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Discontinuity in the Transition From Pediatric to Adult Health Care for Patients with Attention-Deficit/Hyperactivity Disorder

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Abstract

Background: Although attention-deficit/hyperactivity disorder (ADHD) is a chronic disorder, treatment declines dramatically in adolescence and into early adulthood. This premature termination of care is likely compounded by the difficulty many patients have switching from a pediatric to an adult provider. **Objective:** To review, from the adult primary care provider perspective, the barriers to continuity of care and their implications for patients with ADHD who transition from pediatric to adult health care. **Design:** Literature review. **Approach:** Relevant articles were identified by searches of the PubMed and EMBASE databases and by reviewing the reference lists of articles obtained from these searches. **Results:** Health care transition for adolescents and young adults with ADHD remains a crucial area of research. The current literature reveals a number of barriers to the continuity of care, including disparities and inadequacies in ADHD education in primary care and internal medicine residencies, prohibitive prescribing practices with respect to stimulants, inadequate clinic staffing, lack of support in the college health care system, inadequate health insurance coverage, and failure to conduct transitional planning. Without improved continuity of care and adherence to medication, adolescents and young adults with ADHD are at greater risk of academic, social, and vocational difficulties, as well as behavioral problems, including substance abuse, unsafe driving, and criminal activity. **Conclusion:** If we are to adequately address the health care needs of adolescents and young adults with ADHD, we need to educate primary care providers and support additional research.

Keywords: attention-deficit/hyperactivity disorder; adult; primary care; continuity of patient care; transition planning

Introduction Discontinuity of Care

Attention-deficit/hyperactivity disorder (ADHD) is increasingly recognized as a chronic health condition spanning early childhood, adolescence, and adulthood.¹⁻⁴ It has been estimated that 8.7% of adolescents and 4.4% of adults have ADHD, the rates being approximately 1.5- to 3-fold higher in males versus females.^{5,6} Although rates vary depending on the diagnostic criteria and reporting source (eg, parent report versus self-report), up to 70% of children with ADHD experience persistence of the disorder into adolescence and up to 66% experience persistence into adulthood.^{7,8} However, adult ADHD rates are likely to be artificially low because childhood behaviors morph into adult patterns that no longer fulfill diagnostic criteria and because comorbid psychiatric disorder is common, resulting in diagnostic confusion. Although the severity of hyperactivity symptoms often decline in adolescence, other symptoms do not,⁹ and it is important to recognize the need for many patients to continue with

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ADHD treatment as they enter adulthood, especially those with severe childhood ADHD.¹⁰ Without adequate ongoing treatment, long-term adverse consequences may range from difficulties in school,^{11–13} social relationships,^{11,14} and vocational performance,^{15,16} to high-risk behaviors, including dangerous driving^{17,18} and criminal activity.^{19–22}

Notably, treatment patterns do not correlate with prevalence data; treatment for ADHD rapidly declines into adolescence and young adulthood. According to the US National Comorbidity Survey Replication,⁵ only 11% of adult patients with ADHD received treatment in the year before being interviewed. From 1996 to 2003, 6.5% to 14% of US ambulatory care visits for adult ADHD involved no treatment.²³

Furthermore, treatment rates decline at critical times for patients with ADHD. In a survey of US office-based physicians, pharmacotherapy for ADHD decreased from approximately 65 per 1000 covered lives at age 13 years to approximately 10 per 1000 covered lives at age 24 years.²⁴ This trend is evident elsewhere. A 2006 UK cohort study revealed that prescription prevalence declined by 95% in males aged 15 to 21 years. In this study, all patients stopped treatment by age 21 years,²⁵ which highlights the need to improve awareness among physicians, patients, and patient caregivers (ie, parents) about the persistence of ADHD symptoms across the lifespan and the continued need for treatment.

Potential Consequences of Discontinuity of Care

The impact of ADHD treatment disruption may occur at a critical phase of life. The last years of high school and the college years are particularly vulnerable times for adolescents and young adults as they confront tougher academic requirements and a reduced level of outside support.^{26,27} During this period, young adults have a risk of uncontrolled symptoms that may affect academic functioning and interpersonal relationships as well as critical decisions, having lifelong implications. Continuity of care is an important topic for parents and practitioners to address with young adults before they begin their college experience. It is well established that ADHD in adolescents and young adults is linked to a variety of poor academic outcomes, including low grade point average, course failure, grade retention, and dropout rate.^{11–13} In 1 large study, high school boys with ADHD had approximately 8-fold greater odds of high school dropout than peers without the disorder.¹² However, some data suggest improved academic outcomes in patients who received consistent pharmacologic treatment for ≥ 1 year.²⁸

The potential impact of treatment gaps on personal relationships should also be considered. Young adults with ADHD report problems with quality of life in their relationships¹⁴ compared with peers without the disorder, and are more likely to report social problems and difficulty developing close friendships.¹¹ Young adults with ADHD also report a greater number of dating partners and sexual partners, a younger age at first sexual intercourse, and more frequent sexual intercourse.¹¹ Because severity of current symptoms has been identified as a significant predictor of social problems¹¹ and vocational problems^{15,16} in young adults with ADHD, adequate and consistent treatment is imperative.

Discontinuity of ADHD treatment may also have serious life-altering implications. The prevalence of substance abuse disorders increases rapidly during adolescence, from 3.7% at age 13 to 14 years to 22.3% at age 17 to 18 years.⁶ Despite concerns that stimulant medication could increase the propensity toward substance abuse, research findings suggest that stimulants may offer protection during adolescence.^{29,30} Although the connection between stimulant pharmacotherapy and reduced substance abuse is not fully understood, it is believed that the reduction in conduct symptoms may mitigate the reckless use of substances.³⁰

Continuity of ADHD treatment is equally important to safe driving.²⁶ Studies have shown that adolescents and young adults with ADHD are at increased risk for negative driving events (eg, speeding violations, tickets, and accidents).^{17,18} Thompson et al¹⁸ demonstrated that among patients with ADHD diagnosed in childhood, those with persistent hyperactive or impulsive symptoms in adolescence and adulthood are at greater risk of receiving tickets and having accidents. Small within-patient studies have shown a significant reduction in driving errors while adolescents and young adults are on stimulant medication.^{31,32}

Given the potential consequences of discontinuity of ADHD care, it is important to consider where and how ADHD treatment discontinuations come to be. The objective of this review article is to evaluate, from the adult primary care provider perspective, the barriers to continuity of care and their implications for those with ADHD who transition from pediatric to adult health care.

Methods

PubMed and EMBASE database searches were conducted to identify potentially relevant articles. All searches were limited to English-language articles published on or before March 11, 2011; to focus on articles of clinical relevance,

searches were also limited to human subjects, so as to exclude preclinical studies and experimental ADHD models. The search strategies employed and the number of articles obtained for each search are summarized in Table 1.

Articles identified in the searches were deemed relevant if they provided information specifically related to the transition from pediatric to adult ADHD care. Of 1612 articles identified, only 12 were, by that criterion, deemed to be relevant for inclusion in this review. However, an additional 58 references were identified via the “related articles” function of PubMed, by reviewing the reference lists of obtained articles, or through the collective expertise of all those who contributed to or reviewed this article. Because research in this area is underdeveloped, no quality criteria were applied. Articles addressing patients with ADHD and their primary care physicians (PCPs) were of primary interest; however, relevant articles addressing the issues of health care transition for patients with other special health care needs were also included.

Summary of Findings

Barriers to the Continuity of Care

Numerous obstacles to continuity of ADHD care from childhood to adulthood have been identified, including

disparity in clinicians’ knowledge and ability to prescribe medication, lack of resources, obstacles within the college health care system, lack of health insurance coverage, lack of transition planning, and patient/family resistance.

Disparity in Clinicians’ Knowledge and Ability to Prescribe Medication

One of the barriers facing adolescents and young adults with ADHD may be inadequacy or inconsistency in clinicians’ training in recognizing and treating this disorder in adults, especially in primary care settings.³³ The British Association for Psychopharmacology guidelines note that many adult PCPs lack expertise and capacity to manage patients with ADHD who are transitioning from pediatric care.³⁴ This trend is observed in the United States as well. A retrospective review³⁵ of the medical records of 100 US physicians showed that 56% of adults with previously undiagnosed ADHD had complained about their ADHD symptoms to other health care professionals in the past, most commonly PCPs (33%) or psychiatrists (24%), and that only 27% of the previously undiagnosed adults seen by PCPs were accurately diagnosed within 6 months, a rate that increased to 52% in the group seen by psychiatrists. However, these data may be skewed because the use of psychiatric coding for many disorders,

Table 1. Publication Search Strategy^a

Database Search	Search String	Articles, N
PubMed		
1	(“Attention deficit disorder with hyperactivity”[MeSh] OR ADHD) AND (transition OR interruption OR continuity OR “continuity of patient care”[MeSh] OR “patient care”[MeSh] OR “delivery of healthcare”[MeSh] OR “outcome assessment”[MeSh] or “quality of healthcare”[MeSh] OR medical education)	690
2	(“Attention deficit disorder with hyperactivity”[MeSh] OR ADHD) AND (internal medicine OR general internist OR primary care) AND (knowledge OR medical education OR training)	127
3	(“Attention deficit disorder with hyperactivity”[MeSh] OR ADHD) AND (guidelines OR consensus statement)	348
4	(“Attention deficit disorder with hyperactivity”[MeSh] OR ADHD) AND (college OR university) AND healthcare	452
Total hits ^b	<<All 4 search strings combined>>	1408
EMBASE		
1	ADHD AND (transition OR continuity OR interruption OR resources)	150
2	ADHD AND (internal medicine OR general internist OR primary care) AND (knowledge OR medical education OR training)	158
Total hits ^b	<<Both search strings combined>>	298
PubMed and EMBASE Combined		
Total hits ^b	<<All 6 search strings combined>>	1612
Total cited	<<All 6 search strings combined>>	12

^aAll searches were limited to humans and English-language articles published on or before March 11, 2011; ^bexcluding duplicates.

including major depression and ADHD, may result in reduced payments for primary care services. Data on patients with special health care needs, although not specific to ADHD, are further suggestive of a shortage of trained providers. Patients and their families commonly report difficulty finding providers who have adequate knowledge, training, and experience in adult ADHD.^{36,37}

Despite these concerns about the adequacy of clinical training in ADHD recognition and management, especially among PCPs, this common psychiatric disorder is increasingly being cared for in the primary care setting. From 1997 to 2003, 39% of US ambulatory care visits for adult ADHD were performed by PCPs.²³ The burden will continue to shift to primary care due to the relative lack of treating psychiatrists. This presents challenges to PCPs. It should be noted that there is no need for routine or automatic psychiatric referral for individuals with ADHD; with adequate training, PCPs should be able to manage most cases. An innovative program of training sessions for community-based pediatricians with access to an internet portal to review and critique case management has proven beneficial as a means of improving the quality of medical services for individuals with ADHD³⁸; such programs may also be useful to PCPs and to help in the transition of care from pediatric to adult services.

Data from a small US survey revealed that PCPs are less likely than psychiatrists to prescribe medication for adults with ADHD.³⁵ This reluctance to prescribe medication for this condition is multifactorial. The need for complex, multi-drug therapy in adult patients with ADHD, particularly those with comorbid mental health conditions,²³ may discourage prescribing among PCPs. Some clinicians cite difficulties in coordinating care with a psychiatrist or other mental health specialist,³⁹ perhaps reflecting an assumption that specialty referral or consultation is routinely required for individuals with ADHD. The mainstay of ADHD treatment is stimulant medications, and many clinicians are averse to assuming the responsibility of issuing a new prescription each month. Additionally, some physicians are concerned about potential stimulant diversion and abuse,⁴⁰ and others are unaware that the condition persists into adulthood or that medications for ADHD are indicated in adult patients.⁴¹ Data suggest that internists are generally less comfortable prescribing psychotropic medications for disorders that they do not commonly encounter in practice compared with family practice, possibly due to the vague requirements for psychiatric training during residencies in internal medicine⁴²; this may lead them to believe that ADHD is uncommon among their patients.

These deficiencies in psychiatric knowledge combined with many providers' unwillingness to prescribe medications point to problems in our primary care medical education. Although US residency programs for family practice and internal medicine provide clinicians with the opportunity to acquire knowledge and skills in the area of human behavior and mental health, there are no specific requirements for training to ensure competency in the recognition and treatment of ADHD.^{43,44}

Collectively, limited insurance, lack of adequate planning and preparation for the transition from pediatric to adult services, and inadequate medical training in childhood-onset chronic disorders^{23,37,45,46} strongly suggest the need for purposeful education in residency about the identification and treatment of ADHD across the lifespan. In addition, further continuing education initiatives for family physicians, internists, and psychiatrists are warranted to optimize the ability of health care professionals to stay abreast of updates in the treatment of ADHD in children, adolescents, and adults.

Lack of Resources

Many physicians providing adult services lack the resources to facilitate care for transitioning adolescents. This task entails negotiating relationships with family members who wish to stay involved in a young adult's care, which can be a challenging and time-consuming effort, particularly when combined with the need to coordinate care with the referring pediatrician or, in select cases, with a mental health specialist.³⁹ Furthermore, Health Insurance Privacy and Portability Act regulations may prohibit family member involvement if the young adult patient does not consent.

Possible solutions include the use of physician extenders (eg, nurse practitioners, psychologists, and physician assistants) who are well trained in primary care psychiatry, especially ADHD recognition and treatment, and can assist the physician. Specialty nurses may provide needed expertise when a physician is unfamiliar with adult ADHD,⁴⁷ although their knowledge of the disorder is also dependent on training within their program and their continuing medical education. The regular use of simple, time-efficient screening tools, such as the 6-question World Health Organization Adult ADHD Self-Report Scale⁴⁸ and the adolescent and adult Attention-Deficit/Hyperactivity Disorder Rating Scale,⁴⁹ will assist PCPs in identifying ADHD and serve to inform physicians that it is a common disorder in adolescents and adults. The movement toward "medical homes," where health care is managed by a multidisciplinary team under one roof, will be beneficial in tackling these types of complex issues.

Nurse practitioners can offer an effective way of providing care to the ADHD population. These practitioners have prescribing rights in all states, although some states limit independent prescribing of psychostimulants.^{50,51} In New Mexico and Louisiana (as well as the uniformed services), psychologists are authorized to prescribe psychiatric medications after completion of a formal training program in clinical pharmacology, and other states have proposed legislation to grant such privileges.⁵¹⁻⁵³ Many clinics, however, are not yet organized in a way to use these important collaborative resources.

Obstacles within the College Health Care System

The percentage of college students affected by ADHD is unknown, but US and international studies show that 2% to 8% of college students self-report symptoms of ADHD.⁵⁴ College students may be particularly vulnerable to discontinuity of care, primarily because of their geographical separation from their longstanding health care providers. In addition, the nature of ADHD is such that patients are likely to miss appointments and/or forget to follow-up with their health care providers, which are issues that may be compounded for college-aged students who are unfamiliar with caring and advocating for themselves.⁵⁵ They may also be overwhelmed as they adjust to living away from home and may be unaware of what treatment options their university health care system offers.

Although college students are complaining of symptoms of ADHD, many providers within the college health care system have insufficient training regarding the disorder. In a UK study of 50 health centers at colleges and universities, half of the general practitioners indicated that they had patients with ADHD.⁵⁶ Most (87%) of these general practitioners reported that they had not attended recent courses or training for ADHD. Findings from this questionnaire highlight the need for additional training of providers serving the college community.

Patients in the college health care system also find it difficult to obtain prescriptions. Garnier et al⁵⁷ reported that medication for ADHD was the most commonly diverted class of medication (62% diversion rate) among students at a large US public university. Wilens et al³⁰ reported that 11% of college-aged adults with ADHD diverted their medication, 22% misused their medication, and 10% abused their medication. The potential for misuse or abuse may lead colleges and universities to deny or limit their practitioners' ability to prescribe medication, or may create barriers that make it difficult for students in need to obtain a prescription.

Aside from the potential for illicit use of prescription drugs, young adults with symptoms of ADHD and associated behaviors may engage in other forms of criminal activity.¹⁹⁻²² Studies of offenders in the UK criminal justice system suggest that there is a disproportionately high percentage of youths and male adults with a history of childhood ADHD.²² In a national survey of adolescents within the United States, those experiencing ADHD symptoms were more likely to engage in various criminal activities.²¹ Furthermore, individuals with persisting ADHD symptoms have higher recidivism rates²² and may reoffend sooner after release²⁰; it has been suggested that recidivism rates may be reduced with effective ADHD treatment.¹⁹ Interestingly, in certain types of institutions (most notably prisons⁵⁸), only nonstimulant medications are approved for ADHD treatment. Although nonstimulants are effective in the treatment of ADHD, effect sizes for nonstimulants are typically smaller than those of stimulants (Cohen's *d*, 0.59 vs 0.67).⁵⁹

Lack of Health Insurance Coverage

Access to affordable, continuous health insurance coverage is a longstanding struggle of the US health care system. Retrospective analyses of the US National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey (1996-2003) showed disparities in access to ADHD treatment based on health insurance.²³ Part of this disparity may reflect the fact that individuals with marked ADHD symptoms may have difficulty finding and keeping steady employment,⁶⁰⁻⁶² and thus may lack access to health insurance through an employer. Individuals with insurance other than private and self-pay insurance were 80% less likely to obtain any ADHD treatment, and if they were able to obtain treatment, it was often limited to pharmacotherapy.²³ This barrier may be minimized for young adults following recent health care reform (Patient Protection and Affordable Care Act, signed into law March 23, 2010), which allows coverage through their parents' insurance until age 26 years.⁶³

Lack of Transition Planning

Many mental health professionals have commented on the premature termination of ADHD treatment. One prevalent theory attributes this disruption in care to the difficulty in transitioning from a pediatric to an adult provider (a preplanned process, starting in adolescence, in which the referring pediatric provider works with the receiving adult care provider to ensure continuity of care). Successful transition typically requires planning the process in detail with

young patients and their families, ensuring coordination between the pediatric and adult services, creating a portable health record, and arranging preventive care services and continuous health insurance coverage.

Data on health care transitions are limited but suggest that many pediatricians consider age 18 years to be the appropriate time for transition to adult providers.^{36,64} And while survey data suggest that 29% of patients needing continuing care are able to remain in the pediatric setting past the set age limit, 27% of patients with special health care needs simply transition out of pediatric care because they reach the practice's cut-off age, whereas only 17% are transitioned with a coordinated transfer to adult care.³⁶

In 2002, the American Academy of Pediatrics, American Academy of Family Physicians, and American College of Physicians–American Society of Internal Medicine issued a policy statement intended to ensure smooth health care transitions for patients with special health care needs.⁶⁵ The goal of the guidelines was to provide PCPs and specialty physicians with the knowledge and skills to facilitate the transition from child- to adult-oriented care. The statement delineated the importance of training physicians in the provision of transition services and ensuring that every patient has a written health care transition plan by age 14 years. However, progress toward this goal seems to have been limited. In the 2005 to 2006 US National Survey of Children with Special Health Care Needs (ages 12–17 years), only 42% of parents or guardians had discussed transferring care to an adult provider and only 41% of youths met the transition core performance outcome.⁶⁶ The need for planned transitioning from pediatric to adult care has been recognized within various chronic disorders that may begin in childhood, including asthma,⁶⁷ epilepsy,⁶⁸ diabetes,⁶⁹ and sickle cell disease.⁷⁰ Park et al⁴⁵ found that adolescents with mental health conditions are particularly vulnerable to poor transition outcomes and are likely to experience gaps in the access and quality of medical care.

Despite the American Academy of Pediatrics guidelines,⁶⁵ transition planning is not yet a standard of care, and, when planning does happen, it often occurs later than recommended. Burke et al³⁶ reported that only 13% of primary care pediatricians in Rhode Island had a written policy on transition and transfer. Moreover, only 3% recommended that the transition begin in early adolescence. Similarly, a survey of consultant and child and adolescent psychiatrists in England and Wales determined that only 29% held transfer meetings.⁷¹ Data from a US medical records review indicated that 76% of adult patients with

ADHD were not transitioned but rather were self-referred to primary care.³⁵

Patient/Family Resistance

Another obstacle to ADHD treatment can be adolescent and young adult patients' rejection or denial of their diagnosis. This may reflect a positive illusory bias (inflated perception of one's own competence), which has been associated with ADHD,⁷² a belief that they have outgrown their diagnosis, or an effort to appear "normal" and avoid the stigma of being different from their peers during an often challenging time in their development.⁷³ This resistance is apt to result in discontinuity of medical care.

The functional problems associated with ADHD (eg, forgetfulness, distraction, restlessness, and disorganization) may impair patients' ability to take care of themselves and to obtain needed medical care. Moreover, although increasing independence means taking increasing responsibility for themselves, these individuals are often unskilled in advocating for themselves and their care.

In addition, while pediatric practices typically have a predetermined age at which transition to an adult practitioner should occur, it is important to be aware that this transition timeline may be affected by the maturity level of the patient.³⁷ In addition, in some cases, patients or families may prefer the pediatric care model because of its provision of comprehensive care, integrated with a level of support for the patient and family.³⁷ Adult health care models may leave families feeling excluded at a time when they are not yet prepared to fully remove themselves from their child's care. Hence, there is a need for PCPs to understand the dynamics of the patients and their families during this transition period.

Implications of Discontinuity of Care

Often by default, adult practitioners will inherit the management of ADHD without formal transition at a time when many conditions comorbid to ADHD, including anxiety disorders, major depression, bipolar disorder, personality disorders, substance abuse, and addiction, may be present.^{74–76} Adult providers who lack the background to differentiate and recognize ADHD in the presence of these comorbid disorders should try to consult a mental health provider in the diagnosis in such cases.

The US National Comorbidity Survey Replication not only sheds light on the prevalence of comorbidities in ADHD, but also speaks to the prevalence of ADHD in other disorders. The survey showed a high prevalence of ADHD

among adults with mood disorders (13%), anxiety disorders (9.5%), and substance abuse disorders (11%).⁵ However, whereas 53% of women and 37% of men had received treatment for mental or substance-related problems in the year before being interviewed, only 12% of women and 10% of men with ADHD had received treatment for that disorder. Similarly, Simon et al⁷⁷ examined comorbid disorders and their treatment in 1000 patients with a diagnosis of bipolar disorder and determined that 6% met criteria for ADHD, but only 9% of these patients reported receiving pharmacotherapy for the disorder. Without consistent treatment of an underlying ADHD diagnosis, a patient may experience little relief from mood symptoms. Similarly, uncontrolled ADHD-related impulsivity may make it difficult for patients who are substance abusers to curb drinking or drug use.

Treatments for comorbidities (eg, obsessive-compulsive disorder or depression) can potentially worsen untreated ADHD. For example, in a systematic review about the use of antidepressants in the treatment of adult ADHD, Verbeeck et al⁷⁸ hypothesized that selective serotonin reuptake inhibitor-induced amotivational syndrome could exacerbate the hypofrontal dysfunction that is often associated with ADHD. Executive dysfunction is a core deficit in ADHD.⁷⁹ Although there is limited evidence specific to ADHD regarding treatment-related executive dysfunction, it has also been suggested that antidepressants can impair executive function⁸⁰; conversely, poor response to the antidepressant fluoxetine is associated with preexisting executive dysfunction.⁸¹ Treatment-related executive dysfunction may particularly be a problem in older adults.^{82,83}

During gaps in treatment for their ADHD, individuals may also be less adherent to other medications, including contraceptives and medications for comorbid conditions, which could further impair health and functionality. Given these possible ramifications, it is clear that practitioners, parents, and providers of continuing medical education need to be diligent in promoting adequate and uninterrupted treatment of ADHD.

Conclusion

There is a clear need to improve awareness among physicians, patients, and patient caregivers (ie, parents) regarding the fact that approximately two-thirds of children with ADHD continue to have symptoms into adolescence and adulthood,^{7,8} and that persistent ADHD can be detrimental to academic performance^{11–13,28} and social relationships,^{11,14} and can lead to risky behavior involving sexual activity¹¹ and driving.^{17,18,31,32} These facts demonstrate the

importance of establishing effective continuity of care for young persons with ADHD as they enter adolescence and adulthood.⁸⁴

In a survey of practice patterns in diagnosis of ADHD,³⁵ the majority of adult patients presenting to primary care were self-referred, having been previously diagnosed in their youth. Of those previously undiagnosed presenting to primary care with ADHD symptoms or comorbidities, only 27% were diagnosed within 6 months, whereas 52% of those presenting to psychiatry were diagnosed within 6 months, demonstrating that many PCPs are slower than psychiatrists to recognize and diagnose ADHD in adults, despite the fact that general guidelines for continuity of care have been developed.⁶⁵ The clear implication is that education about ADHD should be strengthened in medical school and residency training. For PCPs in clinical practice, improved knowledge about ADHD may be achieved through interdisciplinary meetings (including web-based forums) with pediatricians and psychiatrists, for discussion of such topics as ADHD epidemiology, diagnosis, and current management strategies. In support of the importance of education, computer-based simulations have indicated that patient/physician educational initiatives can substantially improve the accuracy of ADHD diagnosis.⁸⁵ Diagnosis may also be easier when the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* becomes available; it has been announced that the new edition will offer liberalized diagnostic criteria for ADHD in adults that more realistically reflect the natural history of ADHD symptomatology from childhood to adulthood.⁸⁶ However, other aspects of ADHD management remain challenging for nonspecialists, such as treatment of comorbid depression, where there is a concern that antidepressant treatment may worsen amotivational symptoms⁷⁸ and executive function. This hazard illustrates the importance of improved medical education about ADHD to reduce the chance that a physician will treat the comorbid condition without recognizing or paying due attention to ADHD.

The difficulty of achieving a coordinated and successful transition from pediatric to adult health care is a certain factor in the under-recognition and undertreatment of ADHD in adolescents and young adults. Although largely experiential in nature, the current literature identifies a number of barriers to health care transition to PCPs. Among these barriers are disparities in residency training, limitations in prescribing privileges in some practice settings and for nurse practitioners, and reluctance to prescribe on the part of some providers. These result in a shortage of PCPs available to provide adequate care to adult patients with ADHD

in the general community. There are also inadequacies in staffing clinics with ancillary providers, a lack of trained providers in the college health care system, limitations in health insurance coverage, and a failure to follow recommendations for transition planning. In our opinion, these factors collectively suggest that the number of young adults with ADHD who are connecting with health care providers in their town or university health care system is likely to be modest.

A limitation of the current review that should be acknowledged is that it did not strictly adhere to a systematic review format. Therefore, further analyses and professional commentary are needed to raise awareness and advance the collective understanding of this issue among health care professionals. However, it is our opinion that the articles cited in this review describe reputable data and provide insights concerning the discontinuity of care as pediatric ADHD patients transition into adulthood. Future research may elucidate optimal individualized approaches to providing continuity of care as children with ADHD enter adolescence and young adulthood. In addition, a rigorous assessment of the quality and consistency of clinical training in ADHD would be interesting and important in terms of improving medical education in this area.

Discontinuity of care has broad ramifications for the patient in education, employment, and peer relationships. There are also increases in the risk for potentially life-threatening outcomes related to substance abuse, unsafe driving, and nonadherence to other medications. Health care transition for adolescents and young adults with ADHD remains a crucial area for research, and medical education in adult ADHD and health care transition remains a fundamental unmet need.

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Conflict of Interest Statement

C. Brendan Montano, MD is a consultant for and/or has participated in speakers bureaus for AstraZeneca, Eli Lilly and Company, Forest Laboratories Inc., GlaxoSmithKline, Ortho-McNeil, sanofi-aventis, Shire Pharmaceuticals, Takeda Pharmaceuticals, and Wyeth Pharmaceuticals, and has received grant/research support from AstraZeneca, Eli Lilly and Company, Forest Laboratories Inc., Pfizer Inc, Novartis, sanofi-aventis, Schwarz Pharmaceuticals, and Wyeth Pharmaceuticals. Joel Young, MD has participated in advisory boards for Eli Lilly and Company, Neuro Interactive, Novartis, Shire Pharmaceuticals, Shionogi, speakers bureaus for Angelini, AstraZeneca, Avanir, Bristol-Meyers Squibb, Eli Lilly and Company, Forest Laboratories, Merck, Novartis, Pfizer Inc, Shire Pharmaceuticals, Shionogi, and Sunovion, and has received grant/research support from Cyberonics, Eli Lilly and Company, Novartis, Otsuka, Pfizer Inc, and Shire Pharmaceuticals.

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