ADHD in Managed Care: An Assessment of the Burden of Illness and Proposed Initiatives to Improve Outcomes

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Abstract

Attention-deficit/hyperactivity disorder (ADHD) often results in persistent problems with attention and impulsivity; these problems, in turn, contribute to impairments in a wide range of functions that affect academic, social, and workplace performance. The chronic and cumulative effects of these difficulties can be overwhelming and outline the significant burden of illness associated with ADHD, which is realized in diminished quality of life for patients and their families and increasing costs or loss of revenue for payers and employers. This burden warrants significant consideration and action from managed care stakeholders to foster sound clinical practice and optimal care. For example, educational interventions and evidence-based tools can be implemented to assist providers with accurate diagnosis and more effective treatment. Furthermore, extensive data documenting the benefits of pharmacotherapy and provider follow-up have demonstrated that initiatives designed to encourage treatment adherence may be the best investment for managed care plans seeking to improve outcomes in patients with ADHD.

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Attention-deficit/hyperactivity disorder (ADHD) has a profound impact on managed care due to its broad-reaching effects on every age group of patients. Although traditionally recognized as a childhood disorder, longitudinal and cross-sectional studies indicate that ADHD persists into adolescence and adulthood in the majority of cases and is estimated to affect nearly 8 million adults.[1-5] Unfortunately, adult ADHD is often unrecognized by managed care stakeholders and the general public, leading to late or missed opportunities to effectively treat this disorder in adults. In fact, while approximately half of patients with ADHD are diagnosed before age 13, more than one third (35%) are not diagnosed until after age 18.[1]

The characteristics of ADHD, which can vary significantly among patients and patient age groups, result in chronic problems with attention and impulse control; this, in turn, contributes to difficulties with productive functioning in academic, social, and workplace settings.[6] The implications of these difficulties are often overwhelming and outline the significant burden of illness associated with ADHD, which is realized in diminished quality of life for patients and their families as well as increased costs or loss of revenue for payers and employers. Whether this burden is embodied by poor academic performance among children, dangerous and abusive behavior among adolescents, or decreased earning potential among adults, it is worthy of significant consideration from managed care stakeholders.[6]

On the clinical side, evidence-based care has already contributed to successful efforts by healthcare providers to alleviate a portion of the burden of illness associated with ADHD. However, considering the chronicity and persistence of the disorder and associated impairments, further intervention may be necessary on the part of managed care organizations (MCOs) to foster sound clinical practices and optimal care. The diverse and complex clinical presentations of patients with ADHD, coupled with the prevalent occurrence of psychiatric comorbidities, make the disorder difficult to recognize and diagnose for already overburdened providers in the primary care setting, who may be lacking formalized training in behavioral health.[7] Educational initiatives and evidence-based screening tools, such as behavior rating scales and treatment algorithms, play a role in

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assisting providers with diagnosis and treatment.[5,8,9] Furthermore, data documenting the safety and efficacy of pharmacotherapy and provider follow-up have demonstrated that initiatives designed to encourage treatment adherence—such as medication tracking and the National Committee for Quality Assurance's (NCQA) Healthcare Effectiveness Data and Information Set (HEDIS) measures—may be the best investment for plans seeking to improve outcomes in patients with ADHD.[10] The foundation of such programs should again be centered on education, but also directed at patients and parents of patients who should be made aware of the benefits and potential adverse effects of treatment.[11] Comprehensive efforts such as these may prove imperative for improving patient outcomes in the treatment of ADHD when considering the complexity and significant burden of illness associated with the disorder.

Burden of Illness

When characterizing the burden of illness associated with ADHD, perhaps the most evident component is the economic impact of the disorder. ADHD contributes to rising costs for payers, employers, and patients, realized not only in the direct medical costs associated with the disorder, but also the indirect costs of reduced productivity, lost earning potential, and other socioeconomic factors. Breaking down the direct medical costs of ADHD further, studies have documented increasing costs immediately related to treating the disorder itself, as well as costs associated with treating comorbidities and other medical needs resulting from the effects of the disorder.

In terms of direct expenditures, estimates of the annual costs of treating children with ADHD range from $2 billion to $11 billion, with pharmacotherapy contributing significantly to these expenditures.[12] The scenario is similar among adults, where 6-month estimates of the total medical and drug costs for ADHD range from $2000 to $4000.[13] Psychiatric comorbidities associated with the disorder may have an even more profound impact on payer bottom lines, with yearly estimates totaling $58.3 billion for drug abuse, $85.8 billion for alcohol abuse, and $43.7 billion for depression.[14,15] These costs become noteworthy when considering the increased incidence of substance abuse among individuals with ADHD and an increased likelihood of other unhealthy habits potentially leading to further medical costs, such as smoking and illicit sexual behavior.[16,17] Children with the disorder are more likely to smoke and to start smoking at a younger age than those without ADHD.[16] Individuals with ADHD also have an onset of sexual intercourse at an earlier age, more sexual partners, more early pregnancies, and more sexually transmitted diseases than individuals without the disorder.[17] In addition, compared with controls, patients with ADHD have higher incidences of antisocial personality disorder, major depressive disorder, and anxiety disorder.[18] An increased incidence of accidents and emergency department visits among individuals with ADHD also contributes to the medical costs resulting from the effects of the disorder. Adolescents with untreated ADHD have 4 times as many serious injuries and 3 times as many motor vehicle accidents than those without ADHD or those taking medication for ADHD.[19]

The indirect costs associated with ADHD, while less evident than direct costs, may bear even greater weight in contributing to the disorder's overall burden of illness, particularly for patients and employers. Patients with ADHD experience distraction and inattention that can potentially lead to decreased academic and workplace performance and, ultimately, lost income and revenue.[6] Studies have shown that, compared with individuals without ADHD, those with ADHD had lower educational achievement. Furthermore, patients with ADHD with a high school degree earn significantly less than their counterparts without ADHD.[6] In fact, on average, those individuals with ADHD have household incomes that are more than $10,000 lower for high school graduates and $4334 lower for college graduates, compared with those without ADHD.[6] Furthermore, approximately 50% of individuals with ADHD indicated that they have lost or changed jobs due to their disorder, and many individuals with the disorder are often considered last for promotions or raises.[6]

Less obvious but no less significant than the economic burden of ADHD is the quality-of-life and behavioral dysfunctional impact of the disorder. ADHD is a highly disabling disorder with a significant effect on a broad range of areas of functioning, including education, employment,

and interpersonal relationships. This reduced functioning has resulted in individuals with the disorder reporting lower self-image or optimistic point of view and lower levels of satisfaction with all aspects of life.[18] In turn, the general pessimism resulting from chronic academic, social, and occupational dysfunction has been documented to lead to negative outcomes on a personal level for individuals with ADHD, such as a higher prevalence of marital problems and increased criminal behavior.[4,20] In fact, studies have shown that individuals with ADHD, compared with those without ADHD, are more likely to be divorced and/or arrested.[20] These varied and significant components of the burden of illness associated with ADHD, in addition to the complex nature of the presentations and comorbidities of the psychiatric disorder itself, validate the need for intervention beyond that applied to other disorders and conditions on the part of managed care stakeholders.

Improving Outcomes in ADHD: A Road Map for MCOs

As a means of improving patient outcomes in ADHD, MCOs should seek to optimize care in every phase of the treatment continuum—from diagnosis to follow-up. However, before a patient can even be diagnosed with the disorder, an ongoing relationship must exist between the provider and the patient that fosters trust and a cooperative approach to care where the patient takes an active role in ensuring treatment success. The patient-centered medical home (PCMH) is such a model for care where each patient has an ongoing relationship with a personal physician who leads a team that takes collective responsibility for patient care, including arranging for appropriate care with other qualified physicians and specialists.[21] Serving as a "command center" from which care is planned and directed, the PCMH provides an ideal setting for applying the first steps in adequate care—diagnosis and treatment selection—and culminating in the implementation of interventions to promote adherence to the therapy selected.

Diagnosis and Treatment Selection

Accurate diagnosis and appropriate treatment are hallmarks of interventions for improving outcomes in any disease or condition; however, certain inherent characteristics of psychiatric conditions such as ADHD require special consideration in managed care in light of their divergence from often more common, nonbehavioral illnesses. Psychiatric disorders provide a particular challenge in that many providers in the primary care setting lack the formalized training necessary to optimally diagnose and treat patients with these conditions; this is a unique challenge in the behavioral health specialty, where primary care physicians (PCPs) are often called on to act as specialists as opposed to referring patients to an actual specialist, which is typically the case for conditions specific to other specialties, such as oncology or neurology.[7] Furthermore, the standard organization and routing of care to specialty providers within conventional MCOs offers little assistance in alleviating this apparent disconnect. In fact, diverting patients with psychiatric conditions to more appropriately trained professionals within managed behavioral health often results in the fragmentation of care due to the most commonly employed systems of resource allocation and benefit design in the current managed care landscape. Fortunately, a number of options exist for stakeholders seeking to overcome the barriers to optimal care for patients with psychiatric conditions, such as proven assessment scales, which aid PCPs in diagnosis, and treatment algorithms and guidelines, which aid in guiding appropriate treatment.[5,8,9]

With no clear-cut biological diagnostic markers, patients with ADHD and other psychiatric disorders are more difficult to diagnose than their nonpsychiatric counterparts. Whereas the presence and severity of nonbehavioral conditions, such as diabetes and cardiovascular disease, may be established by assessing levels of hemoglobin A1C and low-density lipoprotein cholesterol, respectively, or other similarly well-defined markers, the diagnosis of ADHD is more subjective and less absolute. Still, the symptoms of ADHD are well characterized, particularly in children, and easy to elicit from parents and teachers. The diagnostic process is more complicated for adults, especially when parents or previous school or medical records are unavailable.

As a means of simplifying the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (*DSM-IV-TR*) criteria and creating a much-needed, more user-friendly interface for the

diagnosis of ADHD in patients in the primary care setting, several rating scales have been developed by various organizations and academic institutions that quantify the symptoms of ADHD in an easy-to-use, question-and-answer format.[22] Three different sets of these rating scales exist—1 for each of the 3 different subsets of patients with ADHD: children, adolescents, and adults.[5,8,9] Although each of these sets of rating scales is based on the universal *DSM-IV-TR* criteria for ADHD, each is also tailored toward the unique presentation of ADHD symptoms in their respective age group.

The sets of rating scales for children and adolescents typically include questions regarding the patient's functioning in the academic setting, since this is where the symptoms of ADHD are most burdensome and evident in school-aged patients.[8,9] Furthermore, the childhood and adolescent scales typically focus on parents and/or teachers as the primary respondent, since these parties are best equipped to provide an objective opinion on behavior and academic functioning in younger patients who may not fully understand the line of questioning or appreciate the importance of candid and honest answers.[8,9] Some adolescent scales, however, query the patient directly, because adolescents are more advanced from a maturity and developmental standpoint. The childhood and adolescent scales currently in common practice for the diagnosis of ADHD include the following[8,9]:

Childhood Rating Scales

- National Initiative for Children's Healthcare Quality (NICHQ) Vanderbilt Assessment Scales—PARENT and TEACHER Information and Follow Up
- Attention Deficit Hyperactivity Disorder Rating Scale (ADHD-RS)
- Conners' Parent Rating Scale (1997) Revised Version: Long Form, ADHD Index Scale (CPRS-R:L ADHD Index)
- Conners' Teacher Rating Scale (1997) Revised Version: Long Form, ADHD Index Scale (CTRS-R:L ADHD Index)
- Conners' Parent Rating Scale (1997) Revised Version: Long Form, *DSM-IV* Symptoms Scale (CPRS-R:L *DSM-IV* Symptoms)
- Conners' Teacher Rating Scale (1997) Revised Version: Long Form, *DSM-IV* Symptom Scale (CTRS-R:L *DSM-IV* Symptoms)
- Barkley's School Situations Questionnaire-Original Version (1989) Number of Problems Settings Scale (SSQ-O-I)
- Barkley's School Situations Questionnaire-Original Version (1989) Mean Severity Scale (SSQ-O-II)
- Swanson, Nolan, and Pelham Rating Scale (1992): Version 5 (SNAP-IV)

Adolescent Rating Scales

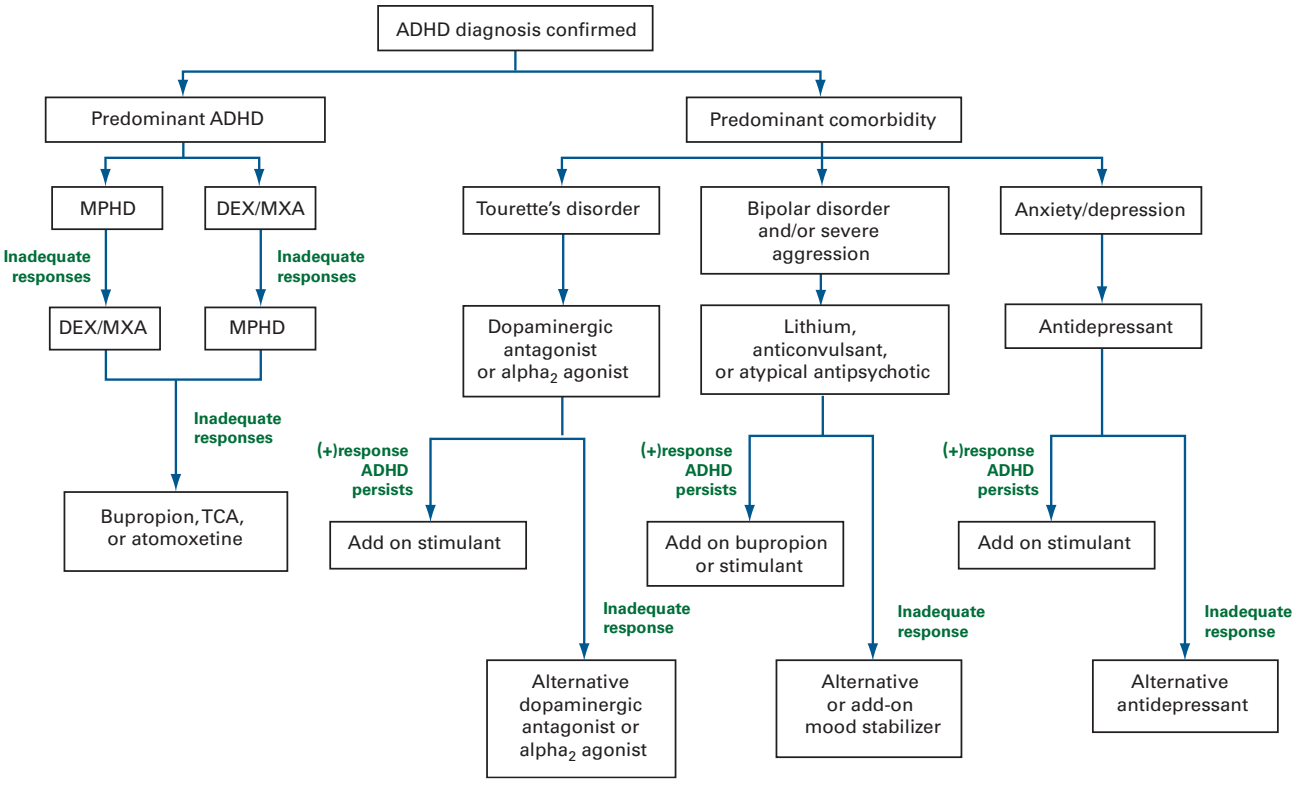
- Attention Deficit Hyperactivity Disorder Rating Scale (ADHD-RS)
- Brown Attention Deficit Disorder Scales
- Child Attention Profile
- Conners' Parent Rating Scale (revised)
- *DSM-IV* Behavior Checklists
- Attention Problems Scale-Teacher Report Form
- Behavior Assessment System for Children (BASC) Parent Rating Scale
- Child and Adolescent Service Center (CASC) Teacher Rating Scale
- Child Behavior Checklist
- Conners-Wells' Adolescent Self-Report Scale

Differing from the sets of childhood and adolescent rating scales, the set of ADHD rating scales for adults focuses on the patients themselves as the primary respondents.[5] These scales feature a similar question-and-answer format, with responses being quantified to a corresponding score to determine a diagnosis of ADHD; however, as patients in this age group have typically advanced beyond the traditional academic setting, the questions are directed toward assessing symptoms in a workplace setting or in other adult-specific scenarios.[5] The adult scales currently in common practice for the diagnosis of ADHD include the following[5]:

Adult Rating Scales

- Brown Attention Deficit Disorder (ADD) Scale
- Conners' Adult ADHD Rating Scale (CAARS)
- Wender-Reimherr Adult Attention Deficit Disorder Scale
- Barkley's Current Symptoms Scale
- Adult Self-Report Scale V1.1
- Adult Investigator Symptom Report Scale (AISRS)

Figure. ADHD Treatment Algorithm Accounting for Predominant Disorder or Comorbidities



ADHD indicates attention-deficit/hyperactivity disorder; DEX, dextroamphetamine; MPHD, methylphenidate; MXA, mixed-salts amphetamine; TCA, tricyclic antidepressant.
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Once the diagnosis of ADHD is made, PCPs may still require guidance in choosing appropriate targets for therapy, which take each individual's symptoms, level and duration of impairment, and comorbidity into account. Rationally derived treatment algorithms have been developed by the American Academy of Pediatrics (AAP) and the American Academy of Child and Adolescent Psychiatry (AACAP) that provide systematic and stepwise treatment recommendations.[8,9] These valuable tools can assist the prescriber who has had little formal training in diagnosis and treatment of ADHD.[23] Similarly, treatment guidelines serve the same role as treatment algorithms in guiding the evidence-based and appropriate treatment of a disease or condition. However, whereas treatment algorithms typically provide this information in a simplified graphic format, treatment guidelines are often presented in the form of a full-text document. The 2 most prominent guidelines for the treatment of ADHD in children and adolescents were published by the AAP and AACAP, respectively.[8,9] At present, no nationally recognized treatment guidelines exist for the treatment of ADHD in adults. It is important to note that both treatment algorithms and treatment guidelines may be adopted from an outside source such as a professional organization or generated within a health plan for distribution to the provider network. In either case, these evidence-based considerations should serve as the foundation for a step-therapy model that can be promoted by plans and serve as a general guideline to providers for making decisions on the most extensively documented clinically and cost-effective form of treatment: pharmacotherapy.

Dictated by existing algorithms and treatment guidelines, the general approach for a step-therapy model in patients with ADHD should be based on the selection of a primary psychostimulant, followed by another psychostimulant trial in the event

of an inadequate response (Figure).[23] If a second psychostimulant provides an inadequate response or poor tolerability after trials of wide dosing ranges, nonstimulant pharmacotherapy should be selected. In patients with psychiatric comorbidities, or in patients in whom there are substance abuse concerns, alternative courses of therapy may be considered, such as nonstimulant pharmacotherapy or behavioral interventions as first-line treatment (Figure).[23] Combining pharmacotherapy with medication is often helpful when there is significant comorbidity and a wide range of symptoms and impairments that extend beyond ADHD.[24]

Promoting Treatment Adherence

Given the high prevalence of ADHD among children and adolescents and the potential for the disorder to persist into adulthood, managed care stakeholders need to develop a strategy for the effective long-term management of this chronic condition. Once an accurate diagnosis of ADHD has been made and an appropriate treatment has been selected, this effective long-term management should be based on initiatives to monitor and promote treatment adherence. This management includes not only adherence to prescribed pharmacotherapy, but also adherence to behavioral interventions and provider follow-up. Without appropriate adherence to therapy, treatment cannot be optimized and little to no improvement in outcomes will be realized.

Education forms the foundation on which treatment adherence is based: If a patient does not fully realize and understand the proven benefits and potential adverse effects associated with a particular treatment, he or she may be more likely to discontinue therapy or adhere to therapy in an inconsistent manner.[11] The physician's office is the most ideal setting in which to deliver this crucial information, since PCPs often have the trust and undivided attention of a patient during these visits. Office visits are also crucial for assessing treatment success and adherence and managing potential adverse events associated with therapy. The office setting is also an area that has demonstrated significant need for improvement in the treatment of ADHD. Researchers in one study reported that only 25% of patients have a follow-up visit with their PCP in the 30 days following their first prescription for the treatment of ADHD, and this number is only 4% higher in psychiatric settings.[25] Furthermore, only 53% of physicians surveyed reported routine follow-up visits for children diagnosed with ADHD.[26]

The NCQA's HEDIS measure for Follow-Up Care for Children Prescribed ADHD Medication is one example of a quality initiative currently in use for improving medication and follow-up adherence.[10] The measure is defined in 2 parts[10]:

- Percentage of children aged 6 to 12 years with a prescription for ADHD medication who had 1 follow-up visit with a practitioner during the 30-day initiation phase
- Percentage of children aged 6 to 12 years with a prescription for ADHD medication who remained on the medication for at least 210 days and had at least 2 additional follow-up visits with a practitioner within 9 months after the end of the initiation phase

While current performance for both components of the measure remains modest, with 33.7% and 38.7% of participating commercial plans achieving compliance for the initiation and continuation/maintenance phases, respectively, it remains a valuable tool for assessing the quality of care for patients with ADHD in terms of follow-up and medication adherence (Table).[10] Before the introduction of the measure, no nationally accepted standard existed for plans to determine their performance in these 2 components of care for patients with ADHD.

Considering the value of the NCQA HEDIS measures for the treatment of ADHD as a means of monitoring and improving follow-up adherence, plans should seek interventions to improve provider adherence to these 2 components of care. Rewarding provider performance in the measures serves as an ideal starting point, by encouraging PCPs to apply the measures through an incentive-based program. Incentives may be either financial, such as bonuses or adjusted fee schedules, or nonfinancial, such as public performance reporting and honor rolls. Regardless of their nature, these incentives must be adequate enough to make physicians take notice and adjust their behavior and clinical practices accordingly.

In addition to follow-up adherence, medication adherence remains a primary concern in the treatment of patients with ADHD, as evidenced by its inclusion in the NCQA's HEDIS measure.[10]

However, while medication adherence is a critical component of optimal care, according to one survey, only 36% of adults with ADHD reported taking a prescription medication for the disorder.[6] Still, a number of interventions are available for managed care stakeholders as a means of resolving this issue of poor adherence to ADHD pharmacotherapy, such as patient education, extended-release formulations of medications, and adherence monitoring.[11,27]

As mentioned previously, patient education serves as the foundation of any initiative to improve medication adherence.[11] By providing patients with the necessary information regarding the benefits and potential adverse effects of their prescribed therapy, MCOs can target the single most influential party in determining medication adherence: the patients themselves.[11] While these educational interventions can be targeted directly at adult patients when treating that particular age group, parents or guardians are likely better suited for understanding and applying education provided in the treatment of children or adolescents with ADHD. Furthermore, parents or guardians typically have a significant influence over the behavior of child or adolescent patients, making them ideal for educational initiatives promoting treatment adherence in these younger age groups.[28] This approach has yielded promising results, particularly in one study where parents who were more knowledgeable about ADHD were more likely to enroll their children in both pharmacologic and nonpharmacologic treatments.[28] Other studies have likewise concluded that education can encourage active participation in treatment, enhance adherence to treatment regimens, and provide patients and families with important coping skills.[29]

Although effective in promoting medication adherence, patient/parent education alone is not sufficient to address the adherence challenges associated with the treatment of ADHD. Helping patients and their families feel comfortable disclosing their concerns and/or issues associated with taking ADHD medication as prescribed remains a significant challenge that can best be addressed through the building of patient–physician trust.[30] Even under the ideal clinical trial conditions of the Multimodal Treatment Study of Children with ADHD, nearly 50% of parents on one or more instances stated that their child was taking his or her ADHD medication as prescribed, while saliva assays indicated that their child had actually not taken the medication that day.[30] Regardless of the cause of patient nonadherence or the reason behind parents providing inaccurate information about their children's adherence, trust in the physician, as well as the physician's ability to set patients and parents at ease to talk about these issues, is paramount.

In addition to educating patients and developing strong patient–physician relationships, the prescribing of recently introduced extended-release formulations of stimulants for the treatment of ADHD has proven effective in improving medication adherence. In fact, the simplified dosing realized through the once-daily administration of these agents has demonstrated an advantage over stimulants dosed multiple times daily in several different measures of adherence. In a retrospective analysis, treatment with extended-release methylphenidate for patients with ADHD was associated with longer treatment periods, fewer switches in therapy, increased patient adherence, and a lower usage rate of emergency department services compared with initial treatment with the conventional immediate-release formulation of the drug.[27]

Obviously, the aforementioned interventions for improving medication adherence are wasted on

Table. Performance in NCQA's HEDIS Measure for Follow-Up Care of Children Prescribed ADHD Medication[10]

Initiation Phase: Trends, 2005-2007		
Year	**Commercial**	**Medicaid**
2007	33.7	33.5
2006	33.0	31.8
2005	32.0	31.4
Continuation and Maintenance Phase: Trends, 2005-2007		
Year	**Commercial**	**Medicaid**
2007	38.7	38.9
2006[a]	N/A	N/A
2005	N/A	N/A

ADHD indicates attention-deficit/hyperactivity disorder; HEDIS, Healthcare Effectiveness Data and Information Set; NCQA, National Committee for Quality Assurance.
[a]The 2006 and 2005 specifications for the commercial and Medicaid phase of the ADHD measure misstated the denominator and will not be publicly reported.
Source: National Committee for Quality Assurance. 2008.

patients who are already compliant with therapy, necessitating a means of distinguishing adherent patients from nonadherent patients. Furthermore, by determining which patients to target with initiatives promoting medication adherence, managed care stakeholders can optimize their investment in such interventions. Adherence monitoring methods such as pharmacy database monitoring is one such means of identifying nonadherent patients that is based on an information technology–driven review of pharmacy claims data to determine which patients fail to fill their prescriptions in the allotted time period. One shortcoming of this method, however, is that it is based on the assumption that patients who regularly refill their medications are actually taking the drug, as opposed to throwing it away, saving it, or giving or selling it to someone else. In the treatment of patients with ADHD, where drug diversion of prescribed therapies is a real concern, the possibility that patients may be throwing, saving, or giving or selling their medication may be the case among many patients who appear to be adherent to therapy. The Schedule II distinction assigned to most of the stimulants prescribed for the treatment of ADHD features a number of safeguards against this diversion and other forms of abuse—such as mandatory hard-copy prescriptions, a no-refill mandate, and drug supplies limited to 30 days—but caution should still be exercised.

Conclusion

Patients with ADHD present a significant cost burden in managed care and on the economy in general, through reduced workplace productivity, an increased incidence of accidents, and increased criminal activity among individuals with ADHD; beyond these economic concerns, the disorder results in substantially reduced quality of life for many patients. Although once considered a childhood disorder, available data have demonstrated the chronicity of the condition across several different age strata, highlighting a significant need for quality-enhancing initiatives in managed care. Further validating the need for quality improvement is the unique and complex nature of ADHD as a psychiatric condition and one that many providers are poorly equipped to diagnose and treat in the primary care setting.

A number of potential interventions are available to managed care stakeholders for addressing the aforementioned concerns associated with the disorder. Proven rating scales and evidence-based treatment algorithms and guidelines serve to simplify the diagnosis and treatment of patients with ADHD by PCPs, thereby assisting them in making accurate determinations and sound clinical decisions. Treatment (ie, medication and follow-up) adherence, a component of care that has been demonstrated as being paramount to improved patient outcomes, likewise plays a role in the quality of care for patients with ADHD and should be fostered by means such as patient education, the NCQA HEDIS measures, the prescribing of extended-release formulations of stimulants, and pharmacy database monitoring. While such interventions will likely come at a significant cost for MCOs, the cost of inadequate or suboptimal care may prove to be even greater.

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