ADHD in Adults: *Update for Clinicians on Diagnosis and Assessment*

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ABSTRACT

The prevalence of attention-deficit/hyperactivity disorder (ADHD) in adults 18–44 years of age ranges from 4.4% to 5.2%. The proportion of those adults who receive pharmacologic or nonpharmacologic treatment for ADHD is only 10.9% to 12.6%, indicating that ADHD remains undiagnosed and untreated in millions of adults in the United States. The potential consequences of ADHD in these adults include major functional impairments in education, work performance, and family and community life. Diagnosis should be based on clinical assessment using the Diagnostic and Statistical Manual of Mental Disorders, *Fourth Edition, Text Revision criteria for ADHD. Among adults, the core ADHD symptoms of hyperactivity and impulsivity tend to diminish with age, and inattention becomes a predominant symptom domain. Many ADHD symptoms are nonspecific and overlap with other psychiatric disorders. Moreover, comorbid ADHD is common in patients with many other psychiatric disorders and comorbid disorders are evident in many adults with ADHD. This article reviews important considerations in diagnosing ADHD in adults and screening and diagnostic instruments that assist in accurate diagnosis of the disorder.*

INTRODUCTION

The understanding of attention-deficit/hyperactivity disorder (ADHD) has evolved over the years, but the core symptoms of

FOCUS POINTS

- The persistence of attention-deficit/hyperactivity disorder (ADHD) symptoms into adolescence and adulthood strongly supports the concept that ADHD is a lifelong disorder for many patients.
- The growing acknowledgment of ADHD in adults as a valid diagnosis indicates that the number of adults seeking professional attention for the disorder will increase in the years to come.
- Diagnosis of ADHD in adults may be challenging because no objective medical or neuropsychological test can be used to make or confirm the diagnosis, and there is no established consensus on the specific symptom cluster for ADHD in adults.
- Missed diagnosis and the absence of treatment of ADHD in adults can be associated with educational, occupational, and social impairments in adaptive functioning.
- The clinical evaluation and interview, essential in identifying the chronicity and pervasiveness of ADHD symptoms and associated impairments, are critical to the correct diagnosis of ADHD in adults.
- Diagnosis may be assisted through the use of several recently developed screening and diagnostic instruments for assessment of ADHD in adults, specifically those that employ adult-specific language.

this psychiatric disorder have continued to be defined by inattentive and behavioral characteristics. In the early 20th century, Still,[1] an English pediatrician, first described "defective moral

control," which comprised some symptoms similar to those in the current definition of ADHD. During the following half century, these characteristics were sometimes considered the sequelae of damage to the brain—either a head injury or a central nervous system (CNS) infection.[2] When the characteristics were found in children without a history of such an insult, the damage was considered to be minimal (only manifesting as a behavioral change), giving rise to the term "minimal brain dysfunction." This term was used to describe a cluster of symptoms that included emotional lability, abnormal electroencephalograms, motor deficits, specific learning deficits, hyperkinesis, impulsivity, and short attention span.[2] Other terms used for patients' symptoms were minimal brain damage, organic learning and behavior disorders, organic deviation, and CNS deviation.

In the *Diagnostic and Statistical Manual of Mental Disorders*, Second Edition (*DSM-II*), the behavioral manifestations of overactivity, restlessness, distractibility, and short attention span were described as components of a specific disorder, "hyperkinetic reaction of childhood (or adolescence)."[3] This became "attention deficit disorder" in the *DSM-III*,[4] "attention-deficit hyperactivity disorder" in the *DSM-III-R*,[5] and then "attention-deficit/ hyperactivity disorder" in the *DSM-IV* and *DSM-IV-TR*.[6,7] Since the *DSM-III*, the criteria have emphasized three core symptoms: inattention, impulsivity, and hyperactivity.

It was not until the *DSM-III-R* that ADHD in adults was included in the definition of the disorder, reporting that "Follow-up studies of clinic samples indicate that approximately one-third of children with ADHD continue to show some signs of the disorder in adulthood."[5] The criteria, however, included onset of ADHD before 7 years of age. The *DSM-IV* provided criteria to diagnose adults with ADHD, and noted that symptoms (particularly motor hyperactivity) attenuate during late adolescence and adulthood in most patients.[6] Some patients experience all of the symptoms into mid-adulthood, while others retain only some, in which case the diagnosis is ADHD "in partial remission." The various subtypes of ADHD are described in Table 1.[7] The *DSM-III* included a category "attention deficit disorder, residual type" for patients in whom signs of hyperactivity are no longer present, but for whom "symptoms of inattention and impulsivity result in some impairment in social or occupational functioning."[4,8,9]

The *DSM-IV* also provides a diagnosis of ADHD "not otherwise specified (NOS)" for patients whose symptoms and impairment meet the criteria for a subtype of ADHD, but whose age of onset is ≥7 years or who do not reach the threshold of six of nine symptoms for the disorder. The guidelines do not further elaborate on the concept, but Faraone and colleagues[10] examined adults with both late-onset ADHD (83% had an age-of-onset between 7 and 12 years of age) and subthreshold ADHD symptoms. The late-onset subjects had a pattern suggestive of familial inheritance, comorbid disorders, and functional impairment consistent with those meeting full criteria. Those with subthresh-

old symptoms, however, had milder impairments and lacked the familial pattern, suggesting this might not be a valid diagnosis.

Assessments of ADHD in adults remained largely unchanged in the *DSM-IV-TR* published in 2000.[7] As McGough and Barkley[8] noted, the *DSM* criteria have never been validated in adults, do not include developmentally appropriate symptoms and thresholds for adults, and fail to identify some significantly impaired adults who could benefit from treatment. Clinical considerations and available instruments for assessment and diagnosis of ADHD in adults are reviewed below.

METHODS

A search of PubMed was conducted to identify relevant studies and critical reviews on the assessment and diagnosis of adults with ADHD. Using the search terms "ADHD," "adults," and "diagnosis," the primary criteria for inclusion in this article were that each study be controlled, had an adequate number of subjects, assessed symptoms using acceptable scales and tests, and was published during the past 20 years. Several older articles are included for historic context.

DIAGNOSING ADHD IN ADULTS

The *DSM-IV-TR* diagnostic criteria for ADHD are listed in Table 2.[7] Symptoms of ADHD may persist into adolescence in up to 30% to 80% of cases and into adulthood in up to 65% of cases.[11-13] In most cases, symptoms (particularly motor hyperactivity) attenuate during late adolescence and adulthood, although

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TABLE 1

ADHD SUBTYPES IN THE *DSM-IV*[I]

1. Combined type: ≥6 symptoms of inattention and ≥6 symptoms of hyperactivity-impulsivity have persisted for at least 6 months

2. Predominantly inattentive type: ≥6 symptoms of inattention, but <6 symptoms of hyperactivity-impulsivity, have persisted for at least 6 months

3. Predominantly hyperactive-impulsive type: ≥6 symptoms of hyperactivity-impulsivity, but <6 symptoms of inattention, have persisted for at least 6 months

4. ADHD NOS: an additional category in *DSM-IV-TR* for disorders with prominent symptoms of inattention or hyperactivity-impulsivity that do not meet criteria for ADHD. These include people whose symptoms and impairment meet the criteria for the predominantly inattentive type but whose age at onset is ≥7 years, and people with clinically significant impairment who present with inattention and who have a behavioral pattern marked by sluggishness, daydreaming, and hypoactivity

DSM-IV=Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; ADHD=attention-deficit/hyperactivity disorder; NOS=not otherwise specified; *DSM-IV-TR=Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Text Revision.

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TABLE 2

DSM-IV-TR DIAGNOSTIC CRITERIA FOR ADHD[7]

A. Either (1) or (2):

1. Six or more of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Inattention

   a. Often fails to give close attention to details or makes careless mistakes in school-work, work, or other activities.

   b. Often has difficulty sustaining attention in tasks or play activities.

   c. Often does not seem to listen when spoken to directly.

   d. Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions).

   e. Often has difficulty organizing tasks and activities.

   f. Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework).

   g. Often loses things necessary for tasks and activities (eg, toys, school assignments, pencils, books, or tools).

   h. Is often easily distracted by extraneous stimuli.

   i. Is often forgetful in daily activities.

2. Six or more of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Hyperactivity

   a. Often fidgets with hands or feet or squirms in seat.

   b. Often leaves seat in classroom or other situation in which remaining seated is expected.

   c. 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).

   d. Often has difficulty playing or engaging in leisure activities quietly.

   e. Is often "on the go" or often acts as if "driven by a motor."

   f. Often talks excessively.

Impulsivity

   g. Often blurts out answers before questions have been completed.

   h. Often has trouble awaiting turn.

   i. 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 age 7 years.

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 school, 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 disorder, or a personality disorder).

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DSM-IV-TR=Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision; ADHD=attention-deficit/hyperactivity disorder.

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some patients experience all of the symptoms of ADHD into mid-adulthood.[7] The clinical evaluation and interview are essential to the diagnosis of ADHD in adults.[14,15] This includes discussion regarding patient recall of any childhood symptoms of ADHD.[14] Current symptoms and their impact on work, home, and social functioning should also be explored.[14] Clinicians should assess the patient's family history and observable impairments of family members, including disorganization, job/financial instability, and alcohol/substance use disorders.[15] Rating scales (reviewed below) can be useful in gathering information from patients regarding childhood and current symptoms.[16] If possible, a collateral interview with a family member during the assessment can provide valuable information that the patient may not self report.[14] Alternatively, a family member may complete an ADHD rating scale as an observer to complement and confirm the patient's symptom and impairment report.[14] Formal records such as report cards and conduct reports are also useful.[14] In addition, because the *DSM-IV-TR* diagnostic criteria use child-specific language, the clinician needs to extrapolate symptoms and other information to adult domains of functioning.

In addition to meeting the *DSM-IV-TR* cut-off scores for core symptoms of ADHD, chronicity and pervasiveness of symptoms and their role in functional impairment also need to be present.[7] The *DSM-IV-TR* criteria for diagnosis of ADHD also include requirements for impairment in at least two settings (eg, at school or work and at home).[7] Assessment of whether the symptoms occur exclusively during the course of a pervasive developmental disorder, learning disorders, or other psychiatric disorders, or can be better accounted for by another mental disorder, is also important.[7]

The three major subtypes of ADHD are described in the *DSM-IV-TR*[7]: the combined type (most frequently diagnosed in adults), the predominantly inattentive type, and the predominantly hyperactive-impulsive type (Table 1). As noted above, another category, ADHD-NOS, is included for disorders with prominent symptoms of inattention or hyperactivity-impulsivity that do not meet all criteria for ADHD. However, if the unmet criterion is "symptoms are not better accounted for by another mental disorder," the diagnosis of ADHD is questionable.[7] Similar proportions of the three major subtypes have been identified in clinical trials (few reports of the results of clinical trials, however, include these data). For example, in a study of 221 adults with ADHD (mean age 38.7 years) by Spencer and colleagues,[17] 70% of the subjects were of the combined type, 27% the inattentive type, and 3% the hyperactive-impulsive type. In other studies, the respective proportions have been 63%, 37%, and 0% in Wilens and colleagues[18] (N=162; 40.2 years); 66%, 31%, and 2% in Michelson and colleagues[19] (N=536; 41.2 years); 56%, 37%, and 2% in Millstein and colleagues[20] (N=149; 37.0 years); and 55%, 34%, and 2% (and 9% of the residual type) in Murphy and colleagues (N=105; 20.7 years).[21] In a *DSM* field trial, Lahey and colleagues[22] reported that most hyperactive-impulsive

children developed the combined type during their early school years, while inattentive children tended to remain inattentive. McGough and Barkley[8] noted that in many cases patients who might have been diagnosed with the combined type as youths will appear to have the inattentive type in adulthood.

SYMPTOMS OF ADHD IN ADULTS

The symptoms of ADHD seen in pediatric patients shift as patients enter adulthood.[7,23,24] In adulthood, as roles and responsibilities change, symptom manifestations may also change, particularly hyperactivity-impulsivity symptoms.[14,23]

Symptoms of inattention in children may include difficulty sustaining attention in tasks or play activities, not listening when spoken to directly, not following through on instructions, or losing things necessary for tasks or activities.[7] In adults with ADHD, these symptoms may be expressed as difficulty finishing tasks, poor time management, difficulty sustaining attention when reading or doing paperwork, distractibility and forgetfulness, and poor concentration.[14,23] Among the 149 clinically referred adults with ADHD in the study by Millstein and colleagues,[20] the most commonly reported symptoms were difficulty following through on tasks, difficulty sustaining attention, and shifting activities frequently, endorsed by an average of 92% of the patients. In contrast, 58% endorsed an ADHD subtype that includes symptoms of hyperactivity-impulsivity.

Symptoms of hyperactivity in children may include fidgeting, running, or climbing in inappropriate situations; difficulty quietly playing or engaging in leisure activities; or talking excessively. Impulsive childhood symptoms include blurting out answers or difficulty awaiting turn (in conversation, in games).[7] In adults, symptoms of hyperactivity can present as subjective feelings of

restlessness, choosing active jobs that require a lot of energy, and working at multiple jobs.[23] Symptoms of impulsivity in adults may present as finishing or interrupting others' sentences during conversation, impulsive or multiple job changes, and interrupting others when they are busy.[23,25] Additionally, a low frustration tolerance can lead to irritability, quickness to anger, and high relationship turnover.[14] Impulsivity can be highly impairing in that impulsive acts cannot be taken back once they have occurred. In contrast, consequences of inattentive symptoms can often be corrected.

Current *DSM-IV-TR* criteria may not accurately represent adult symptom manifestation even among adults who continue to experience significant impairment. Barkley and colleagues[26] have recommended the adoption of nine criteria for the diagnosis of ADHD in adults (Table 3). The authors noted that only three of the items (numbers 1, 8, and 9) are from the *DSM-IV-TR* and that none concern hyperactivity. Data from this study, as well as from a study conducted by Faraone and colleagues,[10] have led some to question whether the age-of-onset criteria should be pushed further back to 12 years of age.

PREVALENCE AND POTENTIAL CONSEQUENCES OF ADHD IN ADULTS

According to data from the National Comorbidity Survey Replication (NCSR; N=3,199 respondents 18–44 years of age), the prevalence of clinician-assessed ADHD in the general adult population of the US is 4.4%.[27] The estimate for the US from the World Health Organization (WHO) World Mental Health Survey Initiative (N=3,197 US respondents 18–44 years of age) was a little higher at 5.2%.[28] The overall prevalence of ADHD in adults in the 10 countries from the WHO survey (N=11,422) was 3.4% (range=1.2%–7.3%).[28] When examined by employment status in the US, the rate of ADHD in employed or self-employed respondents (4.5%) was significantly lower than the rate in unemployed respondents (7.2%; P=.021).[29] Based on these statistics extrapolated to estimates of the full US population of 222,940,420 adults ≥18 years of age (July 2005),[30] ADHD may affect an estimated 10 million adults in the US (4.4% prevalence x 223 million=9.8 million). The proportion of adults in the NCSR who received treatment for ADHD was only 10.1% of men and 12.1% of women, indicating that ADHD remains undiagnosed and untreated in millions of adults in the US.[27]

The growing acknowledgment of ADHD in adults as a valid diagnosis indicates that the number of adults seeking professional attention for the disorder will increase in the years to come.[23] According to an analysis of pharmacy claims data for >2.5 million participants in prescription benefit plans, approximately 1% of the participants ≥20 years of age were treated for ADHD with medication.[31] When the estimated prevalence rate of 4.4%[27] is applied to this population, the result is a pharmacologic treatment rate of 22.7%.

TABLE 3

PROPOSED CRITERIA FOR ADHD IN ADULTS[26]

1. Is easily distracted

2. Makes impulsive decisions

3. Has difficulty stopping activities or behaviors when they should be stopped

4. Starts projects or tasks without reading or listening to directions

5. Does not follow through on promises or commitments

6. Has trouble doing things in the proper order or sequence

7. Drives a motor vehicle much faster than others (excessive speeding); or often has difficulty engaging quietly in leisure activities

8. Has difficulty sustaining attention in tasks or recreational activities

9. Has difficulty organizing tasks and activities

ADHD=attention-deficit/hyperactivity disorder.

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The potential consequences of ADHD in adults have been described in several studies.[21,23,29,32,33] Awareness of some of the educational, social, and occupational problems experienced by many adults with ADHD may prompt the identification of these people. In the studies reviewed below, most of the respondents with ADHD were not receiving treatment for ADHD.

To evaluate functional impairments associated with ADHD, Biederman and colleagues[33] conducted a telephone-interview survey of a community sample of 500 adults (mean age=32 years) who reported having been diagnosed with ADHD, and 501 sex- and age-matched adults who did not have ADHD (controls; mean age=33 years). The adults with ADHD were significantly less likely to have graduated from high school than those without ADHD (7% vs. 17%; P≤.001) and less likely to have attained a college degree (19% vs. 26%; P<.01). Fewer were currently employed (52% vs. 72%; P≤.001) or had full-time jobs (34% vs. 57%; P≤.001), and those with ADHD were significantly more likely to be looking for work (14% vs. 5%; P≤.001). They were also twice as likely to have been arrested (37% vs. 18%; P≤.001), 1.5 times more likely to have received more than one speeding ticket in a 12-month period (25% vs. 17%; P≤.01), 1.8 times more likely to report an addiction to tobacco (64% vs. 36%; P≤.001), and 1.6 times more likely to report recreational drug use (52% vs. 33%; P≤.001).[33]

Barkley and colleagues[32] assessed outcomes in 158 respondents rigorously diagnosed as hyperactive in childhood and 81 community controls who were followed up for ≥13 years. From each group, 94% participated in the follow-up study: 149 of the original 158 members of the hyperactive group and 76 of the original 81 members of the control group. The respondents were primarily male (91%) and Caucasian (94%). Their mean age at follow-up was 21 years (range 19–25 years) and 8.1% of hyperactive group and 1.3% of the control group were taking psychiatric medications, primarily stimulants and some antidepressants. Significantly more of the hyperactive group had been suspended during high school (60% vs. 18%, P<.001) or had received special education (44% vs. 10%, P<.001), and significantly fewer had graduated from high school (68% vs. 100%, P<.001) or enrolled in college (21% vs. 78%, P<.001). According to the parents' ratings on the Young Adult Behavior Checklist, the number of social problems experienced was 2.9±2.6 in the hyperactive group and 0.4±0.8 in the controls (P<.001). The hyperactive group reported significantly more sex partners than the controls (13.6±17.1 vs. 5.4±5.1, P<.001) and 17% vs. 4% had contracted a sexually transmitted disease (P=.006).[32]

In a study of 89 "hyperactive boys almost grown-up" by Mannuzza and colleagues,[34] at 16–3 years of age 26% had been arrested more than once (vs. 8% of non hyperactive controls) and 20% had been convicted of an offense more than once (vs. 2% of controls). Additionally, in a review of the literature on ADHD and correctional health care, Eme[35] reported a 25% prevalence of ADHD among inmates.

A survey of work performance in adults with ADHD was completed recently in 10 countries by the WHO World Mental Health Survey Initiative.[29] Days out of role were assessed by asking the respondents the question, "Beginning yesterday and going back 30 days, how many days out of the past 30 were you totally unable to work or carry out your normal activities?" Compared with employed respondents without ADHD, the mean excess days of lost role performance (number of days per year either absent or with reduced quantity or quality of work) was 22.1 days in the total ADHD group and 28.3 days in the ADHD respondents in the US (both P<.05 vs. respondents without ADHD). Among the 2,387 employed respondents with ADHD in the US sample, only 12.6% had received any treatment for ADHD.[29]

COMPLEXITIES OF DIAGNOSIS

Diagnosis of ADHD in adults may be challenging because, like all psychiatric disorders, no objective medical or neuropsychological test can be used to make or confirm the diagnosis, and there is no established consensus on the specific symptom cluster for ADHD in adults.[15] Making the diagnosis in an adult requires using different resources than are often available when making the diagnosis in a child. With children, parents or teachers see the child intensely for significant time periods, but in adults, there is often no one person who sees the patient throughout the day (a reporter from work may miss symptoms at home and a significant other may under-report symptoms at work). Thus, the careful review of history by the clinician that integrates self-reports and other information recommended for the valid assessment of symptoms and impairments may be more difficult to obtain in the adult patient.[14]

Adult patients with ADHD often have similar educational, occupational, and social impairments. Many adults with ADHD may have failed to live up to their potential and present with problems related to diminished educational achievement or vocational training. Others may present with work-related problems that can be task specific or may involve interpersonal interactions. Other common presentations may involve marital or relationship difficulties.

Adults with ADHD experiencing symptoms for years frequently develop compensatory strategies that help minimize the observable manifestation of impairments, thereby hiding symptoms from others.[14] These compensatory strategies can complicate the diagnosis of ADHD by making impairments less evident to clinicians. Therefore, clinicians need to evaluate the degree of compensation when assessing symptom severity. In addition, impairment, related to a few specific symptoms, may have serious consequences even if problems only occur in a few situations. For example, interruptions may be rare, but if they occur at critical or inappropriate times, such as with a superior or in a courtroom, the consequences can be serious. A person with ADHD may have learned to check carefully at home to

ensure that he or she has not forgotten something, and then may be chronically late for work resulting in a poor job review. Therefore, observable impairments result from intelligence level, compensatory skills, and environmental demands. Establishing effective coping mechanisms is an important goal of cognitive-behavioral therapy in patients with ADHD.[36,37]

Assessment of ADHD symptoms can be complicated by their nonspecific nature. For example, the inattentive symptoms seen with ADHD may resemble concentration impairments that occur in major depressive disorder (MDD), dysthymia, posttraumatic stress disorder, and generalized anxiety disorder (GAD). ADHD inattention symptoms can also resemble the distractibility of a manic or hypomanic episode. Furthermore, some hyperactivity symptoms of ADHD, such as motoric restlessness and excessive talking, can be difficult to distinguish from the symptoms of restlessness in GAD or psychomotor agitation associated with mania, hypomania, or MDD. Similarly, the impulsive symptoms seen with ADHD may resemble the impulsivity characteristic of manic and hypomanic episodes[38] or borderline personality disorder.[7] Some of these complexities can be addressed during the clinical interview by asking questions using adult-specific language and context. Diagnostic accuracy rests on the longitudinal course of cross-sectional cognitive and behavioral symptoms tracked back to the age of onset.

Comorbid ADHD is common in patients with other psychiatric disorders and comorbid psychiatric disorders are evident in a high proportion of adults with ADHD. High rates of mood, anxiety, and substance use disorders have been reported in community studies of adults with ADHD and in national and international surveys. Mood disorders are often present in adults with ADHD with reported rates of comorbidity between 53% and 59%,[39,40] and MDD has been shown to be present in 10% to 55% of adults with ADHD.[40-46] Bipolar disorder/mania is another frequently comorbid condition, reported in 9% to 14% of adults with ADHD,[40,42,43] and dysthymia has been reported in 5.7% to 35% of adults with ADHD.[40,44-46] Antisocial personality disorder has also been frequently reported in adults with ADHD with rates of comorbidity between 7% and 17%.[39,41-43] Generalized anxiety disorder is another common comorbid diagnosis in adults with ADHD, with reported prevalence rates between 3% and 53%.[39,41,44-46] Substance use disorders also frequently accompany ADHD in adults, with reported comorbidity rates of between 7% and 57%.[39-46]

Similar patterns of a high prevalence of these disorders in adults with ADHD are seen in data from the NCSR[27] and from the 10-nation WHO survey.[28] In both surveys, ADHD was assessed according to DSM-IV criteria, and other DSM-IV disorders were assessed using the WHO Diagnostic Interview. In the NCSR, 38.3% of adults with ADHD had a comorbid mood disorder, 18.6% had a major depressive disorder, 19.4% had a bipolar disorder, 12.8% had dysthymia, 47.1% had an anxiety disorder, and 15.2% had a substance use disorder.[27] In the

WHO World Mental Health Surveys in 10 countries,[28] mood disorders were identified in 24.8% of adults with ADHD, anxiety disorders in 38.1%, and substance use disorders in 11.1%.

Comorbid ADHD is found in a large proportion of adults with other psychiatric disorders. The US NCSR[27] identified ADHD in 22.6% of adults with dysthymia, 21.2% of adults with bipolar disorder, 11.9% of adults with GAD, 10.8% of adults with a substance use disorder, and 9.4% of adults with MDD. In the WHO World Mental Health Survey,[28] ADHD was identified in 12.5% of adults with a substance use disorder, 11.1% of adults with mood disorders, and 9.9% of adults with anxiety disorders. Furthermore, in a study by Alpert and colleagues,[47] childhood-onset ADHD was diagnosed in >16% of 116 adults enrolled in a treatment program who had a current episode of MDD. Both the MDD and ADHD were diagnosed according to *DSM-III-R* criteria.

CURRENTLY AVAILABLE RATING SCALES

Several major self- and clinician-rated scales are currently available to assess whether an adult meets the *DSM-IV-TR* criteria necessary for a diagnosis of ADHD. Descriptions of some of the available scales are provided in Table 4.[14,25,48-67] Enumeration of current symptoms, impairments, and childhood onset of symptoms remain the affirming factors in the diagnosis of ADHD.[14] Rating scales provide the basis for the diagnostic interview or supplement it by providing structure and, in some cases, extensive prompts can be used to probe patients further. While the use of rating scales can provide valuable information, it is critical to filter patient reports through the prism of skepticism since patients may assess symptoms in settings in which they are less impaired (ie, tasks that they find easy or interesting) and not the more challenging ones. As a case in point, baseline investigator ratings were stronger predictors of treatment outcome than baseline patient self-report scores on the Conners Adult ADHD Rating Scale.[68] Rating scales can also be used to measure patient response to treatment and changes in quality of life. Descriptions of some of the available scales are provided in Table 4.[14,25,48-67]

NEUROPSYCHOLOGICAL TESTS

Neuropsychological testing is generally reserved for cases of diagnostic uncertainty or for educational reasons. Seidman[69] reported that >70 tests are available to assess neuropsychological functioning in adults with ADHD. Many, however, were used in only one or two studies, and their sensitivity cannot be determined. Instead, Seidman highlighted five tests that most consistently differentiated people with ADHD from controls and were used in ≥7 studies. These were versions of the Continuous Performance Test (CPT), including the Conners CPT, Gordon

TABLE 4

CURRENTLY AVAILABLE RATING SCALES[14,25,48-67]

Scale / Description	Number of Items	Key Points	Scale Availability
Screening Tools			
ASRS v1.1 Self-report Self-report screener Frequency based	18* 6	- Assesses current frequency of symptoms (from 0=never to 4=very often) - ASRS validated using the NCSR cohort[25] - Screener comprised of the same 6 questions on Part A of the ASRS found to be the most predictive of ADHD symptoms - Intended to be used before the symptom checklist to identify persons at risk for adult ADHD - Validity of the scale "to discriminate *DSM-IV* cases from non-cases" confirmed by Kessler and colleagues[48] - Neither version of the ASRS is meant to be a stand-alone diagnostic tool but is designed to be a screening aid to complement the clinical assessment	WHO and on the New York University web-site at: www.med.nyu.edu/Psych/training/adhd.html[49]
Diagnostic Scales			
Conners Adult ADHD Diagnostic Interview Clinician administered	18*	- Contains separate queries for childhood (retrospective) and adulthood ADHD symptoms[50] - Specific prompts and examples of symptoms are provided for each query - Includes a brief screen for comorbidities	Available for purchase from: Multi-Health Systems at www.mhs.com[51]
BADDS Diagnostic Form Clinician administered Frequency based	40	- Asks about the patient's clinical history and how symptoms influence school activities, work, leisure time, peer interactions, and self-image[52] - Assesses frequency of symptoms (from 0=never to 3=almost daily) - The Wechsler Adult Intelligence, which can determine whether the patient's concentration level is below average verbal and spatial capabilities, can be used with the BADDS score to lead to the diagnosis	Available for purchase from: The Psychological Corporation, http://harcourtassessment.com[53]
Adult ACDS v1.2 Clinician administered Severity based	18*	- A semistructured interview to establish the presence of current adult symptoms of ADHD, with suggested age-specific prompts for rating both childhood and adult symptoms - Childhood retrospective recall is assessed using a modified form of the ADHD modules from the Kiddie-SADS Diagnostic Interview[54] - Adult current symptoms are assessed by examining duration of symptoms using a set of questions for each symptom domain - The ACDS has been validated in a re-examination of the prevalence of adult ADHD in the NCSR and treatment trials[55]	Available from Lenard Adler, MD, at adultADHD@med.nyu.edu
Symptom Assessment Scales			
ADHD-RS with Adult Prompts Clinician administered Severity based	18*	- Contains nine items that assess inattentive symptoms and 9 items that assess hyperactive and impulsive symptoms - Symptoms rated using a four-point Likert-type severity scale (from 0=none to 3=severe) - The ADHD-RS was developed as a parent- and teacher-rated scale before a clinician-administered version was validated[56,57] - Although standardized as a rating scale for children, it can also be used as an adult scale after the clinician has been trained[14] - Adult prompts from the ACDS v1.2 can be inserted into the ADHD-RS to create a semistructured measurement[55] that allows the clinician to probe the extent, frequency, breadth, severity, and consequences of these symptoms to ascertain impairment	Published in: DuPaul GJ, Power TJ, Anastopoulos AD, Reid R. *ADHD Rating Scale–IV: Checklists, Norms, and Clinical Interpretation.* New York, NY: Guilford Press; 1998.[57] ADHD-RS with adult prompts available from Lenard Adler, MD, at adultADHD@med.nyu.edu
Adult Investigator Symptom Rating Scale (AISRS) Clinician administered Severity based	18*	- Like the ADHD-RS, the individual items on the AISRS are paired with the adult-specific prompts contained in the ACDS - The AISRS also improves on certain aspects of the ADHD-RS, such as providing a context basis to questions about symptoms and replacing questions that assess two symptom domains with questions that assess only one domain - Symptoms rated using a four-point Likert-type severity scale (from 0=none to 3=severe)	Available from Lenard Adler, MD, at adultADHD@med.nyu.edu *(Continued on next page)*

TABLE 4
CURRENTLY AVAILABLE RATING SCALES (CONT.)[14,25,48-67]

Scale / Description	Number of Items	Key Points	Scale Availability
Barkley's Current Symptoms Scale Clinician administered Frequency based	18*	- The odd-numbered items assess frequency of inattentive symptoms and the even-numbered items assess hyperactive/impulsive symptoms on a Likert-type frequency scale (from 0 to 3=very often) - The form also asks patients to report their age at onset of ADHD symptoms and how often their symptoms interfere with school, relationships, work, and home - Eight questions address the presence of comorbid oppositional defiant disorder	Barkley RA, Murphy KR. Attention-Deficit Hyperactivity Disorder: A Clinical Workbook. 2nd ed. New York, NY: Guilford; 1998.[58] (www.guilford.com[59])
CAARS Self-report Observer rating Frequency based	18* 30	- Both self- and observer-scale types are available in three lengths as screening, short, and long forms - Symptoms and behavior are assessed with a combination of frequency and severity using a four-point Likert-type scale (from 0=not at all/never to 3=very much/very frequently - Both the self- and clinician-rated versions of the scale have been validated - Adult prompts from the ACDS v1.2 can be used as a stand-alone instrument in conjunction with the CAARS[57]	Available for purchase from: Multi-Health Systems at www.mhs.com[51]
BRIEF-A Self-report Clinician administered Informant-based	75	- Assesses executive control and self-regulation in adults (18–90 years of age)[60] - Contains nine "non-overlapping clinical scales corresponding to common theoretically and empirically derived domains of executive function that together tap emotional, behavioral, and metacognitive skills broadly construed as executive abilities"[61] - Scores are combined to produce an overall score, the Global Executive Composite - Both self- and clinician-rated scales are typically administered to obtain two perspectives on the patient's functioning	Published in: Roth RM, Isquith PK, Gioia GA. *Behavioral Rating Inventory of Executive Function—Adult Version*. Lutz, Fla: Psychological Assessment Resources; 2005.[60] Available for purchase from: http://portal.wpspublish.com/portal/page?_pageid=53,109114&_dad=portal&_schema=PORTAL[62]
WRAADDS Clinician administered Severity based	28	- Designed to assess the severity of ADHD target symptoms in adults using the Utah Criteria - Measures symptoms in seven categories: attention difficulties, hyperactivity/restlessness, temper, affective lability, emotional over-reactivity, disorganization, and impulsivity - Individual items are rated from 0–2 (0=not present, 1=mild, 2=clearly present) - Each of the seven categories is summarized on a scale of 0–4 (from 0=none to 4=very much) - The WRAADDS may be of particular benefit in assessing possible mood lability symptoms of ADHD, as demonstrated by effective measurement of improvement in mood dysregulation in ADHD patients enrolled in a large controlled trial of atomoxetine[63]	Contact Fred W. Reimherr, MD, Mood Disorders Clinic, Department of Psychiatry, University of Utah Health Science Center, Salt Lake City, UT
Quality-of-Life scales			
AAQoL Self-report	29	- Designed to assess health-related quality of life[64] during the previous two weeks in adults with ADHD - Each item is rated by patients on a five-point Likert scale (ranging from not at all/never to extremely/very often) - The scale yields a total score and four subscale scores: life productivity, Psychological health, life outlook, and relationships - A recent study has shown that the AAQoL was responsive to changes in symptoms of ADHD and appears to be a useful outcome measure of treatment for adults with ADHD[65]	Brod M, Perwien A, Adler L, Spencer T, Johnston J. Conceptualization and assessment of quality of life for adults with attention-deficit/hyperactivity disorder. *Primary Psychiatry*. 2005;12(6):58-64.[64]

Diagnostic System, and a number of "home-grown" visual CPTs; the Stroop Color Word Task; the Trail Making test; the Verbal Fluency test; and the Wechsler Adult Intelligence Scale.

In a study of 213 adults who met *DSM-IV* criteria for ADHD and 145 matched comparison subjects, Biederman and colleagues[70] found that 31% of subjects with ADHD had executive function deficits. This study examined sustained attention/vigilance, planning and organization, response inhibition, set shifting and categorization, selective attention and visual scanning, verbal and visual learning, and memory. The results suggest that many people with ADHD do not have these deficits and that reliance on neuropsychological testing to make a diagnosis will miss most of those affected. Additionally, the results of several studies suggest that neuropsychological testing cannot definitively distinguish between those with ADHD and those without.[71-74] This further highlights the importance of clinical assessment in making a correct diagnosis of ADHD in adults. Cognitive assessments, however, can improve the validity of an ADHD assessment and can be used to evaluate treatment outcomes.[75]

CONCLUSION

The persistence of ADHD symptoms into adolescence and adulthood in many patients strongly supports the concept that ADHD is a lifelong disorder for many patients. Although the symptoms of ADHD seen in pediatric patients may shift as patients enter adulthood, the consequences of adult symptoms of ADHD are no less serious. During clinical evaluation, symptom assessment is essential but not sufficient to diagnose this disorder. The chronicity and pervasiveness of ADHD symptoms, as well as impairment due to ADHD symptoms, are critical to the correct diagnosis of ADHD in adults. The *DSM-IV-TR* criteria for ADHD still provide the basis for diagnosis despite several limitations involving the different manifestations of ADHD symptoms from childhood to adulthood, such as the possible attenuation of hyperactive-impulsive symptoms. Core inattentive symptoms may continue into adulthood and often drive the presentation of ADHD in adults. Additional complexities to making an accurate diagnosis include patient coping strategies, symptom profiles that overlap with other *DSM-IV-TR* disorders, and frequent comorbidity with other *DSM-IV-TR* disorders. Diagnosis may be assisted through the use of several recently developed screening and diagnostic instruments for assessment of ADHD in adults, specifically those that employ adult-specific language to circumvent some of the shortcomings associated with the child-centered *DSM-IV-TR* criteria for ADHD.

Accurately diagnosing ADHD is critically important, as highlighted by the findings of Barkley and colleagues[32] and Biederman and colleagues.[33] These studies demonstrate that missed diagnosis and the absence of treatment were associated with educational, occupational, and social impairments in adaptive functioning, as well as an increased risk of substance use disorder. Because of the high prevalence rate of ADHD relative to other Axis I psychiatric disorders, clinicians should be aware of the symptoms and adult manifestations of ADHD and include screening in every adult psychiatric evaluation. Rating scales can be helpful in complementing the clinical interview, quantifying target symptoms, and measuring treatment response. *PP*

REFERENCES

1. Still GF. Some abnormal physical conditions in children. Lancet. 1902;1008-1012,1077-1082,1163-1168.
2. Clements SD, Peters JE. Minimal brain dysfunctions in the school-age child. Diagnosis and treatment. *Arch Gen Psychiatry*. 1962;6:185-197.
3. *Diagnostic and Statistical Manual of Mental Disorders*. 2nd ed. Washington, DC: American Psychiatric Association; 1968:50.

TABLE 4

CURRENTLY AVAILABLE RATING SCALES (CONT.)[14,25,48-67]

Scale / Description	*Number of Items*	*Key Points*	*Scale Availability*
AIM-A Self-report	57	- Designed to provide clinicians with an objective standard for documenting changes in quality of life as part of a continuous health management program for adults with ADHD - Comprised of six scales as follows: living with ADHD (10 items), general well-being (11 items), performance and daily functioning (10 items), relationships/communications (8 items), bothersome/concern (9 items), and daily interference (9 items) - In a recent study of 317 adults with ADHD the measure demonstrated reliability and validity, including sensitivity to change[66]	Available for purchase from: www.healthact.com/aim_a.html[67]

*Based on *DSM-IV* diagnostic criteria.

ASRS=Adult ADHD Self-Report Scale; NCSR=National Comorbidity Survey Replication; ADHD=attention-deficit/hyperactivity disorder; WHO=World Health Organization; DSM-IV=Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; BADDS=Brown Attention-Deficit Disorder Scale; ACDS=ADHD Clinical Diagnostic Scale; SADS=Schedule for Affective Disorders and Schizophrenia; ADHD-RS=ADHD Rating Scale; CAARS=Conners Adult ADHD Rating Scale; BRIEF-A=Behavior Rating Inventory of Executive Function—Adult version; WRAADDS=Wender-Reimherr Adult Attention Deficit Disorder Scale; AAQoL=Adult Attention-Deficit/Hyperactivity Disorder Quality of Life Scale; AIM-A=ADHD Impact Module for Adults.

Goodman GW. *Primary Psychiatry*. Vol 16, No 11. 2009.

4. *Diagnostic and Statistical Manual of Mental Disorders*. 3rd ed. Washington, DC: American Psychiatric Association; 1980:41-45.

5. *Diagnostic and Statistical Manual of Mental Disorders*. 3rd ed, rev. Washington, DC: American Psychiatric Association; 1987:50.

6. *Diagnostic and Statistical Manual of Mental Disorders*. 4th ed. Washington, DC: American Psychiatric Association; 1994:78-85.

7. *Diagnostic and Statistical Manual of Mental Disorders*. 4th ed, text rev. Washington, DC: American Psychiatric Association; 2000:85-93, 706.

8. McGough JJ, Barkley RA. Diagnostic controversies in adult attention deficit hyperactivity disorder. *Am J Psychiatry*. 2004;161(11):1948-1956.

9. Faraone SV, Biederman J, Mick E. The age-dependent decline of attention deficit hyperactivity disorder: a meta-analysis of follow-up studies. *Psychol Med*. 2006;36(2):159-165.

10. Faraone SV, Biederman J, Spencer T, et al. Diagnosing adult attention deficit hyperactivity disorder: are late onset and subthreshold diagnoses valid? *Am J Psychiatry*. 2006;163(10):1720-1729.

11. Dulcan M, and the Work Group on Quality Issues. 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(10 suppl):85S-121S.

12. Weiss M, Hechtman LT, Weiss G. *ADHD in Adulthood: A Guide to Current Theory, Diagnosis, and Treatment*. Baltimore, MD: Johns Hopkins University Press; 1999.

13. Kessler RC, Adler LA, Barkley R, et al. Patterns and predictors of attention-deficit/hyperactivity disorder persistence into adulthood: results from the National Comorbidity Survey Replication. *Biol Psychiatry*. 2005;57(11):1442-1451.

14. Adler L, Cohen J. Diagnosis and evaluation of adults with attention-deficit/hyperactivity disorder. *Psychiatr Clin North Am*. 2004;27(2):187-201.

15. Goodman DW. Treatment and assessment of ADHD in adults. In: Biederman J, ed. Across the Life-Span: From Research to Clinical Practice—An Evidence-Based Understanding. Hasbrouck Heights, NJ: Veritas Institute for Medical Education; 2005. [AU: PLEASE PROVIDE PAGE RANGE]

16. Murphy KR, Adler LA. Assessing attention-deficit/hyperactivity disorder in adults: focus on rating scales. *J Clin Psychiatry*. 2004;65(suppl 3):12-17.

17. Spencer TJ, Adler LA, McGough JJ, Muniz R, Jiang H, Pestreich L; Adult ADHD Research Group. Efficacy and safety of dexmethylphenidate extended-release capsules in adults with attention-deficit/hyperactivity disorder. *Biol Psychiatry*. 2007;61(12):1380-1387.

18. Wilens TE, Haight BR, Horrigan JP, et al. Bupropion XL in adults with attention-deficit/hyperactivity disorder: a randomized, placebo-controlled study. *Biol Psychiatry*. 2005;57(7):793-801.

19. Michelson D, Adler L, Spencer T, et al. Atomoxetine in adults with ADHD: two randomized, placebo-controlled studies. *Biol Psychiatry*. 2003;53(2):112-120.

20. Millstein RB, Wilens TE, Biederman J, Spencer TJ. Presenting ADHD symptoms and subtypes in clinically referred adults with ADHD. *J Atten Disord*. 1997;2(3):159-166.

21. Murphy KR, Barkley RA, Bush T. Young adults with attention deficit hyperactivity disorder: subtype differences in comorbidity, educational, and clinical history. *J Nerv Ment Dis*. 2002;190(3):147-157.

22. Lahey BB, Applegate B, McBurnett K, et al. DSM-IV field trials for attention deficit hyperactivity disorder in children and adolescents. *Am J Psychiatry*. 1994;151(11):1673-1685.

23. Goodman DW. The consequences of attention-deficit/hyperactivity disorder in adults. *J Psychiatr Pract*. 2007;13(5):318-327.

24. Weiss MD, Weiss JR. A guide to the treatment of adults with ADHD. *J Clin Psychiatry*. 2004;65(suppl 3):27-37.

25. 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.

26. Barkley RA, Murphy KR, Fischer M. *ADHD in Adults: What the Science Says*. New York, NY: Guilford Press; 2008.

27. 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.

28. Fayyad J, de Graaf R, Kessler R, et al. Cross-national prevalence and correlates of adult attention-deficit hyperactivity disorder. *Br J Psychiatry*. 2007;190:402-409.

29. 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.

30. 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). Available at: www.census.gov/popest/national/asrh/NC-EST2005-sa.html. Accessed October 22, 2009.

31. Castle L, Aubert RE, Verbrugge RR, Khalid M, Epstein RS. Trends in medication treatment for ADHD. *J Atten Disord*. 2007;10(4):335-342.

32. Barkley RA, Fischer M, Smallish L, Fletcher K. Young adult outcome of hyperactive children: adaptive functioning in major life activities. *J Am Acad Child Adolesc Psychiatry*. 2006;45(2):192-202.

33. Biederman J, Faraone SV, Spencer TJ, Mick E, Monuteaux MC, Aleardi M. Functional impairments in adults with self-reports of diagnosed ADHD: a controlled study of 1001 adults in the community. *J Clin Psychiatry*. 2006;67(4):524-540.

34. Mannuzza S, Klein RG, Konig PH, Giampino TL. Hyperactive boys almost grown up. IV. Criminality and its relationship to psychiatric status. *Arch Gen Psychiatry*. 1989;46(12):1073-1079.

35. Eme RF. Attention-deficit/hyperactivity disorder and correctional health care. *J Correct Health Care*. 2009;15(1):5-18.

36. Safren SA, Otto MW, Sprich S, Winett CL, Wilens TE, Biederman J. Cognitive-behavioral therapy for ADHD in medication-treated adults with continuous symptoms. *Behav Res Ther*. 2005;43(7):831-842.

37. Bramham J, Young S, Bickerdike A, Spain D, McCartan D, Xenitidis K. Evaluation of group cognitive behavioral therapy for adults with ADHD. *J Atten Disord*. 2009;12(5):434-441.

38. 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.

39. Miller TW, Nigg JT, Faraone SV. Axis I and II comorbidity in adults with ADHD. *J Abnorm Psychol*. 2007;116(3):519-528.

40. Roy-Byrne P, Scheele L, Brinkley J, et al. Adult attention-deficit hyperactivity disorder: assessment guidelines based on clinical presentation to a specialty clinic. *Compr Psychiatry*. 1997;38(3):133-140.

41. Biederman J, Faraone SV, Spencer T, et al. Patterns of psychiatric comorbidity, cognition, and psychosocial functioning in adults with attention deficit hyperactivity disorder. *Am J Psychiatry*. 1993;150(12):1792-1798.

42. Biederman J, Wilens TE, Mick E, Faraone SV, Spencer T. Does attention-deficit hyperactivity disorder impact the developmental course of drug and alcohol abuse and dependence? *Biol Psychiatry*. 1998;44(4):269-273.

43. Biederman J. Impact of comorbidity in adults with attention-deficit/hyperactivity disorder. *J Clin Psychiatry*. 2004;65(suppl 3):3-7.

44. Murphy K, Barkley RA. Attention deficit hyperactivity disorder adults: comorbidities and adaptive impairments. *Compr Psychiatry*. 1996;37(6):393-401.

45. Shekim WO, Asarnow RF, Hess E, Zaucha K, Wheeler N. A clinical and demographic profile of a sample of adults with attention deficit hyperactivity disorder, residual state. *Compr Psychiatry*. 1990;31(5):416-425.

46. Sobanski E, Bruggemann D, Alm B, et al. Psychiatric comorbidity and functional impairment in a clinically referred sample of adults with attention-deficit/hyperactivity disorder (ADHD). *Eur Arch Psychiatry Clin Neurosci*. 2007;257(7):371-377.

47. Alpert JE, Maddocks A, Nierenberg AA, et al. Attention deficit hyperactivity disorder in childhood among adults with major depression. *Psychiatry Res*. 1996;62(3):213-219.

48. Kessler RC, Adler LA, Gruber MJ, Sarawate CA, Spencer T, Van Brunt DL. Validity of the World Health Organization Adult ADHD Self-Report Scale (ASRS) Screener in a representative sample of health plan members. *Int J Methods Psychiatr Res*. 2007;16(2):52-65.

49. www.med.nyu.edu/Psych/training/adhd.html [AU: THIS REFERENCE, LISTED IN TABLE 4 ON PAGE 27, IS OF AN INACTIVE LINK. PLEASE PROVIDE NEW ONE]

50. Conners CK, Erhart D, Sparrow E. *Conners Adult ADHD Rating Scales, Technical Manual*. New York, NY: Multi-Health Systems; 1999.

51. MHS. Psychological Assessments and Services. Available at: www.mhs.com. Accessed October 22, 2009.

52. Brown TE. *Brown Attention Deficit Disorder Scales (BADDS)*. 1st ed. San Antonio, TX: The Psychological Corporation; 1996.

53. Pearson Assessment and Information. Available at: http://harcourtassessment.com. Accessed October 22, 2009.

54. Kaufman J, Birmaher B, Brent D, et al. Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime version (K-SADS-PL): initial reliability and validity data. *J Am Acad Child Adolesc Psychiatry*. 1997;36(7):980-988.

55. Adler LA, Friedlander RE. Diagnosing ADHD in adults. In: Biederman J, ed. *ADHD Across the Lifespan: An Evidence-Based Understanding From Research to Clinical Practice*. Hasbrouck Heights, NJ: Veritas Institute for Medical Education, Inc and MedLearning, Inc; 2006:145-173.

56. DuPaul GJ. Parent and teacher ratings of ADHD symptoms: psychometric properties in a community-based sample. *J Clin Child Adolesc Psychol*. 1991;20(3):245-253.

57. DuPaul GJ, Power TJ, Anastopoulos AD, Reid R. *ADHD Rating Scale–IV: Checklists, Norms, and Clinical Interpretation*. New York, NY: Guilford Press; 1998.

58. Barkley RA, Murphy KR. *Attention-Deficit Hyperactivity Disorder: A Clinical Workbook*. 2nd ed. New York, NY: Guilford Press; 1998.

59. Guilford Press. Available at: www.guilford.com. Accessed October 22, 2009.

60. Roth RM, Isquith PK, Gioia GA. *Behavioral Rating Inventory of Executive Function—Adult Version*. Lutz, FL: Psychological Assessment Resources; 2005.

61. Rabin LA, Roth RM, Isquith PK, et al. Self- and informant reports of executive function on the BRIEF-A in MCI and older adults with cognitive complaints. *Arch Clin Neuropsychol*. 2006;21(7):721-732.

62. Western Psychological Services. Roth RM, Isquith PK, Gioia GA. Behavior Rating Inventory of Executive Function - Adult Version (BRIEF-A). Available at: http://portal.wpspublish.com/portal/page?_pageid=53,109114&_dad=portal&_schema=PORTAL. Accessed October 22, 2009.

63. Reimherr FW, Marchant BK, Strong RE, et al. Emotional dysregulation in adult ADHD and response to atomoxetine. *Biol Psychiatry*. 2005;58(2):125-131.

64. Brod M, Perwien A, Adler L, Spencer T, Johnston J. Conceptualization and assessment of quality of life for adults with attention-deficit/hyperactivity disorder. *Primary Psychiatry*. 2005;12(6):58-64.

65. Matza LS, Johnston JA, Faries DE, Malley KG, Brod M. Responsiveness of the Adult Attention-Deficit/Hyperactivity Disorder Quality of Life Scale (AAQoL). *Qual Life Res*. 2007;16(9):1511-1520.

66. Landgraf JM. Monitoring quality of life in adults with ADHD: reliability and validity of a new measure. *J Atten Disord*. 2007;11(3):351-362.

67. Healthact chq. AIM-A: ADHD Impact Module - Adult. Available at: www.healthact.com/aim_a.html. Accessed October 22, 2009.

68. Adler LA, Faraone SV, Spencer TJ, et al. The reliability and validity of self and investigator ratings of ADHD in adults. *J Atten Disord*. 2008;11(6):711-719.

69. Seidman LJ. Neuropsychological functioning in people with ADHD across the lifespan. *Clin Psychol Rev*. 2006;26(4):466-485.

70. Biederman J, Petty C, Fried R, et al. Impact of psychometrically defined deficits of executive functioning in adults with attention deficit hyperactivity disorder. *Am J Psychiatry*. 2006;163(10):1730-1738.

71. Quinn CA. Detection of malingering in assessment of adult ADHD. *Arch Clin Neuropsychol*. 2003;18(4):379-395.

72. Harrison AG, Edwards MJ, Parker KC. Identifying students faking ADHD: preliminary findings and strategies for detection. *Arch Clin Neuropsychol*. 2007;22(5):577-588.

73. Suhr J, Hammers D, Dobbins-Buckland K, Zimak E, Hughes C. The relationship of malingering test failure to self-reported symptoms and neuropsychological findings in adults referred for ADHD evaluation. *Arch Clin Neuropsychol*. 2008;23(5):521-530.

74. Booksh RL, Pella RD, Singh AN, Gouvier WD. Ability of college students to simulate ADHD on objective measures of attention. *J Atten Disord*. May 13, 2009. [Epub ahead of print]

75. Faraone SV, Biederman J, Spencer T, et al. Atomoxetine and Stroop task performance in adult attention-deficit/hyperactivity disorder. *J Child Adolesc Psychopharmacol*. 2005;15(4):664-670.