

# Attention-Deficit/Hyperactivity Disorder in Adults

## A Survey of Current Practice in Psychiatry and Primary Care

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**Background:** Recognition and treatment of attention-deficit/hyperactivity disorder (ADHD) in adults in psychiatry and primary care have faced many obstacles.

**Methods:** Review by 50 psychiatrists and 50 primary care practitioners (PCPs) of 537 and 317 medical records, respectively, of adults diagnosed as having ADHD. Information on other psychiatric disorders, time of onset of ADHD, source of referral, use of referrals for diagnosis, ADHD treatment, and use of drug holidays was recorded.

**Results:** Forty-five percent of the patient records reviewed by psychiatrists and 65% reviewed by PCPs indicated previous diagnoses of ADHD. Only 25% of the adults with ADHD had been first diagnosed as having the disorder in childhood or adolescence. A diagnosis of ADHD was the initial cause for referral in 80% of psychiatric patients

and 60% of PCP patients. Most patients with previously diagnosed and undiagnosed ADHD were self-referred. Among patients who had not received a prior diagnosis, 56% complained about ADHD symptoms to other health professionals without being diagnosed; PCPs were the least aggressive in diagnosing ADHD. In psychiatric and PCP settings, there was a statistical difference in the use of pharmacotherapy (91% vs 78%, respectively) and the proportion of patients taking drug holidays (24% vs 17%, respectively); most drug holidays were initiated by the patient (57%). Stimulants were the treatment of choice for adult ADHD (84% treated with stimulants).

**Conclusion:** Data contained within this medical record review suggest that adult ADHD is a substantial source of morbidity in both psychiatric and PCP settings.

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**A**LTHOUGH THERE HAS BEEN some confusion about the persistence of attention-deficit/hyperactivity disorder (ADHD) into adulthood, several studies<sup>1-4</sup> have shown the face validity of ADHD in adults. In fact, community studies<sup>5,6</sup> suggest that the prevalence of ADHD in adults is between 4% and 5%. If we apply these rates to the US Census Bureau estimate of the number of adults living in the United States,<sup>7</sup> as many as 9.4 million adults may have ADHD.

Pediatricians and child psychiatrists regularly diagnose and treat ADHD in children. Conversely, recognition of the disorder in adulthood has faced many obstacles. Because, compared with children, symptoms in adults are typically less disruptive, case identification requires careful interviewing about symptoms of inattention, restlessness, impulsivity, and disorganization. This difficulty in case identification is intensified for primary care practitioners (PCPs) who have received little training in the diagnosis of the dis-

order in adults and, therefore, may be unsure of the diagnosis.

Given the growing evidence for the validity of adult ADHD, the prevalence of the disorder, and the lack of knowledge about ADHD in primary care settings, there is a need to determine the nature of care for adult ADHD patients in both psychiatric and primary care settings. To address this issue, we sought to describe the referral paths that lead adults to ADHD treatment and to determine if patterns of diagnosis and treatment differ between psychiatric and primary care settings. We hypothesized that these data would not only provide information about the real-world treatment of adult ADHD but also point to areas in which the care of these patients could be improved.

### METHODS

Fifty psychiatrists and 50 PCPs were asked to select 5 to 10 adult ADHD patients from their practice. The diagnoses of childhood-onset adult ADHD had been made clinically by the physicians according to *Diagnostic and Statis-*

**Table 1. Age at First Diagnosis of Attention-Deficit/Hyperactivity Disorder**

Age at Diagnosis, y	Psychiatric Patients, %	PCP Patients, %
0-10	24	21
11-20	24	41
21-30	17	16
31-40	17	15
41-50	14	5
51-60	3	2

Abbreviation: PCP, primary care practitioner.

*tical Manual of Mental Disorders, Fourth Edition*<sup>8</sup> criteria and recorded in the medical record before the collection of data for this study.

Physicians used a standardized data collection form to extract information from the patients' medical records. This form included information about other psychiatric disorders, time of onset of ADHD, treatment for ADHD, source of referral, use of referrals for diagnosis, and use of drug holidays. The psychiatrists reviewed a total of 537 medical records. The PCPs reviewed a total of 317 medical records.

Statistical analyses used the  $\chi^2$  test for categorical data or the  $z$  test for comparing 2 proportions (SPSS statistical software, version 10.1; SPSS Inc, Chicago, Ill). All tests were 2-tailed, and statistical significance was achieved at  $P = .05$ .

## RESULTS

Of the 537 ADHD patient records reviewed by the psychiatrists, 244 (45%) included a previous diagnosis of ADHD before psychiatric referral. The remaining 293 records (55%) had no previous diagnosis of ADHD recorded before referral. Of the 317 ADHD patient records reviewed by PCPs, 206 (65%) included a previous diagnosis of ADHD recorded before referral. The remaining 111 (35%) had no previous diagnosis of ADHD recorded. The proportion of medical records that documented a previous diagnosis of ADHD was significantly lower in the psychiatric setting (45% vs 65%,  $z = 5.7$ ,  $P < .001$ ).

### REFERRAL AND DIAGNOSIS PATTERNS

#### Previously Diagnosed ADHD

A diagnosis of ADHD was the initial cause of referral in 80% of psychiatric and 60% of PCP patients. This difference was statistically significant ( $z = 4.6$ ,  $P < .001$ ). Among psychiatric patients whose initial cause of referral was not ADHD, the top 5 reasons for referral were depression, anxiety, panic disorder, generalized anxiety disorder, and problems with temper control. In contrast, among the PCP patients whose initial cause of referral was not ADHD, the top 5 reasons for referral were routine physical examinations, upper respiratory tract infection, injury, asthma, and hypertension.

Age at first diagnosis differed significantly between psychiatric and PCP patients ( $\chi^2_5 = 18.9$ ,  $P < .001$ ) (Table 1). Primary care patients were more likely to have had their conditions diagnosed between the ages of 11 and 20 years, whereas a higher percentage of psychiat-

ric patients had their conditions diagnosed for the first time after the age of 20 years.

Most patients previously diagnosed as having ADHD were self-referred, and this was especially true for the PCP patients (76% for PCP patients, 30% for psychiatric patients,  $z = 9.7$ ,  $P < .001$ ). Among patients referred to psychiatrists and PCPs for treatment, most were referred by psychologists (20% and 13%, respectively) and psychiatrists (13% and 2%, respectively). Fewer (4% and 2%, respectively) were referred by pediatricians, which may indicate that pediatricians are identifying some parents of ADHD children for treatment.

#### Previously Undiagnosed ADHD

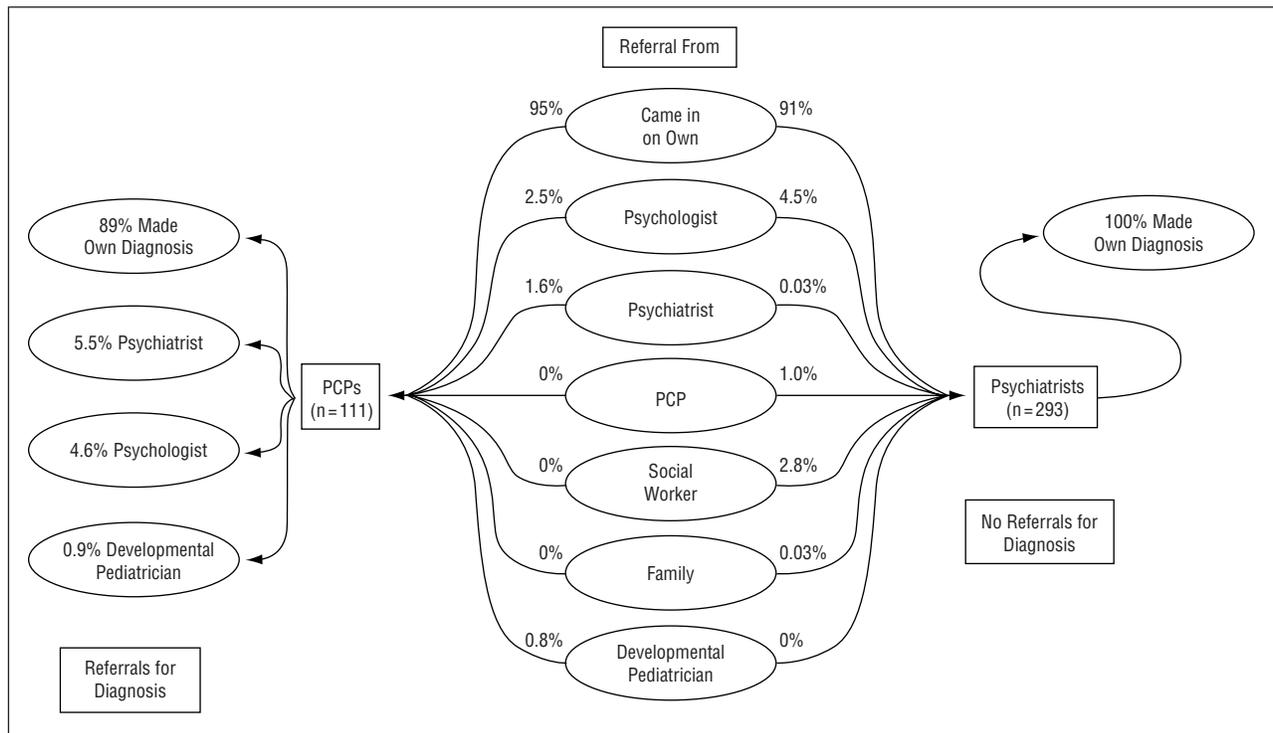
Most patients with previously undiagnosed ADHD were self-referred (95% for PCPs, 91% for psychiatrists,  $z = 1.3$ ,  $P < .05$ ) (Figure). All of the psychiatrists (100%) and most of the PCPs (89%) made the diagnosis of ADHD themselves ( $z = 5.8$ ,  $P < .001$ ). For PCPs, only 11% of cases were referred for diagnosis to psychiatrists, psychologists, or developmental pediatricians.

Although all psychiatrists made the diagnosis of ADHD in their patients with previously undiagnosed ADHD, 11% sought some outside consultation before making the diagnosis. For PCPs who made the diagnosis of ADHD in their patients with previously undiagnosed ADHD, 22% sought some outside consultation, and 15% made a referral before making the diagnosis. The pattern of consultation and referral was significantly different between psychiatrists and PCPs ( $\chi^2_2 = 53$ ,  $P < .001$ ).

When the psychiatrists sought consultation, they consulted psychologists for 64% of cases and other psychiatrists for 27% of cases. The PCPs consulted psychologists for 53% of cases, psychiatrists for 21% of cases, and other PCPs for 11% of cases. These patterns of consultation and referral were not statistically different ( $\chi^2_2 = 1.2$ ,  $P = .65$ ).

The top 10 symptoms that led self-referred patients to suspect they had ADHD are given in Table 2. Notably, all these symptoms are either diagnostic criteria for ADHD or known correlates of the disorder. Table 2 also lists the top 10 complaints for patients who did not self-refer for ADHD but were subsequently diagnosed as having the disorder. Seven (70%) of the 10 complaints were also among the top 10 for the self-referred patients, suggesting that the clinical picture of ADHD at referral is similar for the 2 types of patients. Patients who did not suspect ADHD were more likely to complain about depression, fatigue, and cognitive impairment. The top 10 symptoms that led physicians to suspect ADHD as a likely diagnosis are reviewed in Table 2. With the exception of being hyperfocused, these symptoms overlap completely with the primary complaints of the patients discussed herein.

Although all of the patients with initially undiagnosed ADHD were eventually diagnosed as having ADHD, the time between diagnosis and referral was longer for PCP patients when compared with psychiatric patients. Among PCP patients with initially undiagnosed ADHD, only 27% were diagnosed as having ADHD within 6 months of their initial visit. In contrast, 52% of the psychiatric patients were diagnosed as having ADHD within 6 months ( $z = 2.9$ ,  $P = .004$ ).



Referral patterns for patients with undiagnosed attention-deficit/hyperactivity disorder. Most patients came in on their own accord, without the need for a referral. Psychologists were the most likely source of referral other than the patient. Notably, all of the psychiatrists and most primary care practitioners (PCPs) made the diagnosis without outside help.

**Table 2. Top 10 Symptoms That Caused Referral and Diagnosis in Patients With Previously Undiagnosed Attention-Deficit/Hyperactivity Disorder (ADHD)\***

Patient Suspected ADHD	Unsuspecting Patient Seen by Physician	Physician Suspected ADHD
Poor concentration	Poor concentration	Poor concentration
General disorganization	General disorganization	General disorganization
Tendency to leave projects incomplete	Tendency to leave projects incomplete	Tendency to leave projects incomplete
Inattentive	Inattentive	Inattentive
Poor school performance	Poor school performance	Poor school performance
Problems with time management	Cognitive impairment	Problems with time management
Difficulty controlling temper	Difficulty controlling temper	Difficulty controlling temper
Impulsive	Fatigue	Impulsive
Anxiety	Anxiety	Hyperfocused
Difficulty functioning at work	Depression	Depression

\*Ranked in order of symptoms that led suspecting patients, unsuspecting patients who were subsequently diagnosed as having ADHD, and physicians to suspect ADHD.

Among the 404 patients who had not received a prior diagnosis of ADHD, 227 (56%) had complained about ADHD symptoms to other health professionals in the past but had not been diagnosed as having the disorder. These health professionals were PCPs (33%), psychiatrists (24%), psychologists (22%), neurologists (10%), and unspecified others (11%).

Nearly half of the psychiatric patients (44%) had been diagnosed as having another psychiatric condition before the diagnosis of ADHD ( $z=4.3, P<.001$ ). Only one fifth of the PCP patients (20%) had their conditions similarly diagnosed. Of the psychiatric conditions, the most common were depression, anxiety, and bipolar disorder. The only disorder to differ significantly in prevalence

between the psychiatric and PCP settings was bipolar disorder (6% vs 1%, respectively).

### PATTERNS OF TREATMENT

Ninety-one percent of the psychiatric patients and 78% of the PCP patients were treated with a drug. This difference was statistically significant ( $\chi^2=40, P<.001$ ). The choice of initial medication differed significantly between psychiatrists and PCPs ( $\chi^2=11.8, P=.008$ ) (Table 3). Most of the initially treated patients were prescribed stimulants. The pattern of stimulant prescriptions differed significantly between psychiatrists and PCPs ( $\chi^2=20.5, P=.001$ ). Compared with PCPs, psychiatrists were more

**Table 3. Medications Prescribed for Attention-Deficit/Hyperactivity Disorder**

Medication	Response, No. (%)		
	Psychiatrist	PCP	Total
Stimulant*	418 (86)	199 (81)	617 (84)
Antidepressant†	57 (12)	32 (13)	89 (12)
Other	11 (2)	8 (3)	19 (3)
Combination therapy	1 (0)	7 (3)	8 (1)
<b>Total</b>	<b>487</b>	<b>246</b>	<b>733</b>

Abbreviation: PCP, primary care practitioner.

\*Stimulants included dextroamphetamine, methylphenidate hydrochloride, mixed amphetamine salts, oral osmotic controlled-release formulation methylphenidate, pemoline, and methylphenidate (Ritalin; Novartis Pharmaceuticals Corp, East Hanover, NJ).

†Antidepressants included citalopram, venlafaxine hydrochloride, paroxetine, fluoxetine hydrochloride, bupropion hydrochloride, and sertraline hydrochloride.

likely to prescribe dextroamphetamine, generic methylphenidate hydrochloride, mixed amphetamine salts, and oral osmotic controlled-release methylphenidate. They were less likely to prescribe methylphenidate (Ritalin; Novartis Pharmaceuticals Corp, East Hanover, NJ).

For approximately one fifth of the treated ADHD patients, the medication regimen included drug holidays during which medication was not taken. The proportion of patients taking drug holidays was greater for psychiatric than for PCP patients (24% vs 17%, respectively;  $\chi^2=6.2$ ,  $P=.01$ ). For both the psychiatric and PCP patients, most drug holidays had been initiated by a request from the patient (57%) or the physician (26%). For the remaining patients who took drug holidays, the reason for initiation had not been recorded in the medical record. The pattern of initiation of drug holidays did not differ between the psychiatric and PCP patients ( $\chi^2=3.9$ ,  $P=.27$ ).

The types of drug holidays taken by ADHD patients differed significantly between psychiatric and PCP settings ( $\chi^2=8.9$ ,  $P=.03$ ). Among those patients taking holidays, PCP patients compared with psychiatric patients were more likely not to take medication on weekends (54% vs 42%, respectively) and when on vacation (32% vs 29%, respectively). Psychiatric patients compared with PCP patients were more likely to take holidays at other unspecified times (22% vs 5%, respectively).

## COMMENT

This medical record review of 854 adults with persistent childhood-onset ADHD suggests that the disorder is a substantial source of morbidity in both psychiatric and primary care settings. Our conclusions are necessarily limited by the use of a retrospective medical record review method. Yet, given the dearth of prior studies, we have filled a gap in the knowledge of real-world patterns of referral, diagnosis, and treatment for adult ADHD patients.

### UNDIAGNOSED CHILDHOOD-ONSET ADHD

Despite having childhood onset, only half of the patients with previously diagnosed ADHD had been first diagnosed as having the disorder in childhood or adoles-

cence. In fact, because half of the total sample was referred without a prior diagnosis of ADHD and half of the patients with previously diagnosed ADHD had their conditions first diagnosed in adulthood, our data show that only 25% of adult ADHD cases had been diagnosed in childhood or adolescence. If these patients truly have ADHD, why, given the chronic and impairing nature of persistent ADHD,<sup>9</sup> had it not been diagnosed earlier? One reason is the change in attitudes and education about ADHD, among both physicians and the population at large. The other reason for a late diagnosis could be the emergence later in life of substantial impairments that affect key areas of life. Problems for ADHD patients may worsen in adulthood when patients begin an independent life with increasing organizational challenges, such as marriage, parenting, and occupational planning and administration. In support of this idea, 4 of the top 10 symptoms that motivated self-referral were general disorganization, problems with time management, tendency to leave projects incomplete, and difficulty functioning at work (Table 2).

Clinicians need to realize that, even when a patient has not been diagnosed as having ADHD in childhood, retrospective diagnoses of childhood-onset ADHD can be made in a valid manner. Retrospective diagnoses in clinically referred or self-referred adults have been validated through cross-sectional studies of clinical features,<sup>10,11</sup> neuropsychological impairments,<sup>12</sup> adaptive impairments,<sup>13,14</sup> genetics,<sup>15,16</sup> and neuroimaging.<sup>17</sup>

### ADHD DIAGNOSIS NOT CONSIDERED

More than half of the patients with previously undiagnosed ADHD had complained about ADHD symptoms to other health professionals in the past but had not been diagnosed as having the disorder. These missed diagnostic opportunities emphasize the need to consider adult ADHD as a diagnostic option, especially when a patient is seen for complaints of a condition known to be common among adults with ADHD, such as depression, anxiety, and substance use.<sup>10,11,18</sup> Although in our study, other clinicians may have missed the diagnosis of ADHD due to the presence of another psychiatric disorder, this cannot explain the bulk of missed diagnoses, because most of the patients with undiagnosed ADHD did not have another disorder. The prevalence of psychiatric disorders in these patients is lower than expected from other studies, which used systematic structured interviews to document a lifetime history of diagnoses.<sup>10,11</sup> This suggests that medical record reviews may not have captured all of the psychiatric morbidities experienced by patients. Because, unlike ADHD, comorbid diagnoses are often fluctuating conditions, future studies should systematically assess adults with ADHD for lifetime histories of comorbid disorders.

### SELF-REFERRAL OF PATIENTS WITH ADHD

Perhaps the most striking finding about patients with previously undiagnosed ADHD is that nearly all were self-referred. This finding makes sense in the PCP setting, where we would not expect referrals from mental health professionals, but it is surprising for the psychiatric setting, where

nonspecialists are expected to refer patients to psychiatrists. Patients who were self-referred for ADHD had good reasons to suspect ADHD. Of their top 10 reasons, 7 were signs or symptoms of the disorder and 3 (anxiety, poor school performance, and difficulty functioning at work) were known clinical correlates (Table 2).

### DIAGNOSTIC PATTERNS IN PCP VS PSYCHIATRIC SETTINGS

The proportion of patients with previously undiagnosed ADHD was substantially lower in the PCP setting, which may be due to self-selection on the part of these patients. It is possible that patients with previously undiagnosed ADHD, recognizing that their symptoms and impairments require psychiatric attention, seek expert help. Yet this explanation does not fit with the pattern of referral shown in the Figure, which indicates that, in both settings, most patients with undiagnosed ADHD were self-referred.

There was further evidence of patient differences between psychiatric and PCP settings in the age at first diagnosis for patients who had been previously diagnosed as having ADHD. The PCP patients were more likely to have been first diagnosed with ADHD in youth, and psychiatric patients were more likely to have been first diagnosed with ADHD in adulthood. Although this may reflect self-selection on the part of patients, it is also possible that PCPs are more conservative in making diagnoses of adult ADHD, preferring to reserve it for cases that had been diagnosed in childhood.

The idea that PCPs are more conservative with the diagnosis of ADHD is further supported by our data about time to diagnosis. Among the PCP patients with initially undiagnosed ADHD, only 27% were diagnosed as having ADHD within 6 months of their initial visit. In contrast, 52% of the psychiatric patients were diagnosed as having ADHD within 6 months. The PCPs may require more time to observe the patient and collect prospective information before making the diagnosis.

Another difference between psychiatrists and PCPs was observed in the prevalence of other psychiatric disorders in the patients with previously undiagnosed ADHD. Although half of the psychiatric patients had been diagnosed as having another psychiatric condition before the diagnosis of ADHD was made, only one fifth of the PCP patients had their conditions similarly diagnosed. This likely reflects differences in training and attitudes between PCPs and psychiatrists. Primary care practitioners do not have extensive training in psychiatry and may not be familiar with the signs and symptoms of other psychiatric disorders.

As specialists, it is not surprising that psychiatrists made all the diagnoses of ADHD in their clinics. Although PCPs were more likely to seek outside referrals to make the diagnosis, most PCPs made the diagnosis of ADHD on their own. Although this may reflect the realities of managed care, which discourage referrals to specialists, it also suggests that PCPs believe they have sufficient knowledge to diagnose ADHD in the absence of an expert's opinion. Although PCPs may be more conservative with the diagnosis of ADHD, these data sug-

gest that they can usually make the diagnosis of ADHD if they think it is warranted.

### TREATMENT FOR ADULTS WITH ADHD

Most adult ADHD patients (84%) were treated with stimulant medications, with most of the rest being treated with antidepressants (12%). The use of stimulants is consistent with the current evidence base for adult ADHD, which shows their efficacy in adults.<sup>19,20</sup> This pattern of stimulant prescriptions (Table 3) should be viewed cautiously though. The introduction of new nonstimulant ADHD medications, such as atomoxetine,<sup>21-23</sup> and new long-acting formulations of the currently available stimulants<sup>24,25</sup> will likely change the way patients are treated.

Tricyclic antidepressants are also effective in the treatment of adult ADHD.<sup>26-27</sup> In addition, the norepinephrine specific reuptake inhibitor atomoxetine has been shown to be efficacious for both children<sup>21,22,28-30</sup> and adults<sup>23,31</sup> with ADHD. Despite this evidence, tricyclic antidepressants were not used for the adult ADHD patients, and atomoxetine could not be used because it was not commercially available.

The use of drug holidays, common in the treatment of childhood ADHD, has generalized to the pharmacotherapy of adult ADHD. In most cases, patients initiated these holidays. Although we did not collect information describing why patients requested holidays, it is possible that these requests were driven by concerns over adverse effects or that the patients or clinicians misunderstood the correct use of anti-ADHD medication. There is a growing consensus that this practice is inappropriate and that medication is best used consistently during routine tasks to aid in developing healthy habits of planning, self-discipline, and learning.

### CONCLUSIONS

In adults, ADHD is a common disorder associated with global and significant impairments in occupational, academic, neuropsychological, and social functioning.<sup>32</sup> However, because the disruptive outward manifestations of ADHD (eg, hyperactivity) decrease with age, adult ADHD remains somewhat hidden and underdiagnosed. In childhood, pediatricians and family practitioners routinely screen for ADHD and are the primary source of first diagnosis. This occurs because the disorder is a common public health issue and pediatricians and family practitioners see mostly children. Unfortunately, there is no similar system in place for adults. In contrast to the standard of care in pediatrics, screening of adults for ADHD is not routine in primary care. This is remarkable because, unlike episodic disorders such as depression, ADHD symptoms would be active during the period of every patient visit. Thus, there needs to be more education and training of PCPs so that they can serve the vital role of screening for this condition.

Results from the current study raise additional questions for future research. Since ADHD is a chronic disorder, more information is needed on why patients had scheduled drug holidays and if other treatment options

had been explored before use of the drug holiday strategy. Given that ADHD can lead to substance abuse, motor vehicle crashes, and impaired social functioning, it is possible that patients who take holidays are at a greater risk for poor outcome. This report also raises questions about the potential underdiagnosis of comorbid psychiatric disorders and if the diagnosis of ADHD is considered in patients whose primary psychiatric manifestation is another psychiatric disorder. If the underdiagnosis of these disorders is confirmed with prospective methods, the creation of screening programs for these disorders may be warranted.

The data on age at first diagnosis of ADHD, along with the high prevalence of adults with previously undiagnosed ADHD, suggest that there have been missed diagnostic opportunities in the past. Future work should determine if this is due to diagnostic confusion with other psychiatric disorders, a conservative bias toward not diagnosing ADHD in adults, or limitations of the current psychiatric nomenclature. Although clinicians who treat youth are familiar with the changes in symptom expression that occur through childhood and adolescence,<sup>33</sup> adult psychiatrists and PCPs may be less familiar with the clinical and research literature about the evolution of ADHD symptoms. Therefore, the opportunity for a diagnosis of ADHD may be missed.

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