National Environmental Leadership Award in Asthma Management
Sample Health Care Provider Application

Area 1. Comprehensive Asthma Management Program

a. Management Structure and Operating Principles

Faced with some of the highest rates of asthma in the country, TopCare Physician-Hospital Organization (PHO) launched the Asthma Care Program (ACP) in 2000. Environmental issues have always had a high profile in our state and poor indoor and outdoor air quality was a concern that prompted the program. Ozone rates are consistently high in our state (a product of smokestack industries and other sources) and indoor air quality is often poor, due to high cigarette smoking rates, the wide use of woodstoves and more recently, wood boilers, and mold and mildew in many old school buildings.

Led by our medical director, Dr. Eric Allyson, who also has an MPH, PHO designed an ACP to address the needs of our patients with asthma. ACP is administered through the TopCare PHO, a member organization of the TopCare Health system, a non-profit, integrated healthcare delivery system that brings together physicians across the region. The PHO includes 2,000 physicians in 600 practice sites, with 500 primary care physicians in 200 practice sites. Thirty nurse care managers work directly with approximately 300 primary care physicians and meet regularly with the Asthma Education Specialists and the ACP staff to review best practices and recent research in asthma treatment and management. These staff serve ten counties and approximately 975,000 residents in northern, central, and western areas of our state.

Dr. Allyson created advisory committees to provide regular communication and coordination with primary and specialty care physicians, asthma educators, care managers, home health nurses, and others in the community interested in asthma care and outcomes. The Asthma Clinical Advisory Group members are physicians and other clinicians who represent the entire region. These leaders review research, evaluate and endorse tools and protocols, and help disseminate best practices. One of the major challenges to optimal asthma care in our state and elsewhere is variable knowledge and practice among primary care providers. The ACP has consistently addressed this challenge over the past six years through a diverse offering of interventions, including annual conferences, academic detailing, e-newsletters, and more recently, the *TopCare* Custom Learning Center (an approach developed by the Association for Health Improvement), a multi-modality educational series that allows providers to tailor continuing education based on personal preferences and learning needs.

The TopCare Health system has provided not only leadership, but also administrative support for the ACP since its inception, as well as an annual budget of approximately $350,000, which is augmented by grants from public and private sources. These funds pay for Top Care staff (a full time Program Manager, a part-time Medical Director, and a part-time Asthma Educator Specialist who provides training and develops educational materials). They also allow us to provide partial subsidies to the community hospitals that host local ACPs and Asthma Educator Specialists. The funding model we have developed for local hospitals is a key factor in sustaining these programs over the years: one third of local Asthma Educator Specialists salaries come from TopCare Health, one third from the host hospital, and one third from income generated by the Asthma Specialists for direct patient care.

The ACP has strived to reach low literacy and minority populations. Educational material has been

translated into six languages. Also, to meet the needs of individuals with low literacy (many of our patients, not just those who have difficulty with English) we have produced several innovative tools that use pictograms. Interpreters are available in each community hospital to facilitate both the educational sessions and direct patient care. Support for those who cannot afford monitoring devices and medications has been incorporated into the program. Lastly, the ACP recently completed a grant-supported project to increase culturally appropriate outreach to our Somali and Latino immigrant communities, through the use of specially trained, community outreach workers.

Outside clinical settings, the ACP has created close ties with community organizations and built lasting relationships with a homeless clinic, school-based health centers, daycare and childcare centers, public health departments, and others. We are particularly proud of a partnership established with one of the area's major employers, a food production company. This company employs primarily non-English speaking workers. Although the company had an admirable track record of providing on-site child care, healthcare, and other benefits, workers (many with asthma or other respiratory conditions exacerbated by aerosolized breading mix and the cold environment) and management knew little about appropriate asthma prevention and management. The ACP provided on-site education and training directly to all levels of employees, and occupational exposures as well as environmental exposures in the childcare center have improved significantly.

Twenty nationally certified asthma educators work under the auspices of the ACP, but are based in five community hospitals around the TopCare Health region. Known as Asthma Education Specialists, these highly trained individuals provide direct service to patients and families, providers (primary care physicians and specialists) and to community-based settings, such as child care centers, schools, and work sites. All of our asthma patients meet with an Asthma Education Specialist for a one-hour visit to discuss asthma management; follow-up meetings are determined by the needs of the patient.

* A focus on public policy by the ACP since its inception has helped engage community stakeholders and highlight aspects of environmental management that can help control asthma. Dr. Allyson has stated strongly that, "a community health program cannot be successful unless it engages directly in the issues that affect our patients' health." We annually identify municipal, state, or national public policy issues that affect people with asthma. Issues we have worked on, typically in concert with medical care, public health, and/or environmental advocacy organizations, include bans on tobacco use in public places, school grounds, city-owned parks and recreation areas, and bars and restaurants; increasing the tobacco tax; allowing children with asthma to carry inhalers in their backpacks; and public funding for a state level asthma program. ACP staff routinely work with the Regional EPA Office and the American Lung Association to disseminate information on ozone levels and particulate matters to the public.

The ACP's EPA-trained staff employs guidance and tools from the *Indoor Air Quality Tools for Schools* Program to educate school nurses on making schools more "asthma friendly" for their students. ACP's relationship with school nurses extends to the District's School Nurse Program. By collaborating with administrators we have been able to provide school nurses with a package to aid each patient's asthma management at school, including a letter with a color picture of the child, an authorization form for medication administration, and an informational sheet about common asthma triggers found in the school environment.

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* = Distinguishing program feature

To encourage patients to participate in the ACP (and schedule and complete appointments with the Asthma Education Specialists), we help to secure necessary equipment (such as mattress and pillow covers) or provide it free of charge; we also provide school supplies, telephone cards, and gift certificates as incentives. Due to education and training on environmental management of asthma provided through the ACP, most physicians do take the extra time to incorporate environmental management into their patient interactions. But, we also provide the extra incentive of bonuses for completing asthma action plans and other quality measures.

b. Integrated Health Care Services

The ACP focuses on the four major components of asthma care that have been identified in the National Institutes of Health's (NIH's) Revised Guidelines for the Diagnosis and Management of Asthma, EPR-3: assessment and monitoring; education for a partnership in asthma care; control of factors contributing to asthma severity; and medications. To ensure comprehensive and sustainable asthma care over time, we update our asthma program management plan every year with revised long and short term goals.

In our practices, clinicians establish a diagnosis of asthma in accordance with the NIH Guidelines. An initial detailed medical history and a comprehensive intake survey include questions about exposure to potential indoor and outdoor environmental triggers. Then the patient has a physical exam focusing on the upper respiratory tract, chest, and skin. We also identify comorbidities (e.g., sinusitis, gastroesophogeal reflux, vocal cord dysfunction, allergic rhinitis) and assess patterns of asthma morbidity (e.g., nocturnal awakenings, exercise-induced or viral-related exacerbations). Spirometry is used to determine whether there is an obstruction and assess its reversibility for patients 5 years of age or older.

We define asthma severity and control in terms of impairment and risk so that we are sure to consider asthma’s effects on the patient’s quality of life and functional capacity on an ongoing basis as well as the risks it presents for the future, such as exacerbations and progressive loss of pulmonary function. Assessments are documented as well as put into our Electronic Health Registry (EHR), discussed later.

Other points in the continuum of care are the emergency department (ED) and inpatient units. The care of the patient in the ED includes use of a pulmonary flow sheet developed by the asthma team to prompt caregivers to follow the NIH guidelines. Standards of care were developed which allowed for stratifying patients for disposition to an inpatient unit, ED Clinical Decision Unit, or home.

The education aspect of asthma care is comprehensive in our program in that it involves education of patients and their families, as well as providers. Educational materials have been developed to address the needs of pediatricians, internists, family practitioners, adults, and children.

For providers, ACP provides a full complement of provider education tools, based on NIH Guidelines to facilitate incorporation of our asthma practice guidelines into their clinical programs. We have prepared several diagnostic aids that review the differential diagnosis of asthma (written flip chart, case based, and electronic guidelines). The special considerations needed for children are addressed in *Pediatric Asthma: Promoting Best Practice*, an AAP publication in 1999. They have been constantly updated by advisory groups who have reviewed existing literature and expert opinion. Issues for women of childbearing age have been incorporated into the teachings and recommendations of the group especially as recommended by Schatz through AAAAI publications on pregnancy and asthma. To ensure sustainability of the program and provider participation, we also have incentives for physicians. Physician practices are now using the EHR to track key data points for patients with asthma and, as of

2005, were eligible to receive financial incentives for meeting certain quality thresholds in the PHO's "Excellence Rewards" Program.

Patients and their families are a key component of the partnership and a target for education in the ACP. The ACP integrates asthma self-management education into all aspects of asthma care. We begin self-management education at the time of diagnosis and continue it through follow-up care.

Patients are seen by the Asthma Education Specialist for an initial one-hour visit. The educational intervention is based on our asthma care curriculum. Patients and family members (in the case of pediatric patients) are provided with a packet of educational tools that is tailored to their individual needs and characteristics. The tools are designed to foster self-management and shared decision making with their health care provider. Specific tools help patients monitor their symptoms, track their medications, and answer frequently asked questions. The ACP also gives patients and families an easy-to-read book written in English and Spanish to introduce the NIH Guidelines to parents.

We work with all patients to jointly develop an asthma action plan that includes daily management and how to recognize and handle worsening asthma. The approach to long-term and quick relief medications used by the ACP is in accordance with the Revised NIH Guidelines. The clinicians regularly review the status of the patient's asthma control and the plan is revised accordingly. Written asthma action management plans are used to make sure that patients and families know what is asked of them in their own self-care and that of their children and to help get their input into self-management. We use peak flow monitoring and symptom monitoring to enable our patients to manage their asthma. Patients are also taught to recognize symptom patterns indicating inadequate asthma control and the need for additional therapy.

Both adult and pediatric asthma patients are enrolled in the ACP educational intervention primarily through referrals within the health care system, by primary care physicians (PCP) and specialists, nurse care managers, and inpatient and outpatient (including emergency department) case findings. Referrals also come from outside the system: school nurses, public health agencies, child care program directors and others; and by patients or families themselves.

Each local program has a Medical Director who consults with the Asthma Education Specialists regarding specific patients, and champions the program with physicians and other health care providers. The central office of the ACP employs a Medical Director, who is an Asthma/Allergy Specialist, and a Program Manager. The Medical Director oversees the entire program and is available to consult on specific patients, if necessary. All of these individuals focus on the control of factors that contribute to asthma severity, including the management of asthma co-morbidities, sensitivity to medications, viral respiratory infections, and environmental concerns.

*Clinicians evaluate patients for the presence of chronic comorbid conditions, such as ABPA, gastroesophageal reflux, obesity, OSA, rhinitis/sinusitis, and chronic stress or depression. In addition, the ACP created an innovative care management program in 2004 to improve outcomes among the growing population of children and adults with two highly prevalent chronic conditions: asthma and diabetes. Nurse care managers are "embedded" in our PCP practices and work side by side with physicians and other members of the team. They are a key source of referrals to the Asthma Education Specialists, and have been trained by the Specialists to monitor and help control asthma patients on an ongoing basis.

Also, specific care maps have been developed by multidisciplinary committees for patients who are

treated in the ED and admitted to the hospital for pneumonia in the adult patient population and for the respiratory syncytial virus patient in the pediatric population.

The asthma treatment box on each encounter form also prompts providers to make notes on the patient's medication plan including prescriptions for controllers, relievers, and allergy medications. During annual trainings in asthma and allergy management, providers are reminded to prescribe controller medications to all patients with classifications of persistent asthma in accordance with the NIH EPR-3 Guidelines.

The EHR allows clinicians to track asthma patients' care and asthma management. Specific asthma assessments have also been incorporated into clinical forms, which serve to gather information from the patient on emergency room visits, hospitalizations, school days missed, and parental work days missed. This information is also entered into the EHR and can be accessed by members of the team, including physicians, nurse care managers, and Asthma Education Specialists.

As a routine matter, nurse care managers review the records of their asthma patients every two weeks to evaluate the need for referrals or changes in treatment plans. They also ensure that any reports (e.g., ED or home assessment results) are sent to the PCPs and specialists treating the patients.

c. Tailored Environmental Interventions

Patients who have asthma and are exposed to allergens or irritants to which they are sensitive have more frequent asthma symptoms and exacerbations. Therefore, the ACP has made environmental management an integral component of this program from its very beginning. We emphasize that a multifaceted approach to environmental management of asthma is required and we use the Environmental Protection Agency's Asthma Home Environment Checklist with all of our patients, in the clinical setting as well as the home setting. This ensures that we comprehensively address environmental exposures such as tobacco smoke, mold, dust mites, strong odors, animal dander, and cockroaches. We have supplemented the checklist with a list of outdoor environmental triggers which we cover as well. These concepts are included in individual clinical evaluation, disease management, and planning in our relationships with various community partners.

In addition, our education component of environmental management follows the NIH Guidelines and emphasizes that patients who have asthma at any level of severity should avoid exposure to allergens; exposure to environmental tobacco smoke and other respiratory irritants, such as formaldehyde and VOCs; exertion outdoors when levels of air pollution are high; use of nonselective beta-blockers; and sulfite-containing and other foods to which they are sensitive. We consider allergen immunotherapy when there is clear evidence of a relationship between symptoms and exposure to an allergen to which the patient is sensitive.

Identification of triggers and environmental control is addressed through printed material, videotapes, lectures to practitioners and in large part through our asthma educators who travel throughout the ACP community to share information on the NIH recommended components of accurate and effective asthma diagnosis and management.

We created a robust environmental management component in the ACP, starting with a comprehensive exposure assessment that is completed for all enrolled patients. Considering the limited resources of our target population, ACP's environmental management plan is based on simple, effective, and inexpensive methods to improve each patient's home environment.

At the initial clinical visit, the physician evaluates the potential role of allergens through assessing the patient's medical history to identify allergen exposures that may worsen the patient's asthma, as well as skin testing or in vitro testing to reliably determine sensitivity to perennial indoor inhalant allergens. Using specific information from the intake document, each patient is educated on the different environmental triggers that are most relevant to them. After a personalized evaluation (for example, the asthma counselor may explain in detail to the patient and their family the importance of not smoking or burning incense inside their home, avoiding pest infestation, and preventing mold growth), low literacy printed materials, available in multiple languages, are sent home with the patient so that they will have easy access to the information. These informational sheets explain how these contaminants affect asthma and also how to reduce their presence in the home. We often assist patients in improving the physical structure of their home by having nurse care managers contact their landlords to facilitate mold and pest removal and provide information about tenant's rights and the services of Department of Health inspectors.

Although the scope of our environmental management program extends to community-wide advocacy and partnerships, our principal focus is in modifying the home environment of each clinic patient. By mitigating the exposures to asthma triggers in significant and specific areas, such as the bedroom, we aim to have the maximum impact on a patient's health with minimal disruption of their home life. Our population is exposed to many allergens and irritants, and many patients do not know that these factors exacerbate asthma. ACP takes into account these social and economic circumstances, and has devised an environmental management plan template that can be tailored to each patient's specific exposures. We give them simple, effective, and transferable methods to improve their environment. In the case of child patients, we are able to give families the tools and education to positively affect their child's asthma, so that they can be an integral part of the process that helps their child breathe more easily. The ACP also enrolls children with severe asthma in a case management program. The nurse care managers work with the Asthma Education Specialists to ensure the children are receiving adequate attention and care, as well as to obtain referrals for additional assistance if necessary.

Home visits are often recommended for patients with persistent asthma. For these patients, the Asthma Education Specialist visits the home for an initial 2 hour session to assess the patient's home environment, develop the environmental section of the asthma action plan, and educate the patient and family on the impact of environmental triggers on asthma. The comprehensive environmental assessment of the home is conducted using the EPA's Asthma Home Environment Checklist. Based on the outcome of the Checklist, tailored interventions may be provided, such as mattress and pillow covers, specific information regarding nontoxic cleaners, or smoking cessation program information. The ACP also partnered with a non-profit organization to provide necessary resources and materials to low-income patients to address their environmental needs, such as free mattress and pillow covers. The environmental section of the asthma action plan includes triggers at home, as well as triggers in the school or work environment. Two copies of the asthma action plan are provided to the patient, one copy to keep at home and one copy to take to school or work. In addition, a copy is sent to the patient's physician to keep on file.

Area 2. Evaluating the Program – Getting Results

*Measurement of outcomes, including behavioral, clinical, health status, and costs, is one of the most unique, differentiating aspects of the ACP. With assistance from the Outcomes Research and Evaluation Center at TopCare Medical Center, we have evaluated the effect of interventions on the annual enrollees in the ACP (inpatients and outpatients in hospitals, and physician practices) (n=400).

After several years of experience fine-tuning our metrics and data collection tools, we worked with the TopCare Physician-Hospital Organization to integrate these measures into a secure Web-based Electronic Health Registry (EHR). Physician practices are now using the EHR to track key data points for patients with asthma and, as of 2005, were eligible to receive financial incentives for meeting certain quality thresholds in the PHO's "Excellence Rewards" Program. Currently, the EHR is used by more than 300 physicians in 86 practices. Over 8,000 patients with asthma are now in the registry, allowing clinicians (care managers, physicians, and nurses) to actively manage their asthma population, and to quickly and easily measure the effects of their efforts on clinical and behavioral outcomes.

During the first year that the Electronic Health Registry was used, physicians improved the care of pediatric asthma patients, age 2-18, by increasing severity classification from 70 percent to 89 percent; controller medication use from 75 percent to 93 percent; written asthma action plans from 62 percent to 75 percent; and written asthma school plans from 45 percent to 65 percent.

The EHR includes questions on exposure to environmental triggers, including tobacco smoke. Reported exposures to environmental allergens and irritants were initially extremely high. Over 62 percent of families reported exposure to environmental tobacco smoke in the home, and 33 percent reported seeing cockroaches in the home. In addition, 24 percent reported seeing mold or mildew, and 23 percent reported a dog or a cat in the home. Enrollment in the ACP was associated with increases in behaviors to reduce exposure to environmental triggers. The proportion of families reporting a mattress pad or pillow cover on the child's bed increased by 100 percent, and the proportion of families who reported daily smoking in the home decreased by 87 percent.

The ACP used Asthma Education Specialists to provide education on asthma management with an emphasis on environmental management. Examples of typical behavioral and clinical outcomes 6 months post-intervention include 61 percent reductions in inappropriate emergency room use and 29 percent reductions in hospitalizations. At our largest hospital, TopCare Medical Center, a 700 bed tertiary care teaching hospital, ED visits for patients with asthma dropped from 81 percent to 20 percent from 2001 to 2007 and admissions decreased from 32 percent to 5 percent. At the beginning of enrollment, 67 percent of patients missed school due to asthma compared to only 7 percent at follow-up. Across six hospitals in the health system, the length of stay for hospitalized pediatric patients (age 2-18) with a primary diagnosis of asthma was 1.76 days, compared to the 2006 national benchmark of 2.44 days.

Sharing these outcomes in our community has been key to sustaining the funding model we employ. We have been able to demonstrate the success of our program for our patients and as a result of our approach, the cost savings we enjoyed (see below).

Area 3. Sustaining the Program

Determining cost savings is an important part of our evaluation program. Using our health outcomes data and the cost of services, we can calculate our cost savings.

Cost savings resulting from the ACP have been documented in each of the local hospitals and communities. For example, at TopCare Medical Center, asthma patients enrolled in the ACP experienced reductions in ED visits and hospitalizations: 81 percent of patients enrolled had an ED visit at baseline, compared to only 20 percent at follow-up. The average charge for an ED visit for asthma in 2007 was $587, resulting in a total savings to the overall health care system of $61,635 in avoided health

care costs. Also, admissions decreased from 32 percent to 5 percent from 2001 to 2007. This yielded a savings of $375,000, compared to a program cost of $252,000. Using the Johns Hopkins Standard Outcomes Metrics and Evaluation Methodology for Disease Management Programs to calculate return on investment (pre-program medical costs minus post-program medical costs divided by program costs) yielded a return on investment of 1.49. We also found that patients who received the home visit, which includes the comprehensive environmental management aspect, had a 50% reduction in ED visits and 70% reduction in hospital admissions. This translates to a cost savings of $107,000.

*Since avoided health care costs for hospitals (avoided costs translate into lower hospital revenues) might prevent hospitals from implementing programs such as the ACP, TopCare Medical Center's ACP has taken their economic analysis to the next step. They have documented the fact that reductions in their asthma-related ED use and hospitalizations have allowed asthma patients with highly acute needs to receive more comprehensive ED and inpatient care, thus contributing to increased levels of revenue. This type of program impact is one of the reasons that the ACP has been accorded a high level of visibility and support in budget deliberations.

The ACP has observed numerous non-monetary returns from our efforts. Our program serves as a valuable resource to those disparately affected by asthma; providing services, education, and bringing to light environmental management has allowed the asthma patients to take a more proactive role in their disease management. Due to our growing reputation as a program with an emphasis on environmental control of asthma, we are seen as a community resource for asthma education, and as such, our staff has been invited to speak in schools, parent groups, local asthma coalitions, and other community organizations.

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We believe the following features distinguish the ACP from other approaches to asthma management.

Results-oriented: The centerpiece of the ACP has been and continues to be measuring and reporting outcomes from individual behaviors (e.g., cessation of smoking or reduction in exposure to ETS), to clinical measures (e.g., appropriate use of controller medications or emergency room use), to changes in community practices (e.g., use access to asthma medications by school children or improved reporting of ozone levels). These outcomes have been successfully used to expand the reach of the ACP to adults and children with asthma, health care providers, community leaders and policymakers, and the public at large. These results have been a critical factor in our ability to leverage funding from the TopCare Health system and other public and private sources needed to sustain and grow the program. ACP has received awards from the Public Health Association and the American Lung Association in recognition of the impact the program has achieved.

Collaboration and Partnerships: The TopCare Health system values collaboration and partnerships, and has a long history of inclusiveness in clinical and community health initiatives, with the assumption that everyone benefits – patients and families, physicians, and the entire community – from such efforts. The ACP engages and connects individual patients and their families with their physicians and entire health care teams, as well as with the nurse care managers, and the Asthma Education Specialists at hospitals, clinics, health centers, public health organizations, child care centers, worksites, schools, and the media. Recognizing that asthma disproportionately affects disadvantaged populations (e.g., low income, uninsured, non-English speaking, rural), the ACP has done the appropriate research to identify barriers for each of these groups, and has developed effective interventions by working with community

partners such as the Medicaid Program, the American Lung Association, the Air Quality Coalition, the Public Health Department Minority Health Program, the Regional Primary Care Council, and many others.

Environmental Focus: When the ACP was launched in 2000, we encountered barriers to conducting environmental assessments and interventions, due in large measure to the lack of reimbursement for both. We have worked with payers, public health departments, and environmental organizations to assure that these critical elements of a comprehensive asthma management program are in place. In many cases, we have found that awareness and education are the missing pieces. For example, in working with child care centers that increasingly care for young children with asthma, we found them eager to convert to "green" cleaning practices and supplies, when given practical information about the effectiveness of such products and where to obtain them. We continue to emphasize the importance of assessing and acting upon environmental exposure by the Asthma Education Specialists, nurse care managers, home health nurses, community outreach workers, and others who provide direct care to patients and families.

Sustainability: Over the past seven years, the ACP has leveraged more than a half million dollars from sources external to TopCare Health to support a wide variety of activities, such as educational materials that are made available free of charge to patients and families and can be distributed to the community and used beyond the scope of a project. It has become increasingly important to ACP's organizational leadership to leverage other sources of financial support that promote the mission of ACP and reduce disparities in asthma care. We have developed mechanisms to charge payers for asthma education that is provided in hospital inpatient and outpatient settings, and to reward health care providers for achieving excellent outcomes among their patient populations. We have effectively reached out to other partners and advocates in the community to lobby for stronger laws to protect individuals with asthma, and the general public, through legislation that promotes clean indoor and outdoor air. These efforts, coupled with TopCare Health's leadership and continued financial support, along with the clinical and financial support of our member hospitals, provides a strong and sustainable infrastructure for the future.