Challenges in Identifying and Managing Attention-Deficit/Hyperactivity Disorder in Adults in the Primary Care Setting: A Review of the Literature

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Objective: To examine how to screen for and establish a correct diagnosis of attention-deficit/hyperactivity disorder (ADHD) in adults and to identify the outcomes associated with untreated ADHD.

Data Sources: PubMed was searched using the key words *ADHD*, *adult*, *diagnosis*, and *primary care* from the years 1999 to 2009.

Study Selection: This search produced 50 publications.

Data Extraction: Publications were screened for data specific to the diagnosis or management of adult patients with ADHD in the primary care setting.

Data Synthesis: The estimated prevalence of ADHD in adults throughout the United States is 4.4% or approximately 10 million adults. Adults with ADHD by definition must experience impairment from the symptoms of ADHD in at least 2 areas of their life. Despite significant impairment, only 1 in 10 adults with ADHD have received ADHD treatment within the past year. Given the high rates of undertreatment, primary care physicians, who provide much of the general adult mental health care in the United States, are increasingly charged with making the diagnosis of ADHD in adults. ADHD symptoms are often masked by comorbid psychiatric conditions or patient adaptations such as choice of occupation. One of the ADHD assessment tools, a short 6-item screener, can simplify identification and management of ADHD in adults and help identify which patients may require further evaluation.

Conclusions: Primary care physicians should consult with other members of the health care community such as psychiatrists and psychologists when necessary, but should also develop a level of comfort with diagnosing and treating ADHD.

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Attention-deficit/hyperactivity disorder (ADHD) is a commonly diagnosed disorder in children, affecting approximately 8% of children in the United States.[1,2] ADHD is a highly genetic neurobiologic condition that persists into adulthood in approximately 65% of children with ADHD.[3] Despite this very high persistence, ADHD has traditionally been viewed as a childhood disorder, and far more is known about ADHD in children than in adults.[3] Although the terminology used to describe ADHD has evolved over the years, the core symptoms of ADHD have consistently been defined by inattention and behavioral characteristics that affect academic and occupational performance as well as social and family relationships. For a diagnosis of ADHD in adults, there must be symptoms dating back to childhood that continue to cause impairment in 2 or more areas of the individual's life.[2]

Current diagnostic criteria for ADHD include 18 symptoms that are defined by the 3 core symptoms of inattention, impulsivity, and hyperactivity.[2] Studies of ADHD in both children and adults document that these symptoms continue to define ADHD at any age.[4] The validity of ADHD in adults has been justified by evidence from longitudinal studies of children with ADHD followed into adulthood, family history, treatment response, neuropsychological studies, and epidemiology studies comparing the disorder in children and adults.[4] Neuroimaging studies have shown that adults with ADHD are unable to efficiently activate pathways in the brain that help adults without ADHD remain focused and complete a variety of cognitive tasks.[5]

The National Comorbidity Survey Replication (NCS-R)[6] carefully screened American adults for symptoms of ADHD that dated back into childhood and continued to cause impairment in at least 2 areas of the individual's life. Utilizing very strict criteria for establishing a diagnosis of ADHD, the NCS-R found a prevalence of 4.4% for ADHD in American adults. Given a population of 223 million adults as described in the 2005 US Census,[7] ADHD is therefore estimated to affect approximately 10 million adults throughout the United States.[6] Only 1 in 10 adults with ADHD had received treatment for the condition during the prior 12 months.[6] Extrapolation of this

Clinical Points

- Approximately 1 in 25 adults have attention-deficit/hyperactivity disorder (ADHD), 90% of whom may be currently untreated, with potentially profound and negative impact on the lives of patients and their families.
- There is increased understanding of the genetic and neurobiologic basis of ADHD and behavioral approaches and proven pharmacotherapeutic options to help improve the lives of those with ADHD.
- The use of a simplified screening tool, brochures, informed application of *DSM-IV* criteria, and cultivation of consultation and referral services can empower primary care physicians to significantly improve the diagnosis and treatment of adult ADHD.

estimate to the US adult population suggests that up to 9 million adults with symptomatic ADHD are currently not receiving treatment for the disorder.

In adults, ADHD is associated with a substantial burden on patients, families, the workforce, and society at large. Results from the World Health Organization World Mental Health Survey Initiative[8] show that ADHD is associated with significant impairment in the workplace. An ADHD screener was administered to adults aged 18 to 44 years in 10 countries to quantify the effect of ADHD on lost role performance among employed and self-employed respondents. Among the 7,075 employed respondents, the estimated prevalence of ADHD was 3.5% and ranged from 0.9% in Lebanon to 4.5% in the United States and to 6.3% in France.[8] The mean number of days per year absent or with reduced quality or quantity of work was 22.1 days in adults with ADHD in all countries and 28.3 days in US adults with ADHD. Projections from the individual data to the national US labor force produced an estimate of 104.7 million lost days of productivity among workers with ADHD.[8] Similar to the NCS-R, only 12.6% of 2,387 US respondents with ADHD had received treatment for ADHD in the previous 12 months.[8]

Over the past decade, many primary care physicians have become comfortable screening and initiating treatment for primary mood disorders. A variety of surveys have shown that the majority of primary care clinicians have received very little education about how to appropriately screen and initiate treatment for adults who are experiencing ongoing difficulties with untreated ADHD. Given the high rates of undertreatment, primary care physicians, who provide much of the general adult mental health care in the United States, are increasingly charged with making the diagnosis of ADHD in adults. ADHD by definition must have started with symptoms that date back into childhood.[2] Family history, childhood scholastic difficulties, not performing up to expectations, and chronic difficulties with time management or disorganization may all be warning signs to alert the primary care clinician to screen more carefully for ADHD.[9–13] Primary care physicians are often untrained in the use of diagnostic or assessment tools to evaluate adults in whom ADHD is suspected and to help manage ADHD in adults.[14] Therefore, they may feel less comfortable managing the disorder in adults than in children.[13] In a medical record review of 854 adults with persistent childhood-onset ADHD, primary care physicians were significantly less likely than psychiatrists to make an initial diagnosis of ADHD in adults if no pediatric ADHD diagnosis had previously been made.[15]

The goal of this review is to examine how to screen for and establish a correct diagnosis of ADHD in adults and identify the outcomes associated with untreated ADHD. This review will evaluate one of the screening tools suitable for the primary care environment, outline appropriate referral processes, and provide educational resources to assist primary care physicians in managing this challenging population.

METHOD

A PubMed literature search was conducted using the search criteria *ADHD*, *adult*, *diagnosis*, and *primary care* from the years 1999 to 2009. This search produced 50 publications. Publications were then screened for data specific to the diagnosis or management of adult patients with ADHD in the primary care setting.

Complexities in Making a Diagnosis of ADHD in Adults

The diagnosis and evaluation of ADHD in adults is based on clinical assessment, which should include a review of medical history, family history, relationship history, and interviews with a family member when possible.[10] Since ADHD has a heritability of 75%–91%, depending upon the definition of ADHD used,[16] quite often, adults will present because a family member has recently been diagnosed with similar symptoms. By definition, ADHD symptoms must have been present in some form since childhood. Therefore, a quick developmental history helps to establish the foundation for a possible diagnosis. Simple probes such as "Where did you grow up?" "If I had met you in second or

Table 1. Diagnostic Criteria for Attention-Deficit/Hyperactivity Disorder[a]

A. Either (1) or (2):
- (1) Inattention: 6 (or more) of the following symptoms of inattention have persisted for at least 6 mo to a degree that is maladaptive and inconsistent with developmental level:
  - Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
  - Often has difficulty sustaining attention in tasks or play activities
  - Often does not seem to listen when spoken to directly
  - Often does not follow through on instructions and fails to finish school work, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
  - Often has difficulty organizing tasks and activities
  - Often avoids, dislikes or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
  - Often loses things necessary for tasks or activities (eg, toys, school assignments, pencils, books, or tools)
  - Is often easily distracted by extraneous stimuli
  - Is often forgetful in daily activities
- (2) Hyperactivity-impulsivity: 6 (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 mo to a degree that is maladaptive and inconsistent with developmental level:
  - *Hyperactivity*
  - Often fidgets with hands or feet or squirms in seat
  - Often leaves seat in classroom or in other situations in which remaining seated is expected
  - Often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
  - Often has difficulty playing or engaging in leisure activities quietly
  - Is often "on the go" or often acts as if "driven by a motor"
  - Often talks excessively
  - *Impulsivity*
  - Often blurts out answers before questions have been completed
  - Often has difficulty awaiting turn
  - Often interrupts or intrudes on others (eg, butts into conversations or games)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before 7 years of age

C. Some impairment from the symptoms is present in 2 or more settings (eg, at school or work and at home)

D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning

E. The symptoms do not occur exclusively during the course of a pervasive developmental disorder, schizophrenia, or other psychotic disorder and are not better accounted for by another mental disorder (eg, mood disorder, anxiety disorder, dissociative disorders, or a personality disorder)

[a]Reprinted with permission from the American Psychiatric Association.[2]

third grade, what did you like to do?" "What were you good at?" and "How would a friend have described you—quiet, shy, loud, hyper, good temper or bad?" can help to establish a developmental history in a matter of minutes. Patients should be asked to provide an educational and occupational (to determine course over young adulthood) history to ascertain whether symptoms were present in childhood.[13] Rating scales can be useful adjuncts in screening for adult ADHD and may provide a starting point for a discussion of the patient's clinical history, including functional impairments.[10]

Criteria for ADHD from the *DSM-IV-TR*[2] are currently the same for adults and children. The essential features require (1) at least 6 months of symptoms, defined as either inattention or hyperactivity/impulsivity; (2) presentation of at least some of the symptoms before 7 years of age; and (3) evidence of impairment in 2 or more areas of life including home, work, school, and social settings (Table 1).[2] In addition, the symptoms should not be better explained by another psychiatric or neurologic disorder. While symptom assessment is important in making the diagnosis, factors such as chronicity, pervasiveness, and the degree of impairment are also critical components.

The diagnosis of ADHD in adults is often complicated by the fact that the *DSM-IV* criteria were originally developed for children aged 8 to 12 years; therefore, clinicians must extrapolate these criteria for adults. This becomes problematic as children enter adolescence and adulthood and their symptoms shift to reflect changes that are characteristic of adult lifestyles, activities, and responsibilities.[10] For example, childhood symptoms of inattention such as difficulty sustaining attention, difficulty following instructions, not listening, and being easily distracted may manifest differently in adults. Adult patients may fail to pay attention to details, have poor time management skills,[10] or lack considered thought when completing work or other projects.[11] Inattentiveness in adults may manifest as distractibility, forgetfulness, an inability to concentrate, or difficulty paying attention while reading or doing paperwork.[17]

Hyperactivity, while a common feature among children with ADHD, is likely to be less overt in adults. Rather than the constant activity, squirming, and fidgeting seen in children, adults are more likely to report restlessness,[2] difficulty relaxing, or having a history of frequent job changes.[10] Hyperactivity may impact work in subtle ways, for example, it may be difficult for the adult to sit through meetings.[14]

Childhood symptoms of impulsivity include blurting out answers, an inability to wait one's turn, or interrupting others.[2] In adults, impulsivity may result in interrupting others when they are busy,[17] difficulties

with waiting in line or in traffic, and quickness to anger, as well as high job or relationship turnover.[10,11]

While ADHD in adults is characterized by symptoms such as inattention, restlessness, and disorganization,[11] many adults with ADHD have developed coping mechanisms to minimize the impact of their symptoms on daily work and family life.[10] Examples include choosing a spouse who is very organized, working at a job below one's potential, or rigorously structuring one's day.[10,14] These coping mechanisms may complicate the initial diagnosis because the symptoms or problems with daily functioning may appear less severe than they really are. When rating symptom severity, it is important to account for the degree of patient compensatory behavior.[10]

Diagnosing ADHD in adults can be further complicated by the nonspecific nature of ADHD symptoms, which may overlap with other psychiatric disorders.[18] Many adults with ADHD suffer from other associated comorbid psychiatric disorders. Among adults with ADHD in the NCS-R,[6] social phobias were reported to be the most common comorbidity (29.3%). Other prevalent comorbidities in adults with ADHD included bipolar disorder (19.4%), major depressive disorder (18.6%), dysthymia (12.8%), and generalized anxiety disorder (8.0%).[6] To accurately differentiate between ADHD and other psychiatric disorders, clinicians must learn to pay careful attention to the patient's clinical features[11] and history of onset and persistence since childhood. While mood lability and increased activity are associated with both ADHD and bipolar disorder, bipolar disorder is a more likely diagnosis if the patient also complains of a decreased need for sleep or "racing thoughts" and describes a cyclical pattern of manic and depressive symptoms, as well as if the patient has experienced the onset of symptoms in adolescence or later.[11] Although patients with ADHD have attention and concentration deficits, they are less likely to display the excess worry and somatic symptoms that are typically seen in patients with anxiety disorders.[13]

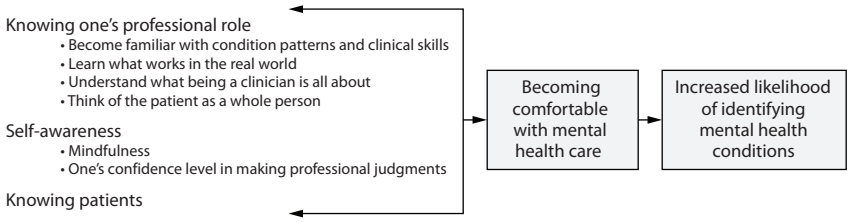
Untreated ADHD may affect the quality of many of life's domains. Patients may present with complaints that range from mood symptoms and low self-esteem to an inability to concentrate or establish a routine. Patients may report problems with personal or peer relationships, conflicts with authority, educational impairment, and frequent job changes.[10] Modulating emotional responses is a frequent problem among adults with ADHD, with 19.6% meeting the criteria for intermittent explosive disorder.[6] Young adults with ADHD are significantly less likely to have completed high school ($P < .001$), are significantly more likely to have a lower grade point average ($P < .001$), and tend to rank lower in their high school class ($P = .002$) than those without ADHD.[19] Another study of adults diagnosed with ADHD showed that their lower educational achievement carried over to difficulties in the workplace.[20] These adults also reported less full-time employment and having had more jobs over the previous 10 years compared with the control group. This study also showed that adults who reported having ADHD were significantly less satisfied with their family and social lives and had higher divorce rates than those without the disorder.[20] ADHD in adults has also been associated with poor driving behaviors.[21] These data show that adults with ADHD pay an enormous price in their occupational, social, and personal lives.

How Do Adults With ADHD Present in Clinical Practice?

While some patients may seek treatment if they suspect that their symptoms are associated with ADHD and are concerned about the impact of the condition on their families and the workplace,[14] it is unrealistic to presume that all patients who need help will recognize or choose to acknowledge the disorder on their own. Since ADHD has its onset in early childhood, many patients view the behaviors that constitute the diagnosis as normal and thus do not even consider the possibility of the diagnosis. Patients can be encouraged to self-refer by leaving information booklets in the waiting room or in examining rooms. However, because many of the symptoms of ADHD can produce behaviors that might be considered objectionable or undesirable, patients may be reluctant to discuss their concerns. Primary care physicians are in a unique position to become familiar with their patients over time, allowing them to recognize behaviors that may indicate ADHD. While discussions of "abnormal" behavior can be uncomfortable for both the clinician and the patient, the strength of the relationship built over time allows clinicians to ask for and convey information in a way that is acceptable to the patient. Research describing the role of clinical experience in providing depression care suggests that clinicians who understand the various presentations of ADHD and are familiar with their patients are willing to devote time to patients and their families. These clinicians also view their patients in a more holistic manner and are more likely to broach the topic early during the patient encounter. All of these factors can lead to a more efficient identification of ADHD (Figure 1).[22,23]

Since both parents and siblings of a child with ADHD are genetically at risk for the disorder, the diagnosis of ADHD in one family member should lead to consideration of the diagnosis for others in the family as well. In a study of 457 first-degree relatives of children diagnosed with ADHD,[24] psychiatric disorders, or no disorders, the risk of having ADHD was 28.6% greater in parents who had children with ADHD than in parents of children in the other 2 groups. Siblings of those with ADHD had a 20.8% greater risk of ADHD compared with siblings of children with no disorders. In another study,[25] 57% of the offspring of 31 adults with childhood-onset ADHD were reported to have ADHD.

Figure 1. Flow of Clinical Experience Relevant to the Recognition of Mental Health Conditions[a]



[a]Reprinted with permission from Baik et al.[23]

Various critical time points can provide an opportunity to ask patients how they are faring. For example, patients who have transitioned from high school to college might manifest symptoms of ADHD that did not previously fulfill all *DSM-IV* criteria because coping strategies had previously been adequate. Adults with ADHD may have had parents who structured daily routines and helped to minimize problems with forgetfulness and disorganization. Changes in family dynamics or relationships due to increased personal responsibility and more complex interpersonal relationships (eg, marriage, parenting, and financial obligations) may stress the adult with ADHD who had previously been able to compensate, and, thus, the adult begins to demonstrate symptomatic impairment. Family physicians can use their intimate knowledge of the patient and extended family to recognize these changes, which may be subtle, and then tailor interventions in ways that are most meaningful to the patient.[23]

Figure 2. Adult Self-Report Scale (ASRS) Screener[a]

Name	Date					
Circle the number that best describes how you have felt and conducted yourself over the past 6 months. Please give the completed questionnaire to your health care professional during your next appointment to discuss the results.	Never	Rarely	Sometimes	Often	Very Often	Score
1. How often do you have difficulty getting things in order when you have to do a task that requires organization?	0	1	2	3	4	
2. When you have a task that requires a lot of thought, how often do you avoid or delay getting started?	0	1	2	3	4	
3. How often are you distracted by activity or noise around you?	0	1	2	3	4	
4. How often do you leave your seat in meetings or other situations in which you are expected to remain seated?	0	1	2	3	4	
5. How often do you feel restless or fidgety?	0	1	2	3	4	
6. How often do you have difficulty waiting your turn in situations when turn taking is required?	0	1	2	3	4	

[a]Reprinted with permission from Kessler et al.[17]

Evaluation and Patient Management

Rating scales can help assess current symptoms; some can be used to assess whether a patient meets the *DSM-IV* criteria for ADHD.[10] Rating scales best suited for use in the primary care setting should be sensitive, specific, and easy to administer. One of the most practical office rating scales is the Adult ADHD Self-Report Scale (ASRS) V1.1 Screener (Figure 2)[17] developed by the World Health Organization Workgroup on Adult ADHD. This 6-question screening tool is a quick and efficient screen for possible adult ADHD.[10,17] With a positive predictive value of approximately 90%, the ASRS Screener is estimated to classify two-thirds of clinical cases as having a very high probability of ADHD.[17] While evidence is not available to support a recommendation to screen all adults visiting primary care settings for ADHD, use of the ASRS Screener among those identified with risk factors, behavioral characteristics, or histories suggestive of ADHD is warranted.

Since about one-third of adults with ADHD do not score positively on the ASRS Screener, if clinical suspicion warrants, the clinician should pursue additional diagnostic assessment among these patients. Given the range of potential presentations discussed above, the primary care physician should maintain a low threshold for further inquiry both during periodic health assessments and at other visits. For patients scoring positive on the ASRS Screener, further investigation is indicated. Since the ASRS Screener is only a screening instrument and not a diagnostic test, diagnostic assessment is needed to follow up on patients who screen positive. This clinical assessment should evaluate other potential causes of the symptoms and behaviors identified, probe for comorbid conditions, and lead to patient education and acceptance of the diagnosis, as well as therapeutic intervention.

Treatment strategies for adults with ADHD include the use of stimulant and nonstimulant medications, as well as adjunctive cognitive-behavioral skills training and psychotherapy. Based on effect size, a statistical calculation that can be used to compare the efficacy of different agents by quantifying the size of the difference between treatments, the various pharmacotherapeutic

options available for the treatment of ADHD in adults have proven to be very efficacious.[26–28]

How and When to Involve Other Professionals

For some patients, the primary care physician may make the ADHD diagnosis and manage therapy unassisted. However, the physician may seek assistance, particularly if there is uncertainty regarding the diagnosis, if there are possible psychiatric or substance use comorbidities, or if there is a crisis in the patient's life requiring substantial intervention. Some patients might benefit from the primary care physician obtaining assistance in educating the patient and family, particularly when this forms the basis for counseling regarding lifestyle and behavioral changes. Either initially or during the course of therapy, the physician may desire consultation regarding treatment decisions, particularly if treatment resistance or side effects occur.

The primary care physician should consider and cultivate a range of consultation and referral resources for patients with adult ADHD, including student health centers of universities and colleges. College students, with loss of parental oversight and with academic and social lives more self-directed, may cross from asymptomatic to symptomatic ADHD, leading to recognition of ADHD during young adulthood. Associated mood disorders (anxiety/depression, posttraumatic stress disorder, substance use disorders) may be presenting symptoms. Collaboration with student counseling services may greatly facilitate and improve the management of such students. Brochures in waiting rooms may be useful in some practice settings to draw students' and parents' attention to ADHD in adults and its effects on academics and future employment.

Psychiatrists may be beneficial to patients if the primary care physician suspects ADHD but is reluctant to diagnose it, is unsure of how to treat it, is unsuccessful in treating it, or if the patient has significant psychiatric comorbidity that calls for specialized knowledge. Primary care physicians should be mindful, however, that referrals to psychiatrists may result in lost opportunities to treat and therefore help patients. There are several reasons why patients may not follow up on referrals to psychiatrists, and these include the inability of patients, based on their ADHD symptoms, to remember and organize attendance at the referral visits. Unless educated as to the biologic nature of ADHD and the rationale behind involving a psychiatrist, the potential stigma associated with psychiatric care may result in the patient not following through with the referral and feeling rejected by the primary care physician as well.

Psychologists can meet with patients at more regular and frequent intervals than can primary care physicians or psychiatrists. They may help patients alter entrenched dysfunctional behaviors, relationships, and self-perceptions and thereby greatly improve long-term patient outcomes, even in patients appropriately treated with medication. Psychologists also may be able to provide treating physicians with valuable feedback about the effects of treatment on the lives of patients. ADHD coaches are present in some communities and may work independently or with psychologists or other mental health professionals. They can provide individualized support to adult ADHD patients and may be of particular benefit early in the course of therapy when the patient may feel overwhelmed with his/her life circumstances. Additionally, many communities have local chapters of advocacy organizations that can assist adults with ADHD and their families. In order to assist adults with ADHD in their efforts to utilize these resources, primary care physicians can direct patients to Web sites for relevant organizations such as Children and Adults with Attention Deficit/Hyperactivity Disorder (www.chadd.org), the Attention Deficit Disorder Association (www.add.org), and the ADHD Coaches Organization (www.adhdcoaches.org).

CONCLUSIONS

ADHD is an ongoing pervasive disorder with symptoms persisting into adulthood for approximately 65% of patients. The diagnosis of ADHD in adults should be based on clinical assessment using the established *DSM-IV* criteria. Diagnosis requires an index of suspicion; a clinical judgment that a patient may have unrecognized problems that, if left untreated, may have long-lasting consequences; and a supposition that recognition and treatment of the condition by the physician may be rewarded by real change in the patient's life. Diagnosis may be complex due to different manifestations of pediatric and adult symptoms, patient coping strategies, symptoms overlapping with other disorders, and frequent comorbidity with other psychiatric disorders. The ASRS Screener is an easy-to-use, sensitive, and specific screening instrument that can be utilized in the primary care setting. Primary care physicians should feel comfortable referring patients to other members of the health care community such as psychiatrists and psychologists when necessary, but they should also feel comfortable diagnosing and treating ADHD, as referrals may result in lost opportunities to treat adults with ADHD and improve their quality of life.

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REFERENCES

1. Pliszka S, Bernet W, Bukstein O, et al. AACAP Work Group on Quality Issues. Practice parameter for the assessment and treatment of children and adolescents with attention-deficit/hyperactivity disorder. *J Am Acad Child Adolesc Psychiatry*. 2007;46(7):894–921.
2. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders,* Fourth Edition, Text Revision. Washington, DC: American Psychiatric Association; 2000.
3. Dulcan M, Dunne JE, Ayres W, et al. American Academy of Child and Adolescent Psychiatry. Practice parameters for the assessment and treatment of children, adolescents, and adults with attention-deficit/hyperactivity disorder. *J Am Acad Child Adolesc Psychiatry*. 1997;36(suppl 10):85S–121S.
4. Faraone SV, Biederman J, Spencer T, et al. Attention-deficit/hyperactivity disorder in adults: an overview. *Biol Psychiatry*. 2000;48(1):9–20.
5. Bush G, Frazier JA, Rauch SL, et al. Anterior cingulate cortex dysfunction in attention-deficit/hyperactivity disorder revealed by fMRI and the Counting Stroop. *Biol Psychiatry*. 1999;45(12):1542–1552.
6. Kessler RC, Adler L, Barkley R, et al. The prevalence and correlates of adult ADHD in the United States: results from the National Comorbidity Survey Replication. *Am J Psychiatry*. 2006;163(4):716–723.
7. US Census Bureau. Annual estimates of the population by selected age groups and sex for the United States: April 1, 2000 to July 1, 2005 (NC-EST2005-02). http://www.census.gov/popest/national/asrh/NC-EST2005-sa.html. Accessed March 31, 2009.
8. de Graaf R, Kessler RC, Fayyad J, et al. The prevalence and effects of adult attention-deficit/hyperactivity disorder (ADHD) on the performance of workers: results from the WHO World Mental Health Survey Initiative. *Occup Environ Med*. 2008;65(12):835–842.
9. Weiss M, Murray C. Assessment and management of attention-deficit hyperactivity disorder in adults. *CMAJ*. 2003;168(6):715–722.
10. Adler L, Cohen J. Diagnosis and evaluation of adults with attention-deficit/hyperactivity disorder. *Psychiatr Clin North Am*. 2004;27(2):187–201.
11. Montano B. Diagnosis and treatment of ADHD in adults in primary care. *J Clin Psychiatry*. 2004;65(suppl 3):18–21.
12. Murphy KR, Adler LA. Assessing attention-deficit/hyperactivity disorder in adults: focus on rating scales. *J Clin Psychiatry*. 2004;65(suppl 3):12–17.
13. Moss SB, Nair R, Vallarino A, et al. Attention deficit/hyperactivity disorder in adults. *Prim Care*. 2007;34(3):445–473.
14. Weiss MD, Weiss JR. A guide to the treatment of adults with ADHD. *J Clin Psychiatry*. 2004;65(suppl 3):27–37.
15. Faraone SV, Spencer TJ, Montano CB, et al. Attention-deficit/hyperactivity disorder in adults: a survey of current practice in psychiatry and primary care. *Arch Intern Med*. 2004;164(11):1221–1226.
16. Levy F, Hay DA, McStephen M, et al. Attention-deficit hyperactivity disorder: a category or a continuum? genetic analysis of a large-scale twin study. *J Am Acad Child Adolesc Psychiatry*. 1997;36(6):737–744.
17. Kessler RC, Adler L, Ames M, et al. The World Health Organization Adult ADHD Self-Report Scale (ASRS): a short screening scale for use in the general population. *Psychol Med*. 2005;35(2):245–256.
18. McCann BS, Roy-Byrne P. Screening and diagnostic utility of self-report attention deficit hyperactivity disorder scales in adults. *Compr Psychiatry*. 2004;45(3):175–183.
19. Barkley RA, Fischer M, Smallish L, et al. Young adult outcome of hyperactive children: adaptive functioning in major life activities. *J Am Acad Child Adolesc Psychiatry*. 2006;45(2):192–202.
20. Biederman J, Faraone SV, Spencer TJ, et al. Functional impairments in adults with self-reports of diagnosed ADHD: a controlled study of 1,001 adults in the community. *J Clin Psychiatry*. 2006;67(4):524–540.
21. Fischer M, Barkley RA, Smallish L, et al. Hyperactive children as young adults: driving abilities, safe driving behavior, and adverse driving outcomes. *Accid Anal Prev*. 2007;39(1):94–105.
22. Baik S-Y, Bowers BJ, Oakley LD, et al. The recognition of depression: the primary care clinician's perspective. *Ann Fam Med*. 2005;3(1):31–37.
23. Baik S-Y, Bowers BJ, Oakley LD, et al. What comprises clinical experience in recognizing depression? the primary care clinician's perspective. *J Am Board Fam Med*. 2008;21(3):200–210.
24. Biederman J, Faraone SV, Keenan K, et al. Family-genetic and psychosocial risk factors in *DSM-III* attention deficit disorder. *J Am Acad Child Adolesc Psychiatry*. 1990;29(4):526–533.
25. Biederman J, Faraone SV, Mick E, et al. High risk for attention deficit hyperactivity disorder among children of parents with childhood onset of the disorder: a pilot study. *Am J Psychiatry*. 1995;152(3):431–435.
26. Faraone SV, Spencer T, Aleardi M, et al. Meta-analysis of the efficacy of methylphenidate for treating adult attention-deficit/hyperactivity disorder. *J Clin Psychopharmacol*. 2004;24(1):24–29.
27. Weisler RH, Biederman J, Spencer TJ, et al. Mixed amphetamine salts extended-release in the treatment of adult ADHD: a randomized, controlled trial. *CNS Spectr*. 2006;11(8):625–639.
28. Adler LA, Goodman DW, Kollins SH, et al. 303 Study Group. Double-blind, placebo-controlled study of the efficacy and safety of lisdexamfetamine dimesylate in adults with attention-deficit/hyperactivity disorder. *J Clin Psychiatry*. 2008;69(9):1364–1373.