

Adult ADHD: Issues and Answers

CME Newsletter of the Adult ADHD Program,
Department of Psychiatry, NYU School of Medicine

Studies show that adult ADHD is linked to substance abuse

Untreated attention-deficit/hyperactivity disorder (ADHD) is increasingly being associated with a heightened risk of substance abuse disorder (SUD) in adults. This can make diagnosis more challenging because symptoms of ADHD may overlap [see bottom of Page 5, Differential diagnosis], yet both conditions usually need to be treated, often using different treatment programs. Aside from abusing other drugs like alcohol and cocaine, ADHD medications themselves can be abused, according to a 2006 study by Wilens and colleagues.

The study showed 83% and 33% diverted and 75% and 33% misused immediate-release (IR) methylphenidate (MPH) or IR mixed amphetamine salts (MAS), respectively.¹ The availability of extended-release stimulants such as OROS-MPH and MAS-XR may dissuade diversion or misuse. The same study showed that conduct disorder (CD) and SUD were common among ADHD patients (31% and 53%, respectively). Also, of those ADHD patients who reported diverting their medications, 83% had CD and 83% had SUD.

Often, a comorbidity of ADHD plus SUD can result in additional conditions. For example, in a study by Wilens and cohorts in which 4 groups were identified—adults with ADHD, ADHD + SUD, SUD, and controls—those with one or both psychiatric diagnoses had higher rates of major depression ($P = .05$), CD ($P = .04$), antisocial personality disorder ($P = .009$), agoraphobia ($P = .01$), and social phobia ($P = .007$).²

Untreated ADHD has also been associated with increased risk of smoking, and some studies have suggested that inattentive symptoms specifically may underlie this risk. In an analysis of a population-based sample of young adults, regression analysis was used to assess the relationship between self-reported ADHD symptoms and the lifetime likelihood of being a regular smoker (≥ 1 cigarette/day for 30 days), as well as age of smoking onset.³ The results showed that inattention and hyperactivity/impulsivity symptoms significantly increased the likelihood of habitual smoking by

11% and 16%, respectively. For those reporting lifetime regular smoking, reported symptoms decreased the estimated age at onset and increased the number of cigarettes smoked.

Untreated ADHD is also prevalent in adult cocaine users.⁴ Since ADHD is commonly treated with stimulants, such as MPH, does maintenance of MPH change the response to cocaine in these abusers with ADHD? A study by Collins and colleagues evaluated the effects of oral sustained-release MPH (MPH SR) maintenance (40 mg and 60 mg) on the response to cocaine in a group of adults with ADHD.⁴ Patients were followed for 3 weeks and offered regular IV cocaine. The results revealed that maintenance on MPH SR decreased some of the positive subjective effects of cocaine with high dose MPH SR, causing a decrease in cocaine choice. Thus, oral MPH SR may be safe in combination with repeated cocaine doses. Thus, the clinician should be attentive to other psychiatric disorders that may occur in adults with ADHD and/or SUD and make treatment options that encompass all diagnoses. Depending on the severity and duration of the SUD, the patient may require hospitalization.⁵ Self-help groups can also offer a useful treatment modality. Together with addiction treatment, patients with SUD and ADHD require intervention for ADHD, and if applicable, comorbid psychiatric disorders. Education of the individual, family members, and other caregivers is a useful initial step to improve the recognition of the SUD/ADHD.

1. Wilens TE, Gignac M, Swezey A, Monuteaux MC, Biederman J. Characteristics of adolescents and young adults with ADHD who divert or misuse their prescribed medications. *J Am Acad Child Adolesc Psychiatry*. 2006;45:408-414.
2. Wilens TE, Kwon A, Tanguay S, Chase R, Moore H, Faraone SV, Biederman J. Characteristics of adults with attention-deficit/hyperactivity disorder plus substance use disorder: the role of psychiatric comorbidity. *Am J Addict*. 2005;14:319-327.
3. Kollins SH, McClernon FJ, Fuemmeler BF. Association between smoking and attention-deficit/hyperactivity disorder symptoms in a population-based sample of young adults. *Arch Gen Psychiatry*. 2005;62:1142-1147.

Statement of Need

Attention-deficit/hyperactivity disorder (ADHD) is the most common neurobehavioral disorder of childhood; incidence ranges from 5% to 10% among school-age children. Up to 50% of children with ADHD continue to have ADHD-related problems during their adult years. In addition, many ADHD cases are first diagnosed only after patients have reached adulthood. Adults with ADHD may experience significant functional problems, such as job difficulties, academic underachievement, troublesome relationships with family and peers, and low self-esteem. Diagnosing ADHD in adults can be difficult, and—even when the diagnosis is made—available medications are often not used to treat the disorder, or medication management varies widely across communities and among physicians.

As subjects with ADHD age and more adults are newly diagnosed, there is a concern over the possible abuse and misuse of ADHD medications, particularly stimulants. It is known that untreated ADHD patients are more likely to smoke and abuse alcohol and cocaine. In addition, a recent study suggests that some college students use their medications to get high or sell them to others for similar purposes. Even differences in brain structure are being linked to alcohol abuse in adolescents and an increase in alcohol intake in adults. Published research and opinion has been in debate for quite some time over an increase in risk in those patients who are currently being managed for ADHD. Research has hypothesized that an increased risk of misuse is noted in subjects taking immediate-release stimulant preparations and in those with conduct disorder and previous substance use disorder. Newer beaded and osmotic-controlled delivery systems may offer potential advantages in subjects at risk for abuse of misuse.

In addition to the above, there is also a growing concern over a possible increased risk of adverse cardiovascular complications—despite minimal blood pressure changes—in the patients who take stimulants to manage their ADHD symptoms. A recent review of the evidence to date by the FDA found no reason for global labeling revisions; however, some manufacturers have moved to warn about the use of stimulants in patients with preexisting cardiovascular malformations or risk factors.

1. Wilens TE, Gignac M, Swezey A, Monuteaux MC, Biederman J. Characteristics of adolescents and young adults with ADHD who divert or misuse their prescribed medications. *J Am Acad Child Adolesc Psychiatry*. 2006;45:408-414.
2. Wilens TE, Kwon A, Tanguay S, Chase R, Faraone SV, Biederman J. Characteristics of adults with attention-deficit/hyperactivity disorder plus substance use disorder: the role of psychiatric comorbidity. *Am J Addict*. 2005;14:319-327.
3. Kollins SF, McClernan FJ, Fumemiller BF. Association between smoking and attention-deficit/hyperactivity disorder symptoms in a population-based sample of young adults. *Arch Gen Psychiatry*. 2005;62:1142-1147.
4. Collins SL, Levin FR, Foltin RW, Kleber HD, Evans SM. Response to cocaine, alone and in combination with methylphenidate, in cocaine abusers with ADHD. *Drug Alcohol Depend*. 2006;82:158-167.
5. Wilens TE. Attention-deficit/hyperactivity disorder and the substance use disorders: the nature of the relationship, subtypes at risk, and treatment issues. *Psychiatr Clin North Am*. 2004;27:283-301.
6. Carpenter PJ, de Jong CA, Dijkstra BA, Verbrugge CA, Krabbbe PF. A controlled trial of methylphenidate in adults with attention-deficit/hyperactivity disorder and substance use disorders. *Addiction*. 2005;100:1868-1874.
7. Spencer T, Biederman J, Wilens T, et al. A large, double-blind, randomized clinical trial of methylphenidate in the treatment of adults with attention-deficit/hyperactivity disorder. *Biol Psychiatry*. 2005;57:456-463.
8. Biederman J, Mick E, Suman C, et al. A randomized, placebo-controlled trial of OROS methylphenidate in adults with attention-deficit/hyperactivity disorder. *Biol Psychiatry*. 2006;59(6):829-835.
9. Biederman J, Spencer T, Wilens TE, Weisler RH, Read SC, Tulloch SJ, SLD381.304 study group. Long-term safety and effectiveness of mixed amphetamine salts extended release in adults with ADHD. *CNS Spectr*. 2005;10(12 suppl 20):16-25.
10. Upadhyaya HP, Rose K, Wang W, O'Rourke K, Sullivan B, Deas D, Brady KT. Attention-deficit/hyperactivity disorder, medication treatment, and substance use patterns among adolescents and young adults. *J Child Adolesc Psychopharmacol*. 2005;15:799-809.
11. Wilens TE, Gignac M, Swezey A, Monuteaux MC, Biederman J. Characteristics of adolescents and young adults with ADHD who divert or misuse their prescribed medications. *J Am Acad Child Adolesc Psychiatry*. 2006;45:408-414.
12. De Bellis MD, Narasimhan A, Thatcher DL, Keshavan MS, Soloff P, Clark DB. Prefrontal cortex, thalamus, and cerebellar volumes in adolescents and young adults with adolescent-onset alcohol use disorders and comorbid mental disorders. *Alcohol Clin Exp Res*. 2005;29:1590-1600.
13. Gignac M, Wilens TE, Biederman J, Kwon A, Mick E, Swezey A. Assessing cannabis use in adolescents and young adults: what do urine screen and parental report tell you? *J Child Adolesc Psychopharmacol*. 2005;15:742-750.
14. Spencer T, Biederman J, E Ciccone P, et al. PET study examining pharmacokinetics, detection and likeability, and dopamine transporter receptor occupancy of short- and long-acting oral methylphenidate. *Am J Psychiatry*. 2006;163:387-395.

Learning Objectives

After completing this activity, you should be better able to:

1. Identify ADHD subjects who may be at risk for a future substance use disorder.
2. Assess the available treatment options to determine the most appropriate ADHD treatment for patients at risk for abuse and misuse of stimulant medications.
3. Understand the implication of concomitant illness on the risk of substance abuse.
4. Explain the implications surrounding recent labeling change discussions by regulatory agencies.
5. Comprehend the current understanding of brain structure as it relates to the development of future disorders.

Method of Participation

Read this newsletter, complete the CME Posttest/Answer Form and Activity Evaluation Form, and fax or mail the forms to Veritas Institute for Medical Education, Inc. at the address listed. You will receive a certificate by fax or mail. There is no certificate processing fee.

Intended Audience

This activity was developed for psychiatrists, primary care physicians/internists, neurologists, and psychologists.

Effective Dates

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Faculty Author

Lenard A. Adler, MD
Director, Adult ADHD Program
Associate Professor
Departments of Psychiatry and Neurology
New York University School of Medicine
New York, New York

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4. Collins SL, Levin FR, Foltin RW, Kleber HD, Evans SM. Response to cocaine, alone and in combination with methylphenidate, in cocaine abusers with ADHD. *Drug Alcohol Depend*. 2006;82:158-167.
5. Wilens TE. Attention-deficit/hyperactivity disorder and the substance use disorders: the nature of the relationship, subtypes at risk, and treatment issues. *Psychiatr Clin North Am*. 2004;27:283-301.

More ADHD medication studies on adults needed

While a federal panel in March reversed its previous decision to put a boxed warning on ADHD drugs due to a possible increase in cardiac risks, researchers are calling for more studies to be done on the drugs because more adults are being diagnosed with ADHD—a population who is at a higher risk for cardiovascular disease. "Longitudinal studies so far have shown minimal changes in blood pressure and pulse in adults, but we need longer-term prospective studies to further document the safety and efficacy of these medications," said Lenard Adler, MD, Director of the Adult ADHD Program at New York University Medical Center. He continued, "Adults are going to stay on these medications for a long period of time, and adults themselves have a baseline risk of hypertension."

"Adults, depending on their age, are more likely to have underlying cardiac disease, and therefore the cardiovascular risk may be greater," said Karen Ballaban-Gil, a professor of clinical neurology and clinical pediatrics at New York's Albert Einstein College of Medicine. "I think it's a low risk, but it's not a zero risk."

In the absence of definitive research that is "just not out there," say researchers, Adler monitors his adult patients carefully, including regular monitoring of pulse and blood pressure. "I think that's going to be the standard of care," he said.

Case report

Roy, 20-years-old, was first diagnosed with ADHD combined subtype, at 7 years of age, after exhibiting symptoms of inattention, daydreaming, inability to sit still, and talking out of turn. He was prescribed immediate-release MPH, which he took sporadically throughout elementary and high school. His symptoms continued to emerge due to his intermittent adherence to therapy, and both his grades and his relationship with his parents suffered. He did well on standardized tests, and was in the highest quartile in both his AP and SAT scores. He was accepted to college, but his first semester was fraught with dysphoria, feelings of isolation, inability to concentrate, and a low energy level. He was prescribed MAS XR (mixed amphetamine salts extended-release; Adderall XR), but did not take the medication. He began to binge drink, first on the weekends, then escalating to most nights of the week. Prior to that, he had no prior history of alcohol or other substance use. After failing most of his final exams and getting drunk and starting a fistfight in his dorm, for which he was charged with assault and public intoxication, he left college before his second

semester. At this point, his parents arranged his initial consultation with a psychiatrist.

Upon presentation to the psychiatrist, Roy described his dysphoria, coincident with accelerated thinking, making unrealistic plans about his future (eg, wanting to return to school immediately and take a double course load, along with entering an executive training program), pressured speech, and a heightened energy level. His mental status exam was notable for pressured speech, dysphoric mood, and a somewhat labile affect. No thought disorder, flight of ideas, or suicidal or homicidal ideation was observed. Having discontinued his MAS XR, he described difficulty with attention, task completion, listening to others, organization, planning, misplacing items and forgetfulness, along with the same ADHD symptoms he has had since elementary school. One month before, his primary care physician placed him on sertraline (Zoloft) 50 mg/d; Roy also started substance abuse counseling and had stopped drinking. Provisional diagnoses of ADHD combined subtype, bipolar disorder, and mixed and alcohol abuse in early remission were made. Neuropsychological testing revealed superior intellectual capacity, although with relative weakness in attention and visual processing speed and significant verbal impulsivity, all consistent with ADHD and bipolar disorder.

Roy continues follow-up medication management visits, with weekly substance abuse counseling, and has remained sober. His ADHD has been successfully treated with MAS XR 30 mg/d, and he is attending a community college and works in a restaurant, where he was recently promoted to manager. He was prescribed valproic acid (Depakote) 500 mg bid—with regular drug level monitoring—for his bipolar disorder, and quetiapine (Seroquel) 150 mg at bedtime for depression and insomnia. This therapeutic regimen has substantially decreased impulsivity, along with the manic symptoms of pressured speech, labile affect, and accelerated thoughts. His dysphoria has responded to sertraline.

Key points:

- Coexistent alcohol abuse and ADHD
- Successful treatment with a stimulant, MAS XR, along with substance abuse counseling and regular follow-up
- Complicating factor of bipolar disorder contributed to the onset of substance abuse
- Patient improved after all 3 conditions—ADHD, bipolar disorder, and alcohol abuse—were identified and treated

Recent studies assess medication usefulness in adult ADHD

A number of recently published studies are repositioning several ADHD drugs for use in adults, with a particular focus on dosing.

- Carpentier and colleagues performed an 8-week, double-blind, placebo-controlled, multiple crossover (A-B-A-B) study that compared low-dose MPH (0.6 mg/kg/d) with placebo in 25 adults with ADHD and SUD.¹ The results showed significant symptom reduction by the first week in both conditions, but the positive response to the drug was not significantly higher than that to placebo (36% vs 20%). Thus, low-dose MPH in adult ADHD patients with concomitant SUD is of limited use and produced a distinct short-term placebo effect. As a caveat to this study, Spencer and colleagues have shown that a dose of MPH in the range of 0.7 to 1.0 mg/kg/d is needed for the full therapeutic effect.² Thus, the effects of MPH in the Carpentier trial may have been underestimated. Spencer also observed that ADHD cannot be successfully treated unless the patient is on concomitant treatment for the SUD if applicable, and that giving stimulants alone is usually not sufficient
- Biederman and colleagues performed a 6-week, randomized, parallel-design study of once-daily higher-dose (starting at 36 mg/d and titrating up to 1.3 mg/kg/d) OROS MPH treatment in 141 adult ADHD patients.³ At end point, 66% patients receiving active drug and 39% of those receiving placebo were very much improved (Clinical Global Impression-Improvement scale plus a >30% reduction in Adult ADHD Investigator System Report Scale score). Some increases in blood pressure and heart rate were noted, and those patients were monitored for cardiovascular changes during treatment
- Another study by Biederman and colleagues was a 24-month, open-label extension of a 4-week, double-blind, placebo-controlled study of MAS XR in 223 adult ADHD patients.⁴ Treatment started at 20 mg/d for 1 week and was titrated up to 60 mg/d. Treatment with MAS XR 20 mg/d to 60 mg/d for adult ADHD was generally well tolerated (43% reported mild-to-moderate dry mouth) and was associated with sustained symptomatic improvement ($P < .01$ for change in mean ADHD-RS-IV total scores) for up to 24 months

1. Carpentier PJ, de Jong CA, Dijkstra BA, Verbrugge CA, Krabbe PF. A controlled trial of methylphenidate in adults with attention-deficit/hyperactivity disorder and substance use disorders. *Addiction*. 2005;100:1868-1874.

2. Spencer T, Biederman J, Wilens T, et al. A large, double-blind, randomized clinical trial of methylphenidate in the treatment of adults with attention-deficit/hyperactivity disorder. *Biol Psychiatry*. 2005;57:456-463.

- Biederman J, Mick E, Surman C, et al. A randomized, placebo-controlled trial of OROS methylphenidate in adults with attention-deficit/hyperactivity disorder. *Biol Psychiatry*. 2006;59(9):829-835.
- Biederman J, Spencer TJ, Wilens TE, Weisler RH, Read SC, Tulloch SJ; SLI381.304 study group. Long-term safety and effectiveness of mixed amphetamine salts extended release in adults with ADHD. *CNS Spectr*. 2005;10(12 suppl 20):16-25.

Study examines medication misuse and diversion in ADHD-treated college students

In conjunction with an annual national survey that probes college students about substance abuse behaviors, 334 students were asked about their attitudes regarding substance abuse.¹ The survey revealed that those students with untreated ADHD were more likely to have used tobacco and other drugs (besides alcohol and marijuana) compared to those without active ADHD symptoms. Among those prescribed ADHD medications, 25% reported that they have used their medication to "get high" and almost 29% reported at least one incident in which they gave or sold their medication to someone else. These results indicate that ADHD symptom control may be important to protect against increased risk of substance use among college-age students with ADHD. Further studies of misuse/diversion of prescription stimulant medication among college students are needed. Long-acting medications may be useful in the college-age population (eg, FDA-approved long-acting stimulants [Adderall XR and Focalin XR] or the nonstimulant, Strattera). Given the difficulties in extracting MPH or amphetamine from beaded or osmotic extended-release preparations, these stimulant formulations may be less frequently misused and abused than immediate-release forms.²

- Upadhyaya HP, Rose K, Wang W, O'Rourke K, Sullivan B, Deas D, Brady KT. Attention-deficit/hyperactivity disorder, medication treatment, and substance use patterns among adolescents and young adults. *J Child Adolesc Psychopharmacol*. 2005;15:799-809.
- Wilens TE, Gignac M, Swezey A, Monuteaux MC, Biederman J. Characteristics of adolescents and young adults with ADHD who divert or misuse their prescribed medications. *J Am Acad Child Adolesc Psychiatry*. 2006;45:408-414.

Stimulant treatment of childhood ADHD associated with reduced risk for later substance abuse

A study was performed involving 295 cases of stimulant-treated ADHD and 84 cases of untreated ADHD—followed for a mean of 17.2 years—to evaluate whether treatment of ADHD in childhood resulted in a decrease in later substance abuse disorders (SUD). The results showed that:

- 60 (20.3%) of treated ADHD cases had documented SUD compared to 23 (27.4%) of cases not treated (OR = 0.7)
- Among treated ADHD boys, 21.8% had SUD compared to 36.4% not-treated ADHD boys (OR = 0.5)

- Among treated ADHD girls, 15.2% had SUD compared to 10.3% not-treated ADHD girls (OR = 1.5)

While these results cannot demonstrate cause and effect, the authors indicate that psychostimulant treatment of childhood ADHD is associated with reduced risk for later substance abuse among boys with ADHD.

Katusic SK, Barbaresi WJ, Colligan RC, Weaver AL, Leibson CL, Jacobsen SJ. Psychostimulant treatment and risk for substance abuse among young adults with a history of attention-deficit/hyperactivity disorder: a population-based, birth cohort study. *J Child Adolesc Psychopharmacol*. 2005;15:764-776.

Smaller prefrontal cortex associated with early-onset drinking in persons with comorbid mental disorders

In adults, prefrontal, thalamic, and cerebellar brain injury is associated with excessive alcohol intake. Because these brain structures are actively maturing during adolescence, a study was done to compare the brain volumes of 14 persons with adolescent-onset alcohol use disorder (AUD, defined as *DSM-IV* alcohol dependence or abuse) with 28 nonalcoholic controls (mean age, 17 years). Prefrontal-thalamic-cerebellar measures were done using magnetic resonance imaging. The results showed that those with AUD had smaller prefrontal cortex and prefrontal cortex white matter volumes compared with controls. Right, left, and total thalamic, pons/brainstem, right and left cerebellar hemispheric, total cerebellar, and cerebellar vermis volumes did not differ between groups. A significant sex-by-group effect was observed, indicating that males with an adolescent-onset AUD compared with control males had smaller cerebellar volumes, whereas the 2 female groups did not differ in cerebellar volumes. Prefrontal cortex volume variables significantly correlated with measures of alcohol consumption. These findings suggest that a smaller prefrontal cortex is associated with early-onset drinking in individuals with comorbid mental disorders. Further studies are warranted to examine if a smaller prefrontal cortex represents a vulnerability to, or a consequence of, early-onset drinking.

De Bellis MD, Narasimhan A, Thatcher DL, Keshavan MS, Soloff P, Clark DB. Prefrontal cortex, thalamus, and cerebellar volumes in adolescents and young adults with adolescent-onset alcohol use disorders and comorbid mental disorders. *Alcohol Clin Exp Res*. 2005;29:1590-1600.

In assessing marijuana use in kids, direct structured review better than indirect parental report

The most common drug abused in early adulthood and adolescents is marijuana. A new study examined data on 207 children (45% of whom also met criteria for AUD), derived from 2 family studies of children with or without ADHD, to compare 3 approaches to detect cannabis use:

(1) report on direct structured interview; (2) indirect parental report; and (3) urine toxicology screen.

The results showed that 97% of the participants—who reported no use of cannabis within the past month—had a negative urine screening, while 79%—who admitted cannabis use—had a positive urine screening. The sensitivity of the direct structured interview report was 91%, the specificity 87%, the positive predicting value 67%, and the negative predictive value 97%; indirect parental reports, conversely, were found to be less informative. Thus, direct reports of cannabis use, abuse, or dependence during the structured interview are both sensitive and specific when compared to urine toxicology screens and indirect parental reports.

Gignac M, Wilens TE, Biederman J, Kwon A, Mick E, Swezey A. Assessing cannabis use in adolescents and young adults: what do urine screen and parental report tell you? *J Child Adolesc Psychopharmacol*. 2005;15:742-750.

Abuse potential of MPH strongly influenced by formulation delivery rate, not only blood levels

The abuse potential of MPH is linked to the drug's capacity to rapidly block the brain's presynaptic dopamine transporter. Compared with immediate-release MPH, an oral QD osmotic controlled-release (OCR) formulation produces a more gradual rise in drug-plasma concentration. A study was done to see whether OCR MPH would also produce a slower blockade of dopamine transporter and, thus, would be less attractive to would-be abusers, compared to immediate-release MPH. Twelve adult volunteers were randomly assigned to receive single doses of immediate-release MPH (40 mg) or OCR MPH (90 mg). The results showed that despite similar C_{max} values for both formulations, the OCR form was associated with a longer time to maximum concentration and maximum CNS dopamine transporter occupancy, and no detection/likeability compared with the immediate-release drug, to suggest that abuse potential of oral MPH is strongly influenced by the rate of delivery and not solely by the magnitude of plasma concentration or brain transporter occupancy, an important step in identifying a potentially less abusable MPH.

Spencer TJ, Biederman J, Ciccone PE, et al. PET study examining pharmacokinetics, detection and likeability, and dopamine transporter receptor occupancy of short- and long-acting oral methylphenidate. *Am J Psychiatry*. 2006;163:387-395.

Consider comorbid psychiatric disorders in the differential diagnosis of adult ADHD

A differential diagnosis is important because ADHD symptoms are very nonspecific and can be symptomatic of other psychiatric illnesses. Persons with ADHD are at risk

for developing maladaptive lifestyles that can lead to a variety of psychiatric conditions, including mood disorder, substance abuse, and antisocial behavior. Many adult patients with ADHD may also meet criteria for other psychiatric diagnoses.

New books on ADHD

Two new books focus on the subject of ADHD in patients of all ages. Thomas E. Brown, PhD, of the Department of Psychiatry at Yale University School of Medicine documents his 3 decades of listening to patients of all ages who tried, but could not “pay attention.” In his book, *Attention Deficit Disorder: The Unfocused Mind in Children and Adults*, Dr Brown helps patients recognize the quality of the deficits that have hampered them. He provides valuable glimpses into the lives of people who are burdened with ADHD and explains the theory and science behind this complex disorder and the impact it can have on the lives of children, adolescents, and adults.

In his new book for the lay public as well as professionals, *Scattered Minds*, Dr Adler explains how to recognize the 3 common subtypes of the disorder, hidden symptoms and red flags to look for, and common co-conditions, such as substance abuse disorder. He also discusses medications and coping strategies and includes a simple screening quiz to assess risk level. Clinical presentations and case studies frame the discussion in the book. The book was released in May of 2006. Both books are available at www.amazon.com.

Posttest

Please select only one answer for each question. Circle the letter corresponding to the correct answer on the answer form on the next page.

- According to a 2006 study by Wilens and colleagues, persons who divert or misuse stimulants are more likely to do so with:
 - immediate-release mixed amphetamine salts.
 - immediate-release methylphenidate.
 - extended-release methylphenidate.
 - pemoline.
- In March, a federal panel placed boxed warnings on all ADHD drugs because of their inherent toxicities.
 - True
 - False
- Which of the following is not true about the study by Carpentier that assessed the use of low-dose methylphenidate in adults with ADHD and SUD?
 - The doses of methylphenidate used may have been subtherapeutic.
 - Positive response to drug was not significantly higher than that of placebo.
 - The dose was 1.3 mg/kg/d.
 - Low-dose MPH in adult ADHD patients was found to be of limited effect.
- In the study by Biederman that assessed the efficacy of MAS XR in adult ADHD patients, which of the following is true?
 - Treatment with MAS XR (75-100 mg/d) was well tolerated.
 - The main side effect observed in the study was constipation.
 - Symptomatic improvement in ADHD symptoms was seen for up to 2 years.
 - All of the above are true.
- A study by Wilens and colleagues showed that adult patients with comorbid diagnoses of both ADHD and substance abuse disorder also had higher rates of:
 - depression.
 - anxiety.
 - suicide.
 - posttraumatic stress disorder.
- In the study that compared treated and nontreated children with ADHD, which group demonstrated the highest prevalence of SUD?
 - Untreated boys
 - Treated boys
 - Untreated girls
 - Treated girls
- Which area of the brain was found to be smaller in volume in adolescents with alcohol use disorder?
 - Thalamus
 - Pons/brainstem
 - Cerebellar vermis
 - Prefrontal cortex
- The abuse potential of methylphenidate has been found to be strongly influenced by:
 - blood levels of the drug only.
 - formulation delivery rate into the blood only.
 - brain transporter occupancy only.
 - Both A and B
- The ADHD symptoms of fidgetiness and trouble concentrating could also be part of a symptom profile for a patient who also has:
 - bipolar disorder.
 - generalized anxiety.
 - major depression.
 - antisocial personality.
- In the case report presented here, the patient improved after which of his conditions were treated?
 - ADHD
 - Bipolar disorder
 - Alcohol use
 - All of the above

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Successful completion of the posttest examination (at least 70% correct) and activity evaluation is required to earn a maximum of .75 AMA PRA Category I Credits™. Statements of Credit will be awarded upon successful completion of the posttest and evaluation.

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(Circle the correct answer to each question)

- | | |
|------------|-------------|
| 1. A B C D | 6. A B C D |
| 2. A B | 7. A B C D |
| 3. A B C D | 8. A B C D |
| 4. A B C D | 9. A B C D |
| 5. A B C D | 10. A B C D |

To receive credit, you must answer 7 of the 10 posttest questions correctly, complete all forms, and submit them by May 31, 2007.

Registration for Credit (please print)

First Name: _____

Last Name: _____

Degree: _____

Specialty: _____

Street Address (your certificate will be sent here):

City: _____

State: _____

ZIP: _____

Phone: _____ Fax: _____

E-mail: _____

Veritas Institute has my permission to e-mail or fax me a very brief Educational Outcomes Survey on this activity.

Yes No

I certify that I have completed this CME activity. The actual amount of time I spent on this activity was ____ minutes.

Signature _____ Date _____

Activity Evaluation Form

Please circle the appropriate rating in answer to the questions that follow:

- How would you rate the content of this CME activity?
Poor 1 2 3 4 5 Outstanding
 - How relevant was the content of this activity to your practice?
Not relevant at all 1 2 3 4 5 Very relevant
 - To what degree were you able to meet each of the learning objectives of the activity? Please respond to each learning objective listed below:
 - Identify ADHD subjects who may be at risk for a future substance use disorder
Poor 1 2 3 4 5 Outstanding
 - Assess the available treatment options to determine the most appropriate ADHD treatment for patients at risk for abuse and misuse of stimulant medications
Poor 1 2 3 4 5 Outstanding
 - Understand the implication of concomitant illness on the risk of substance abuse
Poor 1 2 3 4 5 Outstanding
 - Explain the implications surrounding recent labeling change discussions by regulatory agencies
Poor 1 2 3 4 5 Outstanding
 - Comprehend the current understanding of brain structure as it relates to the development of future disorders
Poor 1 2 3 4 5 Outstanding
 - Based on your knowledge and experiences, the level of the activity was:
Basic Appropriate Complex
 - How would you rate the activity overall?
Poor 1 2 3 4 5 Outstanding
 - Do you believe this activity was fair, balanced, and free of commercial bias?
 - Yes No
 - If No, please state the reason:

 - How much did this activity enforce your current clinical opinions?
Not at all 1 2 3 4 5 A lot
 - How much new information did you find in this activity?
None 1 2 3 4 5 A lot
 - As a result of this activity, will you alter your practice?
Yes No
 - If Yes, please describe any change(s) you plan to make:

 - How committed are you to making these changes?
Not at all committed 1 2 3 4 5 Very committed
 - If No, why not? _____
7. Additional comments about this activity?

- Do you feel future activities on this subject matter are necessary and/or important to your practice?
Yes No
 - Please list any other topics that would be of interest to you for future educational activities.

MLSHAD89

Adult ADHD: Issues and Answers

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Veritas Institute for Medical Education, Inc.
611 Route 46 West
Hasbrouck Heights, NJ 07604

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