

The Role of Pharmacotherapy and Managed Care Pharmacy Interventions in the Treatment of ADHD

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Despite the availability of effective behavioral interventions for the treatment of attention-deficit/hyperactivity disorder (ADHD), the dominant role of pharmacotherapy as a mode of management for patients with ADHD within a managed care setting cannot be ignored. Approximately 54% of children aged 6 to 11 years who have been diagnosed with ADHD receive prescription drug therapy for their disorder.¹ Furthermore, the use of pharmacotherapy for the treatment of ADHD has increased dramatically in other childhood age groups, with the number of children younger than 9 years of age receiving drug therapy for the disorder growing nearly 75% over the past 4 years.² This rise translates into a 412% increase in healthcare spending on medications for ADHD in younger children over that same time period.² Even in adults, where ADHD is far less recognized and diagnosed, drug therapy is on the rise: the 18% increase in the number of adult patients (aged 20-64 years) using medications for the treatment of ADHD from 2003 to 2004 ranked second among all drug categories, with only the growth in rheumatologic drug users (25%) being greater.²

The widespread application and rapid growth of pharmacotherapy in the treatment of patients with ADHD is not a new phenomenon. Drug therapy—psychostimulant therapy in particular—has been employed in the treatment of patients with ADHD for decades and is supported by robust efficacy and safety data.^{3,5} Furthermore, medication management has been demonstrated to be the most cost-effective form of therapy for ADHD.³ However, although 75% to 90% of children with ADHD display reductions in ADHD symptoms with medication management,⁶ the Multimodal Treatment Study of Children with ADHD (MTA) suggests that less than half display “normalization,” depending on which type of treatment they receive; thus, 56% of children receiving high-quality medication management are “normalized,” while only 34% and 25% receiving intensive behavioral therapy and routine community care, respectively, are normalized.⁷ Psychostimulants have been demonstrated to have increased efficacy relative to nonstimulants (eg, comparator trials of atomoxetine vs stimulants) in the treatment of patients with ADHD.³⁻⁵ Not surprisingly, psychostimulants are typically first-line therapy for the treatment of ADHD in treatment guidelines published by a number of professional organizations, such as the American Academy of Pediatrics (AAP) and the American Academy of Child and Adoles-

Abstract

Pharmacotherapy plays a primary role in the management of attention-deficit/hyperactivity disorder (ADHD), despite the availability of effective behavioral interventions. Psychostimulants are the most commonly prescribed form of pharmacotherapy for patients with ADHD and their benefits in managed care are severalfold, leading not only to symptom resolution and improved quality of life for patients, but also reduced costs for payers and purchasers. The use of these agents requires careful consideration and management by health plan stakeholders for optimal effectiveness. Concerns regarding medication adherence, in addition to the potential for diversion and abuse of psychostimulants, highlight the importance of effective pharmacotherapy management in patients with ADHD. Initiatives promoting medication adherence, such as patient/parent education, provider follow-up, and adverse effect management, are crucial for ensuring treatment success. Once-daily, extended-release formulations of stimulants may also contribute to improving medication adherence, as may managed care pharmacy interventions such as pharmacy database monitoring.

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For author information and disclosures, see end of text.

cent Psychiatry (AACAP).^{3,8} The clinical practice guidelines published by both of these nationally recognized institutions recommend prescribing a stimulant medication first, followed by another stimulant medication if ineffective or poorly tolerated before switching to a nonstimulant, in children and adolescents with ADHD and without a predominating psychiatric comorbidity requiring a different type of treatment, such as depression or obsessive-compulsive disorder.^{3,8}

The benefits of effective pharmacotherapy for ADHD in managed care are severalfold, leading not only to symptom improvement and improved quality of life for patients and their families, but also reduced costs for payers and purchasers. For example, a meta-analysis of 62 randomized controlled trials reported that the use of psychostimulants improved teachers' and parents' ratings of disruptive behavior in students with ADHD.⁹ Furthermore, among children with ADHD, those receiving pharmacotherapy demonstrate significantly less frequent and less costly emergency department visits.¹⁰ Conversely, in the absence of consistent treatment, adolescents with ADHD suffer 4 times as many serious injuries and 3 times as many motor vehicle accidents versus those without ADHD or those with ADHD who are medication compliant.¹¹ Although somewhat controversial, several studies suggest that substance abuse disorders occur at a rate 3 to 4 times greater among patients with untreated ADHD versus those managed with psychostimulants.¹²

While offering significant benefits, pharmacotherapy for patients with ADHD still requires careful consideration and management by health plan stakeholders for optimal effectiveness. In recently published literature from the MTA study, researchers again highlighted the benefits of an individually titrated psychostimulant regimen, with the caveat that this therapy needs to be intensely managed to be effective.¹³ Echoing the sentiments of the AAP and AACAP, Swanson et al concluded that therapy should be tailored to the individual, with consideration given to each patient's clinical presentation, comorbidities, and treatment goals.¹³ Behavioral interventions should be applied in conjunction with pharmacotherapy to effectively manage psychiatric comorbidities and potentially lower the dose of medication necessary for symp-

tom resolution.¹³ In addition, initiatives promoting medication adherence, such as patient/parent education, provider follow-up, and adverse effect management, are crucial for ensuring treatment success. Once-daily, extended-release (XR) formulations of stimulants may also contribute to improving medication adherence, as can managed care pharmacy interventions such as pharmacy database monitoring.¹⁴⁻¹⁶ As the use of pharmacotherapy for the treatment of patients with ADHD continues to rise, these proactive measures can help to ensure that managed care organizations receive an adequate return on investment for their drug spending on patients with ADHD.

Overview of Pharmacotherapy in the Treatment of ADHD

The catecholamine dysfunction theory of ADHD suggests that the disorder is etiologically linked imbalanced levels of specific neurotransmitters—specifically, dopamine and norepinephrine. Dopamine is believed to play a role in the inattention and hyperactivity, and reward/motivational deficits associated with the disorder, whereas low levels of norepinephrine are believed to play a role in inattention and executive functioning. Psychostimulants prescribed for the treatment of ADHD serve to increase levels of neurotransmitters by inhibiting the reuptake of dopamine and norepinephrine in the neural synapse, as well as through inhibition of monoamine oxidase. The 2 main classes of psychostimulants available, methylphenidate and amphetamine, feature a phenethylamine pharmacophore that is common to dopamine and norepinephrine, allowing these agents to compete with the neurotransmitters for transporter receptor binding (**Figure 1**).

The first evidence of psychostimulant use in the treatment of patients with ADHD was a study published in 1937 by Charles Bradley, MD.¹⁷ Dr Bradley reported that treatment of so-called “behavior problem children” with a racemic mixture of amphetamine resulted in improved academic performance and subdued emotions without a lack of interest.¹⁷ What is now the most commonly prescribed psychostimulant for the treatment of patients with ADHD—methylphenidate—became available years later in 1955, although at the time it was not indicated for the treatment of patients

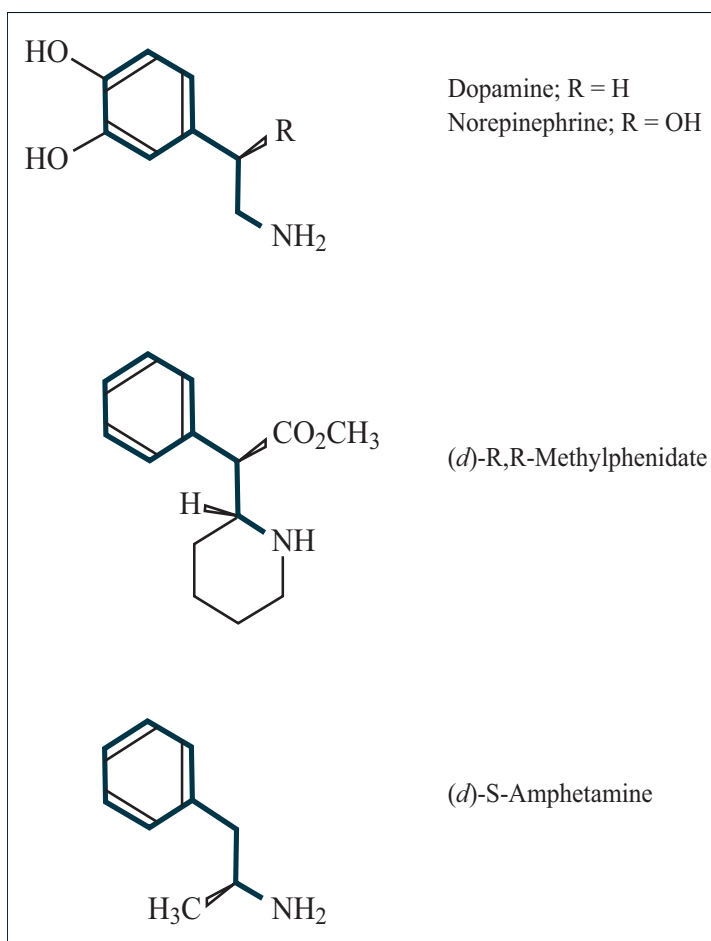
with ADHD.¹⁸ By 1957, methylphenidate was available in various forms from different manufacturers, and clinicians began prescribing the agent for the treatment of patients with ADHD, known at the time as hyperactivity of minimal brain dysfunction.¹⁸ After nearly 50 years of use of the immediate-release formulation of methylphenidate, several XR formulations of the agent were introduced in 1999, revolutionizing its ease of use and associated adherence levels.¹⁸ In recent years, immediate-release and XR formulations of other stimulants, such as dexamethylphenidate, mixed amphetamine salts, dextroamphetamine, and lisdexamfetamine, have also been approved for the treatment of patients with ADHD. The first and only nonstimulant to be approved for the treatment of ADHD, atomoxetine, was introduced in 2003; however, this agent is currently prescribed in less than 20% of patients with ADHD receiving pharmacotherapy, with psychostimulants making up the remaining majority share of prescriptions for the disorder.¹⁹

Prior to the prescribing of any of these aforementioned stimulant or nonstimulant medications for the treatment of patients with ADHD, health plan providers must accurately diagnose and adequately characterize the patient's disorder. These considerations assist in choosing the most appropriate agent and dose for each individual patient, thus optimizing therapy. A comprehensive assessment of the patient also allows the clinician to determine to what extent behavioral interventions alone or in combination with pharmacotherapy may be appropriate as part of the treatment plan.

Stimulants Versus Nonstimulants

After diagnosis and disorder characterization, providers have a wide range of pharmacotherapeutic options available for the treatment of patients with ADHD. As mentioned previously, available child and adolescent treatment guidelines recommend prescribing a psychostimulant as first-line therapy, followed by another psychostimulant if first-line therapy does not produce an adequate response.^{3,8} In the majority of patients, nonstimulants are only recommended after 2 failed stimulant trials.^{3,8} Although no formal guidelines exist for the treatment of ADHD in adults, available data demonstrating the effectiveness of psychostimulants

■ **Figure 1.** Phenethylamine Pharmacore (in Bold) Common Among the Psychostimulants Methylphenidate and Amphetamine and the Neurotransmitters Dopamine and Norepinephrine



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warrant a similar approach to pharmacotherapy in this age group.²⁰

As ADHD was originally identified and characterized in children, the majority of commercially available psychostimulants are indicated only in the treatment of ADHD in children and adolescents. The dose form, typical starting dose, and maximum dose per day of these agents are outlined in [Table 1](#).³ Note that the recently introduced intermediate- and long-acting formulations are dosed only once daily, compared with dosing 2 or 3 times a day for short-acting formulations. However, MTA researchers reported that optimal psychostimulant therapy was achieved with 3-times-daily dosing of immediate-release methylphenidate.¹³

Table 1. Characteristics of Psychostimulants Approved for the Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents³

Generic Class/Brand Name	Dose Form	Typical Starting Dose	FDA Maximum/Day	Off-Label Maximum/Day
Amphetamine preparations				
Short-acting				
Adderall ^a	5, 7.5, 10, 12.5, 15, 20, 30 mg tab	3-5 y: 2.5 mg qd; ≥6 y: 5 mg qd-bid	40 mg	>50 kg: 60 mg
Dexedrine ^a	5 mg cap	3-5 y: 2.5 mg qd		
DextroStat ^a	5, 10 mg cap	≥6 y: 5 mg qd-bid		
Long-acting				
Dexedrine spansule	5, 10, 15 mg cap	≥6 y: 5-10 mg qd-bid	40 mg	>50 kg: 60 mg
Adderall XR	5, 10, 15, 20, 25, 30 mg cap	≥6 y: 10 mg qd	30 mg	>50 kg: 60 mg
Lisdexamfetamine	30, 50, 70 mg cap	30 mg qd	70 mg	Not yet known
Methylphenidate preparations				
Short-acting				
Focalin	2.5, 5, 10 mg cap	2.5 mg bid	20 mg	50 mg
Methylin ^a	5, 10, 20 mg tab	5 mg bid	60 mg	>50 kg: 100 mg
Ritalin ^a	5, 10, 20 mg	5 mg bid	60 mg	>50 kg: 100 mg
Intermediate-acting				
Metadate ER	10, 20 mg cap	10 mg qam	60 mg	>50 kg: 100 mg
Methylin ER	10, 20 mg cap	10 mg qam	60 mg	>50 kg: 100 mg
Ritalin SR ^a	20 mg	10 mg qam	60 mg	>50 kg: 100 mg
Metadate CD	10, 20, 30, 40, 50, 60 mg	20 mg qam	60 mg	>50 kg: 100 mg
Ritalin LA	10, 20, 30, 40 mg	20 mg qam	60 mg	>50 kg: 100 mg
Long-acting				
Concerta	18, 27, 36, 54 mg cap	18 mg qam	72 mg	108 mg
Daytrana patch	10, 15, 20, 30 mg patches	Begin with 10-mg patch qd, then titrate up by patch strength	30 mg	Not yet known
Focalin XR	5, 10, 15, 20 mg cap	5 mg qam	30 mg	50 mg

bid indicates twice a day; FDA, US Food and Drug Administration; qam, every morning; qd, every day; tid, 3 times a day.

^aShort-acting formulations of methylphenidate may be dosed up to 20 mg 2 or 3 times a day in adults.

Adapted from Pliszka S; AACAP Work Group on Quality Issues. Practice parameter for the assessment and treatment of children and adolescents with attention-deficit/hyperactivity disorder. *J Am Acad Child Adolesc Psychiatry.* 2007;46(7):894-921.

Of these psychostimulants, only mixed amphetamine salts, XR; dexmethylphenidate XR; lisdexamfetamine; and osmotic release oral system (OROS) methylphenidate have received approval from the US Food and Drug Administration (FDA) for use in adults.²¹ Beyond their effect on symptoms of ADHD in children, adolescents, and adults, psychostimulants have also demonstrated clinical worth in a variety of related neurobehavioral domains, such as oppositional and aggressive behaviors, academic achievements, and social skills.²²

The most common adverse events associated with psychostimulants include insomnia, nervousness, irritability, anxiety, jitteriness, headache, stomachache, and decreased appetite.²⁰ Although stimulants can increase pulse and blood pressure modestly, this is rarely a clinical problem, and recent data indicate that the risk for sudden cardiac death in patients receiving stimulant pharmacotherapy does not exceed the base rate in the general population.²³ Furthermore, this sudden cardiac death incidence is often associated with preexisting

structural cardiac defects, other complicating circumstances, or a positive family history.²³ There has also been some concern regarding the worsening of tic disorders in association with psychostimulant therapy.²⁴ However, standard doses of stimulants do not exacerbate or precipitate tic disorders in most patients, and apparent medication-induced exacerbations may decline spontaneously even without discontinuation of therapy.²⁴ Likewise, the chronic use of psychostimulants appears to acutely decrease growth rates in children, although the effects of these agents on weight and height have generally been considered to be of minimal clinical significance.²⁵ Despite the fact that growth appears to stabilize over time in group studies, it remains important to consider and closely monitor individuals being treated.²⁶

The abuse potential of psychostimulants has led to the classification of most of these commercially available agents as Schedule II controlled substances. In a Web survey of students from a Midwestern public school district in grades 6 through 11, illicit use of psychostimulants was reported by 4.5% of respondents.²⁷ Another online survey demonstrated that the incidence of stimulant misuse and abuse appears to increase significantly among college students, where 16% reported abusing or misusing a prescribed stimulant.²⁸ Drug diversion—another managed care concern associated with psychostimulants—was even more apparent than misuse among the aforementioned middle and high school survey respondents, with 23.3% reporting having been approached to sell, give, or trade their prescription drugs.²⁷ While misuse is a definite issue, a number of safeguards are built into the Schedule II designation that are designed to prevent these instances of abuse and diversion, such as mandatory hard-copy prescriptions, no refills on prescriptions, and 30-day limits on drug supplies. Furthermore, concern over stimulant abuse has decreased as newer XR formulations have been introduced to the market. For example, OROS methylphenidate demonstrated no detection or likeability in subjects tested every hour for 10 hours after ingestion in one study.²⁹ Although some reports have suggested that treatment for patients with ADHD is associated with a significantly reduced risk of substance abuse, recent findings from the National Institute of Mental Health's MTA have not uncovered any systematic

relationship.^{30,31} Still, nonstimulant pharmacotherapy is usually preferred in patients with a history of substance abuse.

Atomoxetine, a selective norepinephrine reuptake inhibitor and the only nonstimulant approved by the FDA for the treatment of ADHD, is indicated for use in children, adolescents, and adults. Dosing for this agent follows a weight-based schedule because plasma levels vary considerably as a function of body weight, with a recommended target dose of 1.2 mg/kg.³² A longer period than that of psychostimulants is often required before the full effects of atomoxetine are observed.³³ The therapeutic benefits of atomoxetine often persist into the evening or even the following morning when the agent is dosed during the day; however, patients typically need 2 to 4 weeks of regular dosing with the agent to realize therapeutic benefits, compared with 1 to 2 hours with psychostimulants.³³ The most common adverse events associated with atomoxetine therapy include dry mouth, insomnia, decreased appetite, nausea and vomiting, sexual difficulties, dizziness, and increased blood pressure and heart rate.³² Irritability and increased aggression have also been observed, particularly in individuals with comorbid mood or behavioral syndromes, and hepatotoxicity has been reported in rare instances.³² The potential advantages of atomoxetine over psychostimulants with regard to adverse events are decreased insomnia and growth-related effects. There is also less potential for abuse than for stimulants, and this agent appears not to be well suited for those who display tics, which are exacerbated by stimulants.

Managed Care Pharmacy Interventions

Prescribing and use of the aforementioned stimulant and nonstimulant pharmacotherapy for patients with ADHD can have a significant financial impact on managed care. In fact, estimates of the annual cost for treating children with ADHD range from \$2 billion to \$11 billion, with pharmacotherapy making up a significant portion of those expenditures.³⁴ Among adults, one analysis demonstrated total medical and drug costs for patients treated with pharmacotherapy as ranging from \$2000 to \$4000 during a 6-month period.³⁵ Furthermore, this spending on agents for the treatment of patients with ADHD shows no signs of slowing down anytime in the near future. Despite making up only 1.8% of

plan cost, pharmacotherapy for ADHD increased 5.6% in utilization in 2007, with a 6.8% increase in unit cost also contributing to increased spending.²

When considering these rising costs associated with pharmacotherapy for patients with ADHD in managed care, it is obvious that plans have invested a significant amount of resources toward treating the disorder. To ensure a sound return on this investment, stakeholders must implement pharmacy interventions to manage the use of pharmacotherapy and promote improved outcomes. This process begins by addressing a key component of treatment for patients with ADHD: medication adherence.

Adherence is a critical aspect of care due to the chronicity of lifelong ADHD and the consequences resulting from significant symptoms that continue to exhibit into adulthood. Without consistent, adequate treatment, these symptoms remain minimally managed and can impact patient quality of life, as well as lead to increased costs for payers and purchasers. Similar to interventions promoting medication adherence for other conditions, patient/parent education serves as the foundation for addressing adherence in patients with ADHD.

An important part of any management strategy for children, adolescents, or adults with ADHD, patient/parent education is designed to counsel patients and/or parents on the benefits and adverse events associated with all psychopharmacologic treatments. By helping a patient and/or parent understand why a medication is being prescribed and what potential positive and negative effects to expect, managed care organizations can foster realistic expectations regarding treatment and minimize anxiety should adverse events occur.

In children and adolescents with the disorder, managed care stakeholders may be best served by focusing such educational interventions on parents or guardians, since they are better suited to understand the implications of treatment adherence and can have a profound impact on the behavior of the patient. Parent training and education are based on the premise of giving parents the tools to manage their child's behavior and encourage medication adherence.³⁶ These interventions have been shown to be highly effective for assisting parents in fostering regular medication habits, identifying target

behaviors, providing positive reinforcement, and encouraging skill development.³⁷

When addressing adolescent or adult patients with ADHD, who are capable of fully understanding the implications of treatment adherence, educational efforts should be targeted directly at the patients themselves. It is important to discuss the standard messages regarding target outcomes and potential drug adverse events. In particular, because a noticeable proportion of high school and college students receiving prescription drugs for the treatment of ADHD are likely to be approached regarding their medication, it is useful to discuss this potential problem.

As a means of improving the effectiveness of educational efforts for promoting medication adherence in the treatment of patients with ADHD, plans may also implement adherence monitoring measures to track adherence and target nonadherent patients for intervention. These pharmacy monitoring interventions may be as simple as basic pharmacy database monitoring or more involved and sophisticated, as in the case of the Stimulant Adherence Measure described by Charach et al.¹⁴ The Stimulant Adherence Measure is a semistructured telephone interview designed to elicit a detailed description of medication use from parents and children that takes 5 to 15 minutes to complete.¹⁴ In the study, the researchers compared use of the Stimulant Adherence Measure to use of the Medication Event Monitoring System (MEMS®)—a device that records the date and time the pill container was opened using an electronic computer chip in the cap—for monitoring adherence to pharmacotherapy for ADHD. Charach et al reported that the telephone interview method employed in the Stimulant Adherence Measure demonstrated good to excellent agreement with the proven yet costly MEMS.¹⁴

The effective management of adverse events associated with drug therapy is another means of improving adherence among patients with ADHD. Management begins with a comprehensive physical examination prior to the initiation of therapy as well as initiating therapy at a low dose and sequentially titrating upward to minimize adverse events. Furthermore, in many cases, lowering the medication dose is the first step to minimizing or even completely resolving the occurrence of adverse events (**Table 2**). It should be noted, how-

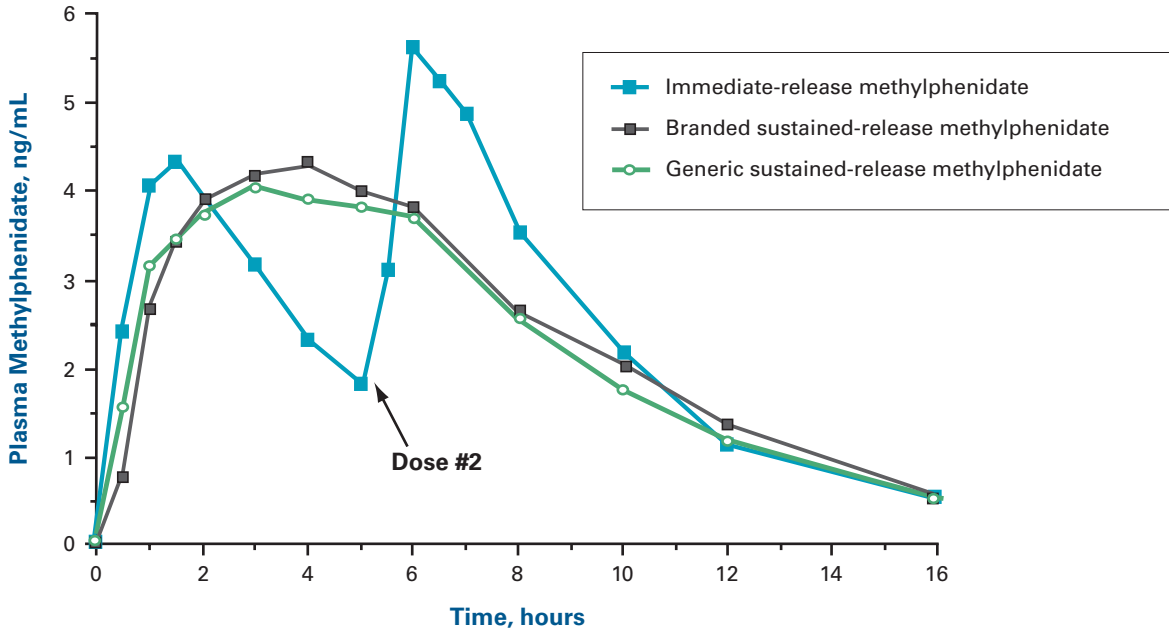
Table 2. Strategies for the Management of Various Safety Considerations and Potential Adverse Events Associated With Pharmacotherapy for Attention-Deficit/Hyperactivity Disorder

Pharmacologic Treatment	Safety Considerations/ Potential Adverse Events	Management Strategies
Methylphenidate		
Immediate release (short-acting; ie, dextro, levo-MPH, d-MPH)	Risk for tachycardia, arrhythmia, sudden death Risk for growth suppression Risk for tics Potential for abuse and diversion Risk for hallucinations Risk for GI adverse events (abdominal pain, vomiting, decreased appetite)	Heart rate/BP monitoring, ECG and/or echocardiogram in high-risk cases; baseline ECG not recommended Baseline height/weight with periodic monitoring; dietary consultation and/or nutritional supplementation Decrease anxiety; monitor for appearance/exacerbation of tics; adjust dose; change medication Counsel; nonstimulants; extended-release formulations of stimulants Inquire about vision symptoms; discontinue use if hallucinations occur Inquire about GI symptoms; decrease dose if these occur
Extended release (intermediate- and long-acting; ie, MPH-LA, MPH-CD, OROS MPH, d-MPH XR)	Presumed same risk for cardiovascular adverse events as IR, but not studied Risk for growth suppression and tics similar to or lower than IR formulations Possible lower potential for abuse and diversion, but not well studied	See recommendations for IR formulations
Transdermal system	Risk for skin erythema, rash Risk for other side effects similar to oral MPH Possible lower potential for abuse and diversion, but no data currently	Observation; topical creams; rotation of administration site
Amphetamine		
Immediate release (d-AMP, MAS)	Overall risks are similar to MPH, with some individual variations	See recommendations of MPH
Extended release (d-AMP, spansule, MAS-XR, lisdexamfetamine)	Presumed risks similar to IR formulation Possible lower potential for abuse and diversion	See recommendations of MPH
Atomoxetine		
	Risk for hepatotoxicity Possibility of suicidal thinking Risk for sedation Risk of tachycardia, arrhythmia, sudden death No abuse potential	Baseline history; follow clinically for abdominal pain/jaundice Weekly monitoring for suicidal ideation/behavior when beginning treatment or changing dose Dose twice a day, or bedtime dosing Heart rate/BP monitoring; ECG and/or echocardiogram in high-risk cases; baseline ECG not recommended
AMP indicates amphetamine; BP, blood pressure; d, dextro; ECG, electrocardiogram; GI, gastrointestinal; IR, immediate release; LA, long acting; MAS, mixed amphetamine salts; MPH, methylphenidate; OROS, osmotic release oral system; XR, extended release.		

ever, that some adverse events are idiosyncratic and cannot be managed successfully by dose reduction. In these cases, intolerability should be managed by switching to a different agent or by administering supportive care when appropriate.

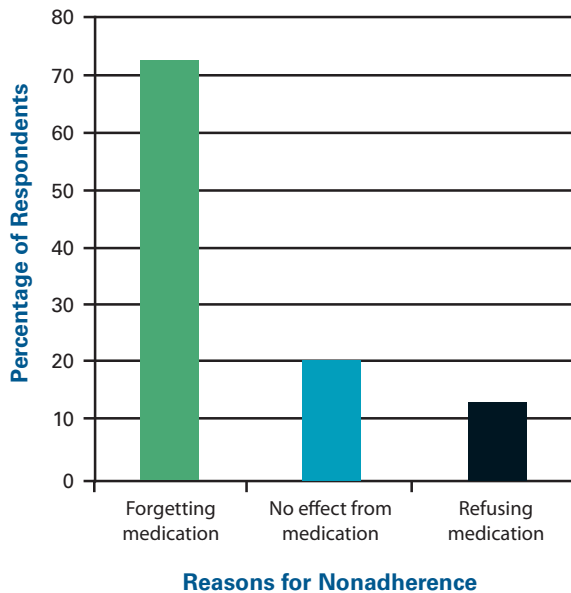
Beyond the implications of patient education and management of adverse events, the actual choice of agent can have a profound effect on medication adherence.¹⁶ As mentioned previously, over the past decade, several XR formulations of psycho-

Figure 2. Pharmacokinetic Profile of Immediate-Release Methylphenidate (twice/day) Compared With That of the Branded and Generic Sustained-Release Products



Source: Patrick KS, et al. *Biopharm Drug Dispos.* 1989;10:165-171.

Figure 3. Reasons for Poor Adherence to Medications for the Treatment of Attention-Deficit/Hyperactivity Disorder¹⁶



stimulants have been introduced that require only once-daily dosing, as opposed to immediate-release formulations that must be dosed 2 to 3 times a day. These XR formulations maintain effective plasma concentrations of the active agent over 8 to 12

hours, whereas immediate-release formulations must be dosed again after approximately 4 hours (Figure 2).³⁸

When considering that forgetting medication is among the most common reasons for nonadherence, these XR formulations that allow for minimal dosing are likely to cause the patient to experience higher adherence rates (Figure 3).¹⁶ Another common reason for nonadherence (at least among children), refusing medication, may also be alleviated by newer formulations that increase ease of administration, such as the methylphenidate patch or granulated formulations that can be sprinkled on or in food or drink.

Conclusion

Pharmacotherapy has demonstrated significant benefits in improving outcomes in many patients with ADHD, which can in turn reduce direct and indirect costs for payers and purchasers. Specifically, treatment with psychostimulants has demonstrated robust effects on ADHD symptoms. However, these agents come at a cost that has been increasing on a yearly basis, in conjunction with their utilization. It is obvious that management is necessary on the part of managed care organizations to maximize the return on their investment.

A number of pharmacy-led interventions may prove beneficial to managed care stakeholders for improving outcomes and maximizing the effectiveness of prescription drug therapies. These interventions are founded on the principle of promoting medication adherence, which is crucial in the treatment of patients with ADHD when considering the chronicity of the disorder. Patient/parent education efforts, adherence monitoring, management of adverse events, and the use of XR formulations are among some of the most effective means of achieving higher rates of medication adherence in the treatment of patients with ADHD. These interventions, which can be either partially or exclusively implemented and managed by managed care pharmacy, allow for optimal use of pharmacotherapy for the treatment of patients with ADHD, benefiting patients, purchasers, and payers alike.

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