

Enhancing the Role of the Emergency Department in the Identification and Management of Childhood Asthma

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The authors have indicated they have no relationships relevant to this article to disclose.

EMERGENCY DEPARTMENT DEMONSTRATION PROGRAM RATIONALE

Childhood asthma rates have risen dramatically over recent years for reasons only partially understood. Although appropriate treatment and self-management techniques can frequently keep asthma symptoms under control, evidence demonstrates that asthma control eludes far too many children. An estimated 9 million (12.5%) children <18 years of age in the United States have had asthma diagnosed at some time in their lives.¹ One of 3 children with asthma visits the emergency department (ED) because of an asthma-related event every year,² and these visits cost 5 times as much as primary care visits for childhood asthma.³ Asthma represents 17% of all pediatric ED visits.⁴ Children aged ≤14 years accounted for 570 000 ED visits in 1995 and 658 000 in 1999.⁵

In the late 1990s, these disturbing patterns prompted leading allergy and asthma specialists Gary S. Rachelefsky, MD, a past president of the American Academy of Allergy, Asthma and Immunology (AAAAI), and Gail G. Shapiro, MD, also a past president of AAAAI, to convene a task force of asthma experts comprising medical association, government, foundation, and nonprofit agency representatives; their charge was to raise the standard of care for children with asthma. In addition to co-chairs Rachelefsky and Shapiro, task force members included:

Peter Gergen, MD, Agency for Healthcare Research and Quality

David Bergman, MD, American Academy of Pediatrics

Joann Blessing-Moore, MD, American College of Allergy, Asthma, and Immunology

Meyer Kattan, MD, American Thoracic Society
Stephen Redd, MD, Centers for Disease Control and Prevention

Irwin Redlener, MD, Children's Health Fund
Carol Costante, RN, MS, CSN, National Association of School Nurses

Virginia Taggart, MPH, National Heart, Lung, and Blood Institute

Seth Emont, PhD, MS, the Robert Wood Johnson Foundation

These experts extrapolated pediatric asthma information from the National Heart, Lung, and Blood Institute's Expert Panel Report 2⁶ to create a set of stand-alone, evidence-based guidelines focused exclusively on the pediatric population: *Pediatric Asthma: Promoting Best Practice Guide for Managing Asthma in Children* (Pediatric Guide).⁷ Endorsed by the National Heart, Lung, and Blood Institute and the American Academy of Pediatrics, the Pediatric Guide recommendations serve as the gold standard and an important catalyst for improvements in pediatric asthma treatment and care.

This significant accomplishment notwithstanding, task force members Emont, a former senior program

Abbreviations: ED, emergency department; EDDP, Emergency Department Demonstration Program; AAAAI, American Academy of Allergy, Asthma and Immunology; RWJF, Robert Wood Johnson Foundation; QoL, quality of life; PI, principal investigator; CDC, Centers for Disease Control and Prevention

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officer with the Robert Wood Johnson Foundation (RWJF), and Rachelefsky believed that more needed to be done. Accordingly, they, along with Marielena Lara, MD, MPH, a researcher with the health division of the Rand Corporation, presented their concerns and findings on childhood asthma to the RWJF board of trustees, painting a picture of a chronic disease spiraling out of family, health care provider, and public health control. The presentation and findings helped convince the board that the complex problems associated with pediatric asthma warranted considerable foundation attention. In 1999, the RWJF launched its pediatric asthma initiative, which consisted of 5 separate but related components:

1. **Managing Pediatric Asthma: Emergency Department Demonstration Program (EDDP)**, a \$3.5 million program based at the AAAAI and directed by Gary S. Rachelefsky, MD—Awards were made to 4 pediatric emergency care centers that partnered with 15 additional pediatric EDs to develop tracking systems for characterizing asthma and asthma care patterns and to provide evidence-based asthma education and follow-up to children and families. The programs developed at these institutions serve as national models for enhancing the role of the ED in managing childhood asthma.
2. **Improving Asthma Care for Children**, at the Center for Healthcare Strategies, first directed by Richard Baron, MD, and then by Patricia Barta, MPH, RN—The goal of this initiative was to improve the management of pediatric asthma in high-risk recipients of Medicaid and the State Children's Health Insurance Program under managed care. Through this initiative, 5 health plans are seeking to improve the health and health-related quality of life (QoL) for children with asthma by developing and sustaining partnerships with key community stakeholders and institutionalizing innovative clinical models in asthma care.
3. **Allies Against Asthma, a Program to Combine Clinical and Public Health Approaches to Chronic Illness**, directed by Noreen M. Clark, PhD, at the University of Michigan's School of Public Health—Seven community coalitions were awarded grants designed to develop a community-based, sustainable strategy for asthma management. The primary goals of the program are to enhance the QoL of children with asthma and reduce hospital admissions, ED visits, and missed school days.
4. **A Study to Develop Policy Options to Improve Pediatric Asthma Outcomes in the States** awarded to the health division of the Rand Corporation and directed by principal investigator (PI) Marielena Lara, MD, MPH, and co-PI Gary S. Rachelefsky, MD—In collaboration with its expert panel, Rand produced *Improving Childhood Asthma Outcomes in the United States: A*

Blueprint for Policy Action,⁸ a report that formulates 6 policy goals and 11 policy recommendations for improving childhood asthma outcomes nationwide. The premise is that implementation of the report's policy recommendations will help build asthma-friendly communities in which children with asthma can be diagnosed quickly and accurately and receive appropriate and ongoing treatment; health care, school, and social agencies will be prepared to meet the needs of children with asthma and their families; and children will be safe from physical and social environmental risks that exacerbate their condition.

5. **Tools and Training to Improve Pediatric Asthma Management by Clinicians**, directed by Michael D. Cabana, MD, MPH, at the University of Michigan's School of Public Health—Through a multipronged intervention, this project has built a large cadre of opinion leaders and trainers who educate primary care physicians delivering asthma care. Moreover, the project evaluates education outcomes and disseminates a tool kit to clinicians by means of national and local professional associations.

As described later in more detail, at about the same time that the RWJF launched its initiative, the Centers for Disease Control and Prevention (CDC) announced the availability of \$600 000 in fiscal-year 2000 funds for a cooperative agreement program titled *Asthma Surveillance and Interventions in Hospital Emergency Departments*. The purpose of the program, developed under the leadership of Stephen Redd, MD, chief of the Air Pollution and Respiratory Health Branch of the CDC, was to foster state and local health department partnerships with local EDs that would develop asthma surveillance systems. The partnerships were also intended to utilize the surveillance data to develop policies and interventions that improved the medical and environmental management of asthma. Findings from 2 of the 3 funded programs appear in this supplement.

THE EMERGENCY DEPARTMENT DEMONSTRATION PROGRAM: MODELS FOR ENHANCED CARE

Pursuant to RWJF procedure, once an Emergency Department Demonstration Program (EDDP) National Program Office at the AAAAI became operational, an invitation for proposal was sent to potential applicants: nearly 70 pediatric care centers throughout the United States. Moreover, a 9-member National Advisory Committee comprising asthma and ED clinicians, researchers, and policy makers was formed; the committee's initial role included a thorough and careful review of the submitted proposals. (Throughout the life of the project, committee members and the National Program Office provided technical assistance and direction to sites that addressed research design, educational intervention, and program management matters.)

Selection Criteria

Assisted by the National Program Office and RWJF senior staff, the National Advisory Committee assessed applicants in 5 areas:

1. Target populations (pediatric asthma patients at high risk);
2. Patient-tracking system (capturing pediatric asthma patients around the clock, 7 days per week);
3. Clinical care delivery improvement interventions and patient, family, and caregiver educational interventions;
4. Internal evaluation approach (validating data-collection approach and information generated); and
5. Partnerships (collaboration among academic, private, and community hospitals).

At the conclusion of the review process, the National Advisory Committee forwarded its site-selection recommendations to the RWJF, which awarded grants to 4 pediatric care centers whose PIs, lead institutions, and partners are listed below:

PI: Stephen Teach, MD, MPH

Project title: Improving Pediatric Asthma Care in the District of Columbia (IMPACT DC)

Lead institution: Children's National Medical Center
Partners: Howard University Hospital, Providence Hospital, and George Washington University Hospital

PI: Rodney Boychuck, MD

Project title: Hawaii CARES (Child Asthma Research to Elevate Standards)

Lead institution: Kapi'olani Medical Center for Women and Children
Partners: Pali Momi Medical Center Castle Medical Center, Waianae Coast Comprehensive Clinic, and Kaiser Permanente Medical Center

PI: Charles Macias, MD, MPH

Project title: Texas Emergency Department Asthma Surveillance (TEDAS)

Lead institution: Texas Children's Hospital
Partners: Ben Taub General Hospital, Lyndon B. Johnson General Hospital, and University of Texas Medical Branch (Galveston)

PI: Kevin Kelly, MD

Project title: ED Allies

Lead institution: Children's Hospital of Wisconsin
Partners: St Mary's Hospital (Milwaukee), St Mary's Hospital (Ozaukee), St Joseph's Community Hospital of West Bend, Community Memorial Hospital-Menomonee Falls, and Kenosha Hospital and Medical Center

For children up to age 18 at risk for severe asthma,

the EDDP sought to reduce ED visits, increase reliance on primary care providers, improve adherence to clinical protocols, and improve patient/family knowledge of and compliance with therapeutic regimens. The intent was to develop models of ED-based tracking systems and educational interventions that could be replicated throughout the country.

The tracking systems were to provide real-time data that could be used to improve clinical care delivery and eventually be integrated into a community-wide strategy for monitoring childhood asthma trends and improving the quality of asthma care. By collecting extensive demographic, care pattern, insurance, and clinical information at the point of ED admission, the EDs would be able to pinpoint factors that precipitated asthma exacerbations and ED admissions and could be addressed through a multitude of approaches.

In addition to a patient-tracking system, the EDDP design also called for evidence-based patient and family education intervention models. The statistics on pediatric asthma ED visits^{4,9-12} suggested that ED-based asthma education could reach a sizeable, high-risk pediatric population. Moreover, it was reasoned that for some of these children, the ED would represent the sole opportunity for connection to a primary or specialty care setting. The intent was to build a bridge between ED-based care and primary or specialty care, thereby increasing the likelihood that all children would be reached.

By launching the EDDP, the RWJF made it possible to determine if the ED could serve as an asthma education setting that produced positive health outcomes and, concomitantly, an effective location from which to track and characterize pediatric asthma admissions.

Program Methodology

Each center developed and implemented its own program, using a unique study design. As indicated in Table 1, however, all sites collected a set of core data from prospectively tracked patients, including assessments of chronic asthma severity based on the Pediatric Guide.⁷ Collection and validation of these core data depended on individual study design. Interventions and intervention data were also site-specific; as such, the intervention outcomes varied from site to site. To achieve some common ground for qualitative comparison without hindering program progression and changing outcome measures, sites agreed to use the same instrumentation¹³ to gather common data on ED visits, hospitalization, QoL, and insurance coverage (Table 1).

ASTHMA SURVEILLANCE AND INTERVENTIONS IN HOSPITAL EDs: A CDC PROGRAM

The CDC program was developed specifically to address the *Healthy People 2010*¹⁴ goals for reducing hospital ED admissions resulting from asthma. Implementing and evaluating a sentinel surveillance system that monitored

TABLE 1 Core Data and Common Data Questions

Core data variable
Numbers of pediatric asthma ED admissions
Numbers of hospital admissions
Objective measurements of pulmonary-function tests
Medical history, including age of asthma onset, medications used, and severity and frequency of asthma symptoms
Physical exam
Classification of severity in present episode
Season, pollution levels, and weather conditions at time of presentation
Type of care the patient received for current asthma episode immediately before the ED visit, if any
Family history and demographics
Self-reports of allergens/irritants present in the home, day care, and/or school
Health insurance status
Health care provider (primary care or asthma specialist)
Common data collection
ED visits
Hospitalizations
Insurance
QoL (Integrated Therapeutics Group Bukstein instrument) ¹²

trends in and identified reasons for receiving asthma care in hospital EDs would enable projects to develop and implement interventions that improved asthma care; the surveillance data could help evaluate the interventions. It was expected that grantees would forge partnerships with universities, hospital EDs (at least 3–4 that serve different populations), and state and local health departments, developing ED-based models of asthma surveillance and intervention that potentially could be replicated in similar settings.

Recipients

After objective reviews, the CDC awarded funds to 3 grantees to:

- Collaborate with the state health department and 3 to 4 EDs in locations that serve diverse populations (eg, rural, urban, suburban) to plan and implement surveillance and model interventions for asthma;
- Participate in a recipient meeting to coordinate surveillance and intervention activities across sites;
- Develop and pilot-test all data-collection instruments;
- Develop model interventions to reduce severe exacerbations by improving care for asthma;
- Analyze the data and report surveillance findings to collaborating EDs, the state health department, and the CDC;
- Make presentations and prepare written manuscripts for publication; and
- Evaluate the surveillance system and the effectiveness of the interventions to reduce severe asthma exacerbations.

The CDC grant recipients and their partners included:

PI: Tim E. Aldrich, PhD, MPH

Project title: Carolina Asthma Surveillance and ED-Based Intervention

Lead institution: University of South Carolina School of Public Health

Partners: Richland Memorial Hospital, Fairfield Memorial Hospital, and Piedmont Medical Center

PI: Mathew J. Reeves, PhD

Project title: Development and Implementation of an ED Surveillance and Intervention System for Asthma Care in Grand Rapids, Michigan

Lead institution: Michigan State University

Partners: Spectrum Health Downtown (Butterworth, MI), Spectrum Health East Campus (Blodgett, MI), and Gerber Memorial Hospital

PI: Kevin Weiss, MD

Project title: Illinois ED Asthma Collaborative Study

Lead institution: Northwestern University

Partners: Rush University Medical Center, Christ Hospital, John H. Stroger, Jr, Hospital of Cook County, Rockford Memorial Hospital, St John's Hospital, and University of Chicago Hospitals

Program Methodology

As the RWJF sites had done, each CDC site developed and implemented unique asthma surveillance and intervention programs. Unlike the RWJF projects, however, the CDC projects targeted adults and children rather than just children. Site-specific program elements are reflected in Table 2.

Symposium: Doing the Most to Ensure the Least: ED Asthma Visits

As preliminary results emerged from both the CDC and RWJF projects, investigators started seeing potential implications for clinical practice, health care delivery, and health care policies. Accordingly, the AAAAI, RWJF, and CDC hosted an invitational meeting titled "Doing the Most to Result in the Least: ED Asthma Visits," at which select clinicians, researchers, public health experts, insurers, and policy makers learned about the projects and their preliminary findings and had an opportunity to consider their potential impact. The meeting participants included (in alphabetical order):

Patricia Barta, MPH, RN
Center for Healthcare Strategies

M. Beth Benedict, RN, DrPH, JD
Centers for Medicare and Medicaid Services

Shawn K. Bowen, MD
Director, Childhood Asthma Initiative
Children's Health Fund

Rodney B. Boychuk, MD
Program Director
Hawaii CARES

TABLE 2 CDC Site-Specific Program Elements

Site	Surveillance	Intervention
Illinois	Developed, tested, and refined ED survey instrument and administration Conducted 18-mo feasibility and responsiveness trial Outcomes: 30-d ED relapse rate, symptom burden, QoL, patient satisfaction Refined system, transferred to Internet, and disseminated findings/ system to state health department	Not included
Michigan	Assessed feasibility of ED electronic billing data for asthma surveillance Assessed reasons for seeking asthma care in ED	Evaluated 2 asthma management interventions Usual ED Usual ED + inhaled corticosteroid + asthma management plan
South Carolina	Used state-collected ED electronic data to characterize children receiving asthma care	Called families to identify triggers; sampled children visiting ED for home assessments and interviews; conducted educational interventions for adults in hospitals

Susan K. Bricker, MPH
Epidemiologist
Texas Department of State Health Services

Michael Cabana, MD, MPH
Associate Professor Pediatrics
University of Michigan

Carlos A. Camargo, Jr, MD, DrPH
Director, EMNet Coordinating Center
Massachusetts General Hospital

Seth Emont, PhD, MS
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Gail G. Shapiro, MD
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Michigan Department of Community Health

Paul V. Williams, MD
American Academy of Pediatrics
Section on Allergy and Immunology

Seymour G. Williams, MD
Centers for Disease Control and Prevention

Joseph L. Wright, MD, MPH
Medical Director, Advocacy and Community Affairs
Children's National Medical Center

From January 21 to 23, 2005, presenters and participants met in Atlanta, Georgia, near the CDC national headquarters. In light of preliminary project findings, as well as their collective experience, meeting participants concluded that continued research will be essential to evaluate educational strategies in ED settings. Elements of programs that seem to have the most promise for effective education include (1) offering education in the ED to take advantage of teachable moments, (2) using a collaborative staff training model, (3) defining an ED educational role that is distinct from, but related to, the broader, long-term educational role of primary care providers and asthma specialists, and (4) offering a follow-up educational intervention to patients at high risk of repeat ED visits. Meeting proceedings appear at the end of this supplement (see pages S159–S166). It is important to note that the commentary reflects the opinions of individual participants and in no way should be construed as constituting endorsements by the participants' affiliated organizations. We hope that a number of audiences will find the comments thought-provoking and useful in the ongoing effort to make sure that this nation's children receive better asthma care from all quarters.

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