

# Adult ADHD: Issues and Answers

CME Newsletter of the American Professional Society of ADHD and Related Disorders (APSARD)

## Should adults with ADHD who use stimulant drugs be screened for CV risk?

Approximately 1.5 million adults in the United States take a psychostimulant on a daily basis, with 1 in 10 of these users age 50 or older<sup>2</sup> – the age range at which the risk of cardiac disease is heightened. That stimulants have the potential to cause significant cardiovascular (CV) effects in a small percentage of patients is known. Whether adults with ADHD who will be receiving stimulants should be screened, and at what level of screening they should have to identify the slight chance of CV events, is still a matter of debate. On the one hand, there are case studies that have documented sudden cardiac events in individuals who have been receiving stimulants.<sup>1,2</sup> On the other hand, no large scale, long-term placebo-controlled studies specifically designed to assess potential serious CV events have been performed because of the complexities in excluding all possible confounding factors. Yet, the physiologic possibility of a stimulant-related CV risk remains. To address the issue, the FDA recommended in 2006 that stimulant medications indicated for ADHD include a black box warning to caution prescribers about stimulant-related CV risks.

What are the concerns? The CV effects of sympathomimetic amines – to which the amphetamines and MPH products are related – have been thoroughly described in the medical literature. These agents significantly elevate both heart rate and blood pressure (BP). In a 2005 placebo-controlled trial, catecholaminergic agents, both stimulant and non-stimulant (in this case, bupropion and desipramine) given to adults (mean age – 39 years) increased systolic and/or diastolic BP by approximately 5 mm Hg (See Table 1).<sup>4</sup> BP changes of this degree, particularly during long-term therapy, could increase morbidity and mortality. In addition, new-onset cases of systolic or diastolic hypertension (BP  $\geq$ 140/90 mm Hg) were observed in 10% of subjects receiving active medication, regardless of the class (stimulant/nonstimulant). A 2009 case-control study, in which the authors sought to

**Table 1 – Changes in blood pressure following the use of a stimulant or non-stimulant agents in 125 patients with ADHD, compared with placebo<sup>4</sup>**

Agent	Changes in blood pressure
Amphetamine	Systolic - +5.4 mm Hg* Diastolic - +7.3 mm Hg*
Bupropion	Systolic - +5.9 mm Hg* Diastolic - +6.9 mm Hg*
Desipramine	Diastolic - +7.1 mm Hg*
Methylphenidate	Diastolic - +4.5 mm Hg*

\*  $P < .05$  compared to placebo

determine whether a significant association exists between the use of stimulants and unexplained sudden death (SD) in 564 children and adolescents who experienced SD, showed that 1.8% of such unexplained deaths involved stimulant use – a 7.4-fold increase ( $P = .02$ ) in SD among the subjects who took stimulants compared with those who did not.<sup>5</sup> This study had both important limitations as well as strengths: On the down side, case-control studies, while a powerful method of detecting association, cannot establish causality. On the plus side, the study used a matched case-control design, which yielded substantial power to detect rare outcomes, and it excluded several potential confounding factors, such as subjects who had asthma, which is also a cause of SD. In any event, this study uncovered a signal between unexplained SD and the use of stimulant medication.

Should we be worried? SD occurs at a rare but stable rate in the general population. Estimates indicate that the risk for

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AMERICAN PROFESSIONAL SOCIETY OF ADHD AND RELATED DISORDERS

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## Statement of Need

Approximately 4% of the adult population in the United States is thought to exhibit symptoms of attention deficit-hyperactivity disorder (ADHD).<sup>1</sup> Although identifying such patients, many of whom have comorbid psychiatric conditions that can complicate the diagnosis, can be challenging, finding the appropriate therapeutic strategy can be even more daunting, especially when a chronic disorder such as cardiovascular disease is also present. About 1.5 million adults in the United States take a psychostimulant on a daily basis, with 1 in 10 of these users age 50 or older—the age range at which the risk of cardiac disease is heightened. To that end, the FDA has recommended “black box” warnings to describe the cardiovascular risks of stimulant drugs indicated for ADHD. This issue focuses on the medications used to treat ADHD in adult patients and how comorbidities, both cardiovascular as well as psychiatric, can impact therapy.

## References

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## Learning Objectives

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

1. Explain why the blood pressures and heart rates of adult patients with attention deficit-hyperactivity disorder (ADHD) who are prescribed stimulant medications should be regularly monitored.
2. Predict the mental health status of children who are prescribed ADHD stimulant medications as they progress to adulthood.
3. Prescribe stimulant medications at escalating doses that are clinically effective, yet well-tolerated.
4. Summarize clinical studies that highlight the importance of combination therapy in adult ADHD, show the impact of substance abuse disorder on ADHD therapy, stress the importance of treating comorbidities in the ADHD patient, and illustrate the stigmatizing effects of ADHD on patients and their peers.

## Method of Participation

Read this newsletter, complete the CME Posttest Answer Form and Activity Evaluation Form, and fax or mail the forms to Medical Education Resources, 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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He has received royalty payments (as inventor) from NYU for license of adult ADHD scales and training materials since 2004.

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## Use of Brand and Generic Names

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SD in children and adolescents is between 0.6 and 6 in 100,000 per year.<sup>6</sup> SD increases with age, with the risk in adults reaching upward of 1 in 1,000 per year.<sup>7</sup> Data collected between 1999–2003 indicate that, using the World Health Organization classification, 25 instances of SD have been reported in patients treated with stimulants: 8 of them while on MPH (7 pediatric, 1 adult) and 17 of them while on amphetamines (12 pediatric, 5 adults).<sup>8</sup> The adjusted rates per million prescriptions over this period for pediatric subjects were calculated to be 0.16 for MPH and 0.36 for amphetamines; rates in adults were 0.07 for MPH and 0.53 for amphetamine. Because of these very rare occurrences, no meaningful comparison could be made between amphetamine- and MPH-associated SD.

Stimulants remain among the most effective and safest pharmacologic interventions for ADHD.<sup>9</sup> Whether or not a higher risk of SD exists in stimulant-treated individuals compared with the general population is not certain. Although there is evidence of biological plausibility, the known effects of the stimulants on CV electrophysiology and vital signs appear to be benign. Yet, caution must be heeded.

Given the minor pressor and chronotropic effects of these medications, the clinician would be prudent to check BP and heart rate of adults with ADHD at baseline and periodically during treatment.<sup>3</sup> A statement from the American Heart Association Council on Cardiovascular Disease in the Young Congenital Cardiac Defects Committee and the Council on Cardiovascular Nursing make recommendations for CV monitoring (**See Table 2**).<sup>10</sup> Despite the fact that the recommendations are for children, adult patients can benefit as well if baseline and regular measurements are taken, as well as reviewing thorough family history for CV disease.

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**Table 2 – Cardiac effects of medications used to treat ADHD<sup>10</sup>**

Drug	Mechanism of action	Cardiac effects and comments	Recommendations for cardiac monitoring	
			<i>Class I, level of evidence C</i>	<i>Class IIa, level of evidence C</i>
Methylphenidate Amphetamine	Both classes release and/or inhibit catecholamine reuptake (e.g., D and NE) increase level of these NT at the synapse	Increased HR and BP; no ECG changes	BP, HR	ECG on first visit
Atomoxetine	Inhibits selective norepinephrine reuptake	Increased HR and BP in adults and children, palpitations in adults, no ECG changes	BP, HR	ECG on first visit
Clonidine	$\alpha_2$ -adrenergic agonist	Decreased HR and BP; no ECG changes, rebound hypertension with abrupt discontinuation	BP, HR; additional BP when medication is started and weaned	ECG on first visit
Guanfacine	$\alpha_2$ -adrenergic agonist	Decreased HR and BP; no ECG changes	BP, HR	ECG on first visit
Desipramine; imipramine	Block the reuptake of D and NE	Prolongation of QTc, PR, QRS, tachycardia; rare reports of sudden death	BP, HR	Baseline ECG and at dose increases PR $\leq$ 200 ms QRS $\leq$ 20 ms QTc $\leq$ 460 ms
Bupropion	Decreases firing rate of NE- and S-releasing neurons	Increased BP in adults, not in children; cardiac toxicity with overdose	BP, HR	ECG on first visit

BP – blood pressure; D – dopamine; ECG – electrocardiogram; HR – heart rate; NE – norepinephrine; NT – neurotransmitter; S - serotonin

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## Stimulants decrease risk for future psychiatric disorders and academic failure in youth with ADHD, study concludes.

Determining the effect of stimulant treatment on psychiatric and academic outcomes can offer important prognostic information to clinicians treating children with ADHD. A new study by Biederman et al found evidence that stimulant treatment decreases the risk for subsequent comorbid psychiatric disorders and academic failure in youth with ADHD.<sup>1</sup> In that study, the association between stimulant treatment and the subsequent development of mood, anxiety, and disruptive disorders, as well as educational outcomes was analyzed in a longitudinal sample of patients with ADHD. The investigators assessed consecutively referred white male children with (n=140) and without (n=120) ADHD, aged 6 to 18 years. They then followed the boys prospectively for 10 years from childhood into their young adult years. Among participants who were followed-up at the 10-year assessment, the researchers compared subjects with ADHD with and without a lifetime history of stimulant treatment on follow-up demographic factors. The stimulants used by the ADHD group included amphetamines (mixed amphetamine salts, *d*-amphetamine), methylphenidate (MPH) products (immediate-release MPH,

OROS MPH, transdermal MPH, *d*-MPH, extended-release MPH), and pemoline.

The results showed that participants with ADHD who were treated with stimulants were significantly less likely to subsequently develop major depression, conduct disorder, oppositional disorder, defiant disorder, and multiple anxiety disorders compared with ADHD participants who were not treated ( $P < .001$  for all comparisons). In addition, the stimulant therapy group had significantly lower lifetime rates of grade failure compared with the non-stimulant therapy group. The association between stimulant treatment and the risk for bipolar disorder was not statistically significant ( $P = .06$ ).

According to the authors, the study had several limitations. First, because the sample consisted of referred white boys, whether the results could be extrapolated to all children with ADHD in the general population or to other racial groups or females is not known. Also, although the study was prospective, the investigators relied on retrospectively reported ages of onset for treatment and comorbid disorders to establish the temporal sequence. Finally, the naturalistic study design cannot provide the more revealing evidence that would be generated by a randomized, controlled study. If confirmed by clinical trials, these findings could help clinicians plan treatment and forecast prognosis for children with ADHD, and possibly deepen our insight of the pathways leading to these disorders.

## Reference

- 1 Biederman J, Monuteaux MC, Spencer T, Wilens TE, Faraone SV. Do stimulants protect against psychiatric disorders in youth with ADHD? A 10-year follow-up study. *Pediatrics*. 2009;124:71-8.

## Case study

Roger is a 38 year old freelance writer who presents for evaluation for ADHD after his teenage son was recently diagnosed with ADHD (inattentive) and has been successfully treated with atomoxetine. While sitting through his son's evaluation, both he and his wife realized that Roger had similar symptoms.

Roger describes various ongoing issues that negatively impact his freelance writing business: procrastination (e.g., putting off writing projects until the last minute), the crises created by procrastinating (e.g., losing clients), trouble estimating the time necessary to complete tasks, not listening to others, easy distractions, misplacing items (e.g., paychecks from clients; project timesheets) running late for appointments and daydreaming. He has few hyperactive/

impulsive symptoms, albeit exhibiting notable restlessness and fidgetiness, but otherwise non-contributory.

The onset of difficulty with attention and distraction goes back to the first grade, which was noted on his report card and was corroborated by his parents – they simply thought he was a late bloomer and would learn to focus over time. He also was socially impaired as a child and teenager and had a period of dynamically oriented psychotherapy for social avoidance while in college, which led briefly to some relief, but then symptoms returned. He still avoids group situations and tends to isolate himself except when his wife makes the social engagements. He has no history of depression or mania. His family history is notable for an episode of depression in his mother, successfully treated with venlafaxine.

His mental status exam was notable for no psychosis. He was observed to have no thought disorder; his affect was full, mood anxious. No psychomotor agitation and no tics were noted. He was alert and oriented to person, place, time and situation. Using the ASRS v1.1 Symptom Checklist, Roger is positive for 8 of 9 inattentive symptoms and 2 of 9 hyperactive/inattentive symptoms. The assessment: ADHD, inattentive and social anxiety disorder.

Treatment plan: In a recent study, atomoxetine monotherapy effectively improved symptoms of ADHD and comorbid social anxiety disorder in adults and was well tolerated.<sup>1</sup> In that study, subjects received either 40 to 100 mg atomoxetine or placebo for 14 weeks following a 2-week placebo lead-in period. Given Roger's history of ADHD and social anxiety disorder and his son's response to atomoxetine, Roger was started on atomoxetine 18 mg once daily. The dose increased to 18 mg twice daily after one week. He was then titrated over several weeks to 40 mg twice daily, with resulting substantial reduction of inattention and some improvement in social anxiety symptoms. To treat any residual ADHD and social anxiety symptoms, he was referred for cognitive-behavioral therapy (CBT).

### Take home points from this case study:

- Atomoxetine can be used successfully to treat ADHD and comorbid social avoidance behavior
- The agent was selected in part because of its success in treating another family member as well as a recent study that showed atomoxetine can treat both disorders
- Starting atomoxetine at a lower dose and then slowly (e.g., weekly) titrating upward to the target dose as well as splitting the dose into a twice-daily regimen can lead to improved tolerability and adherence

- Use of CBT can improve residual symptoms of both ADHD and social avoidance therapy not fully controlled by pharmacotherapy alone

### Reference

- 1 Adler LA, Liebowitz M, Kronenberger W, et al. Atomoxetine treatment in adults with attention-deficit/hyperactivity disorder and comorbid social anxiety disorder. *Depress Anxiety*. 2009;26:212-21.

### Dose escalation study shows extended-release methylphenidate (OROS® MPH) safe, effective in adults with ADHD.

Recently published research conducted in adults have demonstrated that methylphenidate (MPH) is effective in the management of ADHD, with significant reduction in ADHD symptoms compared with placebo.<sup>1-5</sup> The latest published research is a large, randomized, placebo-controlled study of extended-release MPH in adults with ADHD and is the only multi-site, non-fixed-dose study of the extended-release formulation of MPH, (ER MPH).<sup>6</sup> This study showed that in a wide-ranging dose escalation, OROS MPH is effective and well-tolerated in the management of adult ADHD.

The study was designed as a randomized, 7-week, double-blind, placebo-controlled, dose-escalation, parallel-group trial of ER MPH 36, 54, 72, 90, or 108 mg/d versus placebo in 226 adults (56% male; mean age 39 years; age range 18-65 years). Of these, 49% were on ER MPH and 51% were on placebo. The primary end point was the Adult ADHD Investigator

Symptom Report Scale (AISRS), with other assessments including the Clinical Global Impressions-Improvement scale (CGI-I), a post hoc responder analysis, adverse events, and vital signs.

### Compared with placebo, the ER MPH group demonstrated:

- Greater ADHD symptom improvement than placebo as demonstrated by a statistically significantly lower least squares mean change from baseline in AISRS total score at the final visit (last observation carried forward [LOCF]:  $P = .012$ ).
- Significantly lower least squares mean Clinical Global Impressions-Improvement score at the final visit (LOCF:  $P = .008$ )

- Significantly greater number of responders at the final visit compared with the placebo group (LOCF: 37% vs. 21%;  $P = .009$ ).

ER MPH was well tolerated across the dose range (36-108 mg/d), with no treatment-emergent serious adverse events or deaths reported. Adverse events were experienced by 93 (85%) of the 110 ER MPH-treated subjects versus 74 (64%) of the 116 placebo-treated subjects (See Table 3). Similar mean changes from baseline to LOCF for systolic and diastolic blood pressures for the ER MPH and placebo groups were observed. The highest proportion of subjects reporting adverse events were receiving the 36-mg dose (the starting dose) of ER MPH at the time of onset of the adverse event. The percentage of subjects who had an adverse event at each dose was as follows: 36 mg (64%); 54 mg (40%); 72 mg (50%); 90 mg (36%); 108 mg (31%).

**Table 3 - Commonly reported adverse events (Reported in  $\geq 5\%$  of ER MPH-treated or placebo-treated subjects)<sup>6</sup>**

Medical Dictionary for Regulatory Activities (MedDRA) preferred term	ER MPH (n=110) %	Placebo (n=116) %
Any adverse event	85	64
Decreased appetite	26	6
Headache	26	14
Dry mouth	20	5
Anxiety	16	3
Nausea	13	3
Blood pressure increased	10	5
Insomnia	9	5
Heart rate increased	7	4
Initial insomnia	7	3
Bruxism	6	1
Irritability	6	2
Muscle tightness	6	0
Diarrhea	4	5
Somnolence	3	7

The investigators noted that the study design had design limitations which may have contributed to an over- or underestimation of the efficacy of active treatment. For example, in the study, known MPH non-responders were excluded, possibly enriching the study population and leading to an overestimation of treatment response. Also, persons with moderate depression, marked anxiety, suicidal ideation, or drug or alcohol dependence were also excluded from the study. Therefore, these data may not generalize to adult patients who exhibit such health issues.

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## Journal reviews

### Study shows combination therapy in adult ADHD not uncommon, targets comorbidities.

In managing psychiatric disorders, combination therapy is becoming the norm. For example, patients with treatment-resistant depression or schizophrenia often receive polypharmaceutical treatments to control their symptoms.<sup>1</sup> While combination therapy has been documented for depression and bipolar disease<sup>1,2</sup>, only recently has a study delved into the combination use of medications in patients with ADHD.<sup>3</sup> This study was a retrospective claims analysis in which prescription dispensing events were drawn from a US national claims database that included 80-plus managed care plans and involved over 18,000 patients.

The study showed that after 1 month of starting on a long-acting stimulant (LAS; e.g., MPH extended-release [ER], mixed amphetamine salts ER), 21% of patients required a second drug. Similarly, 27% of those on an intermediate-acting stimulant (IAS; e.g., sustained release [SR] MPH or SR *d*-amphetamine), 20% of those on atomoxetine (ATX), 37% of those on bupropion (BUP), and 53% of those on an alpha-2 adrenergic agonist (A2A; e.g., clonidine, guanfacine) needed a second drug after 1 month. Stimulants and ATX were used in combination with BUP approximately 9% the time. Excluding BUP, ATX was used most frequently in combination with LAS (7%); LAS was most frequently used with short-acting stimulants (SAS; 10%); IAS with SAS (17%); and SAS with LAS (9%).

In addition, for patients receiving LAS, being age 25–44 or age 45-plus versus being 18–24 years old, seeing a psychiatrist, having comorbid depression, or having point of service coverage versus an HMO increased likelihood for combination therapy in managing adult ADHD. Combination therapy was least common in patients prescribed LAS and in patients prescribed ATX. For patients prescribed BUP or A2A, combination therapy was much more common. Of note, for patients prescribed BUP and A2A, the supplemental medications were most often stimulants. One notable limitation of this study is that this study interpreted claims from a claims database in which the diagnoses were neither prospectively determined nor standardized.

### Atomoxetine may not help ADHD patients who use cocaine.

In 2006, the National Comorbidity Survey Replication (NCS-R), a community-based epidemiologic study, found that approximately 15% of individuals with ADHD met the DSM-IV-TR criteria for a substance use disorder (SUD).<sup>4</sup> When compared with the SUD prevalence of 6% among individuals without ADHD, this estimate suggests a 3-fold higher likelihood of SUD among adults with ADHD.

Additionally, the NCS-R study found that 11% of persons with SUDs met criteria for adult ADHD, demonstrating an almost 3-fold higher prevalence compared to the 4% prevalence in individuals without SUDs.

The first published trial – 12-week, open-label and preliminary – assessed the therapeutic efficacy of atomoxetine in cocaine-dependent individuals with ADHD.<sup>5</sup> The sample consisted of 20 subjects who met DSM-IV-TR criteria for ADHD and cocaine dependence (CD). Using several measures to assess ADHD – the Adult ADHD Rating Scale (AARS), the Conners' Adult ADHD Rating Scale-Self Report: Long Version and Observer: Screening Version (CAARS-S:L and CAARS-O:SV) – no significant reduction in ADHD symptoms was observed. Likewise, no significant decrease in cocaine use was noted throughout the trial. Taken together, although cocaine-dependent individuals showed some reduction in ADHD symptoms while receiving atomoxetine, the high drop-out rate (only 25% completed the 12-week study), and lack of impact on cocaine use may limit its utility in ADHD adults who are currently abusing cocaine. Besides the high discontinuation rate, this study was also beleaguered by a small sample size, and lack of a control group. Future studies that compare atomoxetine to stimulant medication, perhaps in cocaine-dependent individuals who have achieved a period of abstinence, may allow for a better assessment of atomoxetine in this dually-disordered population. However, the findings from this trial do not imply that a double-blind, placebo-controlled trial in a current cocaine-abusing population with ADHD is necessary.

### Benefits of ADHD pharmacotherapy are not compromised by psychiatric comorbidity, study finds.

A recent review suggests that treating a patient for ADHD is beneficial in patients who have other psychiatric problems. Psychiatric disorders can occur concomitantly in persons with ADHD. The National Comorbidity Survey Replication (NCS-R) determined that among adults with ADHD, approximately 20% also met the criteria for depression, as did 20% for bipolar disorder, 30% for social phobia, and 15% for substance abuse disorder.<sup>4</sup> A newly published literature review assessed psychiatric comorbidities and their impact on diagnosis and treatment efficacy in adults with ADHD within the primary care arena.<sup>6</sup> The study authors noted that the high rate of comorbidity in adults with ADHD may present a challenge in differential diagnosis. For example, a patient who cannot sit still and who also has problems concentrating may have ADHD or generalized anxiety disorder (GAD). However, symptoms of incapacitating apprehension or worry plus somatic symptoms related to anxiety – such as a racing heart beat – are more consistent with GAD. The authors suggest that, in choosing a

treatment strategy for patients with ADHD and comorbid psychiatric disorders, the PCP should first focus on stabilizing the patient by treating the most severe disorder, and then address comorbid diagnoses. The major concern with using psychostimulants as initial therapy in patients with ADHD and comorbid conditions is the possibility of an exacerbation of symptoms related to a comorbid diagnosis, such as bipolar disorder, in which the manic phase may be heightened by the stimulant. Failure to treat comorbid conditions as their own entity – including depression and anxiety – may result in continuing impairments that erode quality of life. Controlled clinical trials suggest that the presence of comorbidity does not greatly alter the safety and efficacy of ADHD pharmacotherapy and that ADHD treatment can often improve symptoms of the comorbid disorder. Although rates of psychiatric comorbidity are high in adults with ADHD, available data imply that the benefits of pharmacotherapy for ADHD are not compromised by the presence of psychiatric comorbidity.

#### **College students with ADHD feel stigmatized, reveals survey.**

ADHD is arguably one of the most stigmatizing psychiatric disorders. The media portray the condition as “a mythological illness diagnosed far too frequently by overzealous health professionals”<sup>7</sup>, possibility resulting in misperceptions and stereotypes toward persons with ADHD.<sup>8</sup> To examine the attitudes of college students with and without ADHD toward peers with ADHD, 196 college students – 30 (15%) of whom were diagnosed with ADHD – anonymously completed 4 attitude measures: the College Student ADHD Questionnaire (CSAQ), the ADHD adjective checklist, the Test of Knowledge/Attitudes About Adult ADHD, and the Community Attitudes Toward Mental Illness (CAMI) measure.<sup>8</sup> Of those with ADHD, 62% reported knowing someone else with the disorder, as did 59% of those without ADHD. Frequency of contact, though, was greater among those with ADHD than for those without ADHD. Persons with and without ADHD generally reported similar attitudes toward other individuals with ADHD, with the average participant endorsing more negative adjectives than positive adjectives to describe peers with ADHD. However, while those with ADHD used significantly more negative adjectives for describing ADHD, their responses were softened by knowing other individuals with ADHD, in that among those with ADHD knowing someone else with the disorder as well as spending more time with that person was linked to better overall attitudes toward individuals with ADHD. This suggests that for college students with ADHD, it may be especially important to know and frequently interact with other individuals with ADHD, which can decrease stereotypic or prejudiced beliefs. Of the study’s limitations, note that all of the ADHD measures were locally developed by the authors and were

being used for the first time in the present study. Also, because the study results were based on self-reports by college students, the possibility exists that these reports were not completely accurate.

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## Posttest

Instructions: Please select the best answer for each of the following 10 questions, and mark your answers on the Post-test Answer Form, on page 11.

1. Approximately how many American adults aged 50 years and over take a psychostimulant on a daily basis?
  - A. 1.5 million
  - B. 15 million
  - C. 150,000
  - D. 0.5 million
2. In the study by Wilens and colleagues, which ADHD medication raised diastolic pressure to the greatest degree?
  - A. Amphetamine
  - B. Bupropion
  - C. Desipramine
  - D. Methylphenidate
3. Which medication used to treat ADHD selectively inhibits norepinephrine reuptake?
  - A. Methylphenidate
  - B. Desipramine
  - C. Atomoxetine
  - D. Amphetamine
4. In the study by Biederman et al, participants with ADHD who were treated with stimulants were significantly less likely to subsequently develop all but which psychiatric disorder?
  - A. Depression
  - B. Bipolar disorder
  - C. Conduct disorder
  - D. Defiant disorder
5. In the dose escalation study involving a range of extended-release MPH doses to assess safety and efficacy, which dose of MPH resulted in the highest percentage of adverse events?
  - A. 36 mg
  - B. 54 mg
  - C. 72 mg
  - D. 108 mg
6. In the same study of extended-release MPH, all but which of the following side effects were observed in 10% or more of subjects?
  - A. Decreased appetite
  - B. Anxiety
  - C. Dry mouth
  - D. Bruxism
7. In the retrospective claims analysis of combination therapy in the treatment of adult ADHD, what percentage of those subjects on an alpha-2 adrenergic agonist needed a second drug after 1 month?
  - A. 20%
  - B. 27%
  - C. 37%
  - D. 53%
8. In the same study as cited in Question 7, for patients prescribed bupropion or an alpha-2 adrenergic agonist, supplemental medications were most often:
  - A. Atomoxetine
  - B. Clonidine
  - C. Psychostimulants
  - D. Desipramine
9. In the study that assessed the therapeutic efficacy of atomoxetine in cocaine-dependent individuals with ADHD, which of the following statements is false?
  - A. A significant decrease in cocaine use was noted throughout the trial
  - B. The study lacked a control group
  - C. The study experienced a high drop-rate
  - D. The study was comprised of a relatively small sample size
10. The National Comorbidity Survey Replication (NCS-R) determined that among adults with ADHD, approximately how many met the criteria for social phobia?
  - A. 10%
  - B. 20%
  - C. 30%
  - D. 40%

## Adult ADHD: Issues and Answers

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™.

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### Posttest Answer Form

(Circle the correct answer to each question)

- |            |             |
|------------|-------------|
| 1. A B C D | 6. A B C D  |
| 2. A B C D | 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 February 28, 2011.

### Registration for Credit (please print)

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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:
  - Explain why the blood pressures and heart rates of adult patients with attention deficit-hyperactivity disorder (ADHD) who are prescribed stimulant medications should be regularly monitored  
Poor 1 2 3 4 5 Outstanding
  - Predict the mental health status of children who are prescribed ADHD stimulant medications as they progress to adulthood  
Poor 1 2 3 4 5 Outstanding
  - Prescribe stimulant medications at escalating doses that are clinically effective, yet well-tolerated  
Poor 1 2 3 4 5 Outstanding
  - Summarize clinical studies that highlight the importance of combination therapy in adult ADHD, show the impact of substance abuse disorder on ADHD therapy, stress the importance of treating comorbidities in the ADHD patient, and illustrate the stigmatizing effects of ADHD on patients and their peers  
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? \_\_\_\_\_
- 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.  
\_\_\_\_\_  
\_\_\_\_\_



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