

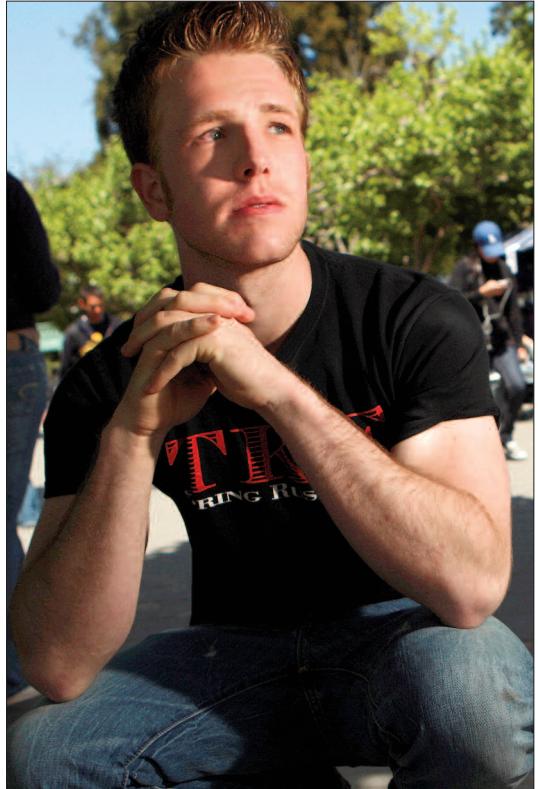
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Treating ADHD

Are attention disorders overdiagnosed?

Once viewed chiefly as affecting grade school-age children — chiefly hyperactive boys — attention deficit hyperactivity disorder (ADHD), which makes it difficult to focus attention and control impulses, today is widely seen as a lifelong condition affecting both genders equally. As more and more children, adolescents and adults are diagnosed with ADHD, prescriptions for stimulants such as Ritalin and Adderall to fight the disorder are soaring. Yet many experts say that while stimulants temporarily ease symptoms, they do nothing to improve academic or work performance or social skills, and some worry the condition is being overdiagnosed. At the same time, non-drug treatments remain under-used. The increased availability of stimulants, which are addictive, is fueling prescription-drug abuse among students and others who do not have ADHD but use the drugs as study aids or to get high.



Blake Taylor, a student at the University of California, Berkeley, began taking medication for ADHD at age 5. ADHD is widely seen today as a lifelong condition affecting both genders equally.

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Treating ADHD

BY MARCIA CLEMMITT

THE ISSUES

Patricia Quinn, a pediatrician in Washington, D.C., specializes in attention deficit hyperactivity disorder (ADHD), and she has lots of personal experience to back up her medical training. Quinn is a self-described classic example of an adult ADHD sufferer who struggles with organization, focus and time management. She's also the mother of four children, three of whom also have ADHD.

"I've forgotten to pick up my kids from soccer practice," she says. "I interrupt a conversation to finish a conversation we were having three days ago." And without her business partner's help, she says, she'd often commit them to more clients and projects than they could reasonably handle.

Quinn didn't fully realize how hard it was for her to focus her attention until she was in medical school in the 1960s. Despite being a high achiever, "I had to reread and reread and reread" to get the full meaning of texts, she recalls. She didn't identify her problem as ADHD until much later, however.

That wasn't unusual. In the '60s, doctors were only beginning to identify the mental traits of hyperactivity, impulsiveness and attention-focusing problems as a psychiatric disorder. They called the condition "minimal brain dysfunction" and diagnosed it only in children, primarily below the age of puberty. Today, psychiatry holds a different view. Adults are increasingly diagnosed with ADHD, which many specialists view as a lifelong condition rather than what it used to be con-

sidered: a developmental problem that children outgrew in their teens.

Like most mental disorders, ADHD is diagnosed by observations of behavior, not physical abnormalities. Brain imaging and genetic studies have turned up clues about brain regions and functions that may be involved in ADHD, but no consensus exists about its cause.

As more and more adults are diagnosed with ADHD, so too are increasing numbers of children and teens. Driving the increase is growing pressure on



Getty Images/The Washington Post/Caitlin Teal Price

Michelle Suppers, a mother of two in Manassas, Va., gets her eldest son, Anthony, started on his homework as soon as he comes home from school so he doesn't get distracted. When she learned he had ADHD, Suppers also underwent testing and found she too has the condition. Nearly 10 percent of children ages 4-17 have been diagnosed with ADHD at some point in their lives.

children to succeed in school, many scholars say.

Prescriptions for Ritalin, Concerta, Adderall and other stimulant drugs — long the first-line treatment for ADHD — also are increasing. For some medical experts as well as parents, that stirs fears that the amphetamine-like drugs could cause unforeseen health problems, if taken long term. And some worry about an epidemic of stimulant abuse as people without an ADHD diagnosis use the drugs to help them concentrate or to get high.

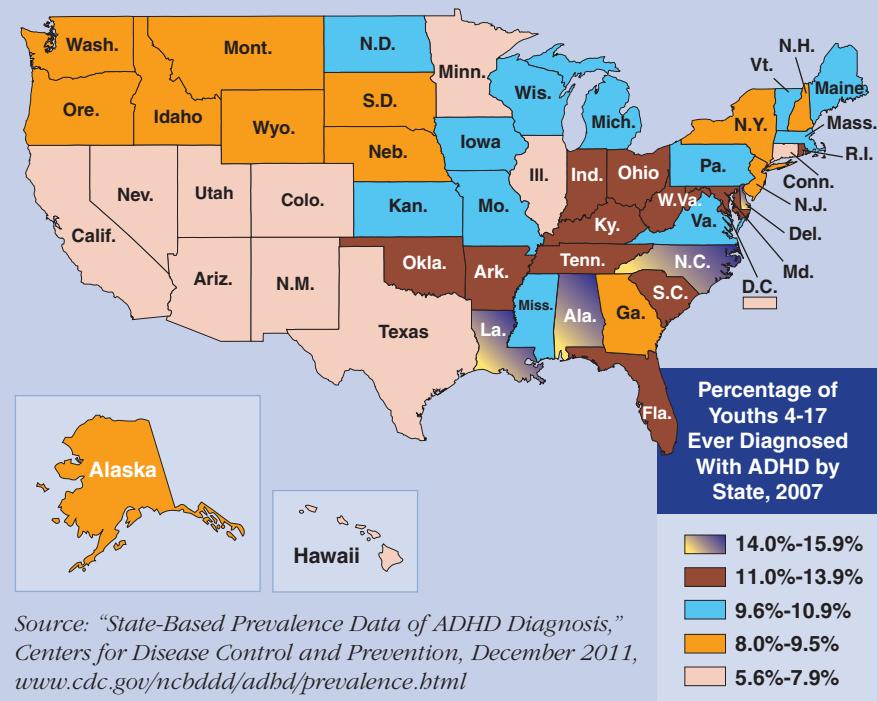
Over the past three decades, the number of children diagnosed with ADHD has soared, rising nearly eightfold between 1980 and 2007.¹ The percentage of children ages 4 to 17 diagnosed with ADHD increased at an average rate of 5.5 percent a year from 2003 to 2007.² In the mid- to late-1990s, the nationwide prevalence of ADHD among American children was estimated at between 4 and 5 percent.³ By 2007 — the most recent year for which the Centers for Disease Control and Prevention (CDC) has analyzed data — 9.5 percent of children, or 5.4 million, had been diagnosed.⁴

Because young boys are most likely to exhibit hyperactivity, adults and girls with ADHD often have gone undiagnosed in the past, says Quinn. About 13.2 percent of boys have had an ADHD diagnosis, compared to 5.6 percent of girls.⁵

But many specialists now say ADHD is probably about equally prevalent in both genders. They give more weight to attention problems as the hallmark of the condition than in the past, which helps to extend the diagnosis to adults

One in 10 Children Diagnosed With ADHD

Nearly 10 percent of children ages 4 to 17 have been diagnosed with ADHD. Diagnosis rates exceed 14 percent in Alabama, Delaware, Louisiana and North Carolina. Rates are far lower in the West.



and girls, who are less likely to be perceived as hyperactive, Quinn says.

For as long as ADHD has been diagnosed, however, some clinicians have debated the validity of diagnoses. Today a few clinicians still argue that no matter how many ADHD-type symptoms a person has they do not constitute an actual biological brain disorder that should be treated medically.

"ADHD is defined as involving hyperactivity, inattention and impulsivity. These are not diseases — they are disciplinary and educational problems," wrote Peter R. Breggin, a psychiatrist in Ithaca, N.Y. "Very often these children improve dramatically when parents develop a more consistent, rational and loving plan for discipline. . . . Or the child may be especially full of life and need more opportunity to run, to play and to be creative."⁶

However, most clinicians today seem

to agree that at least some people do have traits severe enough to warrant treatment. (*See box, p. 677.*) But intense debate continues over whether doctors are making the diagnosis too freely, whether medical researchers are defining the disorder too broadly and whether ADHD patients' prognosis is far less gloomy than the medical establishment contends.

It's hard to overestimate the areas of life in which children with ADHD may experience — and cause — difficulties, says Richard Milich, a professor of psychology at the University of Kentucky in Lexington. They are more likely to be held back in school, less likely to graduate and "they can be a discouraging presence in the classroom and can disrupt a whole class," he says.

Worse, "these children are often socially rejected by their peers, sometimes within five minutes" of meeting

them, Milich says. "The other kids hate them," perhaps because they have poor impulse control. "They act like younger kids. They both give and receive bullying." 7

Often, "in high school the problems get bigger," encompassing more out-of-school activities, Milich says. For example, when driving skills of young adults with ADHD are tested in a simulator, "their driving is equivalent to the way others drive under the influence of alcohol." Yet, they are "more confident in their driving" than others, he says.

Some experts, however, contend that the new notion of ADHD as a lifetime diagnosis is too extreme. Lawrence Diller, a developmental pediatrician in Walnut Creek, Calif., and author of the 2011 book, *Remembering Ritalin*, interviewed 10 of his former ADHD patients, now young adults, and found they had fewer coping difficulties than one might expect.

"The trend is unmistakable. These kids are getting better," he says. "Some of the most hyperactive kids I've ever seen were in this group," but in their late 20s most are settling into jobs and acquiring stable, productive life patterns "as they're finding what they like to do. One kid was in the penitentiary. But now he's a police officer." Only two of the 10 — "both perfectionists," Diller says — still take medication, while the others haven't taken ADHD drugs for years.

ADHD drugs for years. ADHD is no barrier to success. Grammy-winning pop singer Justin Timberlake, comedian Jim Carrey and swimmer Michael Phelps, the most decorated Olympic athlete of all time, for example, all suffer from the condition.

The first line of treatment for ADHD has long been prescription stimulants — amphetamines and similar drugs formulated as relatively low-dose pills such as Ritalin. Seven percent of U.S. children take a psychiatric medication, and most of the prescriptions are for ADHD.⁸

The drugs are effective at temporarily quelling ADHD symptoms such as hyperactivity and lack of mental focus.

"There are patients who are quite debilitated" by their ADHD symptoms, and stimulants help them "get an even playing field" for school and jobs, says Joshua Israel, a San Francisco psychiatrist and associate clinical professor at the University of California, San Francisco.

But others point out that stimulant drugs can be addictive and may carry cardiovascular risks if used over a long period.

Because many now see ADHD as a long-term illness that also affects adults, the "medications aren't being prescribed the same way they were 20 years ago," says Mark Stein, a professor of psychiatry and pediatrics at the University of Illinois at Chicago. Back then, virtually all prescriptions were written for children, who stopped taking the medications when they hit puberty. Today, Stein says, more people "are taking them for many years," and we "don't have data" on the safety of long-term use or use by adults.

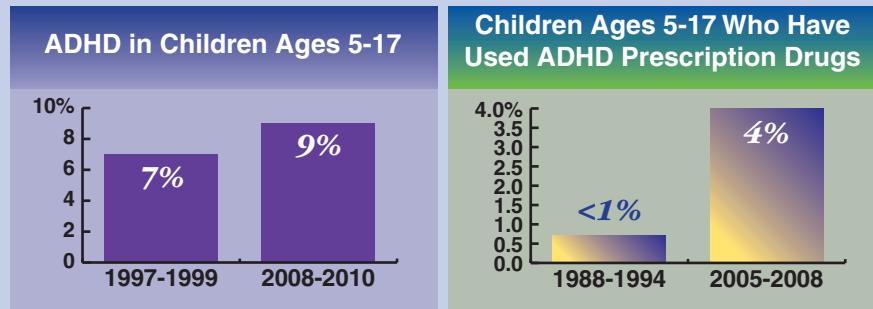
There also is "abundant evidence" that people who have not been diagnosed with ADHD take the drugs as mood elevators and performance enhancers, Nicolas Rasmussen, a professor of the history and philosophy of science at Australia's University of New South Wales, wrote in his 2008 book, *On Speed: The Many Lives of Amphetamine*.

"Reports of medication abuse have increased in step with attention deficit drug prescriptions," he wrote. And "the shift from misusing unprescribed Ritalin as an occasional study aid to straightforward abuse can happen easily." One Harvard student discovered the dangers of Ritalin abuse when she became "an absolute speed-freak — up all night and strung out all day," Rasmussen wrote.⁹ (See sidebar, p. 682.)

Stimulants can also constitute a too-easy answer to complex behavioral or learning problems, says Milich. While quelling symptoms may be useful, it doesn't help ADHD patients develop appropriate social responses and effective learning strategies, he says. The

Childhood ADHD, Drug Treatment on Rise

Nine percent of children ages 5 to 17 were diagnosed with ADHD between 2008 and 2010, up from 7 percent between 1997 and 1999. Use of ADHD prescription drugs among children rose from less than 1 percent from 1988 to 1994 to 4 percent from 2005 to 2008.



Source: "Health, United States, 2011," National Center for Health Statistics, 2011, p. 29, www.cdc.gov/nchs/data/hus/bus11.pdf

lack of such skills may be a special problem for ADHD patients as they come of age in today's difficult job market. "In this economy . . . , it's harder and harder to just go out and grab a job," Milich says.

As ADHD diagnoses continue rising for children and adults, here are some of the questions being debated:

Is ADHD being overdiagnosed?

The percentage of children and adults with ADHD has risen steeply for two decades, causing some experts to argue that the condition is overdiagnosed. A minority of critics of the diagnosis go farther, arguing that ADHD-type traits should not be treated as a disease or disorder because the traits would be benign or might disappear altogether with proper response by teachers, parents and others.

Other analysts, however, argue that ADHD is clearly a biological condition and that, while some diagnoses are "false positives," many people who would benefit from treatment have never been told they have ADHD.

No brain scan or other medical test confirms ADHD, say critics of the diagnosis.

"The evidence for an organic basis for most children who are diagnosed with ADHD remains elusive," writes Peter Conrad, a professor of medical sociology at Brandeis University, in Waltham, Mass. He said clinicians who are overdiagnosing ADHD are engaging in a "classic case of the medicalization of deviance" from what is considered normal behavior. "Even if one found some validated biopsychological differences," Conrad wrote, "the sociological question remains: Does difference mean disease?"¹⁰

Some recent research suggests that careless ADHD diagnoses are occurring. In Germany, where the rate of ADHD increased by 381 percent between 1989 and 2001, a recent survey of nearly 500 therapists found that many of the clinicians diagnosed ADHD based on too few criteria. Clinicians diagnosed ADHD in about 17 percent of the cases deemed by experts not to meet the criteria — compared to about 7 percent of cases in which clinicians missed signs of ADHD. Moreover, boys were incorrectly deemed to have ADHD more often than girls.¹¹

(The ADHD rate in Germany for children ages 3-17 is about 5 percent, roughly half the U.S. rate.)¹²

Cultural Expectations Fuel ADHD Diagnosis

School pressures help define normal behavior.

Millions of kids are restless, inattentive, disorganized and impulsive — but does that mean they have a psychiatric disorder?

Some scholars argue that it's wrong to label common childhood traits that way. Doing so, they maintain, is an abdication of the responsibility that parents, society and, especially, schools share to create environments in which children can function effectively.

"Hyperactivity is the most frequent justification for drugging children. The difficult-to-control male child is certainly not a new phenomenon, but attempts to give him a medical diagnosis are the product of modern psychology and psychiatry," wrote Peter R. Breggin, an Ithaca, N.Y., psychiatrist and long-time critic of labeling children as having ADHD.¹

But Breggin is in the minority. More and more clinicians argue that ADHD has a biological basis, although most also contend that cultural forces play a powerful role in defining ADHD-type traits as a disorder.

The fact that many cases are inherited demonstrates that ADHD is a biological illness, says Russell Barkley, a professor of psychiatry at the Medical University of South Carolina, in Charleston.

Studies of families show that genetics is responsible for about two-thirds of ADHD, he says. Most of the remaining third is due to other biological causes — mainly damage of various kinds to the front portion of young brains, often caused by mothers smoking or drinking alcohol during pregnancy, Barkley says.

Yet, Barkley also maintains that social environment does help determine what mental traits we view as psychiatric illnesses.

Before about the 18th century, when most people couldn't read, "there were no reading disorders," although the traits recognized today as reading disorders certainly existed in people of those times, says Barkley. "The same is true of ADHD," he argues. "Until society demanded that virtually all children and

A recent study of nearly a million children in western Canada found that the youngest in a class are more likely to be diagnosed with ADHD — at a rate of 7.4 percent, compared to 5.7 percent for the oldest children.¹³ That result "suggests younger, less mature children are inappropriately being labeled and treated," presumably because their immaturity is mistaken for the disorder, said lead author Richard Morrow, a professor of counseling psychology at the University of British Columbia in Vancouver.¹⁴

With growing pressure on children to perform well in school, "it's very easy and popular to give this simple diagnosis," says Diller, the California pediatrician. Furthermore, in upscale neighborhoods, private clinics can make good money selling ADHD therapies — proven or not — to parents anxious to raise high achievers, he says.

Other analysts say, however, that fewer people have been diagnosed with ADHD than actually are impaired by it, especially adults and females of all ages.

teenagers focus on academics for hours each day," ADHD-type traits existed but were not seen as a problem, he says.

Additional evidence of how academic pressure shapes ADHD diagnoses lies in state variations in ADHD rates, says Stephen Hinshaw, a professor of psychology at the University of California, Berkeley. For example, among 4- to 17-year-olds in North Carolina, 16 percent have had an ADHD diagnosis, compared to only about 6 percent in California — a nearly threefold difference, says Hinshaw. He says that most states with high ADHD rates were among the first to punish schools that did not raise student test scores.

Even the culture of an individual classroom can determine whether a child needs treatment, says Barkley. "If in second grade a child has a great teacher, he may be able to get off medications" for that year but resume treatment in another school year if the nature of the classroom makes concentration tougher, he says.

Still, Barkley maintains that while supportive school environments can make it easier for ADHD students to function without drugs, schools are not obliged to provide such environments. In the Americans With Disabilities Act — which requires institutions to make accommodations to assist disabled people, including those with ADHD — "there is a very important word," Barkley says. "It says that schools must make *reasonable* accommodations. Society can't afford every accommodation that is conceivable. We're not going to design a separate curriculum for every child."

— **Marcia Clemmitt**

¹ Peter R. Breggin, *Toxic Psychiatry: Why Therapy, Empathy and Love Must Replace the Drugs, Electroshock, and Biochemical Theories of the New Psychiatry* (1994), p. 277.

Once believed to be a condition that affected only children, ADHD is now estimated to afflict 9 million to 10 million U.S. adults, but fewer than 2 million have been diagnosed, says Israel, the San Francisco psychiatrist.

Historically, girls and women have been under-diagnosed because "we've focused on the hyperactivity," which shows up more in males, rather than problems with attention and organizing, says Quinn, the Washington pediatrician. "A lot of people still think girls can't have" ADHD, partly because girls often have quieter symp-

toms that may cause less trouble in classrooms.

Many experts say misdiagnosis — including both over- and under-diagnosis — is the real problem.

The average diagnosis occurs in “a 10-minute pediatric visit” after a teacher or parent perceives that a child is having problems, says Stephen Hinshaw, a professor of psychology at the University of California, Berkeley. “In a visit like that, you get tons of false positives and tons of false negatives,” he says.

For example, under-diagnosis may occur if a doctor concludes that, “Well, it can’t be ADHD because the child is sitting still in the [doctor’s] exam room,” says Hinshaw. That’s because ADHD’s “symptoms are context-dependent,” and a child’s ability to sit still in one situation doesn’t rule out having a damaging level of hyperactivity in another.

False-positive diagnoses can occur because doctors don’t take the time to rule out the many other conditions besides ADHD that may cause hyperactivity or attention problems, such as seizure disorders or abuse of some kind, Hinshaw says. “It’s so easy to prescribe a stimulant,” he says. Physicians’ professional societies “have good guidelines now” that could prevent most misdiagnosis, “but the guidelines don’t have teeth,” so they’re seldom consulted, Hinshaw says.

But debating the “correct” prevalence of ADHD is beside the point when the real need is to locate the children whose ADHD-type traits are causing them problems and find ways to help them, says William Pelham, a professor of psychology at Florida International University, in Miami. “I’ve never had a parent say, ‘I did a survey [of symptoms], so I brought in my child.’ They say, ‘I brought him because he won’t stay in his seat, he drives the teacher crazy.’ For that child, it doesn’t mean a hill of beans whether more or fewer children are diagnosed. The important question is: How many children are having problems in school?”

Those children should be located and offered help, Pelham says.

Are too many stimulants being prescribed?

Those who argue that ADHD is overdiagnosed worry mainly that stimulants such as Ritalin and Adderall used to treat the condition can create health risks, including addiction. Many ADHD specialists say, however, that stimulants are an important part of ADHD therapy and that studies have not shown significant safety risks. (A few nonstimulant drugs, such as Strattera, also are occasionally prescribed for ADHD; unlike stimulants, they are not believed to be addictive but do carry other health risks.¹⁵)

Up to 80 percent of those diagnosed with ADHD will need medications as part of their treatment, says Russell Barkley, a professor of psychiatry at the Medical University of South Carolina, in Charleston, and author of several books on ADHD. And stimulants are far from the only drug that people abuse, he says. “Are there some students on college campuses using Adderall when they don’t have ADHD? Yes. We need to be careful about that, but it’s also true for Viagra.”

“As a society, it is hard to see why it would be good for us to not let people succeed” when the drugs can help, says Israel, the psychiatrist from San Francisco. “This is not cosmetic pharmacology” aiming to make people “better than well.”

The largest long-term study of ADHD — the Multimodal Treatment of Attention Deficit Hyperactivity Disorder Study, funded by the National Institute of Mental Health in the 1990s — found that the medications are largely safe for children. Of 289 children who were randomly assigned to drug treatments, only 4 percent had significant adverse effects, mainly loss of appetite, sleep problems and crying spells. Children also grew somewhat more slowly while taking the drugs.¹⁶

In both Canada and the United States, some serious health problems among children, including heart attack and stroke — some fatal — have been reported. However, a large 2011 study spurred by the reports found the rates of such cardiovascular problems extremely low. Based on analysis of the medical records of 1.2 million children and young adults, researchers found “no increased risk” for the conditions.¹⁷

The researchers also analyzed data for about 150,000 people ages 25 to 64 who were currently prescribed ADHD drugs and again found “no evidence of an increased risk” of serious cardiovascular problems. However, because few adults have so far been prescribed the drugs, further study on safety for adults is needed, they said.¹⁸

Abuse of stimulants has turned some unwary people into “speed” addicts every time doctors began widely prescribing such drugs, says Diller, the Northern California pediatrician. “Every 20 or 30 years we find a reason” to use stimulants for medical purposes, and that’s “been followed each time by an epidemic of abuse.”

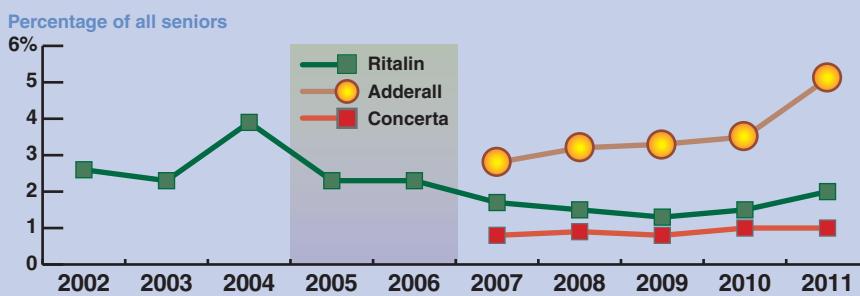
ADHD drugs are classified as “controlled substances” under U.S. and international laws. U.S. law lists the stimulants as Schedule II drugs — drugs that have accepted medical uses but also have “a high potential for abuse which may lead to severe psychological or physical dependence,” according to the Drug Enforcement Administration (DEA).¹⁹ Methylphenidate — a stimulant whose commercial forms include Ritalin and Concerta — “produces many of the same effects as cocaine or the amphetamines,” the agency says.

Methylphenidate’s increased use as an ADHD treatment is paralleled by an increased incidence of abuse, including as a snorted or injected drug, the DEA says. “Binge use, psychotic episodes, cardiovascular complications and severe psychological addiction have all been associated with methylphenidate abuse.”²⁰

More High School Seniors Turning to Adderall

More than 5 percent of high school seniors admitted in 2011 to taking Adderall without a prescription, nearly double the percentage in 2007. About 1 percent of seniors abused Concerta over the same period. Abuse of Ritalin declined since 2004 but is now trending up.

Non-prescribed ADHD Medication Use Among High School Seniors in Previous 12 Months, 2002-2011



Source: Monitoring the Future, University of Michigan Institute for Social Research, June 2012, p. 751, www.monitoringthefuture.org/pubs/monographs/mf-vol1_2011.pdf

A United Nations treaty — the Convention on Psychotropic Substances, which took effect in 1971 — urges governments to ban companies from advertising Schedule II drugs directly to consumers.²¹

In 2001, a British company, Celltech Pharmaceuticals, advertised its new methylphenidate-based drug Metadate in American magazines, and the DEA responded with a cease-and-desist order that called the ads a threat “to the public health and safety.”²²

Ultimately, the U.S. government did not ban direct-to-consumer advertising for Schedule II drugs. But the Food and Drug Administration (FDA) has continued to warn companies about misleading ads, and drug makers have confined much of their advertising to smaller outlets, such as websites and cable TV channels.²³ Currently, the FDA is reviewing public comments on a draft plan to require all TV ads for Schedule II drugs to be screened by the FDA before airing.²⁴

The ease of prescribing stimulants leads families to neglect deeper prob-

lems and longer-term solutions, some analysts contend.

“Stimulant drugs ‘work’ by suppressing all spontaneous behavior in normal children,” a consequence that “looks like an improvement in a classroom or home where the child has seemed uncontrollable,” wrote Ithaca, N.Y. psychiatrist Breggin. In fact, when children’s behavior becomes “age-inappropriate, excessive or disruptive, the potential causes are limitless, including: boredom, poor teaching . . . and underlying physical illness,” and these issues should be examined rather than symptoms merely quelled with medication, he argues.²⁵

“Multimodal” treatment — using drugs alongside parental training and training designed to help children foster social skills, learning strategies and the like — is by far the most effective approach to ADHD, many experts say.

Unfortunately, using drugs as the first line of treatment — the usual pattern — may mean the multimodal approach is never tried, says Florida International’s Pelham. In one study, a

group of children with ADHD was first prescribed stimulants and, later, their parents were offered training in effective techniques for dealing with ADHD. Only 15 percent of those parents ever took the training, Pelham says. By contrast, in families offered training first and prescriptions later, about 90 percent got the training.

“Drugs undermine parents’ willingness” to commit themselves to important behavior changes, Pelham says. “Medications are grossly overutilized compared to behavioral treatment.” But “there are no gigantic corporations that sell and make a profit on behavioral treatments, so nobody’s talking to pediatricians about using these things.”

Are ADHD therapies effective over the long term?

Behind every dispute involving ADHD treatments lies the big question: What, if any, therapeutic methods improve the lives of people who have more than average difficulty controlling their impulses and focusing attention on school or work?

Research shows that stimulant drugs effectively quell symptoms, experts say. Research also shows that training in social and learning skills as well as skills training for parents and teachers also help. But drug treatment does not have long-lasting effects against ADHD, and behavior-oriented strategies haven’t been fully researched and can be difficult for families and schools to adopt.

“Medications can help improve attention and decrease impulsivity,” says the University of Kentucky’s Milich. “They work on the symptoms.”

But research also shows that drug treatment doesn’t make a long-term difference for patients, says Berkeley’s Hinshaw, a researcher on the multimodal treatment study. Follow-up research on the study found that a year after being treated with drugs, children with ADHD had “lost 80 percent” of what they’d gained in symptom

alleviation; and after two years, their behavior was indistinguishable from that of children with ADHD who'd never received the recommended level of drug treatments, Hinshaw says.

"The moment the medication has worn off, all the benefits are gone," says Pelham, another researcher on the multimodal treatment study. This means that "medication has no long-term benefit at all" when it comes to learning, at least in the studies of grade-school students, whose classroom work is mostly simple drills. "All the studies on learning have failed to show anything" in the way of improvements, he says. It remains unclear whether results would differ for older students, who often perform more complex tasks in the classroom. Pelham says no such research has been done because too few middle school and high school students take the drugs.

In a study of children with ADHD who played baseball, stimulant drugs significantly increased their attention to the game "but didn't do anything for their play," says Milich.

In another study, Milich examined how well children with ADHD understood narrative stories — presented as TV programs to eliminate reading problems as a factor in the scores — before and after drug treatment, compared with children without ADHD. Following a narrative requires grasping the significance of "causal connections," and children with ADHD have been shown to be "somewhat impaired" in that skill, Milich says. After taking medication for two years the children with ADHD had not progressed in their ability to understand narratives, while those without ADHD had, Milich says.

Milich says quelling ADHD symptoms accomplishes nothing in the long term because "until you replace old behaviors with appropriate behaviors" the child hasn't progressed.

On the other hand, behavior-modification strategies, which have been

Symptoms of ADHD

Several behavioral signs have been shown to be characteristic of ADHD. Experts say the number of symptoms matters less than the degree of impairment. Most experts agree that if significant impairment appears in at least five or six of the following behaviors, additional evaluation is advised.

Screening for ADHD

Resisting distractions	Persisting toward a goal
Managing time	Managing emotions
Learning from experience	Completing work or tasks
Thinking or planning ahead	Self-monitoring
Avoiding procrastination	Accurately reading social cues
Sustaining effort	Remembering what to do
Getting started with work or tasks	Retaining and retrieving information
Controlling impulsivity	Sitting still
Organizing materials	Handling transitions
Demonstrating flexibility	

Source: "Screening Form," Center for Attention Disorders, 2009, www.centerforattentiondisorders.com/downloads/cad-screening-test.pdf

less extensively researched than drug treatments, have demonstrated long-term success in studies, many ADHD scholars say.

Hinshaw believes children with ADHD have abnormalities in the brain's dopamine system, which is thought to respond to rewards and punishments by sending signals that encourage the brain to repeat rewarded behaviors or avoid punished behaviors. "With behaviorally based strategies, you try to motivate kids who have [dopamine-system] problems," he says.

Such strategies may include consistently providing prompt and specific feedback on youngsters' behavior and classwork. Teachers, for example, can be coached to break each academic skill down into small steps and then provide clear and instant feedback as students perform each step.

One technique, called "the daily report card," is "hugely effective," says Stein of the University of Illinois. Children receive a daily assessment about their progress in improving specific

behaviors and accumulate points they can later redeem for rewards. Children with ADHD generally have difficulties in social relations with their peers, and Stein runs a summer camp that uses the report card to help. By meeting specific behavior goals related to social interaction, children earn points that they can redeem for a field trip the next week.

"The second week, they quickly realize what they need to do if they didn't get the trip," he says. If parents are trained in the same techniques and use them, the results last, Stein says.

Building new skills and finding effective work-arounds for ADHD-related deficiencies is key to helping adult patients, says Israel, the San Francisco psychiatrist. For example, he says he helps patients find software programs that will help them organize their lives and figure out "where they should keep their keys" so they don't forget them.

Unlike drugs, behavioral interventions have no side effects or health risks,

so they have little downside and potentially significant upsides, says Pelham.

Clinicians are careful to point out that today's effective behavioral interventions are not the same as the psychotherapeutic interventions that were widely used beginning in the 1950s in hopes of uncovering hidden emotional roots of ADHD. Diller, the California pediatrician, says the most popular was "play therapy," in which a patient and therapist played together with toys as a way of encouraging a child to uncover and work through anxieties or memories. As early as the 1980s, "it was generally conceded that [play therapy] didn't do anything" for kids with ADHD, Diller says. Despite that, some psychotherapists "continue to waste time and energy doing it," he says.

Many clinicians say the best approach to treating ADHD is combining judiciously prescribed medication with behavioral work carried out with the child and the child's parents and teachers.

In the multimodal treatment study, children who received combination treatment had less anxiety and better academic performance, parent-child relations and social skills, and they needed less medication, than the drug-only group, according to the National Institute of Mental Health.²⁶

"The gains can be amazing," but the complexity and cost of such treatment mean that "so few children can get that," says Stein.

But behavioral interventions remain hard to implement. Hinshaw says that to "have a fighting chance" of truly

ameliorating serious ADHD problems, behavioral work must be intense. That might mean "catching it at age 3 or 4 and doing 20 hours a week of training," for example.

A further difficulty is that ADHD is often an inherited trait, he says. "You've got to be a super-parent," who scrupulously keeps charts of children's behavior



AFP/Getty Images

Widespread stimulant use in the 1960s led to passage of the 1970 Comprehensive Drug Abuse Prevention and Control Act, signed into law by President Richard M. Nixon, left, here with National Security Adviser Henry Kissinger. The law placed restrictions on prescription stimulants and other drugs, and by the late 1970s stimulant abuse had subsided.

and rewards points, "doing it all calmly and without yelling," he says. That's not easy for anyone, "but what if you're a parent with the same problem?" ■

BACKGROUND

Disorder Defined

Over the past half-century, success in American culture has been increasingly defined in terms of educational achievement. It may not be surprising, then, that over the same

period traits that make it difficult for children to sit still at a desk or focus on lessons that bore them have increasingly been viewed as a significant disorder.

Yet, psychiatry has long struggled to define ADHD in terms of its key traits. What level of inattentiveness, restlessness or other characteristics is enough to classify someone as having a true psychiatric disorder? The question remains hotly disputed.²⁷

Before the 1960s, children with traits such as hyperactivity and a lack of focus were described in the *Diagnostic and Statistical Manual of Mental Disorders (DSM)*, medicine's mental-health diagnostic bible, as having a "minimal brain dysfunction." But the vagueness of that term didn't lend itself easily to diagnosis or to clear questions that medical researchers could explore.

Gradually, psychiatrists honed the definition in an attempt to "standardize the field so the condition could be recognized as a real entity that people could research because it was no longer amorphous," says Israel, the San Francisco psychiatrist.

The definitions have shifted over the years from a broad description of "a misbehaving child" to "something treatable," says Patricia Gerbarg, an assistant professor of clinical psychiatry at New York Medical College and a specialist in integrative mental health treatment, which promotes alternative therapies such as herbs and breathing exercises alongside traditional ones.

In 1968, the *DSM-II* made the first attempt at a specific definition, emphasizing hyperactivity in what the

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Chronology

1930s-1940s

Stimulant drugs gain popularity among college students.

1937

Charles Bradley, a psychiatrist at a Rhode Island mental institution, discovers that the stimulant drug amphetamine calms some severely disturbed children.

1948

College students use the stimulant Benzedrine, sold as a decongestant, as a study aid.

1960s-1980s

Medical interest grows in hyperactivity and attention problems.

1961

Stimulant drug Ritalin first used to treat hyperactivity.

1968

First definition of ADHD appears as "hyperkinetic reaction of childhood" in second edition of American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders (DSM)*.

1969

Experts declare a "stimulant epidemic" as 10 million Americans use the addictive drugs, either with a prescription or illegally, for weight control, performance enhancement or to get high.

1971

United Nations Convention on Psychotropic Substances seeks government bans on direct-to-consumer ads for stimulant medications.

1973

California allergist Benjamin Feingold tells American Medical Association

(AMA) that allergenic foods and synthetic food additives and dyes can cause hyperactivity.

1980

DSM-III shifts emphasis from "hyperkinetic reaction" to problems of inattention, renaming the condition "attention deficit disorder."

1990-Present

Newly named diagnosis of attention deficit hyperactivity disorder (ADHD) gains popularity for children and adults. Use of drugs for performance enhancement also soars.

1991

Activists convince an initially reluctant Department of Education to include ADHD as a disability that qualifies students for extra services.

1994

DSM-IV includes both inattention and hyperactivity in its new term, "attention deficit hyperactivity disorder (ADHD); patients with inattention, hyperactivity or both receive the diagnosis.

1998

Nearly 7 percent of U.S. children ages 5 to 17 diagnosed with ADHD.

1999

National Institutes of Mental Health study finds that stimulant drugs are generally safe for children and that children who receive both medication and behavior therapy do better in school and family relationships than those who get medication alone.

2006

A Food and Drug Administration (FDA) panel recommends that stimulant drugs for ADHD carry a "black box" label — the most serious

health caution — warning of cardiovascular risks; FDA rejects the label.

2008

American Academy of Pediatrics recommends that children be assessed for heart conditions before taking stimulants. . . . Sen. Charles Grassley, R-Iowa, accuses three Harvard Medical School ADHD experts — Joseph Biederman, Timothy Wilens and Thomas Spencer — of hiding drug company payments.

2010

ADHD prescriptions for children have risen 46 percent since 2002.

2011

Harvard Medical School disciplines the three ADHD experts for failing to disclose drug company income. . . . FDA rejects calls to ban artificial food dyes, which may trigger hyperactivity in some children.

2012

In a German study, doctors incorrectly diagnosed ADHD in 17 percent of cases where the condition was not present. . . . Canadian researchers report that the youngest children in a school classroom are diagnosed with ADHD much more often than older ones, likely because doctors confused ADHD with immaturity. . . . FDA reviews comments on a plan to require pre-approval before TV ads for Schedule II addictive drugs are aired. . . . Draft of *DSM-5*, due for final release in May 2013, further expands population eligible for ADHD diagnosis. . . . Psychiatrists estimate that between 9 and 10 million U.S. adults have ADHD; under 2 million are diagnosed. . . . Shortages of ADHD medications lead Drug Enforcement Administration (DEA) to raise caps on how much drug manufacturers may produce, despite DEA qualms about drug abuse.

Non-drug Therapies May Help With ADHD

A change in breathing “can have rapid effects on the brain.”

Medications such as Ritalin can bring immediate relief from the symptoms of attention deficit hyperactivity disorder (ADHD), but many experts say non-drug therapies are more effective at controlling the condition over the long term.

Yet, those therapies — which range from meditation and diet to one-on-one help from teachers — are often difficult to implement, researchers say, making pills the default choice for many patients.

ADHD problems “manifest themselves at home and school and should be treated in both places” because providing quick feedback that clearly connects behavior with a reward or penalty is crucial, says Julie Owens, an associate professor of psychology at Ohio University.

Researchers have found that classroom-management techniques such as careful, step-by-step instructions are effective for all students. But students who exhibit ADHD symptoms need additional help, such as a “daily report card” that provides instant feedback on student-specific goals. If teachers persist in these methods, “you get month-by-month incremental improvement” in students’ behaviors, Owens says.

Getting teachers to apply the techniques consistently isn’t easy, however. Teachers face heavy workloads, and many re-

port inadequate training in classroom management, Owens says.

What’s more, says Richard Milich, a professor of psychology at the University of Kentucky, “A teacher may even say, ‘Why would I invest the effort when I have all these great kids who don’t need these extra things?’” Owens points to a study in which all teachers initially used the daily report card. But over the course of a school year, only some continued to do so consistently while others nearly stopped altogether.

Some doctors are training ADHD patients in brain-altering techniques such as “mindfulness” meditation and “mind-body” approaches such as altering breathing patterns to enhance thinking.

ADHD is “a self-regulation disorder” that makes it difficult for sufferers to monitor and control their attention and impulses. Practicing mindfulness meditation — deliberately focusing attention on something specific and immediate, such as the sensations of breathing — can help ADHD sufferers stay focused, says Lidia Zylowska, a Los Angeles psychiatrist and a cofounder of the Mindful Awareness Research Center at the University of California, Los Angeles.

“We often recommend exercise for a physical weakness,” so it makes sense to do the same for mental capabilities, she says. Research to establish how mindfulness works in ADHD “is still

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manual dubbed a “hyperkinetic reaction of childhood.” In 1980, the *DSM-III* dubbed the condition attention deficit disorder, or ADD, shifting the definition from hyperactivity to problems in focusing attention, which likely affect more people. In 1994, in *DSM-IV*, the current definition appeared, labeling the illness as ADHD — attention deficit hyperactivity disorder — and distinguishing three subtypes: one consisting mainly of inattentiveness, one of hyperactivity and impulsivity, and one exhibiting all of those traits.²⁸

Widening Spectrum

More recently, some ADHD specialists have argued for dubbing ADHD a disorder of the brain’s “executive functions.”

Calling the condition ADD or ADHD “is like calling autism hand-flapping disorder,” says Barkley of the Medical University of South Carolina. “The names of the disease have trivialized it. What you’re really finding is a developmental delay in the self-regulating” regions of the brain — the areas, located mostly in the frontal lobe, that control thoughts, emotions and behaviors, he says. The development of those functions to full adult capacity is delayed by two to three years in children with ADHD, Barkley says.

Furthermore, he says brain imaging finds that in children with ADHD, the regions of the brain that perform these functions are 4 to 10 percent smaller and 25 percent less active than in other children. And while the brain structures may catch up in size to those of the average person by the time a person reaches the late teens or 20s, “the function doesn’t catch up” but continues to

be less robust than in the average person of the same age, Barkley says.

That view strikes a chord with some clinicians. “We’re talking about the management, the CEO of the brain — organizing and managing the functions for daily life,” says Quinn, the Washington pediatrician. The difference between people with and without ADHD is that “if you have two people whose desks are a mess, one can organize it if she has time, but the ADHD person, no matter how much time you give them, can’t organize the desk,” she says.

Others remain skeptical. Describing the condition as affecting the brain’s “executive function” is another theory into which clinicians try to fit the symptoms they observe, just like earlier definitions, San Francisco psychiatrist Israel says. “But people can’t even agree about what [the brain’s] executive function is,” he notes.

in an early stage," she says. However, studies have demonstrated that meditation can strengthen the brain's prefrontal cortex region, which manages the brain's regulatory functions, according to Zylowska.¹

A change in breathing "can have rapid effects on the brain," says Patricia Gerbarg, an assistant professor of clinical psychiatry at New York Medical College. A "communication system" called the autonomic nervous system "lets the brain know what's happening in every part of the body" and allows messages coming from the body to affect the brain, she explains.

While the system involves the heartbeat, digestive processes and more, the only function it manages that can be voluntarily changed is breathing, she says. For example, slowing breathing to five steady, rhythmic in-and-out breaths per minute calms anxiety, improves mental focus and allows the brain "to solve problems better," Gerbarg says.

Even children can learn the technique quickly, she says. After one training session, "they can get a CD for 15 bucks and practice at home for free. The kids like it. It doesn't matter what your mind is doing. All you have to do is breathe."

In the early 1970s, when the ADHD diagnosis was in its infancy, Los Angeles-based allergist Benjamin Feingold devised a diet aimed at quelling hyperactivity. The diet eliminates in-

However ADHD's traits are described, most researchers agree that they lie on a continuum, from normal to damaging and difficult to handle. But experts disagree sharply on whether current clinical standards deem too much of that spectrum as illness in need of treatment.

Largely because of the dominance of the pharmaceutical industry, psychiatrists have pushed the ADHD diagnosis beyond impaired people to include many who function normally, charged Allen Frances, a professor emeritus of psychiatry at the Duke University School of Medicine.

ADHD "consists of nonspecific symptoms . . . widely distributed in the general population: poor concentration, distractibility, impulsivity and hyperactivity," wrote Frances, who chaired the panel that assembled the *DSM IV*. "The kid who presents with classic early onset, severe [ADHD] is

unmistakable," while "most kids clearly do not have" the disorder, Frances wrote.²⁹

In between, however, it's tough to distinguish children with a clinical condition "from normal kids who are no more than extremely frisky and difficult to manage." Those kids in the middle have increasingly been diagnosed with ADHD, Frances wrote. "The epidemic started precisely when aggressive drug company marketing succeeded in 'educating' and sensitizing doctors, parents, and teachers to spot" illness "in kids previously considered to be on the normal side of the . . . boundary."³⁰

Drug Abuse

The vast majority of people diagnosed with ADHD are treated at some point with drugs, and most

ingredients to which Feingold hypothesized children might be overly sensitive: mainly naturally occurring organic chemicals called salicylates, found in foods such as blueberries and tomatoes, and artificial flavors, dyes and other additives that were new to American diets at the time.

The diet has been studied repeatedly over the years, and some researchers — and many families — have reported that it quiets some children's symptoms. But dietary research is hard to verify, and many analysts speculate that probably few children have these food sensitivities.²

The European Union requires foods with certain artificial colors to carry a warning about possible ADHD effects, but the U.S. Food and Drug Administration rejected such a warning last year.³ (See "At Issue," p. 685.)

— Marcia Clemmitt

¹ Stephanie Sarkis, "ADHD & Mindfulness: An Interview with Lidia Zylowska," *Psychology Today*, June 19, 2012, www.psychologytoday.com/blog/here-there-and-everywhere/201206/adhd-mindfulness-interview-lidia-zylowska-md.

² For background, see Matthew Smith, *An Alternative History of Hyperactivity: Food Additives and the Feingold Diet* (2011).

³ "FDA Panel: Studies Needed for Food Dye Side Effects, But No Warnings," AboutLawSuits.com, April 4, 2011, www.aboutlawsuits.com/fda-panel-food-dye-side-effects-17270.

ADHD medications are compounds related to amphetamine — a stimulant first formulated in 1887. The full effects of amphetamine-like drugs on the brain remain unclear. But, among other things, they may enhance the system through which the chemical dopamine — a major neurotransmitter active in functions including attention, memory, motivation, learning and the processing of punishments and rewards — carries messages through the brain. That stimulant drugs are used to treat people who already act overstimulated is an often-noted mystery. But, like most other drugs, stimulants found their medical use through the most common process used for drug discovery: trial and error. Even today, little is known about the actual cellular processes involved in most medical conditions and how chemicals interact with those processes, and ADHD and stimulants are no exceptions.

Students Abuse ADHD Drugs as Study Aids

Experts warn of potentially dangerous consequences.

As a double major at Rhode Island's Brown University, "Sarah" (not her real name) takes a rigorous course load to ensure she'll graduate within four years. Not only that, but she engages in summer internships and plans to study abroad in the fall.

To keep it all going, Sarah, a senior, admits to taking Adderall, a highly addictive amphetamine, twice a week, which she obtains without a prescription from fellow students, whose doctors prescribed it for attention deficit hyperactivity disorder (ADHD).

Illicitly obtained prescription stimulants increasingly are used as study aids — and sometimes to get high — on college campuses. Research conducted at 119 U.S. colleges in 2001 found that, on average, one in 25 students had used Adderall or another prescription stimulant in the past year, with a dozen schools reporting a 10 percent or higher usage rate.¹ Six years later, a study at a large, public research university found that about one in three students said they had illegally used Adderall or some other prescription stimulant.²

Sales of Adderall, in a class of stimulants known colloquially as "speed," are regulated because the drug is classified by the U.S. Drug Enforcement Administration as a Schedule II substance, meaning it has a high potential for abuse and psychological and physical dependence.

However, it is readily available for about \$3 to \$10 per pill from other students, according to Sarah, although prices rise during midterms and finals, when "people are rushing to get it. It's almost a desperation."³

Darlene Trew Crist, director of news and communication at Brown, says the university is aware that some students are abusing Adderall and that those caught illegally distributing drugs at

Brown are subject to immediate suspension or expulsion. Cases of simple possession of Adderall and other drugs by students are handled on a case-by-case basis. Many students claim prescription stimulants help them stay awake all night without fatigue, providing them with crucial endurance in a competitive college atmosphere.

Sarah says she first used Adderall during the summer before she entered Brown. After procrastinating on a summer reading assignment until the last day, she says, she took the drug at a friend's recommendation. "I finished the assignment so quickly, it was shocking," she recalls.

During her sophomore year, she began using the drug regularly — usually twice a week. Each of her classes required massive amounts of reading, sometimes eight to 12 hours at a stretch. Sarah describes Adderall as a "robotic drug" that makes her so focused on school-work that she forgets to eat, drink and go to the bathroom.

One academic study found that many students excuse their illegal use of Adderall by claiming not to use the drug recreationally. In addition, the study found, many students view it as safer than street drugs such as cocaine and ecstasy because Adderall is a prescription medicine manufactured under government supervision.⁴

Even students who say they don't take the drug defend its use. Josh Lundfelt, a recent Ohio University graduate in actuarial science, says people exaggerate Adderall's harmfulness. "People make it out to be some horrible thing, but it's just an aid to accelerate your [academic] process," he says.

However, ADHD drugs may not give the boost to academic performance that students think they provide. According to a 2012 analysis of data on more than 1,200 students conducted by researchers from the University of Maryland, using ADHD

In the early decades of the 20th century, as the fledgling pharmaceutical industry first began to search for "blockbuster drugs" — relatively safe compounds to treat chronic conditions that afflict many people — chemists and clinical researchers spent considerable time testing amphetamines on patients and on themselves, based on hunches about what the drug might do in the body.

By the 1930s, amphetamines and chemically similar drugs were being sold as decongestants, for example.

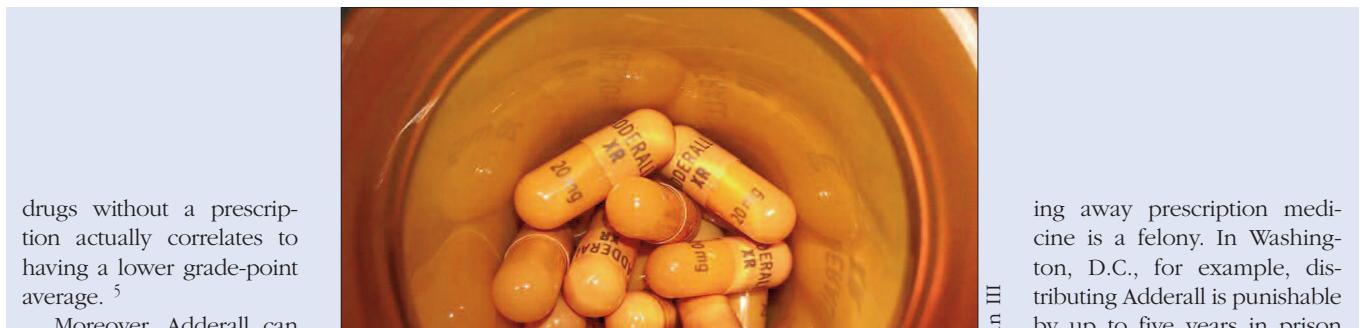
At the same time, the drugs, which could be bought without a prescription,

developed a reputation as remedies for fatigue and as largely overhyped performance enhancers. "During the Second World War, amphetamine and methamphetamine were adopted in the military services on all sides, in quasi-medical efforts to tune mind and body beyond normal human capabilities," wrote Australian medical historian Rasmussen.³¹

Students were among those who bought the drugs — mainly a decongestant sold under the name Benzedrine — for their hoped-for performance-enhancing abilities. In January 1948, for example, *The Harvard Crimson* reported on the "usual semi-annual"

influx of "Benzedrine-happy students" who tried to use the stimulant as a study aid for semester exams but sometimes ended up suffering an overdose-fueled disaster. "There is a rumor of the physics major who stayed up three nights in a row and left his exam confident of an 'A,'" said the paper. "Actually, he had filled the blue book with nothing but his name, written over and over."

If a student "takes a little too much, he will fall into a delusional or 'euphoric' state, in which he does everything wrong without ever realizing it," a health professor told *The Crimson*.³²



Patrick Mallahan III

drugs without a prescription actually correlates to having a lower grade-point average.⁵

Moreover, Adderall can have serious side effects. Food is "displeasing, even nauseating" when she is using the drug, Sarah says. Her weight dropped from 110 pounds to 97 during her junior year.

She also experiences light-headedness, headaches, dehydration and an irresistible desire to smoke cigarettes while on Adderall. "I'd go through a pack every two days," she says, adding that when she isn't taking the drug she smokes only occasionally.

David Goodman, a psychiatrist who is founder and director of the Adult Attention Deficit Disorder Center of Maryland, in Baltimore, says Adderall can be deadly if taken by students with undiagnosed cardiac conditions that could result in an irregular heartbeat or even death.

Doctors and students must take responsibility for controlling Adderall abuse, Goodman says. Because of the drug's popularity with college students who don't have ADHD, he tells students who come to him for prescriptions that he feels he first must call their parents to find out whether they showed signs of ADHD in childhood. "The fakers tend not to want to involve the parent," he says.

Goodman says he also warns patients that selling or giving

away prescription medicine is a felony. In Washington, D.C., for example, distributing Adderall is punishable by up to five years in prison and a \$50,000 fine. Taking Adderall without a prescription, on the other hand, is a misdemeanor, punishable by up to 180 days in jail and a \$1,000 fine.⁶ Distributing Adderall in Rhode Island is punishable by up to 30 years in prison and a \$100,000 fine.⁷

— Kate Iriby

¹ Sean Esteban McCabe, John R. Knight, Christian J. Teter and Henry Wechsler, "Non-medical use of prescription stimulants among US college students: prevalence and correlates from a national survey," Harvard School of Public Health, 2005, www.hsph.harvard.edu/cas/Documents/stimulants/McCabe_2005.pdf.

² Alan D. DeSantis and Audrey Curtis Hane, "Adderall is Definitely Not a Drug: Justifications for the Illegal Use of ADHD Stimulants," *Substance Use & Misuse*, 45:31-46, Informa Healthcare USA, 2010, p. 34, <http://andrewsblogs.com/files/adderall-is-definitely-not-a-drug.pdf>.

³ For background, see Michelle Trudeau, "More Students Turning Illegally to 'Smart' Drugs," NPR, Feb. 5, 2009, www.npr.org/templates/story/story.php?storyId=100254163.

⁴ DeSantis and Hane, *op. cit.*, p. 36.

⁵ Laura M. Garnier-Dykstra, et al., "Nonmedical Use of Prescription Stimulants During College: Four-year Trends in Exposure Opportunity, Use, Motives and Sources," *Journal of American College Health*, March 15, 2012, pp. 226-234.

⁶ DC Official Code, 2001 Edition, § 48-904.01.

⁷ Rhode Island Official Code, Uniform Controlled Substances Act § 21-28-4.01, <http://webserver.rilin.state.ri.us/Statutes/TITLE21/21-28/21-28-4.01.HTM>.

Under the Influence?

Throughout this period, Benzedrine's manufacturer, the Philadelphia firm Smith, Kline & French, sent many samples of the drug to physicians around the country, to test as a treatment for various conditions. As early as 1937 Charles Bradley, a psychiatrist at a Rhode Island institution for children with severe neurological and emotional problems, was testing the drug as a mental-performance enhancer. In the process, he discovered that it made many children calmer and easier to work with.

Stimulants were not sold commercially as hyperactivity treatments until a quarter-century later, however.

In 1961, Ritalin — methylphenidate — was formulated as a stimulant similar to amphetamine but somewhat gentler and with fewer side effects. At the same time, the diagnosis of hyperactivity was first being applied to significant numbers of children who, unlike Bradley's patients, were not seriously ill. Ritalin soon gained popularity as the treatment of choice for the new diagnosis.

Only in the late 1950s did researchers begin turning up evidence that stimu-

lant drugs can be highly addictive and dangerous.³³ As a result, in the 1960s, for the first time, the government began requiring prescriptions for amphetamine and other stimulant drugs. Despite these new restrictions, however, stimulants remained popular mood lifters and performance enhancers, both as prescribed by physicians and illegally.

By the late '60s, one in 20 American adults had a prescription for a stimulant, and "at least half as many were using 'speed' without prescriptions — altogether around 10 million people, equal to the entire combined populations of New York and Philadelphia at

the time," wrote Rasmussen. Stimulant abuse was the leading drug problem of the day.³⁴

The 1970 Comprehensive Drug Abuse Prevention and Control Act, signed into law by President Richard M. Nixon, placed restrictions on prescription stimulants along with other drugs, and by the late 1970s stimulant abuse had subsided.

The use of stimulants to treat children with ADHD was just beginning its long ascent, however.

In 1969, at the height of the nation's biggest stimulant epidemic, U.S. drug companies manufactured about 2.5 billion standard doses of prescription stimulants annually, according to Rasmussen. That amount dropped off substantially in the 1970s, but then, as the ADHD diagnosis gained steam, it began rising again, first gradually but then steeply, beginning in the mid-1990s.

Between 1998 and 2009, the percentage of children between ages 5 and 17 who had been diagnosed with ADHD increased from 6.9 percent to around 9 percent.³⁵ Meanwhile, "America's annual consumption of pharmaceutical "speed" has risen almost ten-fold since 1995," and in 2005 it exceeded the number of doses being produced in 1969, Rasmussen said.³⁶

In many ways, that's a medical success story, some ADHD experts say.

Many parents are hesitant to expose young children to long-term prescription drug use but change their minds when they discover that other approaches they try don't quell symp-



AFP/Getty Images/Christophe Simon

ADHD is no barrier to success. Swimmer Michael Phelps, the most decorated Olympic athlete of all time, Grammy-winning pop singer Justin Timberlake and movie star Jim Carrey, for example, all suffer from the condition. Diagnosed at age 9, Phelps stopped taking medication in seventh grade. His highly structured life as an athlete in training helped keep his symptoms in check, said his mother. "ADHD kids have great passion. It just needs to be funneled," said Debbie Phelps, who used intense behavioral therapy to help her son. Above, Phelps after winning his 19th Olympic medal at the London Summer Games on July 31.

toms, says Quinn, the Washington pediatrician. "It's the most difficult thing in the world to put a kid on medications," she says. But "often the families try other things" — such as eliminating sugar from a child's diet — "and then they come back." Even non-drug therapies that do work, such as behavior-modifying techniques, work better when used alongside medications, she says.

But others worry that the rising rate of ADHD diagnosis — and the near-total reliance on drug therapy — is driven as much by drug company influence as by medical understanding.

At most, only one in 10 families with an ADHD child receives parental training on managing the condition, but nine in 10 children diagnosed with ADHD get drugs, says Florida International's Pelham. "Mainly the teacher complains to the parent, the parent goes to the pediatrician, who's not trained to do a full screen" for ADHD, and the simple, well-publicized drug

fix is prescribed, he says.

"In recent years, I have come to believe that the individuals who advocate most strongly for medication — both those from the professional community, including the National Institutes of Mental Health, and those from advocacy groups — . . . have major and undisclosed conflicts of interest with the pharmaceutical companies," Pelham said in 2004.³⁷

But virtually all medical researchers maintain that they are not influenced by pharmaceutical company funding because as academics their primary interest is in uncovering facts. "My interests are solely in the advancement of medical treatment through rigorous and objective study," and conflict-of-interest issues are something to be taken "very seriously," said Harvard Medical School psychiatry professor Joseph Biederman, an ADHD expert who was sanctioned by the school in 2011 for failing to disclose some payments he got from drug companies.³⁸

The nonprofit disease-advocacy group Children and Adults with Attention Deficit/Hyperactivity Disorder (CHADD) says that it is "committed to avoiding conflict of interest or even its appearance in accepting financial support from corporations" with an interest in promoting ADHD-related products. To that end, "for any . . . fiscal year, no more than 30 [percent] of CHADD's revenue can be derived from donations and grants from pharmaceutical companies," and the group will accept donations for education and information campaigns only if it has "complete edi-

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At Issue:

Are ADHD and artificial food dyes linked?



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EXECUTIVE DIRECTOR, CENTER FOR SCIENCE IN THE PUBLIC INTEREST

WRITTEN FOR CQ RESEARCHER, JULY 2012

Without question, food dyes serve a very useful purpose for food manufacturers. They make a wide variety of low-nutrition junk foods — candy, soft drinks, sugary cereals — more appealing to children. Dyes can help disguise the absence of healthy fruit and vegetable ingredients in a product expected to include them, as was the case in a nearly avocado-free “guacamole” dip Kraft used to sell. But given that they provide no nutritive or preservative function, food dyes have quite a high bar to clear when it comes to their safety.

Thanks to numerous controlled studies conducted in the United States, Europe and Australia, we now know that Yellow 5, Red 40, Blue 2 and other petroleum-based food dyes have a powerfully disruptive impact on some children’s behavior.

A comprehensive 2004 meta-analysis of the medical literature and two important studies funded by the British government found that dyes (and possibly the preservative sodium benzoate) adversely affect kids’ behavior. These studies support what many parents who have placed their hyperactive children on a diet developed by allergist Benjamin Feingold have discovered: that eliminating foods with artificial dyes (and in other cases, other foods) leads to marked improvement in behavior and performance in school.

In 2008, the Center for Science in the Public Interest called on the Food and Drug Administration (FDA) to ban several dyes. At a follow-up 2011 hearing, the FDA agreed that dyes do adversely affect some children.

European food-safety officials are several steps ahead of the FDA and have successfully spurred positive changes in the industry. Thus, a strawberry sundae from a McDonald’s in the U.K. gets its red color from strawberries; McDonald’s treats its U.S. consumers to strawberries and Red 40.

As it happens, safe natural colorings are abundant. (No European consumers seem to miss the fake ones.) Getting rid of food dyes here would certainly be a safer step than dealing with hyperactivity or other behavioral problems in children with powerful stimulant drugs such as Ritalin. (Irony alert: Some Ritalin pills have Green 3.)

The question I pose to American food-safety regulators and companies is why tolerate any risk, even in just a small percentage of children, from something that serves only a cosmetic purpose in food?



SARAH MECHUM

INTERNATIONAL ASSOCIATION OF COLOR MANUFACTURERS

WRITTEN FOR CQ RESEARCHER, JULY 2012

the scientific evidence does not support the claims made by the Center for Science in the Public Interest and others linking synthetic color additives and hyperactive behavior in children. Reviews of several studies on hyperactivity and synthetic food color conducted by U.S. experts and international regulatory bodies have found no correlation between the intake of synthetic food colors and hyperactivity among children.

Just last year, the FDA Food Advisory Committee, an expert panel of pediatricians, toxicologists, behavioral scientists, neuroscientists and food scientists, reviewed all of the available evidence and concluded there is no established causal relationship between color additives and hyperactivity in children. The committee voted against recommending additional labeling beyond the name of the color but agreed additional studies are warranted. The International Association of Color Manufacturers supports the committee’s conclusions. We are currently conducting a study to further improve the understanding of color additive consumption, and the results will be shared with the FDA.

The color industry takes its responsibility for consumer safety seriously. In addition to complying with FDA regulations and procedures for certification of colors, the industry also sponsors many safety studies, the results of which have been evaluated by the FDA and international regulatory bodies, including the Joint Expert Committee on Food Additives and the European Food Safety Agency. The transparent safety-evaluation process includes commentary from all stakeholders, including regulators, consumers, public health advocates and industry. These studies confirm the safety of FDA-certified colors, and as a result, various coloring additives have been approved for use in food, beverages and other products around the world.

While they are not nutritional, color additives play an important role in food, and they do so without posing a health risk to consumers. Color is one of the principal contributors to the palatability of foods. Color additives enhance colors that occur naturally, correct natural variations in color and provide a colorful identity to foods that would otherwise be virtually colorless. Additionally, they provide a means to identify drugs and dietary supplements, helping to prevent medication errors.

Our industry is vigilant about the safety of our products, and we will continue to stay on top of new scientific developments related to color additive safety. We will continue to work closely with regulatory authorities around the world to ensure that food colors are safe.

Continued from p. 684

torial and managerial control" of the projects.³⁹

In his own pharmaceutical-sponsored research, Pelham said he was pressured to delete a portion of an article being prepared for publication "where I was saying it was important to do combined treatments (medication and behavioral)" rather than drugs alone. "It was intimidating to be one researcher and have all these people pushing me to change the text."⁴⁰

Such qualms have been reinforced in the past few years as Biederman and two other leading ADHD experts, all in the psychiatry department of Harvard Medical School, have faced sanctions over failure to disclose payments they've received as consultants to drug companies. NIH requires researchers it supports to report to their universities any outside earnings of \$10,000 a year or more, in a bid to make transparent conflicts of interest that may shade the researchers' findings. In 2008, Sen. Charles Grassley, R-Iowa, announced that he'd discovered serious under-reporting of income by Biederman and Harvard professor Timothy Wilens and associate professor Thomas Spencer. Based on the men's disclosure documents, "over the last seven years, it looked like they had taken a couple hundred thousand dollars" from drug companies, when in fact they had received over a million dollars each, Grassley said.⁴¹

In 2011, Harvard Medical School and Massachusetts General Hospital, where the three are also employed, announced that they were barred from all industry-sponsored outside activities for a year, followed by a two-year probationary period during which they would need approval for such work.⁴²

The conflicts of interest in the case involved mostly the psychiatrists' promotion of increased diagnosis of and drug treatment for more severe child-

hood psychiatric illness than ADHD, such as bipolar disease. But the men's worldwide prominence as ADHD researchers raised questions for many about drug-company influence in that field. An Australian government panel ordered a review of ADHD-treatment guidelines being prepared for the country's national health insurance program following the investigation. At the time, the draft guidelines referred to Biederman's research 50 times, while seven of the 10 people on Australia's guideline-drafting panel also had financial ties to companies such as Swiss-based Ritalin manufacturer Novartis.⁴³

Meanwhile, it has remained difficult for researchers to get funding to study behavioral therapies and other non-drug approaches. Pelham, for example, is currently pursuing a federal grant to explore the limitations of drug treatments. He'd prefer to do a study on non-drug therapies, he says, "but NIH doesn't fund those." ■

CURRENT SITUATION

Numbers Rise

The total number of drug prescriptions written for U.S. children and teens has dropped for the past several years, but the rate of ADHD prescriptions continues to climb, according to the Food and Drug Administration.

ADHD prescriptions rose 46 percent between 2002 and 2010 (the latest year examined), the second-highest increase of any category. Contraceptive prescriptions increased 93 percent, while prescriptions for antibiotics and some cough medicines dropped, after new medical guidelines recommended limiting their use.⁴⁴

Driving the increase in ADHD prescriptions has been a steady rise in the number of young people under age 18 diagnosed with the disorder. It grew 66 percent between 2000 and 2010, according to a study this year by researchers at Northwestern University. By 2010, doctors had diagnosed 10.4 million U.S. children and teens, up from 6.2 million in 2000, according to the analysis.⁴⁵ (The number of Americans ages 5 through 17 — the prime ages for an ADHD diagnosis — hovered between 5.3 and 5.4 million in both years.)⁴⁶

"The magnitude and speed of this shift in one decade is likely due to an increased awareness of ADHD," said study author Craig Garfield, an assistant professor of pediatrics at the Northwestern University Feinberg School of Medicine.⁴⁷

Changing Policies

Late last year, the American Academy of Pediatrics expanded its ADHD diagnosis guidelines to cover children and teens from ages 4 to 18; earlier guidelines had covered only children between 6 and 12. New medical findings about ADHD make it possible to diagnose and treat the broader group, says the academy.

"Treating children at a young age" may "increase their chances of succeeding in school," said Mark Wolraich, lead author of the guidelines and a researcher on neural development at the University of Oklahoma Health Sciences Center, in Oklahoma City.⁴⁸

As for teens, "it's been known for a while" that stopping ADHD drugs at puberty — as recommended in the past — "was a mistake" and that attention problems, in particular, still plague teenagers, says the University of Illinois' Stein.

In the past year, the supply of several ADHD drugs has fallen short of demand. Besides the growing legitimate market, demand is swelling for stimulants as performance enhancers or recre-

ational drugs. Because stimulants are “controlled substances,” the Drug Enforcement Agency (DEA) caps the amount that companies can produce, and the combined legitimate and illegal demand has outstripped supply.⁴⁹

“The DEA is tasked with making sure there is enough for legitimate need without making so much [that] it is diverted for illicit purposes,” said agency spokesperson Barbara Carreno. This year, DEA has raised the cap for methylphenidate, the basis for such drugs as Ritalin and Concerta, from 50,000 to 56,000 kilograms per year and the cap for amphetamine, used in drugs such as Adderall, from 18,600 to 25,300 kilograms per year.⁵⁰

Meanwhile, implementing school procedures that assist both ADHD students and their teachers continues to be difficult.

Federal legislation is pending to limit schools’ leeway in using physical restraints and seclusion to control students, often those with ADHD-related traits. The bills — sponsored by Sen. Tom Harkin, D-Iowa, and Rep. George Miller, D-Calif. — would prohibit schools that receive federal funds from physically restraining a student unless the behavior poses immediate physical harm to the student or others. Restraints can be used only if they allow the student to communicate, and if other means of controlling the behavior have been tried and failed.⁵¹

Many advocates for the disabled support the bills, but schools are leery. The legislation proposes “an extremely high threshold” that schools must meet before restraints are allowed, said the National School Boards Association. For example, a student whose behavior threatens “to destroy a classroom” — a costly consequence — would not be eligible for restraint under the bills as currently drafted, the group said.⁵²

A recent study by the *Chicago Tribune* points to serious inequities between schools in high- and low-income neighborhoods when it comes to mak-

ing accommodations to help ADHD sufferers and other disabled students. Federal law authorizes schools to make certain adjustments — such as allowing seating in the front of the classroom or providing more time to take tests — to create a level playing field for all students. However, the *Tribune* found that Illinois students who live in higher-income districts got the lion’s share of such help.⁵³

Statewide, only about 1 percent of public-school students had accommodations in the 2009-2010 school year, according to the paper. But in some wealthy districts near Chicago, 4 to 5 percent of students got accommodations. The 20 school districts with the highest percentages of students with accommodations had student bodies that were 76 percent white and poverty rates well below the state average of 45 percent; the 20 districts with the fewest accommodations were 19 percent white, and the “vast majority had far higher poverty than the state average,” the *Tribune* reported. ■

go a long way toward “clearing up the uncertainty and discomfort people have around the diagnosis,” he says.

Studying genetic profiles also may eventually yield valuable information, Israel says. In particular, profiles that show variations among groups of ADHD sufferers may help to “match the right person to the right medications” without trial and error.

The American Psychiatric Association plans to release the *DSM-5* in May 2013.⁵⁵ Current *DSM* guidelines state that, to warrant an ADHD diagnosis, a patient must show symptoms by age 7, a threshold that the *DSM-5* will raise to age 12. Drafters say recent research shows that people whose symptoms appear by age 7 aren’t any different from people who don’t exhibit them until later. Moreover, they say raising the threshold will make it easier to diagnose adults, who seldom remember what they were like before age 7 but do remember what they were like as 12-year-olds.⁵⁶

But some medical professionals worry the change will increase the already skyrocketing rates of ADHD diagnosis and expose too many people to “inappropriate treatment and stigmatization” said Frances, the Duke professor emeritus.⁵⁷

Perhaps most in need of examination, however, is a culture that values achievement to the point that it drives “increasing use of stimulant drugs for enhancement, even among the general population,” says Diller, the California pediatrician. ■

OUTLOOK

Debate Continues

With attention growing on ADHD in adults, teens, preschool children and girls, diagnoses will likely increase for the foreseeable future. Many clinicians hope science can eventually clear up doubts that ADHD is a “real” disorder, but others want researchers to take a closer look at the social trends, such as increasing competitiveness, that lead people to seek achievement-enhancing drugs.

Improvements in brain-imaging technology provide hope that it eventually can diagnose ADHD, says Israel, the San Francisco psychiatrist. Brain images showing clear patterns of aberrant activity in ADHD patients could

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Doctors say growth in the number of ADHD cases is causing a shortage of a generic form of Adderall.

Non-Drug Treatments

Andazola, Matt, "Struggling to Focus," *Albuquerque (N.M.) Journal*, July 25, 2011, p. C1, www.abqjournal.com/main/2011/07/25/health/struggling-to.html.

Alternative ADHD therapies often are preferred to drugs because they don't have side effects such as appetite loss.

Manziello, Evelyn Gilbert, "New Approach to ADD, ADHD," *Poughkeepsie (N.Y.) Journal*, Sept. 16, 2011.

Diet, exercise and acupuncture are several ADHD treatments that don't involve drugs.

Yim, Michael, "ADHD — Can the Disorder Be Treated Without Medication?" *The Explorer* (Tucson, Ariz.), Feb. 29, 2012, explorernews.com/northwest_chatter/article_33e0bf8c-6250-11e1-abcd-0019bb2963f4.html.

Many parents of children diagnosed with ADHD prefer alternative treatments.

Prevalence

Hellmich, Nanci, "ADHD Seen As Early As Age 4," *USA Today*, Oct. 17, 2011, p. D4, www.usatoday.com/LIFE/usa_edition/2011-10-17-Attention-Deficit_ST_U.htm.

ADHD can be diagnosed in children as young as 4, according to updated diagnostic guidelines from the American Academy of Pediatrics.

Midey, Connie, "Women and ADHD," *Arizona Republic*, Nov. 11, 2011, p. H1, www.azcentral.com/health/news/articles/2011/11/03/20111103adhd-diagnosis-women.html.

ADHD estimates are low among adults because many affected women haven't been properly diagnosed.

Wen, Patricia, "ADHD Rates Low Among Latinos," *The Boston Globe*, Sept. 26, 2011, p. B1, articles.boston.com/2011-09-26/news/30205138_1_adhd-medication-latino-children-latino-youngsters.

Fewer Latino children are diagnosed with ADHD compared to white and black children, according to the Centers for Disease Control and Prevention.

Symptoms

Gerhart, Jacqueline, "Steps to Diagnosing ADHD," *Wisconsin State Journal*, Dec. 13, 2011, p. C3, host.madison.com/wsj/news/local/health_med_fit/dr-jacqueline-gerhart-how-can-a-parent-know-if-child/article_0ef24598-2514-11e1-bbd8-0019bb2963f4.html.

Children should display symptoms for at least six months in two different settings — such as at home and at school — before being diagnosed with ADHD.

Johnson, Tim, "Inside a Teenager's Brain," *Burlington (Vt.) Free Press*, April 30, 2012, p. A1, www.burlingtonfreepress.com/article/BT/20120430/NEWS0213/120429012/university-of-vermont-teenage-brain-research.

Behavioral scientists generally agree that ADHD is associated with impulsivity but are unsure whether the impulses make people more prone to drug or alcohol use.

Mascarelli, Amanda, "Profile of ADHD Sharpens in Each School Year," *Los Angeles Times*, Aug. 13, 2011, articles.latimes.com/2011/aug/13/health/la-he-adhd-20110813.

ADHD symptoms can become clearer as children enter classes requiring more attention and organizational skills.

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Jost, Kenneth. "Remembering 9/11." *CQ Researcher*, September 2, 2011, 701-732.

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