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Resource Paper

The Bronx Improving Asthma Care for Children Project

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Abstract

Affinity Health Plan sought to address the widespread problem of childhood asthma in New York City through a collaborative effort to establish an early detection, early intervention process coupled with state-of-art pediatric asthma treatment methods and community- and home-based family education. Affinity developed strategies to improve its administrative practices to identify asthma members early, stratify them, and offer case management services; to provide in-home patient education and improve self-management skills; and to improve clinical practice through case-based physician training. Affinity used funding from a Robert Wood Johnson Foundation, Improving Asthma Care for Children grant to pilot these efforts. Detailed analysis of these strategies reveals notable successes, and a marked effect on outcomes. Program efforts reduced childhood asthma utilization and costs significantly, particularly expensive inpatient hospital stays and emergency department visits, and, overall, the plan received a marked return on investment. Our results suggest that these efforts can be replicated to improve clinical outcomes and reduce the high costs associated with asthma.

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Executive Summary

Asthma is the most common chronic condition confronting children, and the prevalence of asthma among children is considerably higher in New York City than in the nation as a whole, particularly in poorer neighborhoods across the city. Affinity Health Plan is committed to improving childhood asthma management and outcomes for children with asthma.

Affinity sought to address asthma for children, 0-18, in New York City and the surrounding communities through a collaborative effort to establish an early detection, early intervention process joined with state-of-art pediatric asthma treatment methods and community- and home-based family education to change the way patients and providers approach asthma. In particular, Affinity wanted to change the asthma treatment paradigm from an acute care episodic model to a chronic disease care model. Affinity used funding from a Robert Wood Johnson Foundation, Improving Asthma Care for Children grant to meet the following goals:

1. To improve Affinity's administrative asthma care management practices by developing and strengthening systems for early identification of plan members with asthma and to stratify them by disease severity.
2. To provide in-home patient education and self-management strategies
3. To improve managed care primary care network clinical practices by promoting the NAEPP guidelines for care, evaluating the quality of care provided to children with asthma, and providing feedback to clinicians.

Affinity developed a number of strategies to identify members with asthma early in their tenure with the health plan and to outreach to those members, stratify them and offer services, including a dedicated effort to outreach to new enrollees in the plan in the first month after enrollment. This early identification strategy has been remarkably successful. By the close of the project Affinity is identifying between 300 and 400 new asthma members each quarter, stratifying their severity and referring them for appropriate care early.

Upon identification, members with asthma are referred to Affinity asthma case managers for assessment and referral to respiratory therapy home visits as needed. These home visits generally include an assessment of the member and a review of signs, symptoms, and triggers with the member and/or caregiver; an environmental assessment of the home and recommendations for elimination of triggers; and patient education on medications, asthma action plans, and equipment (peak flow meters, spacers, nebulizers). These efforts to provide in-home patient education and self-management strategies have been relatively successful as well, though there are challenges confronting any efforts to provide home-based interventions for a mobile Medicaid population.

To improve clinical practice, Affinity worked to develop a set of case-based interactive asthma training materials for its primary care network. "The Asthma Dialogues" uses case-based techniques to assist physicians to diagnose and treat asthma according to

NAEPP guidelines. Physicians who completed the training receive financial reimbursement for in-office spirometry and nebulizer treatment as an incentive, as well as CME credit.

Detailed analysis of outcomes associated with these program efforts reveals marked reductions in childhood asthma utilization and costs. Over the course of the project, Affinity generated quarterly data on trends in utilization and costs to document the changes due to our intervention and demonstrate that early asthma care management improves outcomes and quality of life for children with asthma. For example, inpatient hospitalizations for childhood asthma fell by 300 percent, and inpatient costs fell from over $12 per member to $7.50 per member. The results of this analysis suggest the following conclusions:

- The early identification effort is notably successful in reducing subsequent asthma utilization and costs.
- The combination of identification and outreach reduces utilization and costs. Asthma members touched by case management have significantly lower utilization and costs.
- Members touched by case management are significantly more likely to be compliant with the QARR/HEDIS appropriate asthma medications measure.
- Physicians experience substantial education gains from case-based asthma training. Training increases physicians' sense of self-efficacy, and preliminary analysis suggests training can reduce utilization and costs.
- Analysis of return on investment for the program indicates a significant return for the plan from these activities. For the cohort of children with asthma in the plan (the key target of this intervention), the return on investment ratio was 10.2. In other words, every dollar invested in the project generated ten dollars in costs savings in childhood asthma care. The plan-wide ROI ratio is also very strong at 3.0 – for every dollar invested in this project to improve asthma care for children, the plan saved three dollars in overall cost savings.

Clearly, the project has improved our ability to reach children diagnosed with asthma and attempt to improve their care. As such, it fits closely with Affinity Health Plan's basic mission to improve care-seeking and care-giving in the communities it serves. Early identification and outreach efforts combined with case-based provider training can reduce costly impatient hospital stays and emergency department visits for children with asthma. Our project experience and analytical findings both suggest that Affinity's efforts can be replicated by other health plans and by states seeking to reduce the high costs associated with asthma.

Introduction

Asthma is the most common chronic condition confronting children, and the burden of asthma has increased steadily during the last years of the 20th century. The CDC estimates that six percent of Americans have asthma, which represents a doubling of asthma prevalence since 1980.[1]

The prevalence of asthma is considerably higher in New York City (NYC) than in the nation as a whole. In 2000, children in New York City were almost twice as likely to be hospitalized for asthma as children in the United States as a whole. Moreover, compared to other NYC boroughs, the Bronx experiences the highest rates of asthma prevalence and has the highest overall rates of asthma hospitalizations and deaths among NYC children and adults. Among NYC children 4-5 years old, the Bronx has the highest percentage of school-based asthma prevalence, 15.5 percent in 1999.[2]

A study of asthma prevalence by The Harlem Children's Zone estimated that one in four children in central Harlem has asthma,[3] and there are several areas in the Bronx with similar rates. Estimates from the city's community health profiles cite asthma prevalence rates ranging from 15 to 20 percent in most of the high-risk neighborhoods in the Bronx.[4]

Affinity Health Plan is committed to improving pediatric asthma management and outcomes. Asthma is one of the most common reasons for pediatric hospital admissions and emergency department visits for Affinity members. Affinity hypothesized that early identification, education, and outreach to new members and focused training for primary care providers would improve the management of and outcomes for Affinity pediatric members with asthma. Affinity staff was fortunate to have the full and enthusiastic support of its corporate leaders and board of directors in undertaking this initiative.

Affinity was not alone in addressing asthma during the past three years. The New York City Department of Health and Mental Hygiene Community Health Works targeted asthma as a key public health problem. Patient education materials ranging from asthma action comic books to subway ads raised the public's awareness of asthma. Asthma partnerships received funding to do patient and provider education. Medicaid and the State Children's Health Insurance Program health plans came together to develop a consumer guide for asthma services. In 2002, the city sponsored a learning collaborative for community medical care providers to improve asthma care. The US Department of Health and Human Services also funded an asthma collaborative for Federally Funded

[1] http://www.cdc.gov/asthma/children.htm

[2] New York City Department of Health and Mental Hygiene, *Asthma Facts, Second Edition.*

[3] Nicholas S, et al. Addressing the Childhood Asthma Crisis in Harlem: The Harlem Children's Zone Asthma Initiative. *American Journal of Public Health* 2005; 95(2): 245-249.

[4] Karpati A, Lu X, Mostashari F, Thorpe L, Frieden TR. NYC Community Health Profiles 2003. New York City Department of Health and Mental Hygiene. http://www.nyc.gov/html/doh/html/data/data.html

Community Health Centers, and the Environmental Protection Agency (EPA) funded a program to evaluate the impact of providing environmental interventions in the home to reduce asthma.[5] In November 2003, the New York State Department of Health developed the first statewide asthma guideline tool for use by all insurers and providers in New York State in an effort to create a single standard of care.[6]

The original plan for the project focused on the problem of asthma in the Bronx, where our highest concentration of members with asthma resides. Since the start of this project, Affinity has grown substantially, expanding its service areas to cover all of New York City and the five suburban counties surrounding the city (Kings, Queens and Richmond - Staten Island in the city, and Westchester, Rockland, Orange, Suffolk and Nassau). In addition to expanding its service area, Affinity experienced significant enrollment growth as mandatory Medicaid managed care was implemented in New York City. This growth increased the size of the asthma problem Affinity needed to address and brought in many new members and providers who could benefit from an improved approach to asthma care.

The project was a collaborative effort between Affinity Health Plan and its network providers to establish an early detection, early intervention process joined with state-of-art pediatric asthma treatment methods and community- and home-based family education in order to achieve a change in the way patients and providers approach asthma. A major objective for this project was to shift the asthma treatment paradigm from an acute care episodic model to a chronic disease care model. This required providers to alter their treatment and medication goals from "rescuing" patients having acute attacks to "controlling" a chronic inflammatory disease, and to activate members to participate in this approach to care.

Program Design

Program Goals

Affinity set the following goals for this program:

1. To improve Affinity's administrative asthma care management practices by developing and strengthening systems for early identification of plan members with asthma and to stratify them by disease severity.

2. To provide in-home patient education and self-management strategies.

3. To improve primary care clinical practices by promoting the NAEPP guidelines for care, evaluating the quality of care provided to children with asthma, and providing feedback to clinicians.

[5] http://www.epa.gov/asthma/inhome.html

[6] http://www.health.state.ny.us/nysdoh/asthma/pdf/clinical_guidelines_2003.pdf

Program Activities Designed to Achieve Goals

Early Identification and Stratification

Affinity developed a number of strategies to identify members early in their tenure with the health plan and to outreach to those members, stratify them by risk and offer services such as facilitated PCP appointments and respiratory therapy home visits once identified. As a result, there are a number of "paths" for identifying and outreaching Affinity's asthma members (see Appendix 2 for charts outlining the flow for identification and outreach of asthma members).

To enhance its identification efforts, Affinity developed a new member health assessment form that is sent to all newly enrolled members with their enrollment materials and member handbook. In addition, Affinity contracted with CareCall, an outbound calls vendor, to perform welcome and health risk assessment (HRA) calls to all new members in an effort to identify additional members with asthma. Responses to all HRAs (from Maximus, the Medicaid enrollment broker, the mailed HRAs, and the CareCall HRAs) are captured in our eTrack application and identification of a member with asthma prompts an automated referral to the AIR (Asthma is Relieved) Program, Affinity's outreach and case management program for asthma. In addition, specifications for screening the pharmacy claims database were developed to identify members with asthma, and were also modified to identify children with more severe asthma.

Upon referral to AIR, clinical outreach staff (COS) contact new members identified with asthma. COS educate members and attempt to make the first appointment for members who have not yet seen their PCP, and conduct the initial risk stratification. Members identified with level 3 or 4 asthma are offered a respiratory therapy (RT) home visit. A similar process occurs for members identified via inpatient hospital or ED claims. COS staff make the initial outreach, and schedule an appointment with the PCP. Asthma case managers also speak to members during follow-up calls when the member reveals that they or another family member have asthma and refer members for an RT visit.

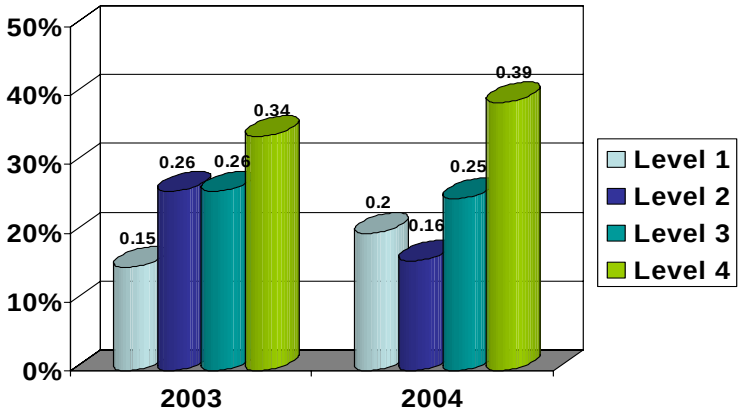
Table 1 summarizes the results of Affinity's outreach efforts over the course of the grant. From 2002 through 2004, over 3,000 new patients were identified with asthma via our early outreach efforts. Notably, the outbound call effort begun in the latter half of 2003 yielded over half of all of those new members with asthma. Approximately half of the new members were risk stratified by Affinity's clinical outreach staff, and a significant proportion of those contacted by Affinity were referred to their PCP or offered a respiratory therapy visit.

Table 1. Summary of Affinity Early Identification and Outreach Efforts

	2002	2003	2004
New Members Identified w/ Asthma	705	1152	1239
CareCall	N/A	837 (73%)	606 (49%)
Risk Assessments	215 (30%)	529 (46%)	646 (52%)
Level 1	N/A	78 (15%)	127 (20%)
Level 2	N/A	135 (26%)	162 (16%)
Level 3	N/A	136 (26%)	124 (25%)
Level 4	N/A	180 (34%)	233 (39%)
PCP Appointments	77 (11%)	513 (44%)	439 (68%)
Kept	64 (83%)	287 (56%)	246 (58%)
Respiratory Therapy/ Home Visits	125 (18%)	334 (29%)	364 (29%)
Visits Made	56 (45%)	143 (43%)	120 (32%)

Interestingly, the majority of new members identified with asthma that Affinity case management staff were able to stratify were classified as having Level 3 or Level 4 asthma (Figure 1). In short, many of the new members have moderate or severe asthma who are likely to be high users of services. This finding underscores the importance of these early outreach efforts for identifying new asthma members and connecting them to care before they have an expensive adverse event.

Figure 1. Risk Stratification for New Members with Asthma from Health Risk Assessments



Finally, Affinity consolidated all asthma-related information into a plan-wide asthma registry. We use this registry to examine differences in utilization of services between different subsets of members with asthma. For example, we compared hospital, ER, and pharmacy costs for members who have contact with our asthma program, AIR, with those who do not, and found significant differences in utilization patterns which we report below.

Patient Education and Self-Management

Strategies to achieve Affinity's patient education and self-management goals focus on home visits to members. Affinity arranges home visits to members with persistent asthma based on Affinity's stratification or if the member has recurrent admissions or emergency room visits. Respiratory therapy and durable medical equipment (DME) vendors provide these home visits. These visits generally include an assessment of the member and a review of signs, symptoms, and triggers with the member and/or caregiver; an environmental assessment of the home and recommendations for elimination of triggers; review and education on medications, asthma action plans, and equipment (peak flow meters, spacers, nebulizers). Detailed reports of the home visits are sent to Affinity and to the primary care provider.

In 2003 and 2004, more than 300 pediatric asthma members were offered a respiratory therapy home visit, representing about 30 percent of the total number of new members identified (Table 1), and a large proportion of the members with severe, persistent (Level 4) asthma. In 2003, 43 percent of patients referred for RT kept their appointment; in 2004 the proportion fell to 32 percent, illustrating some of the challenges associated with this dimension of the program. A health plan may engage in an outreach/patient education effort with the best of intentions, but it is still very difficult to reach members and bring that education to them.

Similar problems affected another dimension of our patient education and self-management efforts. Affinity sought to develop relationships with school-based health centers (SBHCs) as a way of enhancing our patient education and self-management efforts. Contract amendments for providers at several SBHCs were completed and all but one of the providers at these SBHCs were already credentialed, but these efforts to forge new partnerships for patient education fell short of expectations. We also sought to establish a relationship with Health Force, a community-based preventive health program as another avenue for enhancing patient education and self-management, but that effort never got off the ground due to contracting difficulties at Health Force.

Primary Care Clinical Practice

Dr. Robert Morrow, a family practice physician and a member of the research faculty at Albert Einstein College of Medicine in the Bronx with an interest in applying new technologies to continuing medical education, developed the case-based interactive asthma training materials, "The Asthma Dialogues," that promote adherence to the NAEPP guidelines (see Appendix 1 for a brief overview of the training). He also conducted the case-based interactive asthma trainings (Modules 1 and 2) for 86 providers

in 17 sites across our network. Each provider who took part in the Module One (1) training received an AIR tote bag, which contained a peak flow meter, spacer, forms, clinical guidelines, asthma action plans, and patient education materials.

Those providers who complete all four training modules, including two one-hour training sessions and two follow-up multi-media sessions, receive financial reimbursement for in-office spirometry and nebulizer treatments, services that are not generally reimbursable through Affinity Health Plan. Also, those providers who completed the four training modules were offered four CME credits through the New York Academy of Medicine (NYAM) Office of CME. To date, 50 out of 327 providers have completed Modules 1 – 4, and are receiving reimbursement for in-office spirometry and nebulizer treatments for Affinity members. Forty-three of the 50, providers also have received their CME Certificate from NYAM Office of CME.

We continue to offer our providers the opportunity to complete the case-based interactive training via CD-ROM. A web site for the Asthma Training program is available online and contains all the information on Dr. Morrow's clinical simulations. Providers who complete the training are eligible to receive reimbursement for in-office spirometry and nebulizer treatments for Affinity members, and most who are eligible have taken advantage of this benefit.

In addition to these focused efforts on provider education, Affinity adopted a statewide asthma management guideline developed in collaboration with the NYSDOH and other health plans and sent copies of the clinical guidelines to all our PCPs. Affinity will also sponsor clinicians planning to attend the NYSDOH Asthma Guideline conference being held throughout the service area to introduce the management guideline.

Affinity also emphasized improved asthma care through its Primary Care Reinvestment Program (PCRP). In 2002 and 2003, PCRP funds were awarded to selected primary care contractors with significant enrollment based on their performance on several clinical measures, two (2) of which are appropriate asthma medication measures (i.e., the percent of 5-17-year-olds and 18-56-year-olds who were prescribed appropriate asthma medications). To date, an additional 95 providers requested the CD-ROM program as part of their participation in the Primary Care Reinvestment Program.

Finally, Affinity routinely sends health center specific performance measures to providers and/or health center medical directors. Our Quality Management (QM) Department uses our HEDIS/QARR reporting software (CRMS) to produce report cards that provide feedback to our providers regarding their management of members with asthma, as well as a list of all members who should be on controller medications according to their claims history. We also notify PCPs of their members' emergency department visits in order to encourage follow-up ambulatory care visits. Our asthma care managers and clinical outreach staff send stratification tools to PCPs after members have been hospitalized. In addition, Affinity's pharmacy benefit manager sent a letter to PCPs listing their members who had multiple refills of short-acting beta agonists and no controller medications.

Accomplishments and Findings

Our program sought to:

1. Improve Affinity's administrative asthma care management practices.
2. Provide in-home patient education and self-management strategies.
3. Improve primary care provider asthma practice skills.

Achieving these goals should lead to improved utilization of appropriate treatment for asthma, and demonstrate that early asthma care management improves outcomes and quality of life for children with asthma.

We report on both processes and outcomes for each of these goals. Our evaluation of the success of this project focuses primarily on outcomes, but a few comments on process are in order. For the most part, our efforts to achieve the first goal and improve administrative practices were a success, as the earlier discussion of our outreach efforts (Table 1) indicates. We have been able to identify over 3,000 new asthma members, age 0-18, early in their tenure with the plan, and extended case management and home respiratory visits and patient education to them. We have thus achieved some notable plan-wide administrative improvements that are now a part of Affinity's basic approach to asthma care, and embedded in our organizational structure. Finally, we have offered the provider training component to a substantial portion of our primary care network, and although the take-up rate for the training has been less than we had hoped (about 15 percent), it too can be counted as a success.

The key issue is whether achieving these goals has altered utilization patterns, patient costs, or other patient outcomes. We begin this examination of outcomes with a discussion of the trends in utilization and costs, since it is central to the measurement of outcomes. As noted earlier, plan-wide childhood asthma utilization rates and costs declined significantly throughout the period of the project. Some of these changes are due to the dramatic growth Affinity experienced during this period, but the central concern is the extent to which the early outreach and provider training efforts contributed to the reductions in costs and utilization. We examine two sets of questions:

1. What is the effect of our early outreach and provider education efforts on asthma utilization and costs? Can we attribute changes in utilization rates to these factors?

2. What is the return on investment in these programs? Does investment in early outreach and provider education result in lower overall costs to the plan?

Trends in Utilization and Costs

Finding: Overall, Affinity experienced a marked reduction in asthma utilization and costs over the period of the project.

Over the course of this project, Affinity generated quarterly data on trends in utilization and costs as means of monitoring progress and as a first step in the process of calculating a return on investment for the efforts undertaken in this project. During the three-year project, inpatient utilization for childhood asthma fell three-fold from 2002 to 2004, and pediatric asthma ER visits declined over 400 percent (Figure 2). As a result, pediatric asthma costs declined as well (Figure 3). Per member costs for both inpatient hospitalizations and ER utilization fell by 50 percent over the three years – for hospitalizations, from $12.72 per member to $7.50, and for ED visits from $1.89 per member to $0.92 per member.

Figure 2. Annual Asthma Hospitalizations and Emergency Room Visits Per Child with Asthma Decreased between 2002 and 2004
(rates per 1000 childhood asthma patients)

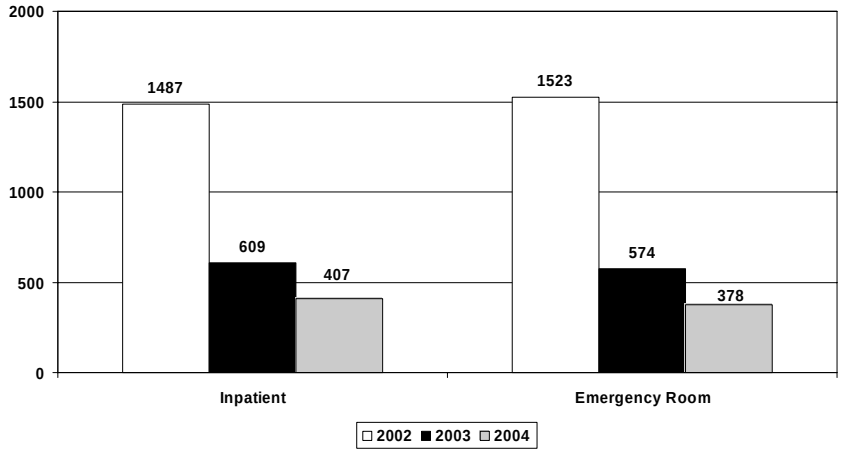
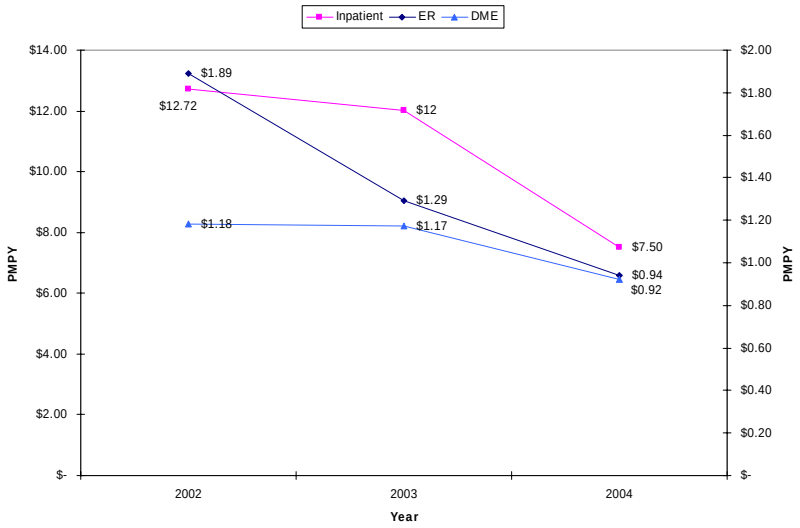


Figure 3. Trend in Pediatric Asthma Costs, 2002-2004



The decline in utilization rates and associated costs deserves extended discussion. As noted earlier, some of these trends are due to the membership growth Affinity experienced in the 2002-2003 period. Quite simply, the denominator for many of these measures is likely to be growing faster than the numerator, despite the controlling effects of focusing on member months. The shift from 2002 to 2004 is also compounded in part by the way measures were (necessarily) constructed for this project. We begin analysis as of January 2002, and include all children diagnosed with asthma in the calculations of rates and costs. Moreover, once a child is identified is diagnosed with asthma, they remain part of the analysis cohort for as long as they remain enrolled – thus, an asthma child identified in July of 2002 is still an asthma child and "counts" in the calculations of rates (and costs) if she is still enrolled in the plan in 2003 and 2004 – whether there is another asthma claim or not. This cumulative cohort of asthma members ensures that we have the entire universe of asthma members for analysis as the project goes on, but can also tend to skew the analysis of change over time due to having to select a starting point. In short, we do not have the full cohort of asthma members in the plan at the start of the study; certainly not to the extent that we do two to three years later. In this case, it means that the utilization rates for 2002 likely overestimate the true rate by some small factor.

Early Identification and Outreach to New Asthma Members

Our efforts to identify and outreach to members with asthma has been a marked success. The results presented in Table 1 highlight our enhanced ability to identify new members via health risk assessments conducted during welcome calls to new members. The plan now typically identifies between 300 and 400 new members (of all ages) with asthma each quarter, with more than half of those coming from the new outreach effort. Upon identification, the case management process kicks in automatically, and members are

referred to the AIR program for outreach, stratification, linkage to their primary care provider, and other additional services as needed.

Analysis of our early outreach and identification of asthma members focuses explicitly on outcomes: does early outreach and identification alter utilization and/or lower costs for members diagnosed with asthma? Do Affinity's early identification, outreach, and the other care management efforts result in higher quality outcomes?

The analysis of the early identification efforts is necessarily preliminary, since implementation began near the middle of the project in July of 2003. Despite this, we sought to examine the effects of contact with members early in their plan tenure. To review, the goal of the early identification effort was to conduct a welcome call and health risk assessment (HRA) within the first month of a member's enrollment in Affinity. Members identified with asthma via the HRA were then referred to Affinity's AIR program for follow up.

Finding: Early identification of new asthma members lowers subsequent utilization and costs.

We first sought to examine whether this early identification effort had any impact on utilization or costs. To answer this question, we examined all asthma members in the second half of 2003 (August through December) identified through early identification and compared their *2004 utilization* to all other asthma members identified in the same time period. As the results indicate, members identified early and referred to AIR have lower ER and inpatient utilization rates and higher PCP visit rates (Figure 4) than their counterparts who were not identified early. In short, outreaching to members early and trying to connect them to care appears to have an effect on subsequent utilization. Keep in mind that those asthma members not identified via the early identification effort come from all sources: hospital claims, pharmacy claims, and others, and many cases are likely to be expensive – and are also likely to get a subsequent referral to case management. Despite this, utilization in the subsequent year tends to be different across the two groups. These results are preliminary, but striking nonetheless.

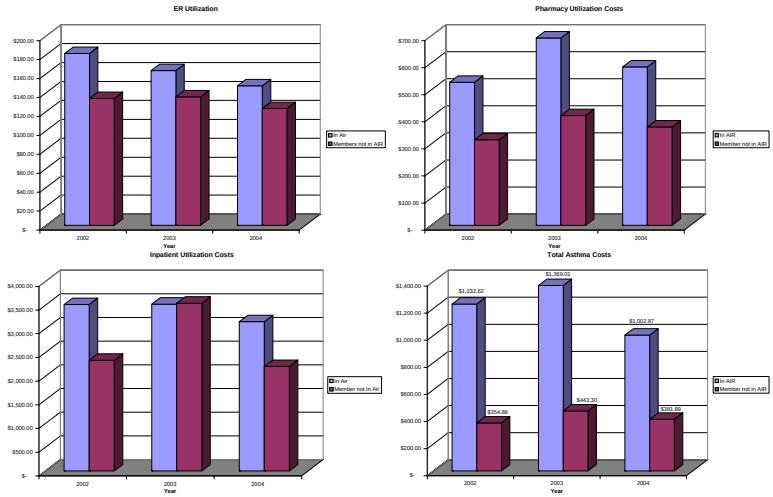
Figure 4. Early Outreach to Members Makes a Difference:
A Comparison of Utilization by Members Contacted Early

Members identified via early outreach call:				
Type	**Percent with claims in cohort**	**Claims rate per unique member w/claim**	**Cost per member ($)**	**Cost per unique member with claim ($)**
ER	**6.1%**	**3.50**	**6.23**	**102.76**
IP	**2.0%**	**8.50**	**55.12**	**2,728.24**
PCP	**46.5%**	**2.33**	**6.43**	**13.84**

Members not identified via early outreach call :				
Type	**Percent with claims in cohort**	**Claims rate per unique member w/claim**	**Cost per member ($)**	**Cost per unique member with claim ($)**
ER	**18.4%**	**4.46**	**34.47**	**186.87**
IP	**13.1%**	**9.47**	**55.12**	**3,034.00**
PCP	**45.8%**	**2.91**	**6.43**	**8.86**

Identifying a member with asthma early appears to make a difference, but the crucial questions concern the effects of our outreach and case management efforts. The simplest way to examine these effects would be to compare members enrolled in the AIR program to those not in AIR. Figure 5 presents this simple comparison for Affinity members with an asthma diagnosis claim for the period 2002-2004. The trouble with this comparison is that it stacks the deck against finding reductions in costs, since an inpatient stay or emergency room claim for asthma triggers automatic enrollment into AIR. The results in Figure 5 confirm the need for caution: per member costs for major utilization categories tend to be higher for members in AIR than for other asthma members.

Figure 5. A Simple Comparison of Utilization and Costs:
Asthma members in **AIR** vs. Not in **AIR**

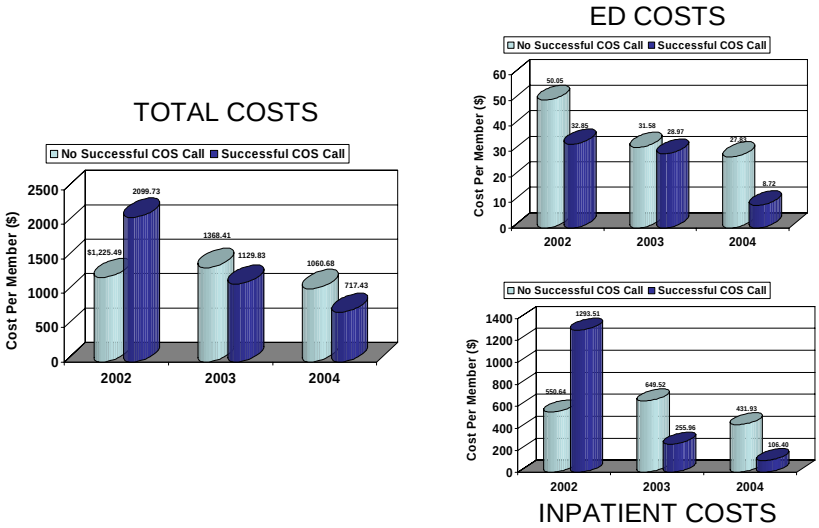


Finding: Affinity members touched by case management have lower utilization and costs than those not touched by case management.

In an effort to overcome these analytic difficulties, we constructed a cohort of all Affinity members with an asthma claim in each year for 2002 through 2004 and compared the utilization of members enrolled in AIR to those outside of AIR. Examining the change in utilization for a cohort of members over time should help to isolate the effects of early outreach on utilization and costs. For this analysis, we focused on making contact with a member through a clinical outreach call – whether an Affinity clinical outreach specialist (COS) was able to reach a member or not – and compared per member costs across these two cohorts of members, all of whom were enrolled with Affinity and had an asthma claim over the three years.

The results of this comparison are striking: a significant reduction in costs occurs across both cohorts, but costs for those members contacted by an outreach specialist are significantly lower. Figure 6 presents the results for inpatient, ER, and total asthma costs for the two cohorts, and in each case there are marked differences for the group touched by our care management efforts. The inpatient costs comparison provides a good example. Inpatient costs per member in 2002 for the AIR/COS cohort are notably higher, yet fall dramatically by 2004, to a point where they are nearly a quarter of the non-AIR cohort. Notably, the costs for the non-AIR cohort vary in a relatively narrow range across the three years, providing some important face validity for this analysis. A similar pattern occurs for ER utilization costs and total asthma costs comparisons, and the differences in mean annual costs per member are statistically significant in almost all of the comparisons.

Figure 6. Analysis Of Pediatric Asthma Costs:
A Cohort Analysis Of Members In **AIR**



Finding: Affinity members touched by case management score better on the standard HEDIS/QARR quality of care measure for asthma care.

Another striking finding emerges when we examine the effects of AIR on the quality of care delivered to members with asthma. We employ the HEDIS/QARR appropriate asthma medications indicator as a standard outcomes measure for this analysis. The results in Figure 7 illustrate the favorable impact of AIR's asthma case management on this measure. Affinity members enrolled in AIR are substantially more likely to be compliant on this measure than members not in AIR – highlighting the contributions of early identification and outreach for better care for asthma patients.

Figure 7. Impact Of **Air** On Asthma Outcomes:
A Cohort Comparison Of Compliance
With the *QARR* Appropriate Asthma Medications Measure

	% Compliant (N)	% Not Compliant (N)
In AIR Database	72.9% (1,132)	27.1% (420)
Not in AIR Database	46.2% (2,344)	53.8% (2,726)

Provider Education

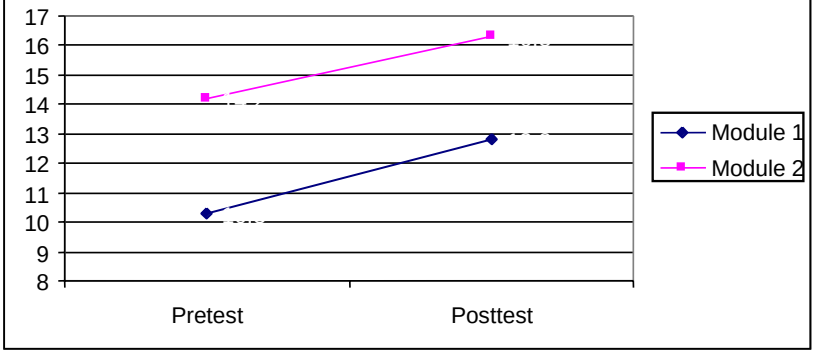
Our analysis of provider education focuses on changes for primary care doctors who completed the training, and an examination of whether the training had an effect on patient outcomes. As noted earlier, the provider education component of this project is still ongoing, and any assessment of the impact of provider education will be limited by the small number of providers completing the training to date and the short interval of time to evaluate its impact.

Finding: Physicians experience substantial education gains from case-based asthma training.

Overall, the provider education we offered was well received and effective in educating physicians – analysis of pre-post responses reveals significant gains for Modules 1 and 2 of the asthma training (Figure 8). We also observed a sizeable gain in physicians' perceptions of self-efficacy in treating patients with asthma (Figure 9). Finally, the

provider training produced a significant increase in the proportion of physicians who were confident about their ability and their patients' ability to treat asthma (Figure 10).

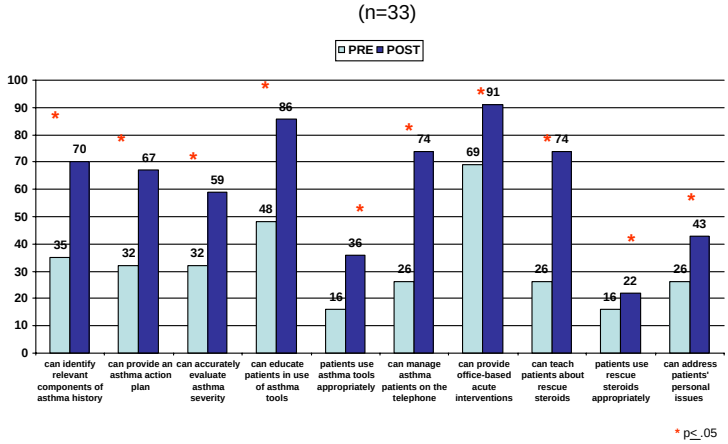
Figure 8. Educational Gains from Asthma Dialogues Provider Training



	Module 1		**Module 2**	
	t-value (df)	Effect size** (d)	*t*-value (df)	Effect size** (d)
Composite score	-11.39* (129)	1.14	-8.55* (99)	0.82

** p < .001*
*** Effect size conventions Small = .2, Medium = .5, Large = .8 (Cohen, 1988)*

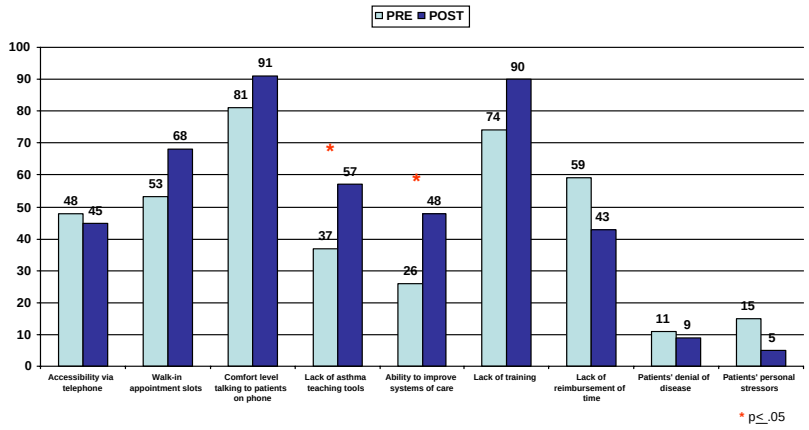
Figure 9. Change in Self-Efficacy:
Proportion of Providers Responding "Very Confident"



* p≤.05

Figure 10. Assessment of Barriers
Proportion of Physicians Responding "Not at All a Barrier"

(n=33)



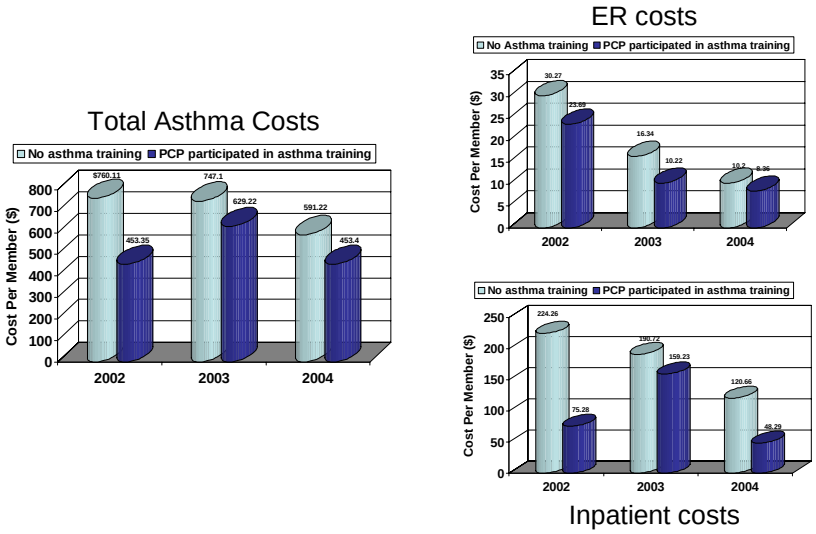
We also sought to examine the impact of provider training on costs, utilization, and quality outcomes. We used an analytic method similar to that used to assess the AIR outreach effort. We focus on a set of Affinity providers in the Bronx who completed the training and compare a cohort of their asthma members' utilization to another set of Affinity asthma members from the Bronx. Our expectation was that this focus on a single set of asthma patients in one region characterized by high asthma prevalence will ameliorate the potential differences in severity and risk across the two groups of patients. In short, we selected patients by provider, focusing on those members assigned to providers who received the asthma CD-ROM training, and comparing them to another similar set of members assigned to providers from the same borough who did not receive the training.

Finding: Patients of providers who underwent asthma training have slightly lower costs and utilization than other asthma members.

The results of this analysis are less certain than those for the AIR analysis, due in part to the preliminary nature of this examination. Patients of providers who received the asthma training tend to have lower overall utilization and costs than other members, but the results do not always achieve standard levels of statistical significance. The analysis of ER and inpatient utilization illustrates the challenges and the patterns apparent in this comparison (Figure 11). Both ER and inpatient utilization costs per member decline rather significantly for both groups of members over the three years examined, highlighting the substantial effects of Affinity's growth and other efforts to address asthma that occurred during this period. Nonetheless, utilization for the provider training group of members declines at a greater rate, particularly for the ER utilization which falls three-fold from roughly 24 dollars per member to 8 dollars per member. The change in utilization is also statistically significant in two of the three years examined. These

findings offer some initial evidence that the provider training produced improved asthma care for members.

Figure 11. Effects of PCP Asthma Training on Utilization and Costs



We examined the impact of the provider education efforts on quality outcomes using the QARR measure for compliance with appropriate asthma medications, but the results were inconclusive (not shown). It may be that it is too early for analysis to find confirmatory differences between the two groups of providers.

Return on Investment

Over the course of this project, Affinity reported quarterly on trends in utilization and costs as a first step in the process of calculating a return on investment for the efforts undertaken in this project. The initial discussion of trends in costs and utilization in the introduction to this section summarizes the results of these analyses, and presents strong evidence of an impact on asthma utilization and costs. Tables 2 and 3 summarize these findings for the three years of the project.

Table 2. Pediatric Asthma Utilization, 2002-2004

		Visits								
Outcome	Ages	2002	Rate/1000 (asthma)	Rate/1000 (Plan)	2003	Rate/1000 (asthma)	Rate/1000 (Plan)	2004	Rate/1000 (asthma)	Rate/1000 (Plan)
PCP	Total 0-18	8,766	2268	72	11,843	1118	71	15,841	1340	79
	0-4	3,143	2438		4,560	1245		5,911	1395	
	5-18	5,623	2183		7,283	1050		9,930	1309	
Specialty	Total 0-18	1,839	476	15	2,060	194	12	1,919	162	10
	0-4	523	406		477	130		565	133	
	5-18	1,316	511		1,583	228		1,354	178	
Ambulatory (PCP + Spec)	Total 0-18	10,605	2743	87	13,903	1312	83	17,760	1502	89
	0-4	3,666	2843		5,037	1376		6,476	1528	
	5-18	6,939	2693		8,866	1279		11,284	1487	
Inpatient	Total 0-18	5,750	1487	47	6,458	609	39	4,817	407	24
	0-4	2,917	2262		3,474	949		2,402	567	
	5-18	2,833	1100		2,984	430		2,415	318	
ER	Total 0-18	5,889	1523	48	6,083	574	36	4,469	378	22
	0-4	2,306	1789		2,697	737		1,841	435	
	5-18	3,583	1391		3,386	488		2,628	346	
DME	Total 0-18	2,130	551	17	2,486	235	15	1,991	168	10
	0-4	1,180	915		1,297	354		1,060	250	
	5-18	950	369		1,189	171		931	123	
Home Visits	Total 0-18	274	71	2	828	78	5	789	67	4
	0-4	133	103		474	129		392	93	
	5-18	141	55		354	51		397	52	
Pharmaceuticals	Total 0-18	18,417	4764	39	27,080	2556	161	29,845	2524	149
Appropriate	0-4	4,635	3595	29	6,867	1875	41	7,455	1759	37
	5-18	13,782	5350	44	20,213	2915	121	22,390	2951	112
Pharmaceuticals		52,459	13571	111	64,840	6119	387	63,894	5404	319
Appropriate		18,417	14284	117	27,080	7395	161	29,845	7044	149
Other		34,042	13214	108	37,760	5446	225	34,049	4488	170

Table 3. Childhood Asthma Costs, 2002-2004

	Costs									
Outcome	2002	PMPY (asthma)	PMPY (Plan)	2003	PMPY (asthma)	PMPY (Plan)	2004	PMPY (asthma)	PMPY (Plan)
Specialty	$ 95,794	$ 25	$ 0.78	$ 113,648	$ 11	$ 0.68	$ 125,806	$ 11	$ 0.63
Inpatient	$ 1,557,299	$ 403	$ 12.72	$ 2,017,513	$ 190	$ 12	$ 1,500,423	$ 127	$ 7.50
ER	$ 231,640	$ 60	$ 1.89	$ 217,032	$ 20	$ 1.29	$ 188,450	$ 16	$ 0.94
DME	$ 144,866	$ 37	$ 1.18	$ 196,563	$ 19	$ 1.17	$ 184,960	$ 16	$ 0.92
Home Visits	$ 17,647	$ 5	$ 0.14	$ 53,619	$ 5	$ 0.32	$ 69,546	$ 6	$ 0.35
Spirometry/ Nebulizer PCP	$ 2,843	$ 0.74	$ 0.02	$ 5,160	$ 0.49	$ 0.03	$ 7,829	$ 0.66	$ 0.04
Spirometry/ Nebulizer Specialty	$ 21,166	$ 5	$ 0.17	$ 27,362	$ 3	$ 0.16	$ 31,039	$ 3	$ 0.16
Pharmaceuticals	$ 3,102,480	$ 803	$ 25	$ 4,188,497	$ 395	$ 25	$ 4,293,976	$ 363	$ 21
Appropriate	$ 1,848,095	$ 478	$ 15	$ 2,843,923	$ 268	$ 17	$ 3,090,707	$ 261	$ 15
Other	$ 1,254,385	$ 325	$ 10	$ 1,344,574	$ 127	$ 8	$ 1,203,269	$ 102	$ 6
TOTAL COST	**$ 5,173,735**	**$ 1,338**	**$ 42**	**$ 6,819,394**	**$ 644**	**$ 41**	**$ 6,402,029**	**$ 541**	**$ 32**
	MM	46,387	1,469,641	MM	127,149	2,012,749	MM	141,890	2,400,625

While there is substantial evidence of a sizeable reduction in costs and utilization, the key question is whether the project components are responsible for the reductions we observe, and whether there is a sufficient return on investment for these efforts. We have provided extensive evidence of a strong connection between our identification and outreach efforts and lower costs and utilization. We employ a simple methodology for calculating return on investment, focusing on the total costs of the project – development, implementation,

and ongoing – and comparing these to the costs savings generated by the reductions in utilization. Formally, the ROI equation can be expressed as follows:

ROI Ratio = Net Cost Savings (2004-2002) /Total Costs of Intervention (2002+2003+2004)

Table 4 presents our summary calculations for the various costs for the project. Notably, costs were divided almost equally between development and implementation costs, and ongoing costs for the project. Our cost calculations include personnel to manage and conduct the project, materials for the provider training and their associated development costs, and ongoing costs associated with continued outreach and case management and data management and analysis. On a per member basis, the project costs about 80 dollars per member with pediatric asthma; the plan-wide PMPY was $3.37.

Table 4. Development, Implementation, and Ongoing Cost of the Intervention (3 Years)

	Total	Cost PMPY (asthma)	Cost PMPY (plan)
Development & Design of Provider Education Material (Year 1 only)	$39,390	$10.16	$0.32
Development & Implementation of Processes			
Year One	$98,575	$25.50	$0.80
Year Two	$81,197	$7.66	$0.48
Year Three	$24,057	$2.03	$0.12
Total Development & Implementation Cost	$203,829	$35.20	$1.41
Ongoing Activities			
Year One	$42,844	$11.08	$0.35
Year Two	$81,755	$7.72	$0.49
Year Three	$161,182	$13.63	$0.81
Total Ongoing Cost	$286,869	$32.43	$1.64
TOTAL COST (Year 1 to 3)	**$529,988**	**$77.79**	**$3.37**

Calculations for cost savings generated by the project appear in Table 5. We experienced sizeable savings from reductions in ED visits ($44 on a pediatric asthma member per year, and almost $1 plan-wide), inpatient utilization ($276 per pediatric asthma member per year, and $5 plan-wide), and alterations in patterns of prescribing asthma medications ($440 per pediatric asthma member and $4 plan-wide) as a result of this project. Total cost savings per member with childhood asthma was almost $800 for the three years of the project, and a full $10 per member per year across all members of the plan.

Table 5. Total Medical Costs Saved After Intervention
(3 Years)

		Cost Savings PMPY (asthma)	Cost Savings PMPY (plan)
Emergency Department Visits		$44	$0.95
Inpatient Visits		$276	$5.22
Specialty Visits		$14	$0.15
Home Visits		-$1	-$0.21
Durable Medical Equipment		$21	$0.26
Spirometry/Nebulizer (PCP)		$0.08	-$0.02
Spirometry/Nebulizer (Specialist)		$2	$0.01
Prescription Medications (for asthma)		$440	$4
COST SAVINGS (Year 1 to 3)		**$796**	**$10**

Finding: Project Efforts Produced A Significant Return On Investment.

Calculation of the ROI ratio involves a straightforward comparison of cost savings on a PMPY basis with the costs of the intervention. For the cohort of children with asthma in the plan (the key target of this intervention), the return on investment ratio was 10.2 In other words, every one dollar invested in the project generated 10 dollars in cost savings in childhood asthma care. The plan-wide ROI ratio is also very strong at 3.0 – for every dollar invested in this project to improve asthma care for children, the plan saved three dollars in overall cost savings (Figure 12).

Figure 12. Return on Investment of Asthma Intervention
(3 Years)

Per Member Per Year (Asthma)

Total Cost Savings of the Intervention/Total Cost of the Intervention =

10.2

Per Member Per Year (Plan)

Total Cost Savings of the Intervention/Total Cost of the Intervention =

3.0

Project Sustainability

Without question, the Improving Asthma Care for Children project improved our ability to reach members diagnosed with asthma and attempt to improve their care. As such, it fits closely with Affinity's mission to improve care-seeking and care-giving, and Affinity is committed to continuing this project as an important reflection of our mission. Sustaining this project beyond the grant will enable us to continue to improve asthma care for our members, to build on our existing progress to improve our internal administrative processes, to improve our ability to identify and outreach to asthma members, and to evaluate the effectiveness of those efforts.

We intend to sustain most of the components of the project beyond the term of the grant. We will build on our efforts to identify members with asthma early in their tenure with the plan, and to outreach to them early. We will expand our physician education efforts to encompass all pediatricians and family practice doctors in our network, and explore alternative vehicles (such as the web) for delivering physician education. We will continue to offer home respiratory therapy visits as a way of improving patient education and patient self-management. We will continue our efforts to build relationships with school-based health centers and to incorporate their activities on behalf of our asthma members into the asthma program. Finally, we will continue to evaluate our efforts, conducting regular quarterly assessments of utilization, cost, and other data.

Fortunately, many of the resources necessary to continue these efforts are already in place, and we have the commitment of Affinity's senior leadership and staff. We will need to prepare a detailed project plan to implement the continued outreach and physician education components. We will continue member outreach under the AIR program, and have the processes in place for continued enhanced reimbursement for asthma as well as for evaluation of the program.

Challenges and Barriers

As with any project of this size and scope, we encountered a number of challenges and difficulties in development and implementation. These included a series of administrative challenges, some issues related to substantial plan growth, and some notable data and analysis challenges as well.

As of January 1, 2002 The Bronx Health Plan and GENESIS Health Plan merged, becoming one corporation named Affinity Health Plan. This merger increased the scope of the project. Although the focus of The Robert Wood Johnson grant was asthma care in the Bronx, all of the activities and services were extended to the entire plan membership (which at that time was over 110,000). The plan's provider network also doubled in size as a result of the merger, and spread over a 10-county area rather than the two boroughs in New York City served by The Bronx Health Plan. As a result of the substantial growth in membership and providers, Affinity Health Plan had to re-evaluate its case management and clinical outreach staffing needs. Additional contracts needed to be developed to provide home visits over a wider service area. In addition, we needed to

increase the role of distance learning for the provider education component of this grant. Also due to the merger, Affinity Health Plan had a different pharmacy benefit manager as of January 1, 2002. As a result, we needed to develop new specifications for screening the pharmacy claims database to identify members with asthma. The specifications also needed to be modified to identify children with more severe asthma.

On the administrative side, we experienced some difficulty in recruiting a full-time Project Manager for this project. At the end of the second quarter in the first year of the project, an existing staff member took over many of the project manager responsibilities for this project on a part-time basis.

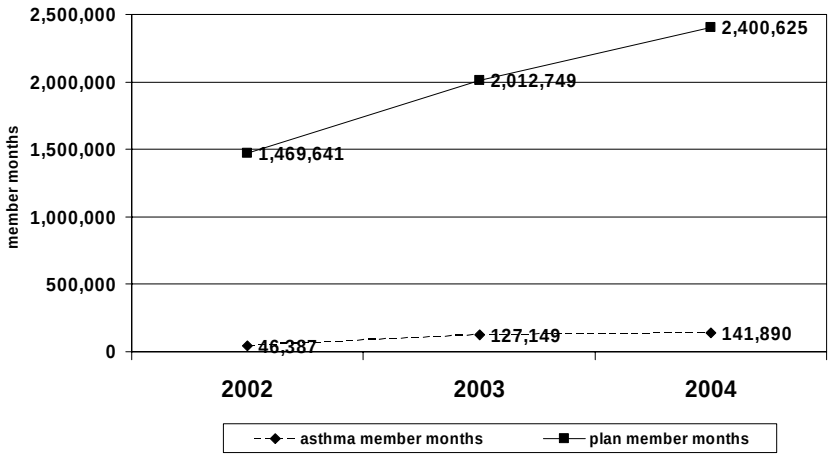
Some of the specific efforts associated with the project proved more difficult than expected. For example, applying for and receiving Continuing Medical Education (CME) Accreditation for the provider trainings was a much more complicated process than originally thought, particularly the new technology distance learning portion. The NYAM CME Committee approved the CME Accreditation for the provider trainings in year two, quarter one of this project. We also experienced difficulty engaging and contracting with the School Based Health Centers (SBHC), and encountered some difficulties credentialing SBHC providers. Finally, the process of contracting with Health Force was longer than expected mainly due to the fact that legal counsels for both sides could not agree on the appropriate contract language, particularly related to medical liability issues. In the interim, we agreed to refer members to Health Force for home visits and education under the New York City Department of Health (NYCDOH) program. However, this program limited us to two zip codes in the Bronx. We also pursued other respiratory vendors as a source of home visits and environmental assessments, and expanded our efforts to contract with respiratory therapy vendors to provide home visits and other services for asthma members.

The details of data management proved challenging as well. The database used by the clinical outreach and case management staff to track contacts with asthma members proved inadequate to manage the growth in health plan membership. As a result, we reviewed several care management and reporting programs that could integrate Affinity's membership, provider, and claims database. A vendor was selected and the implementation phase started in September 2004. In the interim, we used our Asthma Is Relieved (AIR) database, an Access database to manage patient contact and care management. We enhanced our HEDIS/QARR reporting software (CRMS) to build a data warehouse to more effectively identify and track members with asthma, as well as provide feedback to our providers regarding their management of members with asthma. A mailing to PCPs identifying their members who should be on controller medications according to their claims history was completed. We also consolidated all asthma-related information into a plan-wide asthma registry.

As we have discussed, we also encountered some challenges in measuring the outcomes of these interventions. Data, measurement, and analysis issues pose significant challenges to the presentation of findings. One challenge deserves extended discussion. As noted, the tremendous growth Affinity experienced during the project period complicates

analysis. Notably, the growth affects the calculation of rates on a per member basis, whether we focus on asthma patients alone or on total plan membership. As Figure 13 indicates, childhood asthma member months grew significantly from 2002 to 2004, yet did not come close to keeping pace with total plan growth. The fact that asthma member months grew by a factor of three makes the comparison of rates somewhat problematic. The 2002 figures start from an arbitrary baseline, and probably do not reflect the "true" asthmatic population of the plan, and therefore likely overstate the true reductions in utilization rates. Rates for the overall plan compensate for these challenges to a certain degree, but the tremendous growth in overall plan member months cannot be overlooked when considering our findings on reductions in rates and costs, and in return on investment.

Figure 13. Growth in total asthma member months and plan member months (2002 to 2004)



Conclusion

Asthma Interventions by a Health Plan Can Improve Asthma Care for Children

The costs of asthma for children are high and children covered by Medicaid have higher costs than those covered by private insurance. Also, Medicaid children are less likely to receive appropriate medications for asthma than children covered by private insurance.[7] The expansion of managed care in Medicaid presents an opportunity to improve asthma

[7] Laura Summer and Joelle Simpson. "Asthma Care for Children: Financing Issues. A CHCS Chartbook." Center for Health Care Strategies, Princeton, NJ (October 2001).

care for children through preventive care and reducing the number of acute events. Furthermore, there has been increasing attention to the benefits of disease management.

Our project results demonstrate that managed care can improve asthma care. Early identification and outreach efforts can reduce costly inpatient hospital stays and ER visits for children with asthma. Early outreach results in lower ED and inpatient utilization for children with asthma. While we have no direct measure of improvements in quality of life for our asthma patients, it is not too great a stretch to claim that significant reductions in inpatient and emergency room visits for a large cohort of our membership with asthma constitutes a clear signal of improved care and better outcomes for these patients. Going forward, additional plan case management efforts and other interventions to assist patient self-care can build on these early outreach and identification efforts and raise quality of life for asthma patients. Making the connection between plan and patient via clinical outreach specialists can improve care for asthma patients and lower costs for plans.

Similarly, plan efforts to improve physician care for asthma through case-based education and training based on standard guidelines can raise physician confidence in treating asthma and improve outcomes. Skills-based education that is interactive and focuses on clinical care issues is a viable approach to physician training, and can be used for continuing medical education and quality improvement. Although the evidence on patient outcomes is preliminary, our findings suggest that the combination of early outreach and identification of asthma members and increased provider training can reduce adverse utilization and improve overall outcomes for children with asthma.

Currently, quality monitoring occurs at the health plan level, but health plans also have the ability to track utilization of health care at the individual member and physician level and develop interventions. Through the health plan's coordinated efforts, we have increased early identification of enrollees with asthma, increased use of case management services, and increased provider training. All of these have improved outcomes for the plan and for enrollees. The intervention increased visits to specialists, decreased hospitalizations and emergency room utilization, and increased in the use of appropriate asthma medications. Provider knowledge and self-efficacy around asthma care also increased. As studies have noted and our own results demonstrate, these trends signal improved asthma care and better outcomes.

Recommendations

Early identification and outreach combined with basic case management, and provider training can improve asthma care for children. As well, these efforts can produce a significant return on investment for health plans. The administrative and other costs of these programs are an important issue, however, and additional financial incentives for health plans to undertake these kinds of targeted initiatives could encourage greater innovation and more notable successes. These incentives could include risk-adjusted payments for members with chronic conditions such as asthma or diabetes to compensate for the additional investment plans are likely to make in these members. Currently, New York State provides an additional payment to a Medicaid managed care plan's capitation payment based on their performance on QARR/HEDIS measures.

Other incentives are available to states and other payers. Overall quality improvement efforts can be strengthened through provider education programs and interventions by more health plans or collaboration between plans. Incentives to collaborate are few and far between; yet, most physicians contract with many health plans, and health plans have overlapping provider networks. Offering provider training to all physicians or finding ways to promote plan collaborations in their quality improvement efforts may have a great impact.

Next Steps

As noted earlier in our discussion of sustainability, Affinity is committed to continuing these efforts beyond the scope of the project grant. We will continue to focus on early identification, outreach, and provider education as key mechanisms for improving care for children with asthma. Similarly, we will continue to monitor outcomes from these efforts, analyzing trends in utilization and costs on a quarterly basis.

That said, we have only begun to scratch the surface on our efforts to improve patient self management and health maintenance. Respiratory therapy home visits are now a proven first step, but additional patient education and other interventions aimed at assisting children in managing their asthma themselves could significantly improve outcomes and quality of life.

We can continue to work to find other vehicles for provider education on care for asthma and other chronic conditions. The case-based skills training is currently offered as a CD-ROM to our provider network, and we are exploring an on-line tool and other options for this and other educational opportunities for providers.

Continuous data improvement is another important next step for the project. We need to continually improve our efforts to gather accurate, timely encounter data from our providers of asthma care for children, and to explore ways to gather data from school-based health centers and other sources as a way to improve our care management and monitoring efforts.

Finally, the efforts described here are a series of first, successful steps in addressing an important chronic condition for our members. We have demonstrated the importance of early identification and outreach, and the important role that provider training can play in improving asthma care. Affinity will continue to explore innovative mechanisms and approaches to improving care-seeking and care-giving for children with asthma.

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Appendix 1. Tools: Case-Based Skills Training for Treating Asthma

The Asthma Dialogues: Skills Training for Healthcare Providers

How do we get healthcare providers to follow Asthma Guidelines?

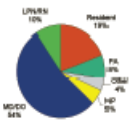
Adherence issues:
- Assessing Level of severity
- Use of appropriate medicines
- Use of appropriate tools
- Creating easy access to services

Hypothesis:
- A teaching model aimed at improving skills and focusing on typical simulated patients would improve providers' ability to chose appropriate care options for post-teaching simulations.

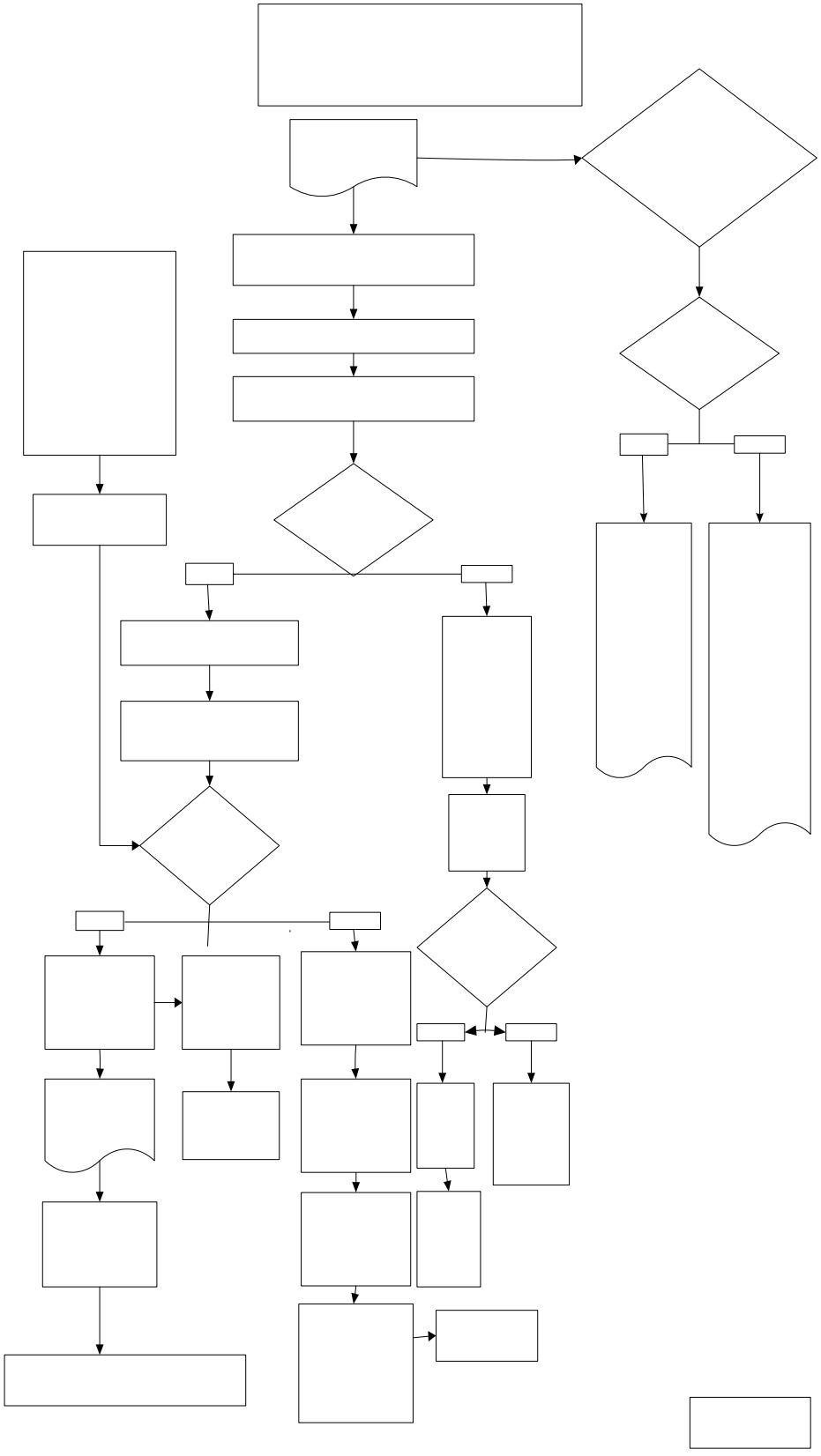
Methods:
- Small group training
- Two one-hour sessions
- Two follow-up multimedia sessions
- More than 200 learners
- Case-based discussions, with "pre" and "post" simulated cases and clinical choices

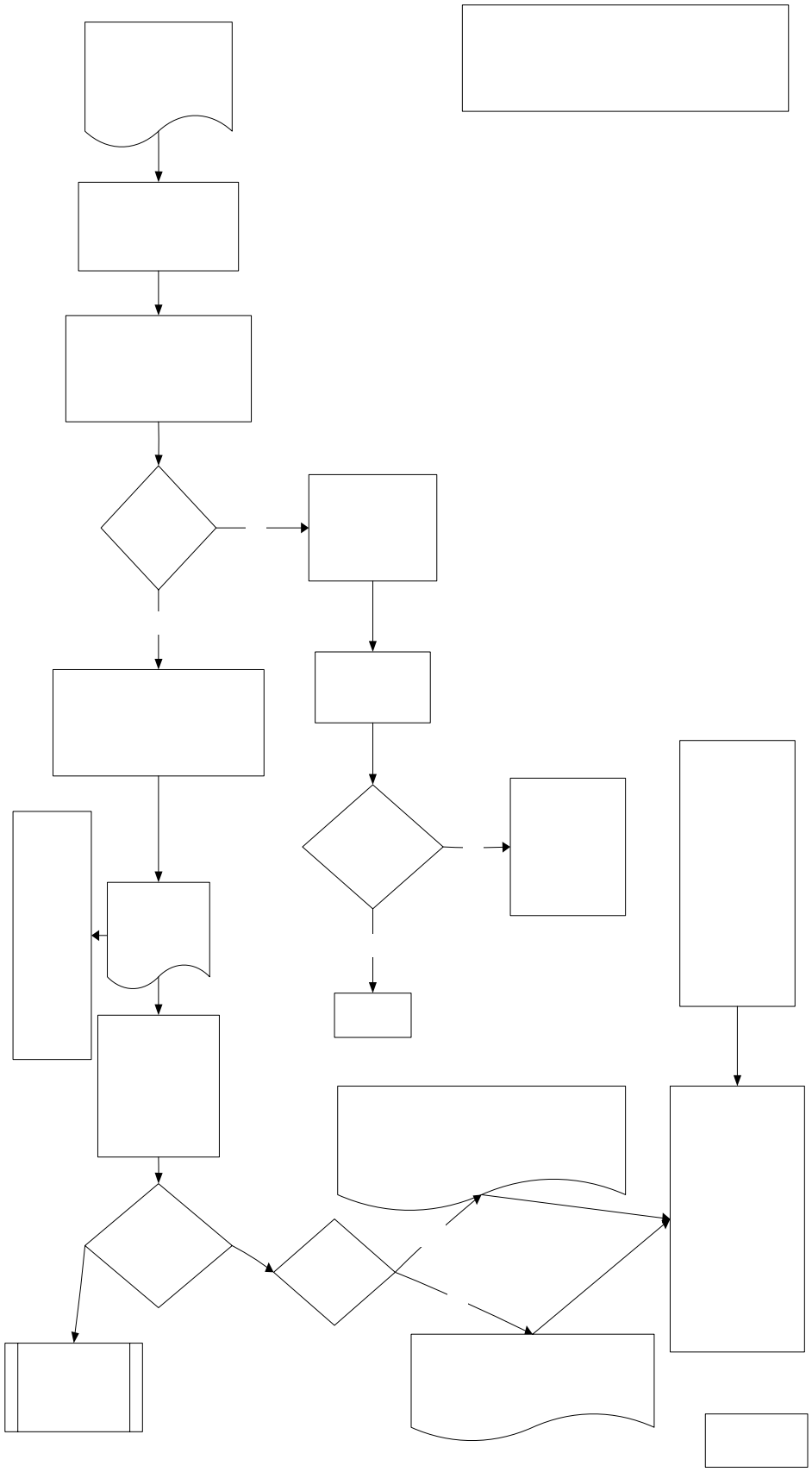
Results:
Significantly more likely to:
- Correctly assess Level of Severity
- Choose appropriate medications
- Choose appropriate equipment and training
- Develop an Asthma Action Plan
- Choose improved contact availability
- Reduce the use of E.D. and hospital

Conclusion:
Healthcare providers in primary care show a measurable improvement in their intent to follow guidelines in an appropriate way using this method of training. Patient outcome data will be available shortly to see if such training improves asthma care i daily practice.



Appendix 2. Flow Charts for Clinical Outreach and Case Management





Summary of Provider Education Efforts

- 323 Providers invited to participate
- 49 Total Completed CD Roms - 43 completed CME, 6 no CME
- 36 MDs, 3RN, 4 LPN, 1 CPNP, 1 PA, 1 DO, 1 RPAC, 1 Unknown

County	**Count**	**%**
Bronx	24	50%
Brooklyn	1	2%
Nassau	2	4%
New York	7	15%
Orange	4	8%
Queens	1	2%
Staten Island	1	2%
Suffolk	1	2%
Unknown	1	2%
Westchester	6	13%
Total	**48**	**100%**

Return on Investment – Methods

- Cost Savings (2002 -2001) – Cost of intervention (2002) = incremental cost for base year
- Cost Savings (2003 -2002) – Cost of intervention (2003) = incremental cost for year one
- Cost Savings (2004 -2003) – Cost of intervention (2004) = incremental cost for year two

ROI Ratio = Net Cost Savings (2004-2002) / Total Cost of Intervention (2002+2003+2004)