

Asthma Disease Management Program

Introduction

The Asthma Disease Management Program of the Kaiser Permanente Colorado (KPCO) Denver/Boulder Local Market began development in August 1995. Its pilot project was implemented in February 1997 with full implementation in August 1998. A very large team of participants contributed to the initial and ongoing success of this regionwide initiative. Table 1 identifies the complete list of project supporters and contributors.

Asthma is recognized as a chronic inflammatory disorder of the airways with symptomatic episodes that range from mild and intermittent to severe and persistent. Although the reasons are poorly understood, the prevalence of asthma has increased significantly over the past 20 years in both children and adults.¹ Undertreatment and inappropriate pharmaceutical therapy have been shown to be major contributors to asthma morbidity and mortality.²⁻⁴ In 1995, the prevalence of asthma within KPCO was estimated to be 4% to 6% (13,600 to 20,400 asthmatic members). Because of our large population of asthmatic patients and the potential for relatively rapid improvement, asthma was one of the diseases chosen for development of a disease management program.^{5,6}

Background

The development of chronic disease management programs began in 1995 with an assessment of the member population which identified that KPCO's model of care could be improved to meet the needs of chronically ill patients. Our traditional ambulatory care model was designed to manage acute, episodic exacerbations of asthma. The following weaknesses were identified: 1) inconsistent approaches across the region to manage chronically ill patients; 2) inconsistent messages to these patients; and 3) no tools to identify patients receiving inadequate care. Epidemiologic data, market climate, and utilization and cost data describing KPCO's asthma population established the need for a redesign process. Employer groups such as PepsiCo, Coors Brewing Company, and Time/Warner Cable were asking about our approach to chronic disease management. Likewise, regulatory and consumer reporting agencies such as the National Committee for Quality Assurance (NCQA) and the Health Plan Employers Data Information Set (HEDIS) had established population-based standards for chronic diseases.⁷

Process

The Asthma Disease Management Program was implemented as a pilot project in February 1997 focusing on registry development, guideline dissemination, limited asthma classes, and nursing care management. Early in 1998, the registry was refined, care managers began limiting their intervention to high-risk patients under the age of 50 years, and physician/staff education was instituted. In August, four additional asthma care managers were hired, and a "real-time" notification process for patient hospital and emergency department encounters was introduced. Additionally, the Care Management Institute (CMI) began supporting local disease management initiatives.

Objectives

The primary objectives of the Asthma Disease Management Program are to 1) improve quality outcomes of care, 2) equip patients to better self-manage their chronic illness, 3) reduce costs of care through avoidance of acute episodes and complications, and 4) increase patient and physician satisfaction with continuity of care. The purpose of the initial pilot project evaluation was to compare the impact of the Asthma Disease Management Program model with "care as usual" regarding quality outcomes, utilization patterns with related costs, and patient and physician satisfaction. Subsequent to the pilot program evaluation, additional analyses were performed to determine if improvements attributable to the Asthma Disease Management Program could be sustained over time.

Methodology

Scope

In 1995, analysis of KPCO's total population of 340,000 members revealed that 34.5% had one or more chronic diseases, an amount that accounted for 60% of primary care physician utilization. By initiation of the pilot project in February 1997, the baseline number of asthmatic patients was 19,784 regionwide. Twenty-two percent of our total asthma population (4708 patients) received their primary care at two of our medical offices, Westminster and Aurora Centrepoint, which were chosen as the pilot intervention sites.

Interventions

The Asthma Disease Management Program is a new model of care that addresses the needs of asthma patients at a population level. The key program ele-

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ments described represent the primary changes from “care as usual.” Of particular note is the use of care managers—registered nurses—who are responsible for monitoring the population of asthma patients in

a specified geographic area, targeting high-risk patients for intervention, and providing one-to-one and group care. The primary care physician retains accountability for directing and managing the patient’s

Table 1. Kaiser Permanente Colorado Denver/Boulder Local Market Asthma Disease Management Program Project supporters/contributors

<p>Disease Management Core Team Members</p> <ul style="list-style-type: none"> • Jean Barker, MBA, Director, Strategy Development and Implementation—Team Co-Leader • David Berman, MD, CMI Physician Implementation Manager/Director, Disease Management—Team Co-Leader • Shelley Cooper, MBA, Consultant, Strategy Development and Implementation—Project Manager • Donna Beall, PharmD, Primary Care Services • Arne Beck, PhD, Director, Research and Development • Michael Bodily, MBA, Programmer/Analyst, Information Technology • Ned Calonge, MD, MPH, Chief, Preventive Medicine & Research • Pamela Cowan, BS, Analyst, Research and Development • Elizabeth Gay, MA, Director, Prevention • Alvin Goo, RPh, Pharmacy • Bill Good, MBA, Manager, Clinical Information Systems • Kent Nelson, PharmD, Primary Care Services
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<p>Administrative support</p> <ul style="list-style-type: none"> • Michael Alexander, Vice President and Executive Director • Connie Slaughter, RN, MS, Director, Quality and Resource Management • Linda Smith, RN, MS, MHA, Director, Operations Support • Andrew Wiesenthal, MD, Associate Medical Director, Medical Management
<p>Physician Mentors</p> <ul style="list-style-type: none"> • Peter Cvietusa, MD, Pediatrics/Allergy • Robert Harvey, MD, Allergy • Ross Westley, MD, MPH, Allergy • John Williams, MD, Regional Department Chief, Allergy
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<p>Research and Analytical Support</p> <ul style="list-style-type: none"> • Jennifer Ellis, MBA, Programmer/Analyst, Research and Development • David Magid, MD, MPH, Investigator, Clinical Research Unit • Avery Wilson, MSPH, CMI Analyst
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The primary care physician retains accountability for directing and managing the patient’s care. Asthma care managers extend physicians’ ability to monitor and educate their patients.

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care. Asthma care managers extend physicians' ability to monitor and educate their patients. Key program elements include processes for registry and reporting, "real-time" notification, care manager intervention, and KP Regionwide education.

Registry and Report Process

The Asthma Disease Identification, Registry, and Reporting System is a set of software programs developed by clinicians, programmers, and analysts at KPCO.⁸ This system extracts and compiles data from clinical and administrative sources to produce a continuously updated registry of patients with asthma. This system also generates monthly and quarterly reports of patient levels in electronic and printed formats. These reports contain clinically relevant data of interest to physicians and care managers. Patients are risk-stratified by pharmaceutical dispensing and by Emergency Department (ED), observation/clinical decision unit (OBS/CDU), and inpatient utilization.

"Real-Time" Notification Process

Information about hospitalizations and ED encounters for asthma is received and entered into an Access database every day. The appropriate care manager is notified to contact patients shortly after discharge, when they are most likely to make behavior changes to better manage their asthma.

Care Manager Intervention

The care managers identify patients for proactive outreach using a combination of the panel report, real-time feedback from hospitals and EDs, and physician referral. The goal of intervention is to empower patients to learn self-management skills and to make lifestyle changes to decrease asthma morbidity. The care manager follows patients enrolled in the program by in-person and telephone contact during a two- to three-month period. When appropriate, patients are referred to classes for additional asthma education. Upon discharge from active care management, patients resume usual care with their primary care physician but may reenter the program if they again meet high-risk criteria. Population monitoring continues for all patients in the Asthma Registry. Major functions and accountabilities of care managers include:

- Assessment, treatment modification, and patient education based on clinical guidelines;
- Addressing patients' psychological responses to living with a chronic disease

using behavioral change strategies;

- Providing telephone follow-up, troubleshooting, monitoring, and coaching to ensure success of the patient's self-management plan;
- Coordinating complex care of patients and planning their transition back to primary care as their condition permits;
- Reviewing and interpreting panel reports and communicating with physicians about the status of their asthma patients.

Regionwide Patient and Staff Education

Asthma management classes for patients (and family members) are offered monthly at all facilities. Asthma skills training sessions are offered to the staff to enhance their ability to conduct pulmonary function tests and to provide education on medication and equipment use, peak flow monitoring, environmental controls, and asthma pathophysiology. In addition, guidelines for asthma care, which are based on the National Institutes of Health (NIH) recommended criteria for diagnosis and treatment, were widely disseminated to physicians and mid-level providers across the KPCO region.⁹

Subjects and Setting

In the initial pilot study, conducted from February 1 to July 31, 1997, the Asthma Disease Management Program model was compared with "care as usual." Three hundred seventy-eight patients from a population of 19,784 members were enrolled in care management during the pilot period. These patients comprised the pilot intervention group. Patients were eligible for enrollment if they received primary care services at one of the two pilot sites and either were identified via registry report as being at high risk or were referred to the program by their primary care physician. High-risk asthma was defined as: 1) overuse of beta2-agonists, 2) high-dose beta2-agonist use with no dispensed inhaled steroid, or 3) a recent asthma-related hospital or ED admission. The pilot project was conducted at two medical offices: Westminster and Aurora Centrepoint. An additional 976 intervention patients were enrolled into the program between August 1997 and January 1999. Patients not in the intervention groups received care as usual. Two asthma care managers (1.6 FTE) were hired to participate in the pilot project. Four care managers and 13 additional offices were added in August 1999.

**Study Design**

A quasi-experimental pretest-posttest study design was used to examine changes in process of care and clinical outcomes measures for asthma intervention patients. For some outcomes, multiple pre- or postintervention measurements were performed. Changes within a comparison group (composed of Asthma Registry members who had not been seen by the care managers) were also assessed on similar outcome measures. A pretest-posttest design was also used to evaluate changes in patient and physician satisfaction. Although planned for the pilot evaluation, use of a more rigorous randomized case-control design was not feasible because of pilot implementation issues. For example, during the pilot project, a large number (48%) of all intervention patients were referred to asthma care managers by their primary care physicians. Given that provider acceptance of the asthma care managers was an important key to successful implementation of the Asthma Care Management Program, referred patients were accepted into the Program at the expense of a more rigorous study design. Also, a great amount of refinement of the computer programs used for patient identification and risk stratification took place during the pilot period. Statistical methods used in analyses of pilot and postpilot data included parametric and nonparametric within-group tests for significance (eg, chi-square, t, and Wilcoxon signed rank tests) as appropriate.

Patient Intervention Procedure

The asthma care managers contacted patients by telephone and screened them for eligibility. Patients were enrolled if they met entry criteria and were willing to participate. A one-to-one initial visit was scheduled. At the initial visit, the care manager recorded a detailed history, performed pulmonary function tests, and provided education about asthma and its treatment. Small steps toward behavior change were negotiated with the patient according to the patient's readiness to change, lifestyle, and areas (s)he was willing to address. Patients were given a written home care plan if their asthma was stable. Patients experiencing an asthma flare were appropriately treated and were scheduled for a second visit. Subsequent patient contacts occurred by telephone a mean of three times during a three-month period. All face-to-face and phone contacts were recorded on coding sheets designed for the pilot project.

Measures

The project addressed the following outcomes, utilization, and process of care measures: patient and physician satisfaction, use of ambulatory and hospital-based health care services, overuse of beta2-agonist medication, usage of prescribed anti-inflammatory medication, dispensing of peak flow meters, prevalence of spirometry testing, and the provision of a home care plan.

Satisfaction Data

Pre- and postpilot patient satisfaction surveys were administered to 258 intervention and nonintervention asthma patients. Pre- and postpilot satisfaction surveys were administered to 71 physicians at pilot and nonpilot medical offices. Survey questions used a five-point Likert scale response, where "1" defined the negative pole and "5" defined the positive pole. Patient satisfaction data were collected from a random sample of nonintervention patients and intervention patients via telephone survey. Survey results were analyzed for patients who responded to both the baseline and postpilot surveys. Questions addressed patient satisfaction with education, home care planning, asthma management, and continuity of care. A written survey was administered in December 1996 and again in August 1997 to a random sample of physicians in primary care departments at pilot and nonpilot sites. Questions addressed satisfaction related to provision and monitoring of asthma patient's care, meeting patient expectations, and availability of resources to manage asthma patients. Within-group and between-group changes in satisfaction were measured using Wilcoxon signed rank tests and Wilcoxon-Mann-Whitney U tests.

In March of 1998 and 1999, the CMI-sponsored administration of a survey to adults who were identified as having asthma. Eighty percent of patients who responded to the 1998 survey also responded to the follow-up 1999 survey, for a total of 1225 patients. Data from a subsample of these respondents were published in the 1998 CMI Asthma Outcomes Report.¹⁰ Three of the 64 survey questions address issues of patient satisfaction. Paired t tests and the Wilcoxon signed rank test were used to assess changes between the two time periods.

Utilization Data

Administrative databases were used to collect pharmacy, outpatient encounter, and hospital (inpatient, ED, and observation/clinical decision unit (OBS/

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CDU)) data for all patients identified with asthma. To control for seasonality and the effect of secular trends in both clinical and data systems, utilization data were extracted for several time periods before and after the pilot.

Outpatient utilization data were obtained from claims and encounter databases. Using paired t tests, the rate of asthma-related ambulatory care visits to primary care departments was measured for several periods before and after the initial encounter with a care manager for intervention patients enrolled during the pilot and for a similar time period for nonintervention patients. During the postpilot phase, changes in ambulatory care utilization was measured at the population level for patients identified in the registry in both March 1998 and March 1999. Patients were stratified into three age groups: 0-18 years (pediatric members), 19-49 years (adult members), and 50+ years (older adult members). Paired t tests were used to evaluate the change in mean number of visits per patient per year to Primary Care Departments for asthma-related conditions and to the Pulmonology and Allergy Departments.

Changes in hospital-based utilization rates (inpatient, ED, and OBS/CDU) were measured for a pilot-specific cohort of intervention patients and for all asthma patients identified via the registry for several time periods. Paired t tests and repeated measures ANOVA were used to evaluate differences in mean number of inpatient admissions, emergency department visits, and OBS/CDU visits per year for the initial pilot cohort of intervention patients. Paired t tests were used to evaluate the change in mean number of inpatient admissions, emergency department visits, and OBS/CDU visits per patient per year. No statistical tests were performed on the likelihood of a hospital event occurring.

Parametric and nonparametric statistical tests were used to assess changes over time for four aspects of pharmacy dispensing patterns for all asthma patients: 1) number of beta2-agonists dispensed per patient in a six-month period; 2) percentage of patients with beta2-agonist overuse; 3) percentage of patients taking high-dose beta2-agonists with a dispensed inhaled anti-inflammatory; and 4) percentage of asthma patients who had been dispensed a peak flow meter. Many of these measures were stratified by intervention status, by age category, or by both. In order to control for unmeasured seasonal variation, the following four time periods were examined for the pilot evaluation: one-year pre-pilot, baseline

(or pre-pilot), end-of-pilot, and six-month postpilot periods. Overuse is defined here as 12 or more metered dose inhalers (MDI), or 180 or more milliliters of nebulizer solution, or 2160 or more milliliters of nebulizer premix solution of a beta2-agonist product dispensed in a six-month period. A patient who is a high-dose beta2-agonist user with an inhaled anti-inflammatory product is one who is dispensed six or more MDIs or the equivalent of a beta2-agonist product in a six-month period and also receives an inhaled anti-inflammatory product (eg, beclomethasone dipropionate, budesonide, fluticasone, cromolyn sodium, etc.).

Process of Care Measures

Dispensing of peak flow meters, administration of spirometry tests, and development and documentation of patient home self-care plans are all considered to be process-of-care measures in this evaluation. In September 1997, registered nurses performed retrospective chart audits on all pilot intervention patients and on a random sample of nonintervention patients to document receipt of spirometry testing and existence of a home care plan. Chi-square and Wilcoxon signed rank tests were used to evaluate within-group and between-group changes in these two measures. Data from the CMI-sponsored Survey of Adults with Asthma was used to describe changes in population-based measures of peak flow meter dispensing and receipt of home self-care instructions.⁷ The Wilcoxon signed rank test was used to examine changes in the distribution of responses between March 1998 and March 1999 for a sample of 1222 documented asthma patients who responded in both time periods.

Results

Satisfaction

Seventeen physicians at pilot sites and 54 physicians at nonpilot sites completed baseline and postpilot surveys. At baseline, no statistical difference for any of the ten questions was noted between pilot and nonpilot physicians responding. Using the Wilcoxon signed rank test, significant improvement ($p < 0.05$) in three of the satisfaction scores was found for the pilot site physicians. For the nonpilot site physicians, one measure improved significantly ($p < 0.05$), and five measures declined significantly. The magnitude of improvement was greater for the pilot group of physicians and staff for all questions. The magnitude of improvement was greater for the pilot group of providers for all questions. Wilcoxon-Mann-



Whitney U tests showed that the mean differences for six of the ten questions were significantly greater ($p < 0.05$) for the pilot group.

Eighteen intervention patients and 240 nonintervention patients responded to a patient satisfaction survey. No differences in satisfaction were found pre-pilot between the two groups. Postpilot satisfaction increased for both groups. Although the magnitude of improvement was greater among the intervention group for three of the five measures, no differences were statistically significant. Two of the three surrogate measures for patient satisfaction contained in the CMI-sponsored Adults with Asthma Survey showed no significant change. The Likert scale response to the question addressing ease of getting medical care for asthma when needed did show a significant change ($p < 0.05$).

Ambulatory and Hospital Utilization

Early pilot results found that for the six months before and after the initial encounter with asthma care managers, ambulatory visits to primary care departments decreased significantly ($p < 0.05$) for the pilot intervention patients. Visits for nonintervention patients increased slightly during the same time period, although the increase was not statistically significant. The visit rate to the Allergy and Pulmonology Departments increased slightly for pilot intervention patients for the same time period.

Ambulatory care utilization measures were assessed for a sample of 17,298 asthma patients who were identified in the registry in both March 1998 and March 1999. The rate of asthma-related visits per 1000 patients per year to Primary Care Departments showed significant reductions ($p < 0.001$) for all age groups (Figure 1). For the age categories of patients targeted by the care managers, Figure 2 shows that the visit

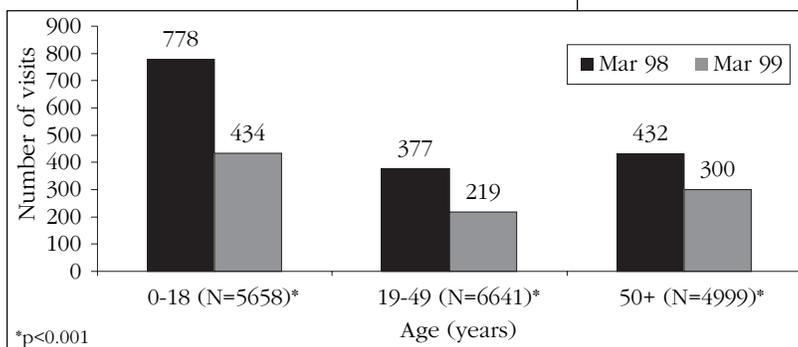


Figure 1. Asthma Registry members' asthma-related Primary Care Department visits/1000 members

rate to the Allergy Department decreased significantly in the 0- to 18-year age group ($p < 0.001$) and in the 19- to 49-year age group ($p < 0.05$). Although a slight decrease in visits for the > 50-year age group was observed, the difference was not significant. The visit rate to the Pulmonology Department showed no statistically significant change.

Figure 3 demonstrates the finding that both the annual hospital inpatient and ED admission rate for 252 continuously enrolled pilot intervention patients declined significantly from March 1997 to March 1999 ($p < 0.05$). OBS/CDU admission rates did not change. For the sample of 17,298 asthma patients on the registry in both March 1998 and March 1999, significant reductions were found in the number of annual inpatient admissions in the pediatric ($p < 0.001$) and adult ($p < 0.05$) age groups (Figure 4). OBS utilization showed no significant changes between the two time periods. ED utilization increased significantly for pediatric patients ($p < 0.05$) and for adults and older adults ($p < 0.001$). Although reasons for the increase are unclear, the reduction in hospital utilization may have resulted in a shift to ED visits.

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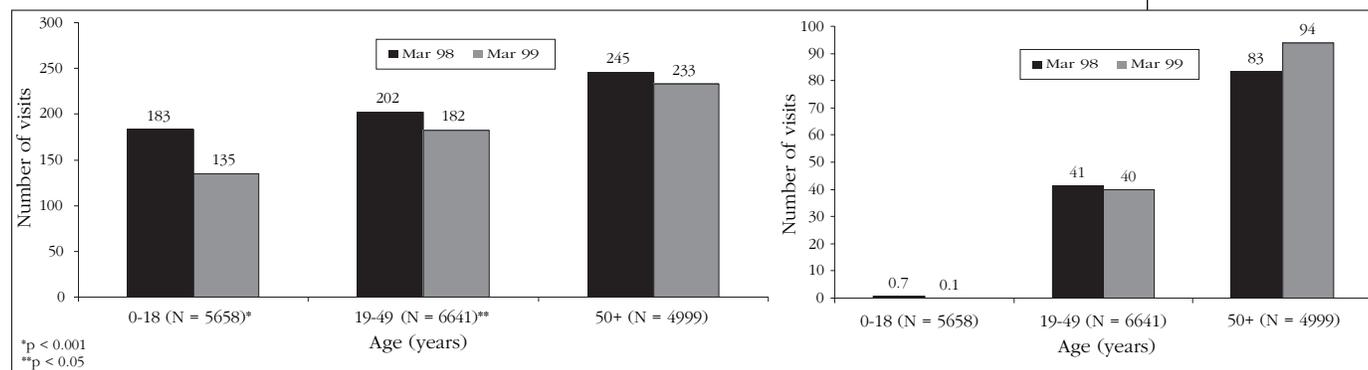


Figure 2. Asthma Registry members' Allergy Department visits/1000 members and Pulmonology Department visits/1000 members

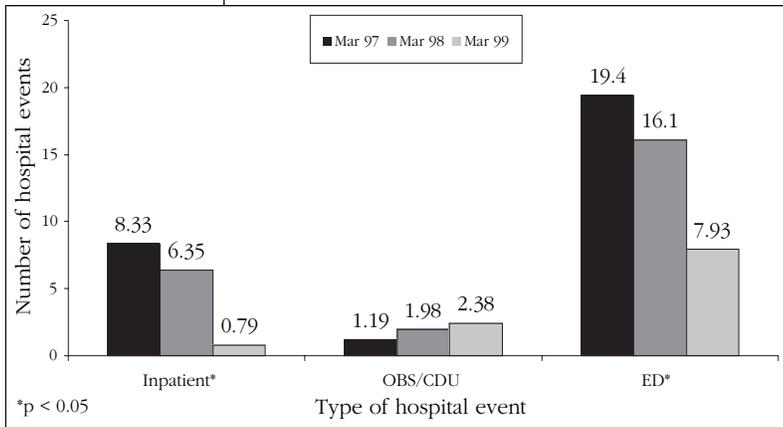


Figure 3. Pilot patients' (n = 252) hospital events/1000 patients

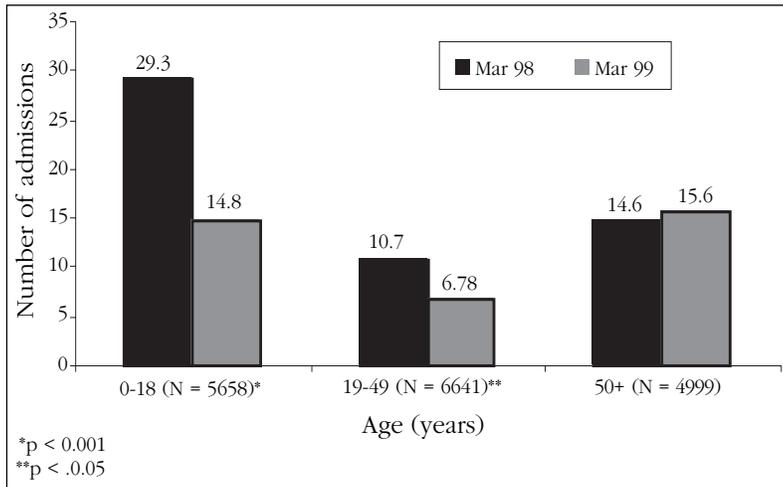


Figure 4. Asthma registry members' inpatient admissions/1000 members/year

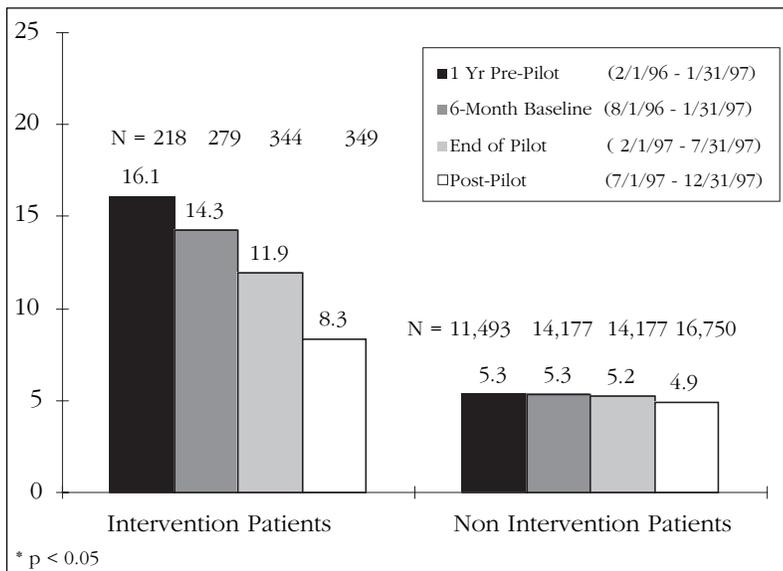


Figure 5. Pilot patients beta2-agonist overuse

Pharmacy Utilization

Measures of beta2-agonist pharmacy dispensing patterns suggest that the pilot intervention patients may have been “higher risk” than the average asthma patient identified from the registry. Although during the pilot project, no significant change occurred in the mean number of beta2-agonist MDIs dispensed per patient, the baseline rate of dispensing was much higher (7.7 versus 4.5) for the pilot intervention patients compared with the nonintervention patients. Figure 5 shows a statistically significant ($p < 0.05$) decline in beta2-agonist overuse among pilot intervention patients from the year preceding to the year subsequent to the pilot. Figure 6 demonstrates that during this same time period, the percentage of pilot intervention patients receiving high-dose beta2-agonist medications who were also dispensed an inhaled steroid significantly increased ($p < 0.05$). Follow-up analyses of these same measures (Figures 7 and 8), evaluated for the entire sample of asthma registry patients and stratified by age category, were performed using data collected two years subsequent to the pilot. Statistically significant improvement in most age categories for both measures was demonstrated ($p < 0.05$).

Process of Care

The percentage of intervention patients with a pharmacy-dispensed peak flow meter increased significantly from 42% before the pilot to 75% after the pilot project ($p < .05$). No change occurred for the nonintervention patients. Analysis of pharmacy dispensing of peak flow meters by product code was also undertaken for a cohort of 17,298 asthma registry patients in 1998 and 1999. The percentage of patients with a dispensed peak flow meter increased significantly ($p < 0.05$) in the 0- to 19-year age group (45.9% to 49.1%), but relatively no change was found for the other age categories. Results from data derived from the CMI-sponsored Survey of Adults with Asthma found a 4.5% increase (73% to 77.5%) in number of asthma patients responding to the survey who reported owning a peak flow meter ($n = 1222$). These data demonstrate a discrepancy between patient reports of having a peak flow meter and pharmacy dispensing. Reasons for the differences are unknown; however, pharmacy dispensing data were available only from 1995 to the present, so we presume that part of the variation is due to some patients having received a peak flow meter prior to 1995 or



having received it somewhere else besides a KPCO pharmacy. Because the patients responding to the CMI survey were not drawn from exactly the same sample as the patients for whom we collected pharmacy dispensing records, additional statistical calculations could not be made to further examine the source of the discrepancies.

Analyses using chart audit data for the pilot intervention patients and for a random sample of nonintervention patients found a statistically significant increase (from 16% to 60.0%) in percentage of pilot intervention patients with a documented home care plan ($p < 0.05$). For the sample of nonintervention patients, the prevalence of home care plans increased from 21% to 26%, but this change was not statistically significant. The percentage of pilot intervention patients who had received spirometry testing also experienced a statistically significant increase (4.6% to 58%). No change was found for the sample of nonintervention patients. Although not statistically significant, results also derived from the CMI-sponsored Survey of Adults with Asthma found that more than 4% (62% to 66.7%) of the 1222 asthma patients responding to the survey had received written directions about how to take their asthma medication and what to do if they had a severe attack.

Comment

Effect of Program on Direct Patient Care

The Asthma Disease Management Program's effect has been to extend the physician's ability to 1) educate patients about their disease, 2) provide appropriate treatment, and 3) monitor patient care over time. The registered nurse's role is expanded to include monitoring and management of asthma patients. Improved collaboration and communication between subspecialty and primary care departments has resulted in improved asthma control in this population.

What Makes the Project Innovative?

The Asthma Disease Management Program is unique because it provides a mechanism to identify patients who are at high risk for complications and exacerbation and to implement proactive interventions to prevent these occurrences. The patient's care plan is negotiated according to the patient's readiness to change and lifestyle choices. The care managers assure communication between key departments such as Allergy, Pulmonology, Pharmacy, and Primary Care.

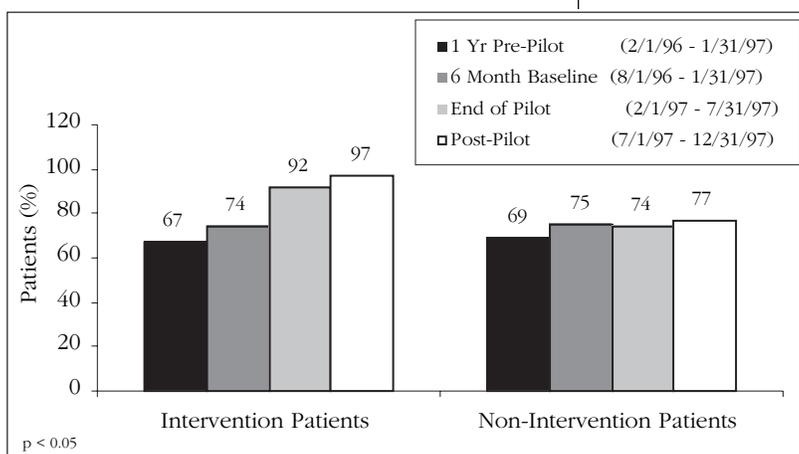


Figure 6. High-dose** beta2-agonist use with inhaled steroids

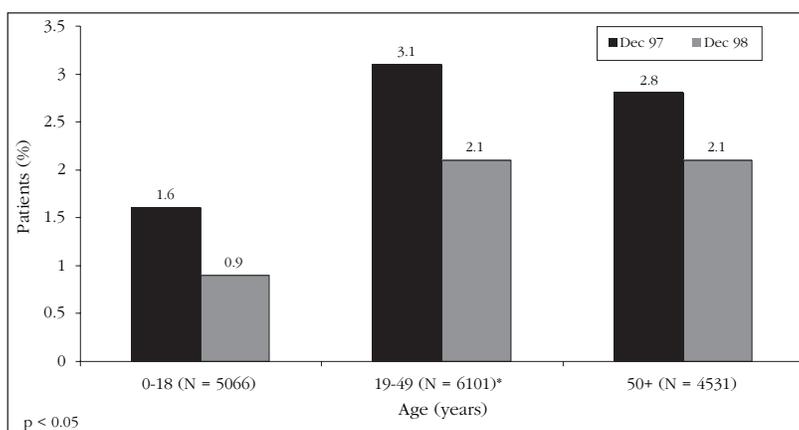


Figure 7. Asthma Registry patients overusing beta2-agonist in past 12 months (N = 15698)

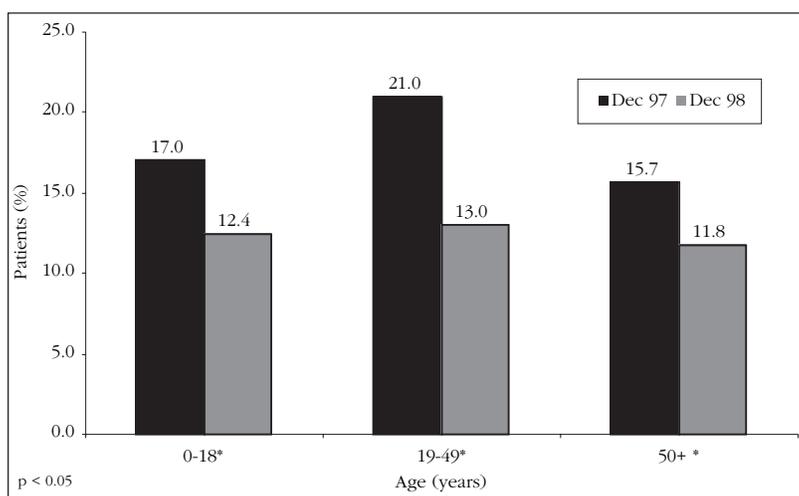


Figure 8. Asthma Registry members receiving high-dose beta2-agonist with no anti-inflammatory**

** Total N for each strata are variable

Has the Program Led to Development of New or Improved Processes That Can Be Considered "Best Practices"?

KPCO's Primary Care Quality Council targeted asthma as one of its primary areas of focus for 1999. The Council adopted asthma quality measures recommended by the Asthma Disease Management Program and is piloting an asthma initiative in the Pediatric Departments. In 1998, all KP Divisions collaborated to create the CMI to disseminate knowledge and assist with local implementation of evidence-based clinical best practices throughout all regions. Our established Asthma Disease Management Program has been highlighted in interregional discussions and is being evaluated as a best practice.

The Program is not viewed as replacing any part of patient care ...

Has the Project Resulted in Excellent Performance Compared with Other Programs or Relevant Benchmarks?

In October 1998, the CMI published data comparing the results for care processes and outcomes for all KP.¹⁰ For the period 8/1/96 through 7/31/97, which included our six-month pilot period, the KPCO compared favorably with other KP Regions.

Benefits of Multidisciplinary Team Involvement

The volume and focus of the Program's development required the skills of clinical and nonclinical staff. The Program is not viewed as replacing any part of patient care but is well integrated into the primary care milieu. The Program's successful implementation occurred because the viewpoints, concerns, and interests of the staff who would be affected were represented. These individuals continue to be on-site champions of the program.

Implications and Conclusion

The pilot project resulted in implementation of asthma care management for all clinics in the Denver/Boulder Local Market and the addition of four asthma care managers. KP Kansas City recently insti-

tuted an asthma care management program based on the successful results of our Denver/Boulder Local Market project. The KPCO Colorado Springs Local Market is working collaboratively with the Denver/Boulder Disease Management Team to implement an asthma disease management program.

In conclusion, evaluation of the Asthma Disease Management Program demonstrated improved patient and physician satisfaction, improved treatment/care planning, and improved medication utilization with gains sustained over a two-year period. The evaluation thus demonstrated that systematic, population-based asthma disease management can improve quality, satisfaction, and utilization outcomes and can sustain these gains over time. ❖

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