

Cost Effectiveness of an Allergy Consultation in the Management of Asthma

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ABSTRACT

In a large Denver HMO, a retrospective study of asthma management was reviewed. Seventy moderate to severe asthmatic patients' charts were reviewed through April 1994. All patients admitted to the study had to be followed for at least 1 year by a primary care physician before the allergy evaluation (AE) and for at least one year of followup (F/U) after the AE. All patients had at least two acute care (ER) visits and/or one hospitalization before the AE. All primary care, AE, and F/U were done by staff physicians in the Kaiser Permanente system. The findings included 1) Forty-five percent decrease (308 to 169) in the number of sick care office visits ($P = 0.0001$); 2) fifty-five percent decrease (266 to 118) in acute care visits ($P = 0.0001$); 3) sixty-seven percent decrease (34 to 11) in the number of hospitalizations after the AE ($P = 0.001$); 4) average hospital days before AE were four days and after AE, 2.5 days; 5) estimated cost saving of \$145,500, or \$2,100 per patient. (Allergy and Asthma Proc 18:15-18, 1997)

Asthma has always been one of the most common chronic illnesses. Recent epidemiologic data have indicated that its prevalence, severity (especially fatalities), and treatment costs are increasing dramatically.^{1,2} In 1990 the total annual cost of care for asthma was \$6.2 billion, and the largest single direct medical expenditure

for the disease was inpatient hospitalization services, which came to \$1.6 billion for 600,000 hospitalizations.³ The largest single indirect cost of asthma, reduced productivity of parents due to school days lost by their children, was estimated to be \$1 billion.³ In 1991 the San Diego Kaiser Permanente Allergy Group demonstrated that an almost 50% reduction in emergency room relapses occurred after an allergy/asthma consultation compared to patients that were managed only by primary care physicians.⁴ In a pediatric asthma study from Children's Memorial Hospital in Chicago, Mahr et al. reviewed a 1-year followup of 209 hospitalized patients. There was a 35% readmission rate and a 47% emergency room utilization rate for patients followed by nonallergists. During the same 1-year followup there was a 13% readmission rate and an 18% emergency room utilization rate for patients followed by the allergists.⁵ Also, an intensive outpatient medical management program performed at New York's Bellevue Hospital revealed a three-fold decrease in hospital admissions from 70 in the routine clinic group to 19 in the study group followed in the Allergy/Asthma Clinic over an 8-month period.⁶ Other studies of hospitalized adults and children at the National Jewish Center in Denver have documented a significant drop in hospitalizations (85%) and emergency room visits (45%) after specialized treatment. The levels were maintained when followed for 5 years posttreatment.^{7,8}

After reviewing the scopes of care of asthma for quality assurance and utilization in the Kaiser Permanente Colorado Region, we desired to determine the cost effectiveness of an allergist consultation for moderately severe and severe asthma patients. We wanted to determine if there also was a pattern of decreased hospitalizations, acute care visits (emergency room), and sick office visits.

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MATERIAL AND METHODS

A retrospective chart review was done of 300 asthmatic patients who were referred to the Allergy/Asthma Department. The criteria for patient selection required all patients to have been Kaiser Health Plan members for at least one year before referral and at least one year after referral. During the year before the allergy/asthma referral, the patients received health care in the primary care setting (Family Practice, Internal Medicine, or Pediatrics). All patients had moderate to severe asthma defined as requiring daily asthma medication and having had at least two acute care (ER) visits and/or one hospitalization before the allergy/asthma specialist evaluation. These criteria are similar to the guidelines outlined in the NHLBI report.⁹

Only males and nonpregnant females were included, and all patients had to reside in the Denver metropolitan area. Kaiser Health Plan medical facilities are located only in the Denver metropolitan area; therefore, patients were restricted to this area. No patients had chronic obstructive pulmonary disease and no patients were smokers. Smokers were excluded because they represent a significantly different subset of patients. Diagnostically, they intermingle with bronchitis and emphysema and may also have substantially different outcomes not reviewed here.

Also, further demographic data of the home environment such as parental smoking, pets, etc., exceeds the scope of this article.

Comparisons of cost and numbers of hospitalizations, acute care (ER) visits, and sick office visits were made one year before the allergy/asthma consultation and one year after the consultation. Sick office visits were necessitated to treat asthma flares and to adjust medications. If visit was in the allergist's office, spirometry was done. If it was in primary care or the ER, a peak flow measurement may or may not have been done. Estimated costs were based on fee for service charges made to previous members who might continue to seek medical care at Kaiser Health Plan clinics and the acute care center. No CPT coding was being done at the time of the study. Hospital costs were the standard per diem charge (See Table I).

Statistical analysis of the results was performed by the Wilcoxon matched pairs signed rank test.

RESULTS

Seventy patients (46% males and 54% females) met the criteria, ranging in age from 3–70 years. Twenty-three percent were 3–5 years, 26% were 6–12 years, 13% were teenagers (13–19), and 39% were over 20 years (See Fig. 1).

Estimated Cost	
Average hospital per diem	\$1088.00
Acute care (ER) visit	\$ 176.00
Sick office visit	\$ 68.25

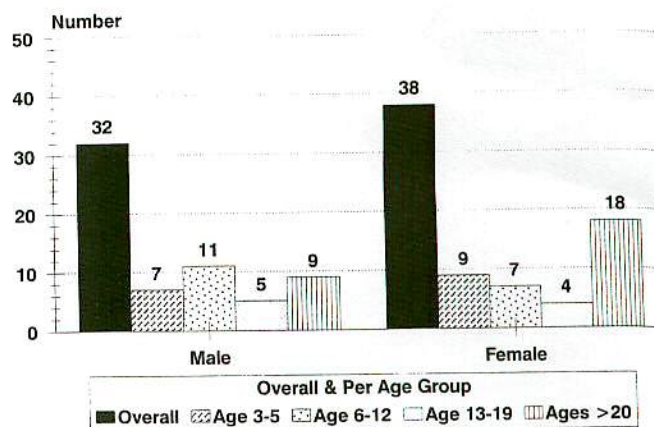


Figure 1. Gender of patients in allergy evaluation study.

Ninety-seven percent of the patients identified with a primary care physician, and 98.6% had the diagnosis of asthma before the allergy evaluation. Sixty-one percent had signs and symptoms of allergies associated with three or more positive skin tests or RAST tests. Patients' steroid use in the years before allergy evaluation included 41% with three or more bursts per year and 17% with daily or every other day steroid usage. Forty-two percent required none or less than three steroid bursts per year.

Sick office visits before allergy/asthma evaluation were 308 and after the evaluation were 169 ($P = 0.0001$) (See Table II). This was an overall reduction of 45% and represented a 29% decrease in the 3–5 year age group, a 48% decrease in the 6–12 year age group, a 64% decrease in teenagers, and a 46% decrease in adults. Total cost savings was approximately \$9,500 (See Fig. 2).

Acute care visits (ER) before allergy evaluation were 266 and after the evaluation, 118 ($P = 0.0001$) (See Fig. 3). This was an overall reduction of 55% and represented a 39% decrease in age 3–5 years of age, 77% in 6–12 years of age, 79% in teenagers, and 44% in adults. The total cost savings were approximately \$26,050 (See Table II).

Hospitalizations before allergy evaluation were 34 and after evaluation were 11 ($P = 0.001$). (See Fig. 4) This was an overall reduction of 67% and represented a 37% decrease in age 3–5 years, a 77% decrease in 6–12 year-olds, a 100% in teenagers, and 72% in adults. The total cost savings was approximately \$110,000 (See Table II). Also, the hospital-

Economic Assessment			
	Pre	Post	Savings
Sick office visit	\$ 21,021	\$11,534	\$ 9487
Acute care (ER)	\$ 46,816	\$20,768	\$ 26,048
Hospitalization	\$140,408	\$30,476	\$109,932
Total	\$208,245	\$62,778	\$145,467

Pre = Pre Allergy/asthma Evaluation; Post = Post Allergy/asthma Evaluation

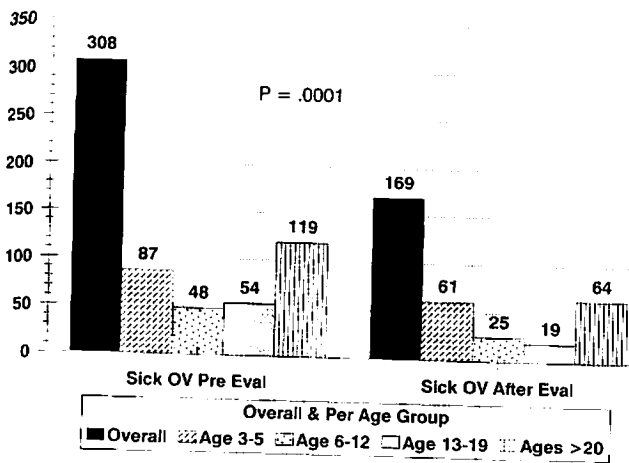


Figure 2. Sick office visits (SOV) before and after allergy evaluation.

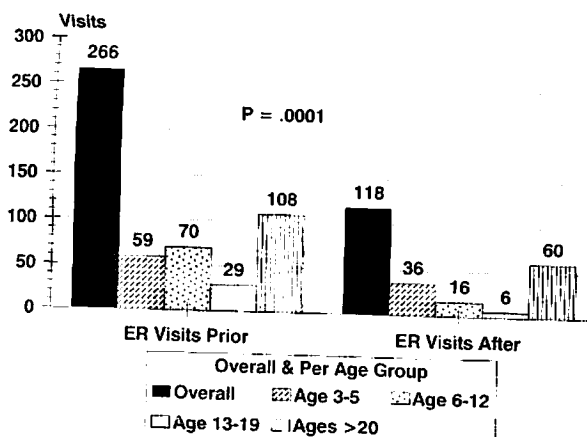


Figure 3. Acute care (ER) visits before and after allergy evaluation.

ization average length of stay was decreased from 4 to 2½ days. This represents a trend toward significance with $P < 0.09$.

The overall combined cost savings was approximately \$145,500, or \$2100 per patient for the 70 patients studied (see Table II).

CONCLUSION AND DISCUSSION

An allergy consultation in moderate-to-severe asthma is cost-effective. This was noted in all age groups with greater improvement noted in the older children, teenagers, and adults. Also, there was an overall decreased morbidity of asthma with fewer hospitalizations, shorter hospitalizations, less acute care (ER visits), and less sick office visits. However, in the 3-5 year-old age group there was somewhat less improvement than the older age groups. This may reflect that prominent triggering role of viral infections in this age group.

This study did not address specifically the reasons for improved outcome following the asthma/allergy consultation. However, our usual practice of attempting to identify triggers, individualizing home care plans with use of a peak

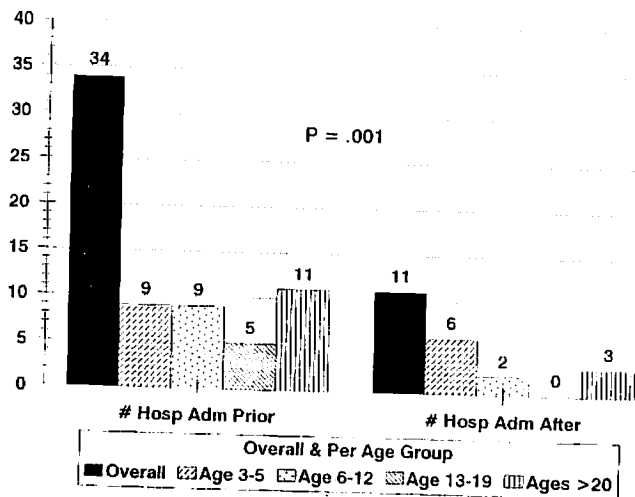


Figure 4. Number of hospitalizations before and after allergy evaluation.

flow meter, aggressive use of inhaled anti-inflammatory medications, close communication with primary care physicians, patients, and family, and early aggressive treatment of acute exacerbation may have played a role in the outcome. These parameters are all in focus with the NHLBI National guideline.⁹

Recently the Harvard Community Health Plan in the Boston, Massachusetts metro area, using somewhat similar parameters, observed a 79% decrease in emergency room visits and an 86% decrease in hospitalizations in pediatric population, monitored over a 6-month to 2-year period.¹⁰ Our model and the Harvard Community Health Plan model are both staff-model health maintenance organizations.

Also, other asthma care models, such as proposed by the Pennsylvania Allergy Association and the National Jewish Center for Immunology and Respiratory Care have similar components to our study.^{11,12} However, National Jewish Center model was designed for chronic, severe, life-threatening asthma and is not directly comparable to our study.

Limitations of the study include the retrospective study design and no cohort of similar patients without an allergy/asthma referral. This was not done in this descriptive study because one year of continuous primary care before referral was considered a reliable normal base data against which to compare changes after referral. In spite of these limitations, the outcome is strongly indicative of the benefits of an allergy/asthma consultation. In our managed care setting, we recommend that all moderate to severe asthmatic patients have an allergy/asthma consultation.

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