National Institutes of Health, National Center for Complementary and Alternative Medicine (<http://nccam.nih.gov>).

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