

Implications for Asthma Treatment Strategies in Managed Care

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Asthma is a chronic inflammatory disease characterized by recurrent episodic inflammation of the airways that results in narrowing of the airways and bronchial hyperresponsiveness. The pathophysiology of asthma involves a complex series of interactions that ultimately result in airway inflammation, hyperresponsiveness, and airflow obstruction.¹⁻³ Left untreated, these changes may lead to irreversible airway remodeling. A strong link between asthma symptoms and severity and airway inflammation and hyperresponsiveness adds to the evidence that early intervention and effective long-term management can modify the process of airway inflammation and prevent possible irreversible airway damage.¹

Effective treatment of asthma must therefore have a long-term focus on the management of chronic inflammation rather than immediate relief of bronchospasms.^{2,4} Therapeutic advancements in asthma have yielded a large number of safe and effective management options and treatment guidelines, such as the National Asthma Education and Prevention Program (NAEPP) Expert Panel Report, which stress the need for aggressive asthma management to improve clinical and economic outcomes.² Unfortunately, current treatment and management strategies have not been sufficient to accomplish management goals in patients who are poorly controlled or have moderate to severe asthma.^{5,6}

Despite abundant scientific and practical knowledge and improved therapeutic options, asthma is still responsible for significant morbidity and mortality, increased direct and indirect costs, and a substantial burden on society; its mounting prevalence is expanding across all demographic categories.⁷⁻¹¹ Patients who continue to remain poorly controlled are at even greater risk for frequent exacerbations, which lead to an increased share of asthma care resources, including greater emergency department (ED) visits or hospitalizations.^{12,13} A real-world study using a validated measure of asthma control, the 5-item Asthma Control Questionnaire (ACQ-5), demonstrated that poor asthma control, leading to increased exacerbations, has a deleterious effect on the use of healthcare resources. Each 1-point increase in the ACQ-5 score was associated with an odds ratio of 2.14 of having an asthma exacerbation, a 25%

ABSTRACT

As the prevalence of asthma continues to increase, the financial impact on the healthcare costs of the United States does as well. Managed care pharmacists are ideally situated to unite the shared goals of all asthma healthcare providers: to improve treatment and management strategies to ensure that patients receive safe, optimal, and cost-effective asthma treatment. Armed with knowledge about the pathophysiology of asthma, pharmacists can educate patients on the importance of early intervention and treatment adherence to help improve their immediate symptoms and ensure the long-term success of their asthma management plan. The implications for asthma treatment strategies in managed care are discussed in this article, with emphasis on the following domains: disease and treatment education, treatment adherence, patient self-monitoring, cost-efficiency, specialized care, and patient co-insurance and assistance. Asthma management programs implemented by managed care organizations can be aligned to improve asthma outcomes and use healthcare resources wisely.

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For author information and disclosures, see end of text.

increase in the expected number of asthma-specific prescriptions, a 59% increase in asthma-related expected ED visits, a 24% increase in expected inpatient visits, a 27% increase in expected outpatient visits, a 62% increase in the number of oral prednisone prescriptions, and a 47% increase in the expected number of short-acting beta-agonist prescriptions.¹⁴

Pharmacists: Leading the Charge

Whereas medical professionals often share the common goal of improving patient outcomes, healthcare stakeholders have unique and sometimes conflicting agendas. These agendas—and their objectives of improving treatment effectiveness and tolerability, reducing costs, and enhancing access to treatment and services—are usually in the perceived best interests of the patient; however, divergent management approaches may hinder progress. The NAEPP suggests that implementing their diagnosis and management recommendations requires a collaborative effort on the part of all stakeholders within the asthma community, including pharmacists.¹⁵

Comprehensive managed care programs that use pharmacists, primary care physicians, pulmonary specialists, and case managers have demonstrated improved asthma outcomes by initiating asthma management programs that identify high-risk patients, encourage use of treatment guidelines, and educate patients on asthma and its treatments.¹⁶ Programs that enlist the support of pharmacists, or are pharmacy-led, show a positive impact on asthma outcomes, including improved clinical and economic outcomes.¹⁶⁻¹⁸

Disease education is a way in which pharmacists can help both clinicians and patients. By remaining updated on national guidelines and emerging therapeutics, pharmacists can both influence formulary decisions and partner with clinicians to monitor patients, communicate changes in patient health status or needs, and help address any potential changes in diagnosis or treatment that may be needed.

An experimental group showed that, compared with receiving care from a pulmonologist alone, a pharmacist-provided comprehensive education program in conjunction with care from a pulmonologist led to significantly greater improvements in economic, clinical, and patient-centered outcomes in adults with asthma.¹⁸ Adults with asthma who were randomized to the pharmacist-led education program reported receiving more information about asthma self-management ($P = .001$), were more likely to monitor peak flow readings ($P = .004$), and were credited with greater patient satisfaction and patient-reported quality of care. Overall, decreases in lost productivity, ED visits, hospitalizations, and physician visits were also reported, along with improved symptom scores at 45 days.¹⁸

Another pharmacist intervention program, a comprehensive drug therapy management program affiliated with a health maintenance organization, showed that patients with chronic health conditions, including asthma, were more likely to feel that they received infor-

mation about all aspects of medications (OR, 1.75-2.68) and to use 2 or more reminder methods to take their medication (OR, 1.87-1.48). Patients participating were also more likely to recognize and report symptoms or treatment-related side effects.¹⁷ Other pharmacist-managed programs have shown positive changes in clinical outcomes related to severity of symptoms, changes in peak flow rates, and the need for daily medications and oral corticosteroids as well.¹⁹

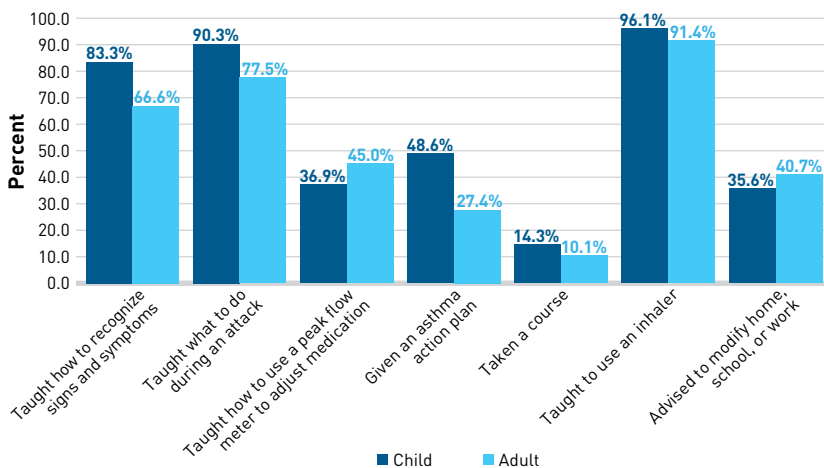
Pharmacists in managed care organizations are able to unite the common goals of various healthcare providers: to improve management strategies to make sure that patients are able to obtain safe, appropriate, and cost-effective therapy. The surge in classes of agents in development combined with the multitude of single and combination therapy options already on the market for asthma, make it imperative that healthcare professionals have a thorough knowledge of the disease state and current and upcoming therapeutic agents. With their access to patients and extensive medication expertise, pharmacists are uniquely capable and well poised to ensure the continuity of care by: (1) educating patients on asthma, their treatment, and their treatment plan, including the purposes and proper use of controller versus reliever medications; (2) highlighting the importance of controller treatment adherence and compliance, including teaching patients proper techniques for use of inhalers; (3) encouraging patients to adhere to their asthma action plan and self-monitor; and (4) helping to reduce exacerbations and overall costs while improving patient access to treatment.

Asthma is a complex airway disorder involving multiple inflammatory cells and cellular elements.² Genetic and environmental factors result in recurrent episodes of the symptoms of asthma: coughing, wheezing, breathlessness, and chest tightness. Left untreated, these initial symptoms can transform into exacerbations ranging from spontaneous reversible airflow obstruction and airway remodeling to death.

Disease Education

The management of asthma focuses on preventing or treating symptoms to reduce disease exacerbations and achieve or maintain asthma control through symptom recognition and treatment and the avoidance of triggers of exacerbation.² Because the progression of asthma is based on triggers, it is important for patients to understand the disease process and identify the allergens that trigger asthma attacks so they can better manage their symptoms through treatment and avoidance.² However, according to a call-back survey by the CDC, only about 77% of adults with asthma were taught what to do during an asthma attack and less than 67% were taught how to recognize the signs and symptoms of asthma (Figure 1²⁰).²⁰

While most adults and children were taught how to use an inhaler (>90%), less than 15% of either group had taken a course on how to manage their asthma.²⁰ Armed with the knowledge about the pathophysiology of asthma, pharmacists can educate patients on

FIGURE 1. Asthma Self-management Education Among Children and Adults With Current Asthma^{20,a}

Source: Asthma Call-Back Survey (ACBS) Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention.

^aThirty-three National Asthma Control Program grantees completed the Asthma Call-Back Survey (ACBS) for adults and 16 National Asthma Control Program grantees completed the ACBS for children.

the importance of early intervention and treatment adherence to help improve their immediate asthma symptoms and ensure the long-term success of their asthma management plan. It is important for patients to realize that by increasing their knowledge and awareness of their disease, they can better manage it and improve their quality of life by reducing the numbers of asthma-related hospitalizations, ED and urgent care visits, asthma-related adverse health effects, and overall healthcare costs.²⁰

Treatment Education

Disease and treatment education are especially valuable to newly diagnosed patients who may be overwhelmed with their diagnosis or for those who are treating themselves with OTC options. According to the CDC, having patients who are educated about their condition is critical to the successful management of asthma. Patient education can aid patients in recognizing the warning signs of asthma attacks or worsening asthma, understanding how and when to properly use their prescribed treatment, and adhering to their asthma plan.²⁰

Pharmacists can be instrumental in treatment by educating patients on their treatment options, the need for early intervention, and proper use of their inhalers and peak flow meters. In return, understanding treatment options can help patients become partners in their own care and will ensure that they make informed decisions with appropriate therapy. Learning the roles of preventive therapy or long-term medications versus those used on an as-needed basis will ensure that patients understand the importance of preventive care and recognize the need for occasional “relief” medications.

Pharmacists can reinforce the instructions of their patients’ doctors on when to take each type of medication, the proper dose, and how to take each.

Instructions on how to take the medications is especially important. In a randomized, noncrossover trial, only 29% (21/72 patients observed) demonstrated competency in their use of an inhaler.²¹ However, of the 4 instructional interventions used to teach proper inhaler technique—reading a metered dose inhaler (MDI) package insert pamphlet, watching a CDC video on MDI technique, watching an online demonstration of MDI technique, or 2 minutes of direct instruction of MDI technique from a pharmacist—direct instruction from a pharmacist was significantly more effective than all the other techniques ($P \leq .03$).²¹

Treatment Adherence

Treatments cannot be effective without patient adherence. Study results have repeatedly dem-

onstrated that adherence to prescribe asthma treatment results in improved clinical outcomes, while lack of adherence is associated with suboptimal asthma control, increased hospitalizations and ED visits, and increased costs.^{16,22-24} Unfortunately, observational studies capturing a broad array of asthma patients have consistently shown medication adherence rates to waver between 30% and 70%.^{16,25-27}

In one study that examined adherence rates among patients newly initiated on asthma controller therapy, adherence rates over 6 to 9 months of observation from pharmacy claims data of 48,571 patients showed that mean adherence to monotherapy on leukotriene receptor antagonists was 67.7%; to inhaled corticosteroids, 33.8%; and to inhaled long-acting beta-agonists, 40.0%. These rates changed based on the addition of another treatment, but remained low. As the duration of time increased, adherence rates fell even more, suggesting a large gap in therapy management.²⁶

Multiple factors predispose patients with asthma to nonadherence. Treatment-related barriers include length and complexity of treatment regimen, polytherapy, cost, access to care, and adverse effects of treatment. Patient-related barriers include lack of understanding regarding disease state and the need for treatment, lack of coordination in administering treatment, low socioeconomic status, low literacy, the rising cost of patient cost-share,²⁸ and language barriers.²⁹⁻³¹ A small focus group of adolescents with asthma mentioned “forgetting” as a major reason for nonadherence.³²

Overcoming a patient’s lack of motivation to adhere to treatment is most critical. Adherence is a learned behavior and can be overcome with education, practice, support, and motivation.¹⁶

TABLE 1. Asthma Triggers²

- Exposure to irritants: tobacco smoke, dust, strong odors, sprays
- Seasonal triggers: pollens or allergens
- Other allergens: dust mites, animal dander, mold
- Air pollution
- Viral respiratory infection
- Physical activity (exercise)
- Cold air
- Medications, including aspirin or some eye drops

TABLE 2. Signs of Uncontrolled Asthma^{2,33}

- Waking up at night because of symptoms
- Increased use of quick-relief/rescue medication
- Increased shortness of breath, episodes of wheezing or coughing
- Not taking long-term medication as prescribed
- Treatment response is slowing down
- Poor tolerance to physical activity
- Increased days of missed school or work because of asthma symptoms
- A visit to an emergency department or hospitalization for asthma
- Not achieving an acceptable peak flow

Because pharmacists have the unique opportunity to communicate with both physicians and patients, they can determine patient understanding, ensure proper device technique, and collaborate with physicians to monitor patients for treatment adjustments. They can also offer feedback to prescribers in cases where patients seem to be nonadherent with their treatment or where they see gaps in the physician’s assessment. Pharmacists can evaluate treatment adherence when a patient picks up their medication by reviewing their asthma action plan with them or assessing asthma control. They can also use the opportunity to educate the patient on the need to comply with their doctor’s instructions on how and when to use the medication and to answer any questions the patient may have. Pharmacists can play a key role in helping patients who require monitoring and encouragement in dealing with their symptoms through education, dialog, and open communication.

Patient Self-monitoring

Patient education should focus on understanding asthma and its therapies. Understanding asthma entails education that focuses on the mechanisms of the disease, its triggers (Table 1), and the signs and symptoms of asthma, worsening asthma (Table 2), and exacerbations. Worsening control of asthma can be avoided with medication adjustment, improved medication administration technique, or adjustments to a patient’s individualized asthma action plan.^{2,33} According to the NAEPP, asthma self-management education is essential to reducing asthma-related adverse health effects.¹⁵ It is recommended that healthcare professionals provide asthma self-management education to all patients with asthma and their families or caregivers.¹⁵

The asthma action plan is a vital component of self-management. Unfortunately, according to the CDC, only 49% of children and 27% of adults were given an asthma action plan by their physician.²⁰ The NAEPP recommends the development of an asthma action plan in partnership with the patient, even if the patient is a child.² The NAEPP and the CDC recommend that patients with asthma, especially those with more severe or poorly controlled asthma and those with a history of severe exacerbations, receive a written asthma action plan and the education and instructions needed to manage

their asthma on a daily basis, recognize the signs and symptoms of worsening asthma, and treat worsening asthma symptoms and exacerbations.^{2,20} Students should be encouraged to take a copy of their plan to school and any afterschool activities. Patients and clinicians should update the action plan at every visit as part of the NAEPP’s suggested “Four Components of Care.” Regular updates can help incorporate changes in lifestyle or disease severity. With periodic monitoring, open communication, and guidance from their doctor and pharmacist, a patient can use their asthma action plan to handle mild episodes and prevent serious episodes, ED visits, and hospitalizations.

To help patients effectively monitor their asthma and the effectiveness of treatment, it is important to educate them on the appropriate use of a peak flow meter. However, a survey by the CDC showed that less than half of people with asthma (45% adults, 37% children) were taught how to use a peak flow meter by their doctor.²⁰ Regular home monitoring with a peak flow meter is critical in helping patients detect worsening disease in the absence of obvious symptoms.³³ Because peak flow meters are available without a prescription, pharmacists can help by educating patients on the need for monitoring, how to appropriately use the peak flow meter and record values, and what those values mean.

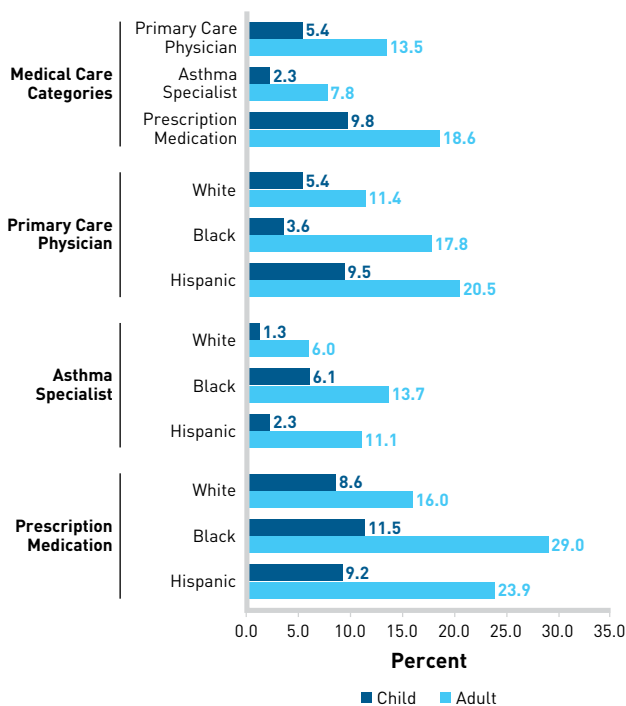
Cost-efficiency

Cost is an obstacle to obtaining primary and continuing care services for asthma. As such, primary and continuing care barriers contribute to an increase in ED visits and hospitalizations.²⁰ According to the CDC, cost is an important barrier to receiving care through a primary care physician or an asthma specialist and to purchasing prescription asthma medication.²⁰ This is especially true for adults with asthma and for Hispanic and black adults in the United States (Figure 2).²⁰

There are several ways in which pharmacists can help patients spend healthcare resources wisely, including:

- Assisting patients in finding co-pay programs or manufacturer-sponsored discount programs;
- Ensuring treatment adherence to limit the costs of exacerbations and worsening disease severity;

FIGURE 2. Cost Barriers to Medical Care^{20,a,b}



Source: Asthma Call-Back Survey (ACBS) Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention.
 *White and black categories are non-Hispanic.
 †Thirty-three National Asthma Control Program grantees completed the Asthma Call-Back Survey (ACBS) for adults and 16 National Asthma Control Program grantees completed the ACBS for children.

- Assisting patients in obtaining prior authorization in a timely manner;
- Helping develop value-based formulary programs through their managed care organization (MCO);
- Educating on proper inhaler and peak flow meter usage to avoid unscheduled physician and ED visits; and
- Limiting the use of biologic agents to appropriate patients.

The cost of treatment increases as newer, safer, and more effective therapies emerge. Biologics and other novel medications for asthma come with significant cost increases. Because cost is a significant barrier to treatment, guidelines are needed to potentially curtail the use of newer and expensive treatment options, limiting their use based on individual patient need. Ensuring access to the medication, however, is critical for chronic conditions such as asthma, but treatment response should be revisited to ensure that the resources required for costly medications are being used wisely.

Specialized Care for Specialized Needs

One way to ensure cost-effective utilization of treatment options is to understand individualized patient needs and focus on the most

FIGURE 3. Percentage of Adults with Uncontrolled Asthma³⁴

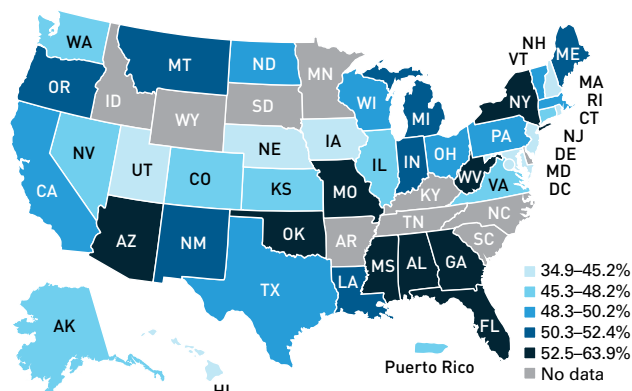
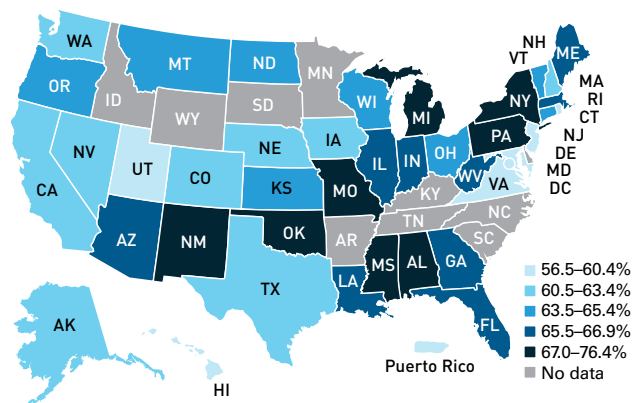


FIGURE 4. Percentage of Adults with Persistent Severity³⁵



important areas. For example, despite the arsenal of therapeutic options for asthma and guideline recommendations that encourage use of a step-wise approach to treatment, uncontrolled asthma (not well-controlled or very poorly controlled) remains a significant burden on patients and the healthcare system through functional limitations, work and school absenteeism, and increased utilization of healthcare resources.^{2,34} Between 2006 and 2010, an average of 50% of adults in the United States with asthma had uncontrolled asthma, with a range of 34.9% in Washington, DC, to 63.9% in Alabama (Figure 3³⁴).³⁴ The prevalence of asthma of persistent severity, which includes individuals who are on long-term control medications and people with uncontrolled asthma who are not on long-term control medications, averages nearly 65% among adults with asthma in the United States, ranging from 56.5% in Utah to 76.4% in Alabama (Figure 4³⁵).³⁵

Encouraging patients to seek out treatment or a referral to an asthma specialist has been shown to result in greater physical functioning, symptom control, and cost savings, along with reduced acute care visits and hospitalizations.^{36,37} The NAEPP specifically recommends that patients with asthma who are poorly controlled by standard treatment should consult an asthma specialist for more

appropriate medication adjustments.² According to the American College of Allergy, Asthma & Immunology, patients with asthma who are under the care of an allergist tend to experience better outcomes at a lower cost.³⁸ Allergists can help reduce costs through simple home assessment and case management³⁹; specialized treatment care, such as the use of immunotherapy; or emerging therapeutic options, such as bronchial thermoplasty.⁴⁰

Bronchial thermoplasty is an expensive, interventional bronchoscopic procedure for the treatment of severe uncontrolled asthma.⁴¹ It requires the expertise of an experienced bronchoscopist in a setting equipped with appropriate clinical monitoring and access to care in the event of potential postintervention complications.⁴² However, in patients at high risk of exacerbations, treatment with bronchial thermoplasty was considered to be cost-effective at 10 years, at \$29,821 per quality-adjusted life-year gained.⁴¹

Information on newer specialized agents is limited, and most estimates suggest that these therapies are not affordable.^{40,43,44} A systemic literature review showed that while treatment with omalizumab may be associated with higher costs, in a specialized patient population—patients with persistent uncontrolled allergic asthma—treatment with omalizumab was associated with significant improvements in quality of life and withdrawal from inhaled corticosteroid therapy, without an increase in treatment-associated adverse events.⁴⁴ However, the cost-effectiveness of omalizumab varied across studies, with severity and risk of exacerbations as key criteria in determining monetary success.⁴⁴⁻⁴⁷

Two recent approvals have expanded the armamentarium for some patients. Reslizumab, an anti-interleukin-5 monoclonal antibody, was approved in March 2016 as an add-on maintenance treatment for patients with severe asthma with an eosinophilic phenotype.⁴⁸ The approval was based on data from 4 double-blind, randomized, placebo-controlled trials demonstrating the safety and efficacy of monthly intravenous infusions with reslizumab. Patients taking reslizumab had fewer asthma attacks, a longer time to the first attack, and a significant improvement in lung function compared with placebo. Adverse events of note included oropharyngeal pain, malignancy, and potentially life-threatening anaphylaxis.⁴⁸

Mepolizumab, also an anti-interleukin-5 monoclonal antibody, was approved with a similar indication in November 2015. The most common adverse events reported in association with mepolizumab use included headache, injection site reactions, back pain, and fatigue.⁴⁹ The use of mepolizumab has been hindered by high costs and relatively unfavorable cost-effectiveness.^{43,50}

Hopefully, future studies may help narrow the selection of a responder phenotype so that appropriate patients can have greater access to these promising treatment options. Roflumilast, a selective phosphodiesterase-4 inhibitor, has demonstrated cost-effectiveness through a reduction in exacerbations and healthcare usage in patients with chronic obstructive pulmonary disease.

Similar studies in patients with asthma are ongoing, but results have yet to be published.⁵¹

Co-pays and Patient Assistance Programs

An effective strategy to overcoming cost as a barrier to treatment includes decreasing co-pays, which has been shown to enhance adherence.⁵² Large corporations, such as Marriott, Procter & Gamble, Eastman Chemical, and Pitney Bowes, have introduced programs that reduced or eliminated co-pays for generic and branded drugs for chronic conditions such as diabetes, asthma, and heart disease. The result was a significant offset in the cost of the program, with substantial savings in the treatment of worsening disease. Pitney Bowes saved \$1 million in cost offsets in 1 year by reducing the cost of branded and generic drugs for diabetes and asthma treatments to a 10% co-insurance level.⁵²

Managed care pharmacists can help organizations understand patient barriers and develop strategies to remove those barriers. Pharmacists can also help patients find assistance programs sponsored by drug manufacturers and assist them with prior authorization to maximize their cost savings. Prior authorizations are usually needed for treatments that are not on an MCO's formulary. The cost of these authorizations is estimated at \$20 to \$25 per request for the MCO.⁵³

The results of 1 study showed that on the physician side, nurses in a specialty practice spent an average of 17 minutes per call and made 5.6 calls per day for prior authorizations⁵³ compared with physicians who spent an average of 5.8 minutes per call and made 1.9 calls per day. Total time spent over the 8-week study period was more than 40 hours on 231 phone calls by nurses and just 8 hours on 154 calls by physicians. Although more than 98% of the prior authorizations were approved the first time they were processed, it cost the specialty practice \$17.77 per authorization. As such, MCOs should consider factoring outcomes such as quality of life, the number of urgent interventions, and the number of respiratory infections into a prior authorization decision, especially for specialists. This would remove a significant impediment to care for the patient and help reduce the overall cost of asthma for the healthcare system.

Strategies for Managed Care Organizations

MCOs balance the allocation of resources to patient care while controlling costs.⁵⁴ They do so by developing a cost-effective formulary and implementing management strategies based on quality measures, such as the Healthcare Effectiveness Data and Information Set. These measures and drug value (monetary value and value to patient care) are taken into consideration when pharmacy teams in the managed care setting develop utilization management strategies to address pharmacy costs.⁵⁴

Disease state management programs implemented by MCOs need to ensure that multiple departments and healthcare professionals

work together to achieve the common goal of providing value-based care for patients. The role of pharmacists in this program is to monitor the organization's annual drug spending, track patient adherence, utilize claims data, and keep up-to-date on therapeutic advancements. Working with the medical team, pharmacists can help develop formulary options that lead to accomplishing this goal, ensure cost-effective options for patients, and identify patients who are underutilizing resources disproportionately or inappropriately, all to implement strategies that can help these patients manage their asthma more effectively.^{54,55} This includes ensuring that healthcare professionals, physicians, and pharmacists understand how to define uncontrolled asthma, are in alignment on the diagnostic criteria of asthma and its severity levels, and have the knowledge needed to escalate and step down treatment based on the step-wise approach to treatment recommended by most guidelines.⁵⁶ Ensuring that patients are treated appropriately can help control asthma, which will help curtail costs related to the burden of this condition.

Conclusion

Despite abundant scientific and practical knowledge and improved therapeutic options, asthma still causes significant morbidity and mortality at a high cost to society. Effective asthma management requires an all-inclusive approach to treatment in which patients engage with healthcare professionals to follow an evidence-based approach to diagnosis, treatment, and long-term monitoring. Doing so requires that patients are educated about their disease state, treatment options, prevention of disease progression, and patient self-management.

For patients with asthma, self-management includes the use of an asthma action plan. As part of the healthcare team, pharmacists can help improve the pharmacologic management of asthma by educating patients on the need for treatment, helping them understand the complexities of asthma, monitoring their progress and adherence to treatment, and curtailing costs for patients and payers. Introducing strategies to address these unmet needs can help improve patient outcomes, manage the needs of individual patients, align patient access, and introduce novel therapies into established formularies when needed. ■

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