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## Strategies for Improving Asthma Outcomes: A Case-Based Review of Successes and Pitfalls

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## Supplement

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### **Target Audience**

This activity has been designed to meet the educational needs of pharmacists and physicians involved in the care of patients with asthma.

### **Educational Objectives**

*Upon completion of this activity, participants should be better able to:*

1. Identify specific features of successful asthma disease management programs and pay-for-performance programs.
2. Discuss potential pitfalls related to various aspects of asthma disease management programs and pay-for-performance programs.
3. Describe the various components involved in developing and sustaining a comprehensive and successful asthma management program.
4. Implement disease management strategies to improve care and outcomes for patients with asthma while containing medical and health plan costs.

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## Strategies for Improving Asthma Outcomes: A Case-Based Review of Successes and Pitfalls

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# Strategies for Improving Asthma Outcomes: A Case-Based Review of Successes and Pitfalls

Dennis Williams, PharmD, BCPS, FASHP; Jay M. Portnoy, MD;  
Karen Meyerson, MSN, RN

## ABSTRACT

Several comprehensive community-based asthma management programs have been developed in recent years. Their central goal is to provide access to quality asthma care to achieve successful long-term disease management. The Kansas City Children's Asthma Management Program (KC CAMP) and the Asthma Network of West Michigan (ANWM) share many of the same objectives, which include educating patients, families, the community, and health care providers about asthma care, advocating on behalf of those who need care, and allocating resources to provide care. Education to promote behavioral changes in health care providers enrolled in KC CAMP was achieved through didactic sessions and was considered successful; provider and staff satisfaction increased, as did compliance with treatment guidelines. ANWM seeks to promote prevention rather than crisis care by providing home visits, physician care conferences to generate asthma management plans, and social workers to address psychosocial barriers to care. Funding from multiple resources is essential for maintaining the programs. In addition, staff work with corporate sponsors, governmental agencies, and individual donors to ensure the programs' success. The benefits of KC-CAMP and ANWM are evident with data showing dramatic declines in emergency department visits, hospitalizations, and overall health care costs for asthma care.

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Asthma is a highly prevalent condition in the United States (16.2 million adults and 6.7 million children, 2008 data) and the potential for complications suggests it is a burdensome and costly disease.<sup>1</sup> Direct costs, mainly for prescription drugs and hospital care, were estimated to be \$14.7 billion in 2007; indirect costs, primarily identified as lost productivity, accounted for an additional \$5 billion.<sup>2</sup> It is apparent that asthma management is resource-intensive, especially when control is not optimal. Ideally, advances in therapies, coupled with ongoing discoveries into the disease's pathophysiology, would result in a population of patients with well-controlled asthma; however, optimal management remains elusive for many individuals. In an effort to optimize outcomes, asthma experts have generated diagnostic and treatment guidelines and several comprehensive community-based programs have been developed.<sup>3,4</sup> Two such successful programs are the Kansas City Children's Asthma Management Program (KC CAMP) and the Asthma Network of West Michigan (ANWM). Dr. Jay Portnoy and Karen Meyerson have been instrumental in the development and implementation of their respective community-based programs. In October, 2009, Portnoy and Meyerson presented an overview of their programs at the Academy of Managed Care Pharmacy's Educational Conference in San Antonio, Texas. In this article, they discuss their experiences in developing a comprehensive program, highlighting their successes, pitfalls, and the practical aspects of setting up such a program.

## DISCLOSURES

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### Failure to Use Guidelines

Although scientific evidence supports the use of diagnostic and treatment guidelines, clinicians often overlook these guidelines when treating patients with asthma.<sup>5</sup> A disconnect appears to occur between the accumulation of data-driven recommendations and their acceptance as a beneficial approach in clinical practice. Perhaps this is a consequence of knowledge deficits or a lack of conviction regarding the utility of guidelines. Regardless of the reasons, changing physician behavior patterns is a challenge, but a requisite for implementation of an effective asthma management program.<sup>6</sup> In addition, the patient and health plan must work with the physician as part of a partnership with the common objective to improve patient outcomes.

While insurers claim to share the same goal as the patient and physician, health plans may impede asthma management. For example, patient education is an important component of asthma care; but, insurance companies generally refuse to pay for educational visits. Moreover, office staff has seldom received special training in asthma education, which further hampers the ability to accomplish an important part of asthma care. Not surprisingly, a focus group of 12 primary care providers with large numbers of Family Health Partners (a managed care organization [MCO]) members stated the following 6 resources would most effectively improve their ability to treat patients with asthma.<sup>6</sup>

- An asthma educator spending time in the office
- Standardized curriculum to teach patients
- Written tools to help manage asthma (e.g., asthma action plans)
- Training for the office staff
- Consistent contact person at the health plan for assistance in asthma-related matters
- Payment to carry out the program

Programs are available for clinicians to enhance their knowledge and skills in asthma education and management, including programs offered by the American Association of Respiratory Care (AARC) and the Association of Asthma Educators (AAE). In addition, a voluntary national certification examination is offered for individuals providing asthma education ([www.naecb.org](http://www.naecb.org)). This is a psychometric-validated examination and the successful

candidate demonstrates minimum competency in the knowledge and skills of a certified asthma educator.

### Pay-for-Performance (P4P)

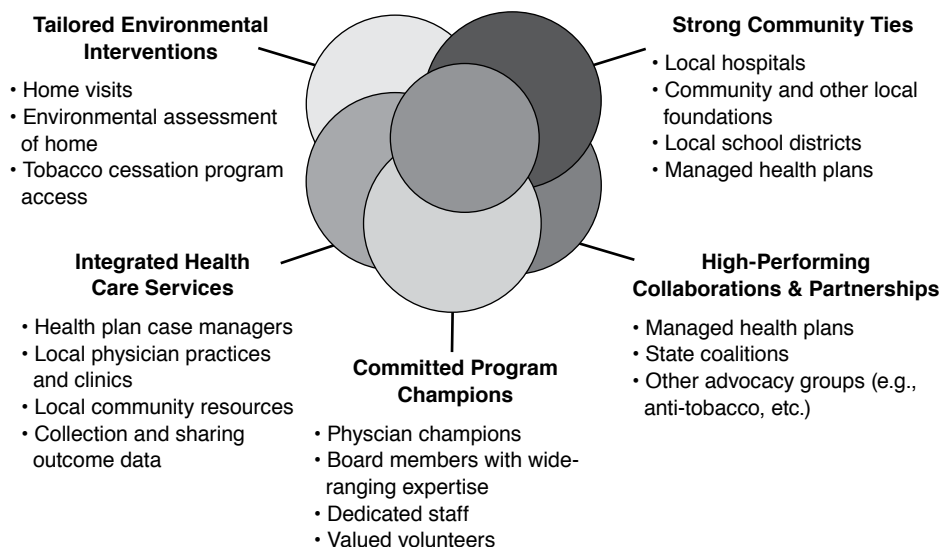
The current health care environment is moving toward offering financial incentives for quality care for various conditions. Generally, this approach utilizes evidence-based practices and expert opinion as the foundation for quality care. The P4P programs were designed to monetarily incentivize providers to utilize patient-focused strategies.<sup>7</sup> The goals of P4P are to improve quality of care while controlling healthcare costs and reducing inappropriate utilization.<sup>8</sup> Reimbursement is offered for quality, access efficiency, and successful outcomes.<sup>7</sup> However, controversy exists for this type of reinforcement system because some physicians find it an insult to their integrity. Although clinicians would like to be reimbursed for their services, P4P can interfere with the concept of professional pride, which in the authors' opinion, is also a strong driving component for many practitioners.

### Asthma Models for Long-Term Success

Several models have been developed to provide a framework for quality asthma care. One example is Community Care of North Carolina, which works directly with health care providers in a community and utilizes a network of case managers and coordinators to access community resources to enhance care. This program targets low-income residents, a population with greater risks for morbidity and mortality from asthma. The program structure has achieved success in improving both clinical and economic outcome measures, as indicated by a 16.6% decline in emergency department admissions and 40% decrease in inpatient admissions for patients with asthma over a 3-year period (2003-2006).<sup>9</sup>

Successful programs simultaneously control disease and improve patients' lives while reducing costs for insurance plans and the health care system. The key elements of a comprehensive asthma program are depicted in Figure 1.<sup>10</sup> KC CAMP and ANWM incorporate these components into their programs. The information that will subsequently be described offers a framework for others interested in developing a community-based, chronic disease program and putting it into practice.

**FIGURE 1** Key Elements of an Asthma Management Program



Adapted from the U.S. EPA National Asthma Forum (2008).<sup>10</sup>

### ■ Kansas City Children's Asthma Management Program (KC CAMP)

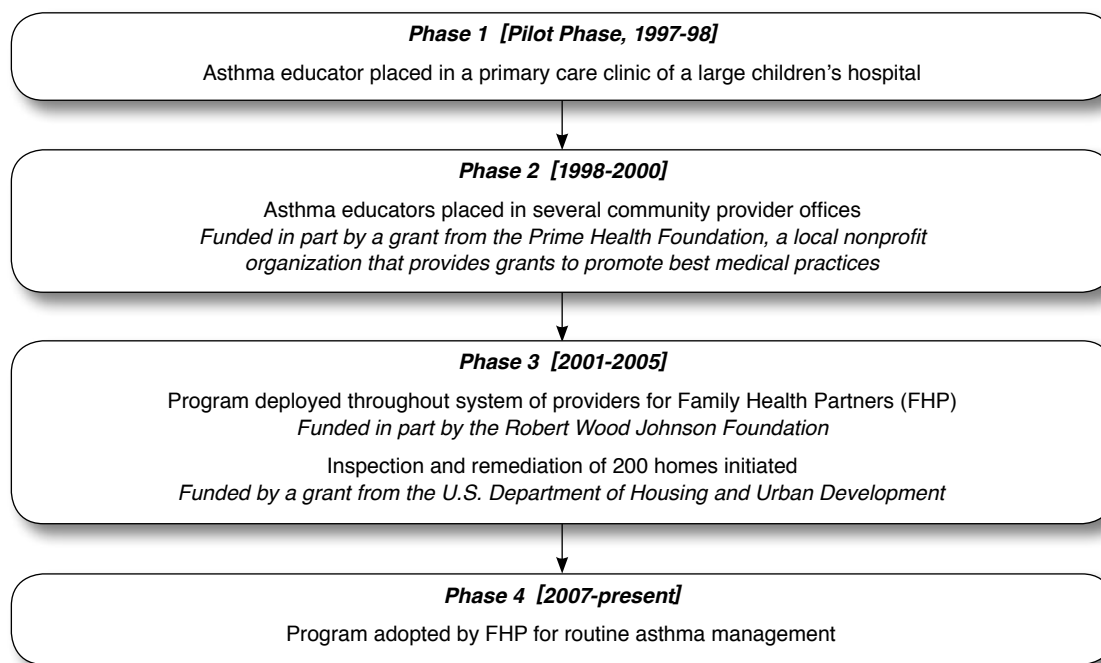
We sought to build a better system of care that significantly improved the health and quality of life for as many children with asthma as possible. We worked with members of the allergy section at Children's Mercy Hospital in Kansas City, Missouri, to develop KC CAMP in 2001 using a grant from the Robert Wood Johnson Foundation. The goals of the program were to:

- Create empowered patients who demand good health care
- Identify, educate, and assist providers who can provide that care
- Generate the community resources needed to assure that the care reaches those most in need.

The program was implemented in 4 phases, with each subsequent phase dependent upon the success of the preceding phase.<sup>11</sup> The phases of the program are outlined in Figure 2. Parameters measured at the end of phases 1 (in 1998) and 3 (in 2005) demonstrated improved outcomes for children with asthma (n=7,081). The following outcomes were observed at the end of phase 1. First, quality

of life measured using a 7-point survey tool improved for caregivers by the second visit and for patients at subsequent visits. The driving forces for increased caregiver quality of life were the self-management skills they learned to minimize anxiety and fear. For the patient, improved asthma symptoms led to fewer life style restrictions and ultimately enhanced their quality of life. Second, we found a decline in hospital admissions, particularly during the fall season when most admissions typically occur. Unlike previous years, hospital admissions did not peak in the fall for patients who were part of the asthma management program. In contrast, an admission peak was observed for an unmanaged comparison group of Medicaid patients during the same period. Third, we found that health care utilization costs (i.e., inpatient and emergency department expenses) were reduced by 37.5% in 1 year.<sup>12</sup> Results from the home inspection and remediation component of phase 3 yielded additional evidence of the program's value. The homes that underwent professional fungal remediation showed a drop in spore counts from a mean of 131,687 spores per cubic meter of air to 1,291 postremediation.<sup>13</sup> In a separate study designed to evaluate the impact of regular home cleaning on the quality of life of children

**FIGURE 2** KC CAMP: Phases of Development



with asthma, families were given cleaning products, either standard Clorox brand cleaners (e.g., Ultra Clorox Bleach, Clorox Clean Up) or the standard cleaners plus diluted 0.09% sodium hypochlorite products, which destroys dust mites and denatures protein allergens. These groups received cleaning instructions and asthma education. A third control group did not receive cleaning products or instructions. Surface bacteria, airborne fungal spores, and dust antigen levels were reduced with cleaning products. Quality of life improvements were greatest for the group using hypochlorite-based products. Still, all groups experienced improvements in quality of life, but at a slower rate in the control group families versus families in the 2 product-issued groups.<sup>14</sup>

### Components of KC CAMP

An asthma registry was created in the early days of the program in 2001. Health Insurance Portability and Accountability Act (HIPAA) confidentiality agreements were signed, but initially there was still resistance among the Family Health Partner (FHP) Information Systems personnel because FHP staff was not comfortable shar-

ing data. Confidentiality and data security concerns were discussed and trust cultivated through meetings between FHP Information Systems and KC CAMP staff. Health plan members who could potentially qualify for the program were identified by input of asthma *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) codes into the FHP database and generating a list of members with any of these codes or bronchiolitis codes. Bronchiolitis codes were added to the asthma registry for recurrent cases because, during the first 2 years of life, many physicians will not label patients with asthma, but will use the diagnosis bronchiolitis. Of note, in addition to patients diagnosed with asthma, children with bronchitis also qualified for the program because a diagnosis of bronchitis in the pediatric population is likely asthma that has not yet been accurately identified. Monthly data downloads were performed with minimal effort and within 6 months information detailing more than 2 million claims were captured in the database. During year 2, asthma action plans were added to the registry and later prescription data were included.

Medical practices were ranked according to the number



**TABLE 1** Behavioral Modification and the Techniques Employed to Bring About Change

Desired Behavior	Change Technique	Reinforcement
Diagnose asthma	Provide clinically useful criteria for making the diagnosis	Generate performance reports to compare number of diagnosed patients versus other providers
Offer asthma education	Provide a role model, curriculum, and information on how to do problem-based learning	Verbal encouragement; payment for service with CPT codes
Generate action plans	Supply tools and attend asthma fairs	Comparison reports for a provider vs. other providers

CPT = Common Procedural Terminology.

Adapted from information presented in Ramos et al.<sup>11</sup>

of FHP members. To enhance efficiency, those with the largest membership were visited first to determine interest in the program. Most were interested in the program; a total of 90 providers enrolled, while 14 declined to participate. One practice felt they already had a good asthma management system and another was undergoing major personnel changes and was not in a position to become involved in KC CAMP. Once enrolled in the program, asthma educators visited the office 8 times to teach a standardized educational curriculum, based on National Heart, Lung, and Blood Institute (NHLBI) guidelines, to providers and their office staff. Initially, the asthma educators were respiratory therapists who worked with patients with asthma. Once asthma education certification was available, these therapists became certified educators. The following components were included in the didactic sessions: a basic overview of asthma, patient evaluation, spirometry, inhalers, spacers, self-management skills using asthma action plans, environmental assessments, and outcome measurements. Subsequently, a video series of the teaching sessions was also distributed to the offices to train new personnel. In addition to the didactic sessions, behavioral changes were also encouraged. Educators spent half days in the office demonstrating desired behaviors, such as how to categorize asthma severity, how to teach patients about asthma triggers, creation and utilization of action plans, and use of asthma devices (e.g., spacers). The key behaviors needing change and the techniques employed are listed in Table 1.

Application of the changes and education led to increased satisfaction with asthma care among providers and staff.<sup>11</sup> Another measure of success is compliance with NHLBI guidelines, which recommend controller medications for patients with persistent asthma.<sup>15</sup> The specific medication

selected is not a concern because KC CAMP uses either the Missouri or the Kansas Medicaid formulary, which approves a single brand of controller medication. This is not a limiting issue for patient management because, in our opinion, the currently available inhaled steroids, long-acting beta agonists, and leukotriene modifiers offer comparable efficacy within their medication class. The primary issues are teaching patients correct use of the medication and making it easy for them to obtain their prescription. In the first 5 years of KC CAMP, the number of prescriptions filled for asthma controller medication increased significantly, while the number of relievers decreased.<sup>11</sup>

Reimbursement for asthma education was made available through current procedural terminology (CPT) codes that were activated for providers involved in KC CAMP. Initial education, as well as follow-up sessions, with no limit to the number covered per patient, was paid to the provider. Random audits revealed no cases of code misuse. In fact, we found that providers did not bill for all educational sessions known to have occurred. Overall, providers filed claims for approximately 40% of eligible educational encounters. However, this relatively low number may be due to problems with the billing form and may increase over time.<sup>11</sup>

KC CAMP incorporated a system of stratified interventions based upon the principle that 5% of health plan members account for 60% of claims. The 5 strata and resources allocated to each group are presented in Table 2. Asthma management tools were developed prior to and during implementation of KC CAMP. Asthma Action Cards (Figure 3), one example of an instrumental tool, were designed to teach providers to promote self-management skills; patients tend to use them during asthma flares.<sup>11</sup>

**TABLE 2** KC CAMP Stratified Interventions and Resource Allocation

Strata	Management Approach and Resource Allocation
Stratum 1: All members	Asthma screening using questionnaire to identify members who filled prescription(s) for asthma medication or carried a diagnosis for asthma-associated conditions (e.g., bronchiolitis, bronchitis, recurrent pneumonia)
Stratum 2: Confirmed asthma	Education and self-management skills through an action plan. Payment for education provided to primary care provider
Stratum 3: Persistent asthma	Controller medications prescribed
Stratum 4: High utilization members (defined as the top 1.4% of the utilization list)	Asthma case manager assigned to each patient for direct intervention
Stratum 5: Ultra high-use members (top 0.4% of the utilization list)	Personal case management as in stratum 4 plus environmental counseling and home inspection by an environmental health specialist as needed

*Adapted from information presented in Ramos et al.<sup>11</sup>*

### KC CAMP Outcomes

Overall, KC CAMP has been a success. Emergency department visits for asthma were estimated to decline by 44%, from 9.7 per 1,000 members in 2000, to 5.4 per 1,000 members in 2004, and hospitalizations for asthma were estimated to decrease by 64% from 1.7 per 1,000 members in 2000 to 0.6 per 1,000 members in 2004.<sup>11</sup> However, changes over time in the number of members with asthma and variation in asthma disease type and severity make “the actual effect of the program on asthma costs very difficult to determine other than to note that they declined.”<sup>11</sup>

Of note, the program was not in Kansas in 2007 but was in progress in Missouri. The discrepancy in health care costs between Kansas and Missouri was dramatic in 2007 when the Kansas program first started, but eventually disappeared after the program had been implemented in Kansas. Claim costs and prescription costs declined over time; however, caution is advised when interpreting the data because the combination of several variables makes it difficult to specifically determine the actual effect other than to note there was a net decline in costs. Two years into the program the total cost of care for patients with asthma was estimated to decrease by approximately \$2 per patient per month, from \$5.37 in 2001 to \$3.21 in 2003 for 3,700 patients that initially participated in the program. Note that these were the direct costs for asthma care of these patients and did not include the full overhead of the health plan which is usually averaged over the entire membership in the plan. The original estimated administrative cost for the program was \$0.43 per patient per

month based on the total budget for the program and the number of patients in the health plan. However, as noted above, the actual effect of the program on asthma costs is difficult to determine because of factors such as change in the number and mix of asthma patients in this health plan over time.<sup>11</sup>

A focus group held in June 2004 generated provider feedback on the program. The providers agreed the educational approach of KC CAMP produced positive team-building, better triage, and improved education for families. Additionally, providers valued the updates on guidelines and treatment recommendations, noted that their nursing staff gave better care once they had a greater understanding of asthma management, and found families were positively impacted; accepting the diagnosis, and taking control of their asthma rather than being controlled by the disease. A shift from reactive care to proactive care was recognized with earlier diagnosis, written action plans, more immediate prescription of controller medications, and less need for specialist referrals. Importantly, providers felt that the health plans demonstrated their appreciation for the work they were doing by reimbursing the providers for patient education and asthma office visits.<sup>11</sup>

### Pitfalls and Challenges

KC CAMP relied on gathering information from various sources and this proved to be a challenge. At one point, it became apparent that data from FHP were incomplete. This turned out to be a result of faulty data transfer from the health plan to the asthma registry. Another glitch

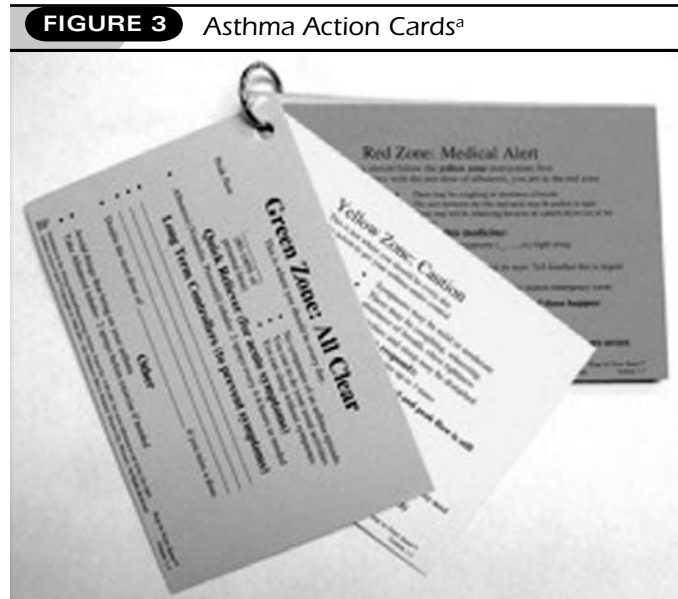
occurred with the CPT codes the providers used to charge for asthma education. The problems were usually easily addressed when providers were taught how to use the codes correctly or when the information technologists at the health plan were asked to correct bugs in the database. Although frustrating, such problems were not unexpected and once identified were resolved.

A self-sustainable program is a challenge to develop, but a necessity if the program is to endure. External grants may be beneficial for research and development, but not to maintain operations. The challenge is to convince health plans that the cost of the program will be offset by a decline in member claim costs, while patient satisfaction is maintained and quality of life improved. Nevertheless, program expansion may prove difficult. Local health plans expressed interest in KC CAMP; but, national plans tended to be resistant to adopting local disease management programs because national groups generally utilize centralized programs.

Despite the potential pitfalls and challenges, asthma management programs are emerging across the country. In addition to the Asthma Network of West Michigan (ANWM), which will be discussed subsequently, the Children's Asthma Management Program (CHAMP), designed and implemented by nurse practitioners working with low-income children in a north Texas metropolitan area, is another example of a successful and innovative program. Designed to implement National Institutes of Health (NIH) asthma guidelines, the program consists of comprehensive patient evaluation, education for the patient and family, symptom management, maintenance therapy, and regular follow up visits as well as telephone interviews. Additional components include an environmental history and interventions, written treatment plans, and education reinforcement. An outcome-based evaluation of the 79 children who completed CHAMP revealed an 85% reduction in hospitalizations for asthma, 87% decline in emergency room visits for asthma, and 71% decrease in acute office visits for asthma exacerbations.<sup>4</sup>

### ■ Asthma Network of West Michigan (ANWM)

In 1994, leaders from several local establishments and communities, including acute care hospitals, the American Lung Association of Michigan, local universities, managed



<sup>a</sup>An example of a tool used in the Kansas City Children's Asthma Management Program (KC CAMP) intended to teach providers to promote self-management skills and to be used by patients during asthma flares.<sup>11</sup>

care organizations, and county health departments united to focus on the rise in morbidity and mortality associated with pediatric asthma. Funded initially from 3 acute care hospitals and 2 local foundations, ANWM, a comprehensive home-based asthma management program for adults and children with asthma, became a reality. The overall goals of ANWM are: (a) community educational resource for health care professionals and the lay public, and (b) case management of children and adults with moderate to severe asthma from predominantly low-income families. Program components are similar to KC-CAMP and include asthma education, coordination with health care providers, development of asthma action plans, home environmental assessments, and social worker support. The strength of the program is a committed group of health professionals who share a passion for children with asthma, are leaders within their community, and continue to work together to overcome the burden of asthma.

The decision to start an asthma care program is a major undertaking and deciding where to begin can appear to be an overwhelming task. However, one good place to start is to acknowledge strengths in terms of geographic location, economic base, population hubs,

## Strategies for Improving Asthma Outcomes: A Case-Based Review of Successes and Pitfalls

**TABLE 3** Asthma Network of Western Michigan (ANWM) Staff Positions and Responsibilities

Position	Number of Full-Time Employees	Employee Background	Roles and Responsibilities
Manager	1	Certified Nurse Practitioner and Certified Asthma Educator with extensive knowledge of asthma management. Lectures frequently about asthma to both professional and lay audiences.	Oversees staff of asthma educators, social worker and clerical support, reports to ANWM board, manages budgets, and responsible for contracting with third party payers, as well as writing grants and progress reports to funders to sustain ANWM
Medical Social Worker	1	Experience in medical social work and extensive knowledge of community resources	Responds to psychosocial needs of patients
Clerical	1	Office assistant/biller with billing and database experience	Assists with scheduling appointments and correspondence
Asthma Educations/Case Managers	2.5	RN or RRT with interest/experience in asthma management and asthma educator certification (AE-C)	Promote prevention through behavior modification, enhance access to medication and primary care physicians, address barriers to care

RN = registered nurse; RRT = registered respiratory therapist.

and local reception for a community-based program. An assessment of the need and capacity for such a program within the community must be determined. During this planning phase, a case should be built for developing the program, identifying key stakeholders and asthma champions, and nurturing partnerships and collaborations with community leaders. Asthma champions within the community can include—but are not limited to—parents and patients with asthma, asthma educators, physicians and other health care professionals, hospital administrators, and health plan managers.

Program partnerships can occur at the national, state, and local levels. Nationally, funding is available through the United States Environmental Protection Agency (EPA) and Centers for Disease Control and Prevention (CDC), educational resources are available through national organizations, and technical support can be garnered from other successful asthma programs. For example, individuals involved in ANWM or KC-CAMP can provide assistance for developing asthma programs. The state may offer money, but their contributions are better suited to the following: area statistics, training and educational opportunities, policy ideas, technical assistance, state asthma web sites, and promotion of, and communication between, various coalitions. Locally, partners help build and staff the program, identify foundations to approach for funding, act in a legal capacity (i.e., local law firms assisting with nonprofit status), provide physical space for

the program (e.g., hospital space), identify participants, evaluate the program (e.g., research at universities), publicize the program through local print and broadcast media, and allow interaction between students and program staff. Additional local partners may include religious congregations, pharmaceutical companies, individuals or families with asthma, and professionals with financial expertise.

Writing a mission statement and remaining true to it provides a central theme for members to strive to uphold. The mission should define the process for developing an asthma program, not the other way around. The ANWM mission statement is “to improve the lives of those individuals affected by asthma through innovative research applications and educational programs that are designed to advance medical best practices, asthma case management, patient, family, and community education, and patient advocacy and legislative reform.”

The organizational structure of ANWM consists of several branches with many members. The Asthma Network Board of Directors consists of 13 volunteers. The network is staffed with 6.5 full-time positions described in Table 3 and 40 volunteers that perform committee functions and joint endeavors, and elect the board of directors. The 5 committees are advocacy, education, finance, fund development, marketing and membership, and research; the joint endeavors are asthma camp, school initiative, community education, and statewide asthma activities. According to the Michigan Department of Community

Health data, 94,500 people in 5 western Michigan counties (the community ANWM serves) have asthma, 27% of whom are children.<sup>16</sup> The ANWM program is focused in its tasks, assigning specific responsibilities to each committee, and maximizing its members' contributions. Collaboration across the care team is standard operating procedure for the ANWM delivery model of care. For example, the baseline severity assessment involves a home visit with a nurse or respiratory therapist (i.e., a certified asthma educator), the medical social worker, and family members. The development of individualized asthma action plans requires family members, home visit teams, and providers to work together. Finally, coordinated care conferences are held, which include providers, families, and home visitors.

### How ANWM Works

The case management services that ANWM provides are unique. Certified asthma educators are sent to the homes of patients for up to a year to perform environmental assessments as well as to teach families about asthma, its pathophysiology and trigger identification, avoidance, and reduction. Education regarding medications, proper use of devices, and other self-management techniques are also taught during the at-home visits. Another distinctive component of ANWM is assignment of a medical social worker to the case management team. The medical social worker makes appropriate referrals and contacts to the Family Independence Agency, Medicaid, mental health agencies, food banks, transportation services, and landlords in order to assist families in avoiding crises so the focus can remain on asthma care. ANWM case management strives to promote prevention rather than emergency interventions, encourage appropriate utilization of the health care system, ensure access to medications and primary care physicians, act in accordance with National Asthma Education and Prevention Program (NAEPP) asthma management guidelines, and improve asthma knowledge and patient quality of life.

The ANWM program is designed to provide 12 months of case management, which allows for adequate follow-up, reinforcement of education, and monitoring during seasonal changes. Initially, a baseline assessment of the patient and the environment is performed and goals are

developed, medical education and care are offered, and psychosocial interventions are performed. For the first 3 months, visits occur biweekly. Later, visits take place monthly or after an exacerbation. Care conferences are held soon after enrollment into the program and as needed thereafter. They are conducted with the primary care physician, possibly a specialist, and family members are usually present. Compliance issues, including psychosocial barriers to asthma management and access to care, are discussed and a written asthma action plan is generated. The care conference is a reimbursable visit.

Managed care pharmacy utilization records have proven beneficial in determining appropriate ratio of long-term control to quick-relief medications and often serve as the basis of a referral to the ANWM case management program. The area's largest MCO uses a 2:1 ratio as the foundation for a physician incentive program. In addition, access to these records provides the case manager with critical information about a patient's adherence to a prescribed regimen.

For pediatric patients, school, or daycare in-service, meetings are scheduled with key school personnel, such as the principal, school nurse, classroom teacher, physical education teacher and school secretary. Important issues regarding the child's asthma, psychosocial barriers (e.g., the multiple stressors ranging from environmental to financial to socio-legal concerns), and any learning problems that may exist are identified and discussed. A copy of the asthma action plan is not just provided to the staff, but also reviewed to ensure the school staff understands its content and purpose. The in-service meeting is also a reimbursable visit.

Referral sources for the ANWM program come from inpatient populations, clinics, school nurses, public health nurses, managed care organizations, and self-referrals. Strong community ties are key to ANWM's success. ANWM is seen as the asthma resource for the community. This impression has driven sustainability through referrals to the program and major contracts with managed care organizations and other health care facilities.

### Funding for ANWM

The major costs to run ANWM are staff salaries, mileage, and supplies. Revenue for ANWM comes from 2

main sources: grants and managed care contracts. Several approaches have been responsible for promoting funding. First, the ANWM program has been well-publicized, with its organizers speaking regularly to medical and corporate groups within their community to promote the program's goals and results. One tactic has been to illustrate the number of area children with severe asthma, their use of the emergency department when they suffer an acute attack, and the economic impact on companies when parents have to miss work because of the attack. Cost savings data directed toward health plans have been effective in persuading health plans to reimburse for home visits.

Another strategy used to elicit donations was to calculate the cost per patient per year for home-based intensive case management and ask donors to sponsor 1 child for 1 year. ANWM estimated that \$2,500 per person per year could reduce hospitalizations, emergency room visits, and missed school and work days. ANWM made the donation process simple and successful, thereby generating a diverse and sustainable funding stream.

ANWM also formed an independent 501(c)(3) organization, which allows funders to provide tax-deductible contributions, simplifies donation of restricted funds slated for nonprofit organizations, and enables ANWM to keep its own financial accounts.

Concerns that funding will be difficult to obtain during an economic downturn have proven unwarranted for 2 main reasons: (a) diversity in funding allows for continued income from several resources, at a time when others need to hold back money; and (b) several donors, such as the United Way, did not cut their funding during the 2008-2009 recession because they made a commitment to help at-risk patients, who are struggling financially and acknowledge that programs like ANWM are responding to increased needs within the community.

### **ANWM and MCOs**

In 1999, ANWM partnered with Priority Health to provide management services to their Medicaid pediatric population with moderate to severe asthma on a fee-for-service basis. This was the first such relationship between a MCO and an asthma network in the country. The ANWM and Priority Health program is comprehensive; components include an asthma patient registry, asthma clinical practice guideline, alignment of benefits and services, pharmacy coverage and classes, patient interven-

tions, physician interventions and tools, telephone-based nurse counseling and education, integration with all other disease management programs and case management, and electronic health management tools.

ANWM currently has 5 signed contracts with MCOs. Prior to enrollment in the ANWM program, members must receive authorization. On average, MCOs authorize as many as 18 visits and often do so after an emergency department visit or hospitalization. Typically, MCO members targeted for inclusion in ANWM are those with moderate-to-severe asthma from low-income families. The health plans are able to track their return on investment because they have access to outcomes data. It is with this information that the health plans observe success and continue to renew contracts.

### **ANWM Outcomes**

Outcomes data are the key indicators for measuring success. ANWM measures many variables and shares the findings with financial decision makers. Although not previously published, ANWM outcomes data have been disseminated at numerous national and international medical conferences through poster presentations and lectures. The data support the benefits of the ANWM program in terms of fewer emergency room visits, hospitalizations, and overall costs for asthma care. For example, an outcomes study evaluated children aged 5 to 19 years with moderate to severe asthma living in low-income areas identified by zip code who had at least 1 emergency room (ER) visit or hospitalization during 1996 to 1999 and compared data obtained during the 1 year that preceded their participation in the NAEPP-based educational program and 1 year during their participation in the program with a matched control group. The age, socioeconomic, and geographically matched controls were children with asthma as a primary diagnosis who had at least 1 ER visit or hospitalization for asthma during 1996–1999.

The goal of this analysis was to determine if ANWM interventions made a significant difference or if the natural history of asthma improved over time regardless of intervention. Twelve months of case management and educational services included home visits conducted by a specially trained case manager, with the assistance of a medical social worker, who provided a baseline assessment and goal development as well as psychosocial interventions. In addition to home visits, each child's school

**TABLE 4** Asthma Network of Western Michigan (ANWM) Asthma Event Counts (1996-1999)<sup>a</sup>

Clinical Outcomes	Case Management Group <sup>b</sup> (n = 45)			Comparison Group <sup>b</sup> (n = 39)		
	Selection Year	Intervention Year	P Value <sup>c</sup>	Prior Year	Selection Year	P Value <sup>c</sup>
ER Visits	80	61	0.047	28	43	0.021
Hospitalizations	41	13	<0.001	23	28	0.146
Days Hospitalized	114	25	<0.001	55	67	0.078

<sup>a</sup>These are unpublished data from 1996-1999 that were presented as a poster abstract by Kirk et al. in 2001.<sup>18</sup>

<sup>b</sup>The analysis periods were different for the cohort and comparison groups. The cohort group was selected for the intervention (education program) based on at least 1 hospitalization or ER visit in the “selection year,” and event counts for the intervention year were compared with the (selection) year prior to the intervention. Event counts in the “selection year” for the comparison group (no education program) were compared with event counts in the year prior to selection.

<sup>c</sup>The t-test for paired samples was used for within-group comparison of event counts; baseline differences between the groups prevented statistical analysis of the case management group versus the comparison group.

ER = emergency room.

received an asthma in-service, and a care conference was conducted with each child’s primary care physician to develop an individualized asthma action plan.

Asthma event counts were assessed for 3 variables: ER visits, hospitalizations, and number of days in the hospital. Outcomes from 3 successive combined 2-year cohorts (1-year pre-study and 1-year study) and the comparison groups were examined.<sup>17,18</sup> There appeared to be improvement in the ER and hospitalization rates in the case management group of 45 low-income children versus the comparison group,<sup>18</sup> but baseline difference between the groups prevented statistical comparison (Table 4). There were also apparent monetary savings for the 34 low-income children with moderate to severe asthma who remained in the case management study for at least 1 year (55 children had originally entered the study; 38% were lost to follow-up), estimated at an average reduction of \$1,625 in total hospital charges per patient between the pre-study and study year.<sup>17</sup> These results appeared promising, but the baseline difference between the groups prevented statistical comparison.

### Pitfalls and Challenges

To establish a program such as ANWM is a major undertaking. Cooperation between numerous people in different fields is essential and can be difficult to accomplish; however, communication and a clear set of objectives generally help direct the efforts. The comprehensive program is proven to work, but it requires a commitment from patients and their families as well as the health care providers and insurers. Patient compliance is not guaranteed and this remains a challenge for the program with addi-

tional innovative strategies needed to improve adherence to the plan.

Funding challenges developed several years ago because the program and services provided were growing faster than revenue could be generated. Changes made to meet the financial need included replacement of one full-time position with a half-time worker, and switch to an hourly wage for staff versus a per-visit system. Changing to hourly payment schedules ensured the staff were compensated for their time, were engaged, and enabled them to increase marketing ANWM services. In addition, a large grant was obtained that allowed for funding of a part-time fund developer.

Another challenge for asthma educators to overcome is the limitation some MCOs place on the number of patient visits they will authorize. These restraints require the asthma educator to call and justify utilization of additional resources when needed. Not allowing for additional visits could be detrimental to the overall outcome. Moreover, the time required to obtain permission for more visits detracts from other patient management issues.

### Conclusions

Clark and colleagues recently reviewed the literature on asthma programs to identify intervention characteristics associated with positive asthma outcomes.<sup>19</sup> They found the following characteristics increase the likelihood that a program will improve health outcomes: a community-based program; participation of community-based organizations; program components provided in a clinical setting; asthma training provided to health care providers; collaboration with outside organizations, institutions, and

government agencies; programs designed for race-specific groups; individually tailored content or delivery based on personal health or educational needs; and performance of environmental assessments with interventions based on these assessments.<sup>19</sup> Characteristics of KC-CAMP and ANWM correspond with the traits Clark et al. found necessary for success, and these programs positively affect their respective patient populations.

The chronic nature of asthma, the morbidity and mortality associated with the disease, and the high cost burden led several dedicated individuals to join forces to develop comprehensive programs that sought to improve overall care of patients with asthma. It is the authors' hope that the direction offered in this manuscript provides encouragement as well as the necessary guidance for other communities to develop similar programs that will improve patient outcomes and enhance quality of life. Building programs such as KC CAMP and ANWM takes a commitment from health care professionals and the community, as well as buy-in from health care plans and other financial sources; but, with dedication and a clear set of goals, it is an achievable and worthwhile endeavor.

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## **Strategies for Improving Asthma Outcomes: A Case-Based Review of Successes and Pitfalls**

### **Physician Continuing Medical Education Accreditation and Credit Designation**

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of Postgraduate Institute for Medicine (PIM) and Educational Awareness Solutions. PIM is accredited by the ACCME to provide continuing medical education for physicians.

Postgraduate Institute for Medicine designates this educational activity for a maximum of *1.0 AMA PRA Category 1 Credit(s)*<sup>TM</sup>. Physicians should only claim credit commensurate with the extent of their participation in the activity.



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Release date: February 1, 2010

Expiration date: February 1, 2011

Media - printed supplement

### **Method of Participation**

There are no fees for participating in and receiving credit for this activity. During the period from February 1, 2010 through February 1, 2011, participants must (1) read the entire supplement; (2) complete the posttest, credit application, and evaluation form; and (3) either send the completed forms to the Postgraduate Institute for Medicine by mail or FAX at 303.790.4876, or complete the activity online at [www.amcp.org](http://www.amcp.org) (CE/CME Center) where you will access the posttest, credit application, and evaluation form.

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## Posttest Worksheet: Strategies for Improving Asthma Outcomes: A Case-Based Review of Successes and Pitfalls

1. According to 2008 data, what is the prevalence of asthma in the United States?
  - a. 750,000
  - b. 10 million
  - c. 23 million
  - d. 55 million
2. What are the overall health care costs (direct and indirect) associated with asthma (2007 data)?
  - a. \$23 million
  - b. \$55.8 million
  - c. \$16.2 billion
  - d. \$19.7 billion
3. Primary care providers stated all of the following resources would effectively improve their ability to treat their patients with asthma EXCEPT:
  - a. An asthma educator in the office
  - b. New treatment guidelines
  - c. Written tools
  - d. A consistent contact person at the health plan to assist in asthma-related matters
  - e. All of the above
4. During their in-office educational sessions for KC CAMP, what key behaviors did asthma educators focus on to create change?
  - a. Diagnose asthma and generate action plans
  - b. Prescribe appropriate medication
  - c. Offer asthma education
  - d. A and C only
  - e. All of the above
5. All of the following are measures of success indicating KC-CAMP was having a positive impact EXCEPT:
  - a. The number of prescriptions for asthma controller medication increased.
  - b. The number of prescriptions for asthma relievers decreased.
  - c. Asthma educators were able to reduce the number of didactic sessions from 8 to 5.
  - d. Staff members and health care providers reported increased satisfaction with asthma care.
6. Why did KC CAMP incorporate a system of stratified interventions?
  - a. 5% of health plan members account for 60% of claims
  - b. Providers file claims only about 50% of the time
  - c. To dissuade clinicians from referring patients to specialists
  - d. All of the above
7. What are the components of ANWM case management services?
  - a. Home visits
  - b. Physician care conferences
  - c. Social workers
  - d. School in-services
  - e. All of the above
8. How many months of case management does ANWM provide?
  - a. 3 months
  - b. 6 months
  - c. 9 months
  - d. 12 months
9. What are the main sources of revenue for ANWM?
  - a. Grants
  - b. Managed care contracts
  - c. Corporate sponsorships
  - d. A and B
  - e. All of the above
10. According to ANWM estimates used for the purpose of soliciting donations, what is the annual cost per patient needed to reduce hospitalizations, ER visits, and missed school or work days?
  - a. \$2,500
  - b. \$3,000
  - c. \$5,000
  - d. \$10,000

Please mark your answers in the Posttest Answer Key found on the Evaluation Form.

**Supplement Evaluation  
Project ID: 6674 ES 15**

Please answer the following questions by circling the appropriate rating:

1 = Strongly Disagree	2 = Disagree	3 = Neutral	4 = Agree	5 = Strongly Agree
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**Extent to Which Program Activities Met the Identified Objectives**

*After completing this activity, I am now better able to:*

- Identify specific features of successful asthma disease management programs and pay-for-performance programs 1      2      3      4      5
- Discuss potential pitfalls related to various aspects of asthma disease management programs and pay-for-performance programs 1      2      3      4      5
- Describe the various components involved in developing and sustaining a comprehensive and successful asthma management program 1      2      3      4      5
- Implement disease management strategies to improve care and outcomes for patients with asthma while containing costs 1      2      3      4      5

**Overall Effectiveness of the Activity**

*The content presented:*

- Enhanced my current knowledge base 1      2      3      4      5
- Addressed my most pressing questions 1      2      3      4      5
- Promoted improvements or quality in health care 1      2      3      4      5
- Was scientifically rigorous and evidence-based 1      2      3      4      5
- Avoided commercial bias or influence 1      2      3      4      5

*Based upon your participation in this activity, choose the statement(s) that apply:*

- I gained new strategies/skills/information that I can apply to my area of practice.
- I plan to implement new strategies/skills/information into my practice.

*What strategies/changes do you plan to implement into your practice?*

*What barriers do you see to making a change in your practice?*

*Which of the following best describes the impact of this activity on your performance?*

- I will implement the information in my area of practice.
- I need more information before I can change my practice behavior.
- This activity will not change my practice, as my current practice is consistent with the information presented.
- This activity will not change my practice, as I do not agree with the information presented.

Please list any topics you would like to see addressed in future educational activities:

**Posttest Answer Key**

1	2	3	4	5	6	7	8	9	10

**Request for Credit**

Name \_\_\_\_\_ Degree \_\_\_\_\_ Specialty \_\_\_\_\_  
 Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 Telephone \_\_\_\_\_ Fax \_\_\_\_\_ Email \_\_\_\_\_  
 Signature \_\_\_\_\_ Date \_\_\_\_\_

**Follow-up**

- I would be interested in participating in a follow-up survey.  Yes  No
- I would be interested in receiving similar educational programs.  Yes  No

**For Physicians Only**

I certify my actual time spent to complete this educational activity to be:

- I participated in the entire activity and claim \_\_\_\_\_ credits.
- I participated in only part of the activity and claim \_\_\_\_\_ credits.



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