

# Asthma Management and the Allergist

Better Outcomes  
at Lower Cost

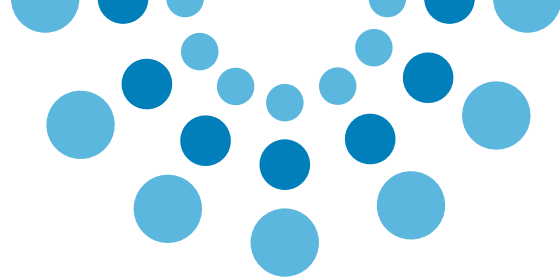


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## Table of Contents

- 4** Summary
- 5** Scope and Impact of the Asthma Epidemic
- 6** Aggressive Asthma Management: The Standard of Care
  - Compliance with guidelines remains poor
- 8** When to Refer to an Allergist
- 9** Asthma Treatment Outcomes with Specialist Care
  - Improvement in diagnosis and prevention of misdiagnosis
  - Improvement in asthma control
  - Diagnosis of comorbid conditions
  - Improvement in adherence to medications and other therapies
- 13** Use of Health Care Resources and Asthma Treatment Costs with Specialist Care
  - Hospitalizations
  - Emergency department visits
  - Missed days from work or school
  - Patient satisfaction and quality of life
- 15** How Allergists Achieve High-Quality, Cost-Effective Outcomes
  - Accurately diagnose the disease, its types, subtypes and severity
  - Identify the role of external factors
  - Administer immunotherapy
  - Use current best practice standards to develop and implement treatment plans
  - Maintain control through a multi-faceted approach
  - Prevent serious consequences of asthma
- 16** New Perspectives on Asthma: Advances and Challenges
  - New therapies
  - Broadening the role of the allergist
- 17** Asthma Specialty Care in Health Plans
- 17** Conclusion
- 18** References



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## Summary

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### Asthma patients under the care of an allergist consistently experience better outcomes at lower cost because of:

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Fewer emergency care visits.

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Fewer hospitalizations.

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Fewer days in the hospital.

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Fewer sick care office visits.

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Fewer days missed from work or school.

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Increased productivity in their work and personal lives.

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Greater satisfaction with their care.

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Improved quality of life (QoL).

● It's been nearly two decades since the U.S. Department of Health and Human Services declared asthma an epidemic. It made the disease a priority of its Healthy People objectives in a call for *Action Against Asthma*, a strategic plan to tackle the growing public health threat of asthma. [1] At about the same time, the Centers for Disease Control and Prevention (CDC) created the National Asthma Control Program (NACP) [2] and asthma management increasingly became a model for new strategies in managed care. Before 1999, there was limited knowledge and understanding about asthma control and the interventions and treatments that worked. Since then, there is increased awareness about this complex disease and numerous initiatives designed to address, analyze and control asthma in the United States and around the world.

Yet despite these efforts and significant scientific advances in the diagnosis, treatment and overall management of asthma, prevalence of the disease has increased over the years and asthma control remains a problem. One study found that 50% of adults and nearly 38.4% of children had uncontrolled asthma. [3]

- Asthma is among the most common chronic diseases among children and adults.
- The disease continues to be a major source of global economic burden in terms of both direct and indirect costs, including \$82 billion annually in the U.S. [4] An estimated 80% of costs are the result of asthma that is poorly controlled. [5]
- Because asthma cannot be cured, efforts to reduce costs should focus on better disease control, including improving access to care and better adherence to evidence-based therapies that can significantly reduce the economic burden. [6]

When managed aggressively by a specialist, asthma does not have to be a life-threatening or disabling disease. The condition can be controlled so that acute asthma exacerbations are avoided in most patients.

Curbing the asthma epidemic, preventing needless suffering and premature deaths and controlling runaway costs of treating the disease continue to be priorities for the nation's allergists and health care policymakers. Most other developed and developing countries also have policies that address this major, but manageable, worldwide health problem. [6]

As asthma specialists, allergists have consistently led the way in advancing asthma management and demonstrating in practice that they provide high-quality, cost-effective asthma care. The allergist also is in a unique position to convey important information to the medical community about factors that influence the course of asthma, methods to assess levels of control and new targets for intervention. By enhancing communication among patients, parents, primary care physicians and specialists within provider systems, the allergist provides timely information that can help to reduce asthma morbidity and mortality. [7]



### **Asthma patients under the care of an allergist consistently experience better outcomes at lower cost because of:**

- Fewer emergency care visits.
- Fewer hospitalizations.
- Fewer days in the hospital.
- Fewer sick care office visits.
- Fewer days missed from work or school.
- Increased productivity in their work and personal lives.
- Greater satisfaction with their care.
- Improved quality of life (QoL).

This report reviews the current state of asthma care, its economic and societal consequences and widely accepted standards of care. It also presents numerous studies – many of them conducted by managed health care plans – that document the superior outcomes of allergist-provided care. While all asthma patients do not require specialty care, the data support that referral to an allergist for patients whose disease is poorly controlled will benefit patients, commercial health plans, Medicare and Medicaid.

## Scope and Impact of the Asthma Epidemic

### Asthma in America

Affects 25.2 million people, including 6.1 million children

Costs society \$82 billion

9.8 million physician office and hospital outpatient department visits

1.8 million emergency department (ED) visits

189,000 hospitalizations, including 80,000 for children 17 and under

14.2 million lost work days

10.5 million lost school days

Sources: Centers for Disease Control and Prevention; Nurmagambetov, et al. *J Asthma*. 2017; Akinbami, et al. *NatlHealthStatReport*. 2011.

- Nearly 340 million people worldwide, or 4.3% of the global population, including 14% of children, have asthma. Rates are on the rise globally, with a 3.6% increase in age-standardized prevalence from 2006 to 2016. [6] In 2017, the CDC estimated that 25.2 million people, or 7.9% of the United States population, had asthma, of which 6.1 million were under the age of 18. [8]

Asthma prevalence in the U.S. is higher in children (8.4%) than in adults (7.7%) and higher in females (9.3%) than males (6.4%). The disease disproportionately affects blacks (10.1%) compared to whites (8.1%) and is most prevalent among persons with a family income below 100% of the federal poverty threshold (11.7%). [8]

In 2013, the total annual per-person medical cost of asthma in the United States was \$3,266, comprising expenditures for prescription medications of \$1,830; office-based visits, \$640; hospital-based outpatient visits, \$176; ER visits, \$105; and inpatient hospital admissions, \$529. From 2008 to 2013, the disease was responsible for \$50.3 billion in medical costs; \$3 billion in losses from missed work and school days per year; and \$29 billion in asthma-related mortality (representing on average 3,168 deaths) for a total of \$82 billion in costs to society. [4] Costs vary substantially from state-to-state, ranging from \$60.7 million annually in Wyoming to \$3.4 billion in California. [9]

Much of the expense of asthma is attributed to costs that can be avoided or reduced when the disease is controlled. The most recently published data show that, annually, asthma accounts for:

- 9.8 million physician office and hospital outpatient department visits. [8]
- 1.8 million emergency department (ED) visits. [8]
- 189,000 hospitalizations, including 80,000 for children 17 and under. [8]
- 14.2 million lost work days. [10]
- 10.5 million lost school days. [10]

## Aggressive Asthma Management: The Standard of Care

● In response to the alarming increase in the prevalence and cost of asthma, an expert panel was convened in 1991 by the National Heart, Lung and Blood Institute (NHLBI) to develop the first consensus guidelines for the care of asthma patients; the most recent update was published in 2007. [11] In 1993, the NHLBI partnered with the World Health Organization to form the Global Initiative on Asthma (GINA) to outline a global strategy for managing and preventing asthma. GINA guidelines were updated in 2019. [12]

Until the first guidelines were developed, it was the consensus of most physicians that asthma therapy should be conservative, and medications introduced one at a time, with dosage increased only when the condition worsened. But evidence-based medicine has proven otherwise. Current guidelines stipulate that asthma should be diagnosed as early as possible and treated aggressively while it is still mild. Otherwise it may worsen, requiring even more expensive medical interventions and, in some cases, cause permanent scarring and irreversible remodeling of the lungs' airways. [11]

Asthma cannot be cured, but it can be controlled. When guidelines are followed, people with asthma should expect:

- No or few asthma symptoms, even at night or after exercise.
- Prevention of all or most asthma exacerbations.
- Participation in all activities, including exercise.
- No emergency room visits or hospital stays.
- Less need for quick-relief medicines.
- No or few side effects from asthma medicines.

Allergists, with their understanding of the complexities of asthma, and extensive training and experience using these medications, can prescribe them according to the severity of asthma diagnosed and other needs of the individual patient.

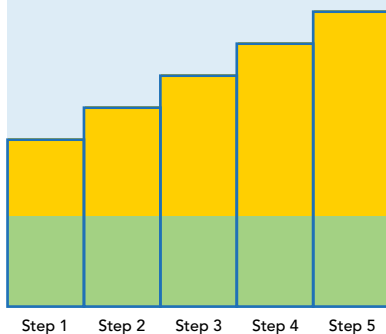
Aggressive step-up therapy should be initiated at the onset to establish immediate control of symptoms. The therapy then may be stepped down as the patient's condition improves. An allergy history, physical exam and allergy skin tests may be needed to identify factors triggering asthma exacerbations. The aggressive therapy recommended in the NHLBI and GINA guidelines also includes ongoing and frequent assessment by medical personnel to monitor the disease, development of written treatment plans, adjustments to therapy as needed, education and support services.

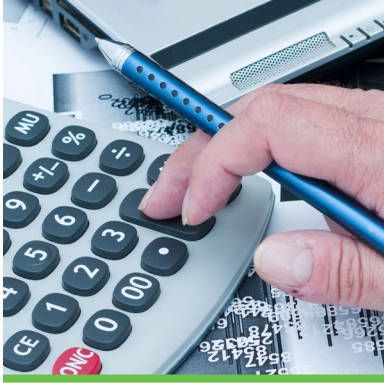
While the NHLBI and GINA guidelines outline how to control asthma, many patients still experience severe symptoms that can affect their QoL. Tools are available to help patients manage the short-term, day-to-day variability of their symptoms, but the guidelines do not always clearly indicate how they should be implemented.

To address this shortcoming, in 2017, allergists and other specialists developed the [Asthma Yardstick](#), a practical tool that helps health care professionals understand how to identify when adults and children with asthma need to step-up their treatments and what the process might involve. In 2018, they issued the [Pediatric Asthma Yardstick](#) to address differences in step-up therapy for children in different age groups. In 2019, [The Asthma Controller Step-down Yardstick](#) was published to provide clinicians with a practical and clinically relevant framework to determine when and how to implement a step-down in therapy. [13-16]

### Allergists develop tools for guideline implementation

The Asthma Yardsticks serve as an "operation manual" to help health care professionals understand how to identify when adults and children need to step up or step down their treatment and what the process might involve.





Every dollar spent on asthma control programs can save \$71 in health care expenses by shifting care from costly hospital/emergency department settings to doctor offices and outpatient clinics.

Source: National Asthma Control Program: An Investment in America's Health. Centers for Disease Control and Prevention. 2013.

Despite the availability of these practice guidelines and tools, asthma continues to be the leading cause of hospital admissions for pediatric patients in the U.S. One study concluded that there is strong evidence-based data that show it is asthma specialty care programs-and not guidelines disseminated to generalists-that are most effective in positively altering the outcome of asthma, especially in patients with severe disease. [17] Specialists are more likely to know the complexities of the disease, be able to identify asthma phenotypes (the unique characteristics that predispose individuals to asthma and are predictive of the nature and severity of the disease) and deliver care tailored to each patient. [18]

Although the costs of the initial therapy may be higher, these measures have been shown to control the disease over the long term and prevent or significantly decrease the frequency of acute asthma exacerbations and the high costs of emergency room care, hospitalization, frequent physician interventions and time lost from work, school or other activities. Studies show significant long-term health benefits and cost savings outweigh initial costs.

For example, a study of children and youth with asthma participating in the Pennsylvania Medical Home Initiative concluded that large-scale implementation of care coordination and management of specialist referrals for children/youth with asthma yields improvements in health care utilization, expenditures and QoL. [19]

### Compliance with guidelines remains poor

Unfortunately, nearly 30 years after publication of the first NHLBI guidelines, a majority of today's patients continue to receive substandard care. Too often asthma patients receive health care services from providers who have little specialized training or knowledge of recent advances in asthma disease management and many outdated approaches to asthma treatment are still practiced.

An analysis of Medical Expenditure Panel Surveys of more than 100,000 people concluded that improvement of asthma control continues to be a U.S. public health concern. Results suggest suboptimal asthma control with underuse of long-term control medications, overuse of quick-relief inhalers and a significant number of self-reported asthma exacerbations. [20]

United States specific data from the Global Asthma Physician and Patient (GAPP) survey also found a lack of asthma control, poor adherence to therapy and room for improvement in patient/physician communication and partnership in treating asthma. Among adults surveyed, 64% were being treated by a primary care provider, 15% by specialists and 21% were not being treated by any physician or health care professional. [21]

A 14-center medical record review studied 385 children aged 2 to 17 years hospitalized for asthma exacerbations during 2012-2013. Of these, one-third were admitted to the Intensive Care Unit (ICU). Risk factors for ICU admission were females, having public insurance, a marker of chronic asthma severity (inhaled corticosteroid use), and no prior evaluation by an asthma specialist. Among these children, guideline-recommended outpatient management was suboptimal and 62% were referred to an asthma specialist during the three-month period after their hospitalization. [22]

## When to Refer to an Allergist



  
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- **The GINA guidelines [12] recommend referral to a specialist for:**
  - Difficulty in confirming the diagnosis of asthma.
  - Suspected occupational asthma.
  - Persistent uncontrolled asthma or frequent exacerbations.
  - Any risk factor for asthma-related death.
  - Evidence of, or risk of, significant treatment side effects.
  - Symptoms suggesting complications or sub-types of asthma.
- **Additional reasons for referral in children 6-11 years of age are:**
  - Doubts about the diagnosis of asthma (e.g., symptoms are not responding well to treatment).
  - Symptoms or exacerbations remain uncontrolled despite moderate dose inhaled corticosteroid with correct inhaler technique and good adherence.
  - Suspected side effects of treatment, such as growth delay.
  - Asthma combined with confirmed food allergy in children.
- **The NHLBI guidelines [11] recommend referral to a specialist for patients who:**
  - Have asthma symptoms every day and often at night that cause them to limit their activities.
  - Have had a life-threatening asthma exacerbation.
  - Do not meet the goals of asthma treatment after three to six months, or their doctor believes they are not responding to current treatment.
  - Have symptoms that are unusual or hard to diagnose.
  - Have co-existing conditions such as severe allergic rhinitis ("hay fever") or sinusitis that complicate asthma or its diagnosis.
  - Need more tests to find out more about their asthma and the causes of symptoms.
  - Need more help and instruction on treatment plans, medicines or asthma triggers.
  - Are being considered for allergy shots, or immunotherapy, which also can be administered orally.
  - Need oral corticosteroid therapy or high-dose inhaled corticosteroids.
  - Have taken oral corticosteroids more than twice in one year.
  - Have been admitted to a hospital because of asthma.
  - Need to identify asthma triggers.
  - Require confirmation of occupational or environmental substances that may be provoking or contributing to asthma.





An asthma specialist also is recommended for children ages 0-4 who have asthma symptoms every day and three to four nights or more a month. Seeing a specialist also should be considered for older children who have symptoms three days or more a week and one to two nights a month.

The GINA and NHLBI guidelines for referral to an asthma specialist are in general accord with recommendations of the American College of Allergy, Asthma and Immunology (ACAAI) and the American Academy of Allergy, Asthma and Immunology (AAAAI), and are endorsed by the Section of Allergy-Immunology of the American Academy of Pediatrics (AAP). The recommendations of these professional medical societies further state that referral to a specialist is indicated when:

- The diagnosis of asthma is in doubt.
- The patient asks for a consultation.

Despite this consensus of experts, the referral pattern of general practice and primary care physicians is frequently not in accord with guidelines due to lack of awareness or nonadherence. [23] A survey of 407 pediatricians and family physicians found that their criteria for referral to an asthma specialist did not conform to the NHLBI guidelines. [24] A study of primary care physicians found that the likelihood of appropriate referral depended on whether the physician had taken a rotation in allergy/immunology during training. Among those who had some training in allergic diseases such as asthma, nearly 78% had referred patients to an allergist, compared with 46% who were less educated about allergic conditions. [25]

## Asthma Treatment Outcomes with Specialist Care

A large survey of national health care data identified two major trends inconsistent with asthma best practices:

Overuse of rescue medications (up to 60%).

Underuse of preventive medicine (70%).

Both are strongly associated with poor disease control, risk for an "asthma attack" and high treatment costs.

Source: Slejko, et al. JACI. 2014.

### ● It is well-documented that asthma care delivered under the supervision of an allergist results in improved outcomes and more cost-effective use of health care resources.

With their years of specialty training and clinical experience in asthma management, allergists are more likely than nonspecialists to:

- Have access to the diagnostic tools that are often essential to assess the unique characteristics that may play a role in confirming the diagnosis, type and severity of asthma in individual patients.
- Manage asthma based on the latest clinical study findings.
- Identify and implement procedures to reduce allergy triggers for the disease.
- Follow consensus guidelines and state-of-the-art treatment plans that improve outcomes.
- Have expertise in the use and management of the latest techniques for addressing patients with severe asthma who have not responded to standard treatments, including:
  - **Biologics.** These agents are genetically engineered proteins that control asthma symptoms by targeting the underlying cellular and mediator changes that cause asthma. GINA guidelines [12] recommend referral to a specialist for consideration of biologics and other add-on treatments for patients who continue to have poor symptom control or exacerbations despite adherence to standard treatment regimens.



## Asthma and Allergies

Allergen immunotherapy is distinguished from symptomatic drug treatments by its unique potential to alter the course of allergic disease and thereby mitigate progression to asthma.

Source: Hankin et al. *Ann Allergy Asthma Immunol.* 2010

- **Allergen-specific immunotherapy.** This treatment is an option when allergy plays a prominent role in a patient's asthma. The technique exposes patients to progressively higher doses of allergens over time to induce desensitization or tolerance to the allergen. The allergen may be administered by injection (subcutaneous immunotherapy) or orally (sublingual immunotherapy). According to current guidelines [11,12], allergy immunotherapy is indicated for people with allergic asthma who:
  - Have symptoms that are not adequately relieved by asthma medications.
  - Are unable to avoid the allergens that trigger their disease.
  - Have unacceptable side effects from asthma medications.
  - Have not responded well to asthma medications or need to avoid long-term medication use.

### Improvement in diagnosis and prevention of misdiagnosis

The best strategy for diagnosing asthma often remains unclear and can be complicated by the lack of appropriate diagnostic tools in the primary care setting. Referrals to specialists are a key component of asthma diagnosis and management and can add additional phenotyping, therapeutic and diagnostic strategies. [26] Confirmation of asthma diagnosis is important to avoid unnecessary treatments, prevent misdiagnosis and avoid missing other important diagnoses with symptoms that may be mistaken for asthma.

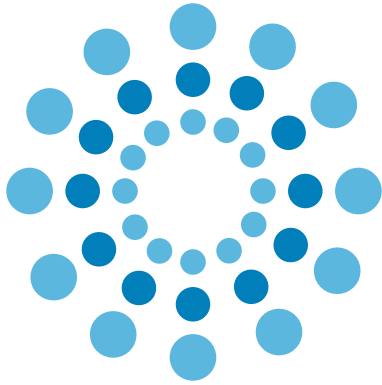
- In a study of more than 600 adults with an asthma diagnosis in the last five years, a diagnosis of asthma was ruled out in 33% after repeated testing over 12 months and staged withdrawal of asthma control treatments. Twelve patients (2%) had serious cardiorespiratory conditions that had been misdiagnosed as asthma. An asthma diagnosis was less likely to be confirmed in patients who had not had lung function testing performed at the time of diagnosis, as recommended by guidelines. [27]
- A comparative evaluation of 301 U.S. worker's compensation claimants with work-related asthma found that only 36.9% of the workers were treated by specialists and fewer than half received an objective evaluation of pulmonary function. Those treated by specialists were significantly more likely to have received appropriate diagnostic testing (82.9%) compared to those treated by generalists (20%). [28]
- International studies also have found a significant number of asthma cases often are improperly diagnosed. [29-32]

### Improvement in asthma control

The costs of asthma are largely due to uncontrolled disease and are likely to increase as prevalence and severity increase. It's been estimated that 80% of all resources expended for asthma treatment are spent on 20% of patients whose disease is not controlled. [5]

The consequences of poor asthma control include direct costs, such as emergency room use and hospitalizations and indirect costs, such as time off work or school.

Numerous studies show that asthma management by allergists results in improved disease control.



- A survey of nearly 2,000 patients enrolled in 12 U.S. managed care organizations analyzed the relationship between physician specialty and treatment outcomes, using indicators from the NHLBI guidelines as outcome measures. Asthma care provided by specialists was consistently associated with better patient outcomes across a range of relevant indicators compared to care provided by generalists, including fewer hospitalizations and emergency room visits, higher ratings for the quality of care, fewer restrictions in activities and improved physical function. [33]
- One multicenter study of 369 children and 555 adults hospitalized for asthma exacerbations at 25 hospitals across 18 U.S. states found that guideline-recommended management of the disease was suboptimal. For example, among adult patients with frequent hospitalizations only 25% had undergone a previous evaluation by an asthma specialist. Of those with frequent hospitalizations, 64% were not referred to an asthma specialist post-discharge. [34]
- A survey conducted among 1,412 primary care clinicians and 233 asthma specialists found that specialists expressed stronger agreement, higher self-efficacy and greater adherence with guideline recommendations than did primary care clinicians. [35]
- A large university hospital studied children 0 to 18 years old who were discharged with a diagnosis of asthma from 2009 to 2013 to determine the effects of a post-discharge referral to an asthma specialist. Patients who adhered to the recommendation for specialist follow-up had significantly fewer subsequent visits to the pediatric intensive care unit, days in the ICU and days in the hospital. Phone interviews with parents showed that patients most commonly missed follow-up because the parents believed it unnecessary since their child showed acute improvement, or on the advice of their primary care physician. [36]
- In a random sample of 3,568 patients with persistent asthma enrolled in a managed care plan, patients who were treated by asthma specialists reported significantly higher general physical and asthma-specific QoL, less asthma control problems, less severe symptoms, higher satisfaction with care and greater self-management knowledge compared with patients followed by primary care physicians. Patients of allergists were less likely to be hospitalized, have unscheduled visits for asthma care or to overuse beta-agonist medications. [37]
- The population density of specialists also may affect asthma control and outcomes when access to care is limited. A Canadian study compared outcomes in two Canadian provinces with similarly sized pediatric populations but substantially different physician densities. Manitoba, which has 48.6 pediatricians and 3.1 pediatric asthma specialists/100,000 children population, had significantly fewer pediatric hospital admissions for asthma than Saskatchewan, which has only 23.5 pediatricians and 1.4 pediatric asthma specialists/100,000. [38]

### Diagnosis of comorbid conditions

- Comorbid conditions are a common occurrence in patients with asthma and can significantly affect the diagnosis and management of the disease. GINA and NHLBI [11,12] guidelines highlight that patients with conditions such as



severe rhinitis, sinusitis, nasal polyps, aspergillosis, vocal cord dysfunction, gastroesophageal reflux disease (GERD), chronic obstructive pulmonary disease (COPD), obstructive sleep apnea and dysfunctional breathing should be referred to a specialist. These conditions not only affect how asthma is treated, they also may act as triggers that exacerbate asthma and make the disease more difficult to treat. Data from The Epidemiology and Natural History of Asthma: Outcomes and Treatment Regimens (TENOR), a three-year observational study of patients aged 6 to 12 years with severe/difficult-to-treat asthma, were used to test for differences in quality-of-life scores at month 12 across exacerbation severity, total number of asthma exacerbations and number of baseline asthma triggers, which are often caused by comorbid conditions. A higher number of asthma triggers at baseline was associated with greater asthma severity, number of asthma exacerbations and lower QoL. [39]

- Rhinitis, a reaction that occurs when airborne allergens are inhaled through the nose, is a common trigger for asthma. The link between allergic rhinitis and asthma was substantiated in a retrospective cohort study in the United Kingdom, which found that, among asthmatic patients who had skin-prick tests, there was evidence for atopy in 52%. [32]
- Additional studies corroborate the high frequency of allergic sensitization in asthmatic patients, including a follow-up study in Finland, in which persistent or allergic rhinitis was reported by 76 percent of patients. The study also found that the presence of chronic allergic or persistent rhinitis was predictive of uncontrolled asthma at 12-year follow-up; [40] another study found that evaluation at an allergy, asthma and immunology clinic improved control of chronic rhinosinusitis, improved asthma control and QoL [41].
- Indoor environmental exposures, particularly allergens and pollutants, are major contributors to asthma morbidity in children, and environmental control practices to reduce these exposures are an integral component of asthma management. Some individually tailored environmental control practices that have been shown to reduce asthma symptoms and exacerbations are similar in efficacy and cost to controller medications. [42]

### **Improvement in adherence to medications and other therapies**

Strategies to improve access and adherence to evidence-based therapies can be effective in reducing the economic burden of asthma. Studies have demonstrated that adherence is improved when asthma specialists are involved.

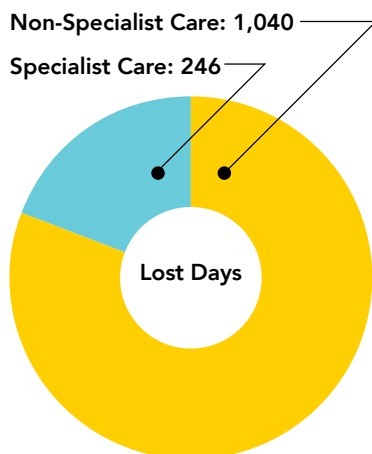
- A retrospective study found that pediatricians were less likely to prescribe inhaled corticosteroids than pediatric allergists. There also was greater improvement in FEV1 (the maximum amount of air that can be forcefully exhaled in one second) among children who received care with pediatric allergists than those seen by pediatricians and pediatric respirologists. [43]
- A systematic review of the literature characterized behavioral interventions at the child, family, home, medical system and community level improves asthma management among adolescents. The U.S. researchers compared populations, intervention characteristics and levels, study designs, outcomes and settings across studies to evaluate behavioral interventions

to improve asthma management for adolescents. They concluded that effective strategies to objectively increase controller medication adherence for adolescents include allergist and/or immunologist feedback and school nurse directly observed therapy. [44]

- The ratio of controller medication to total asthma medications was analyzed for 38,000 individuals with persistent asthma. Standardized performance measures indicate higher ratios (an indicator of adherence) were seen in patients who were treated by asthma specialists. The authors concluded that provider knowledge and communication skills influence adherence to asthma treatment, and specialist providers may be better at communicating complex regimens to their patients. [45] Recent studies in British Columbia [46] and Japan [47] also found an association between adherence to medication among patients treated by specialists compared to those treated by general practitioners.

## Use of Health Care Resources and Asthma Treatment Costs with Specialist Care

### Lost Work/School Days Due to Asthma



77% reduction in time lost from work or school with asthma specialty care

Source: Castro, et al. Am J Resp Critical Care Med. 2003

- The improved outcomes that result from the aggressive management and treatment of asthma by allergists – according to consensus guidelines – not only produce better health outcomes, but also can reduce costly and often avoidable hospitalizations; physician, outpatient and emergency department visits; and missed days from work or school.

Even when asthma patients attend frequent clinic programs offering intensive specialty services, costs are saved in the long-term by reducing the number of emergency room visits and other acute interventions.

- A four-year outcome study of drop-in group medical appointments that allowed patients to interact with an allergist and other asthma specialists consistently met treatment goals as described by National Asthma Education and Prevention Program (NAEPP) guidelines, including those for control of asthma symptoms, prevention of exacerbations, activity levels and patient satisfaction. [48]
- The effective management of asthma is complex and requires effective provider/patient collaboration and communication. Guidelines recommend that providers prepare a treatment plan for each patient that details prescribed daily management (including medications and environmental control strategies) and how to recognize and control asthma exacerbations. In one study of 324 women, those with treatment plans were more likely to see an asthma specialist, be more satisfied with their care and report medication adherence compared to those without a plan. Patients who are cared for by asthma specialists required fewer hospitalizations, emergency room visits, sick care office visits and missed days from work or school. [49]
- In a comprehensive asthma program for 25 pediatric patients whose care included home environmental assessment and case management supervised by asthma specialists, emergency room visits decreased from 47 to 18; hospitalizations from 22 to 3 and clinic visits from 279 to 172. [50]
- A large matched cohort study of Florida Medicaid claims compared health care costs for children treated with allergen immunotherapy (AIT) for allergic rhinitis (AR), a predisposing risk factor for asthma, with those who did not receive AIT. Even after matching groups by the presence of AR-related asthma, patients in the immunotherapy-treated group had

192 hospitalizations compared to 286 in the control group. AIT patients incurred an average of 33% (\$1,625) lower 18-month median per patient overall health care costs compared to controls; 29% (\$765) to 58% (\$1,519) lower outpatient costs; and 16% (\$208) lower pharmacy costs after initiation of AIT. These significant reductions were evident as early as three months after immunotherapy began and reductions continued during the 18-month follow-up period. [51]

### Hospitalizations

- In a Washington University School of Medicine study, nearly 100 adults hospitalized for asthma and a history of frequent health care use were randomized to receive specialty care or general care for six months. There was a 60% reduction in hospitalizations in the group receiving specialty care and readmissions for asthma were reduced by 54%. [52]



### Emergency department visits

- A study of 9,608 patients, ages 3 to 64 years, enrolled in a large managed care plan found that dispensing of seven or more canisters of inhaled controller medications combined with care by an asthma specialist were both independently associated with a lower risk of emergency asthma care. [53]
- A study conducted by a large managed health care plan found the average annual number of emergency room visits was 3.45 for each patient with severe asthma enrolled in a specialty allergy clinic, compared to 6.1 visits for patients who were not enrolled. Patients cared for by allergists tended to be older, had more severe asthma and were more likely to report perennial (rather than seasonal) asthma than those cared for by generalists. Yet the allergists' patients were more likely to have asthma exacerbations treated in a clinic setting rather than an emergency department and reported significantly improved QoL and general health. [54]

### Missed days from work or school

- Poorly controlled asthma also results in a significant number of days missed from work or school. [10] When 100 adults who had a history of frequent health care issues were randomly assigned to receive either specialty care or general care for six months, the general care group had 1,040 days of lost work or school, compared to 246 days for those assigned to specialty care. [52]

### Patient satisfaction and quality of life

Patients who receive asthma care from an allergist experience improved emotional and physical well-being and are more satisfied with their physician and with the quality of their general medical care.

In a survey of nearly 400 patients treated in a large managed care organization, significant QoL improvements were reported by patients treated by allergists, compared to those treated by generalists or in the emergency department. Improvements were seen in physical function, emotion, pain relief and general health. [54] Other studies have reported QoL improvements in patients treated by specialists compared to those treated by general practitioners. [37,39, 41]



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## How Allergists Achieve High-Quality, Cost-Effective Outcomes

● Society in general, health plan administrators, group plan purchasers and – most importantly – patients benefit when asthma care is managed by an allergist. With their specialty training, knowledge and experience, allergists can:

### **Accurately diagnose the disease, its types, subtypes and severity.**

The blockage of airways caused by asthma can be intermittent, so a patient with asthma may have symptoms of the disease and yet appear to have normal lung function during a routine physician visit. The allergist can perform specialized tests such as a methacholine or exercise challenge to determine if symptoms are due to asthma or to another medical condition.

### **Identify the role of external factors, including allergens that can trigger an asthma exacerbation, and advise patients on how to avoid their asthma triggers.**

Many people with asthma are allergic to one or more things that trigger their asthma symptoms. The allergist performs tests to identify an individual's asthma triggers and helps patients develop a plan to avoid or minimize exposure to the allergens that contribute to the disease.

### **Administer immunotherapy to reduce sensitivity to allergy triggers.**

In some cases, immunotherapy also can prevent children with nasal allergies or other risk factors from developing asthma.

### **Use current best practice standards to develop and implement appropriate treatment plans that focus on asthma control.**

The allergist understands that each patient with asthma is unique and requires a treatment plan tailored to individual needs. Allergists work with the patient to develop self-help plans that include at-home instructions for assessing asthma control, how to deal with asthma symptoms and when to seek help for an asthma exacerbation.

### **Maintain disease control through a multi-faceted approach that includes prevention, appropriate use of medications and other interventions to prevent symptoms, and promote ongoing patient education and self-care strategies.**

The most successful asthma control results from a partnership between patient and physician. The allergist is uniquely qualified to work with patients to ensure proper use of long-term controller medications, avoid over-reliance on quick-relief medications and oral corticosteroids, and prevent the hospitalizations, emergency room visits, days lost from work or school and other debilitating and expensive outcomes associated with poorly controlled asthma.

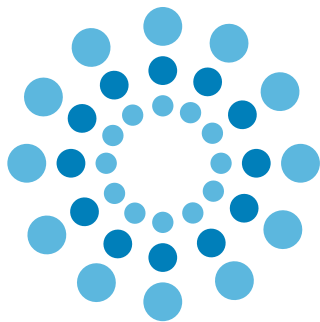
### **Prevent serious consequences of asthma.**

For persons who have required emergency care or hospitalization for asthma, care by an allergist can reduce the need for these acute care services. Compared to care provided by general medical professionals, the allergist is more likely to educate the patient in self-management, including the use of written asthma action plans and of peak flow meters to enhance asthma control.



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## New Perspectives on Asthma: Advances and Challenges



● As more is learned about asthma, researchers are discovering that the disease is far more complex than previously thought, with new data from genomics, epidemiology, in vitro studies and other research that is leading to new asthma management strategies. [55-57] Asthma consists of several subtypes, such as allergic asthma, eosinophilic asthma, asthma related to bacterial or fungal infections, aspirin-related asthma and asthma in the elderly. Each type can have different symptoms or triggers and each requires a different approach to diagnosis and treatment. Allergists, based on extensive experience in treating all forms of the disease, understand its complexities and know that it is crucial to distinguish among different types. They can assess the severity of each case and develop case-specific action plans that have the greatest likelihood of success with individual patients.

### New therapies

Among patients with severe, uncontrolled asthma, individualized treatment based on asthma phenotype and the presence of eosinophils (inflammatory cells that are a major factor in the pathophysiology of asthma), should be considered. Incorporating novel biologic and nonbiologic therapies (investigated for patients with allergic or eosinophilic asthma) and other new and emerging treatments into therapeutic strategies for patients with severe uncontrolled asthma may improve outcomes for this patient population. [57-58].

### Broadening the role of the allergist

In many settings, there is a shortage of allergists or access to specialist care is otherwise suboptimal. New strategies are being developed to make specialist consultation available to all patients whose asthma is not well-controlled.

- Urban, minority and disadvantaged youth with asthma frequently use emergency departments for episodic asthma care instead of primary care providers (PCPs). In this prospective cohort study, an electronic communication process between an asthma specialty clinic and PCPs provided short-term care coordination for a cohort of patients aged 2 to 12. The patients' guardians were interviewed at baseline and three and six months after the intervention. At three and six months after the intervention, significantly more guardians reported that the PCP was their child's primary asthma health care provider and took their child to the PCP when the child experienced problems with his/her asthma. [59]
- The use of telecommunication and information technology to provide clinical health care from a distance has been used to improve access to medical services that would often not be consistently available in rural communities or in communities with a shortage of specialists. The American College of Allergy, Asthma and Immunology advocates for incorporation of meaningful and sustained use of telemedicine in allergy and immunology practice. [60] For example, children with asthma residing in two remote locations were offered the choice of an in-person visit or a telemedicine session at a local clinic. The telemedicine process involved real-time use of a Remote Presence Solution (RPS) equipped with a digital stethoscope, otoscope and high-resolution camera. Children in both groups were assessed initially, after 30 days and at six months. Of 169 children, 100 were seen in-person and 69 via telemedicine. A total of 34 in



person and 40 telemedicine patients completed all three visits. All had a small improvement in asthma control over time. Most of the telemedicine group subjects reported they were satisfied with their experience. [61] Telemedicine consultation with asthma specialists has also been successful in other nations. [62-63]

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## Asthma Specialty Care in Health Plans

- Many of the studies demonstrating improved outcomes and more cost-effective use of health care resources with allergist care were conducted by managed care plans. [33,37,51,53-54]

Because of the consistent findings of the benefits of specialty care, administrators of many health care plans and managed care organizations strive to involve allergists in asthma care.

Asthma management remains a high national priority and the National Committee for Quality Assurance (NCQA) has made the appropriate use of asthma medications a key indicator in evaluating the quality of managed care programs. [64] As asthma management becomes more sophisticated and as payers, regulatory agencies and patient advocates collect and report data on performance, health care plans with a demonstrable record of successfully managing asthma can expect preferential referrals. Plans with goals of reducing participant turnover and that emphasize lifestyle change are most successful at satisfying patients and reducing costs.

Allergists can and should be part of the process of transformation in our health care system. They can be integral in helping value-based care models save money by reducing hospitalizations and other acute care interventions and improving the quality of allergy and asthma care in the populations served. [65]

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## Conclusion

- A substantial and growing body of published clinical data and economic research shows significant differences in treatment outcomes and costs between asthma care that is managed by generalists, who have no specialty training in the complexities of asthma, and disease management that is under the direction of an allergist.

An evidence-based review of the literature indicates that aggressive management of asthma by a specialist improves outcomes for patients, lowers overall treatment costs for payers and reduces the indirect costs to society.

Yet despite this evidence, some health care plans still place obstacles in front of patients seeking referral to an allergist, even when referral to a specialist is recommended in the NHLBI and GINA guidelines and other national consensus recommendations. The result is inadequate or sporadic treatment that allows disease progression, airway remodeling and permanent damage to the lungs. Suboptimal management of asthma also leads to increased direct costs associated with increased hospitalizations, emergency care and other high-priced interventions. It also adds to indirect costs due to the number of days missed from work or school and adversely affects patients' QoL.

As more is learned about the mechanisms of asthma and its risk factors and as new therapies are developed, the allergist can be expected to be at the forefront helping to control disease severity and diminish its progression.

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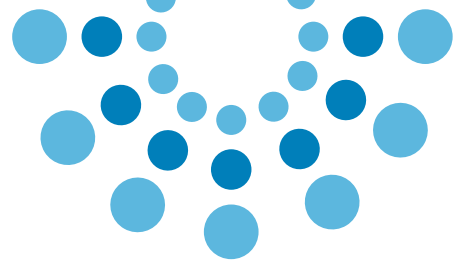
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