COMMENTARY

Doing the Most to Ensure the Least Emergency Department Asthma Visits: Asthma Experts Consider Preliminary Project Findings

In early January 2005, the American Academy of Allergy, Asthma and Immunology, the Robert Wood Johnson Foundation, and the Centers for Disease Control and Prevention (CDC) hosted an invitational meeting in Atlanta, Georgia, near the CDC headquarters, called "Doing the Most to Result in the Least: ED [emergency department] Asthma Visits." Project investigators, select clinicians, researchers, public health experts, insurers, and policy makers learned about the preliminary findings of the CDC and Robert Wood Johnson Foundation projects, some of which are presented herein, and considered their potential impact on clinical practices, health care delivery, and health care policies.

The following commentary reflects the thoughts and opinions of individual meeting participants based on their own experiences as well as the projects' preliminary findings; they should not be construed as endorsements by participants' affiliated organizations. Comments and recommendations were made in hope that a number of audiences would find them thought provoking and useful.

APPROPRIATE ROLE OF THE ED IN MANAGING CHILDHOOD ASTHMA

Asthma is a complex and chronic disease. Although it cannot be cured, long-term treatment can keep asthma symptoms well under control. Elements of effective, long-term asthma treatment include an accurate diagnosis, continuous assessment of severity, prescribing severity-appropriate medications, and teaching and reinforcing patient- and family-centered asthma management techniques. Children who seek ED care for asthma exacerbations may lack connection with a health care provider system that consistently delivers all the elements of asthma treatment necessary for preventing acute exacerbations and ED admissions for asthma.[1–3] Although more research is needed to determine how to best ensure that children with asthma are connected with a long-term care system that delivers all the elements of effective care, the problem itself begs some important health policy questions: Can and should the ED expand its asthma management role beyond the episodic treatment of acute exacerbations? If so, what should this extended role look like? Meeting participants considered these questions and support an ED asthma education role that comprises the following functions.

Ensuring Continuity of Care

In light of the evidence showing that many children seeking ED care for asthma are not connected with a system that provides all the elements of effective treatment, it is important that the ED expand its childhood asthma management role beyond treatment of the acute exacerbation. Initiating some of the elements of long-term care for children who have persistent asthma or recurrent exacerbations can allow the ED to serve as a bridge between the acute and long-term, comprehensive care settings. It is anticipated that fulfilling this role can lead to improvements in patient outcomes.

Assessing Chronic-Severity Level

To make an initial identification of children needing treatment from and referral to a long-term asthma care system, it is necessary for the ED to assess or characterize the child's chronic asthma severity level. Although ongoing chronic-severity assessment during follow-up care is crucial, ED-based assessment can provide a sound

Abbreviations: CDC, Centers for Disease Control and Prevention; ED, emergency department; PCP, primary care provider; BRFSS, Behavioral Risk Factor Surveillance System

Opinions expressed in this commentary are those of the authors and not necessarily those of the American Academy of Pediatrics or its Committees.

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basis on which ED-discharge referral decisions can be made.

As noted in Fig 1, chronic-severity assessment can be accomplished by determining medication use, daytime symptoms, nighttime symptoms, history of ED visits, and activity limitations.[4,5]

Providing Limited Asthma Education

When asthma severity warrants, it is recommended that the ED provide limited patient and family asthma education. For children with persistent asthma or recurrent exacerbations, the purpose of ED-based asthma education is to help the patient and family acquire the most critical elements of asthma knowledge. Because the ED is an exceptionally busy setting, the ED needs to identify patient and family educators who can be available to provide the education. The educators' role includes:

- Providing families and patients with information about the long-term nature and seriousness of asthma, including its inflammatory component and the necessity for ongoing treatment.
- Ensuring that the patient (or the caregiver) demonstrates the skills necessary for taking medication after leaving the ED.
- Teaching the patient (or the caregiver) how to use a simple action plan.

Although much of the aforementioned education would also be helpful or necessary for patients with intermittent asthma or nonasthma wheezing, it can be provided to that patient population in the non–acute care setting.

Making Referrals

For patients with persistent asthma or recurrent asthma exacerbations, it is recommended that the ED initiate a referral to a long-term care system that can provide all the elements of asthma care (Fig 1).

A subset of children who seek ED treatment for wheezing symptoms will have intermittent asthma or other medical problems to which the wheezing can be attributed. In these instances, referral to the child's usual provider for follow-up care is indicated. Among children 2 years of age, wheezing cannot always be attributed to a particular cause. Until a determination of cause can be made, these children will be referred to their usual health care provider.

Patients with persistent asthma or recurrent asthma exacerbations need appropriate assessment and asthma expertise that allow for comprehensive care and man-

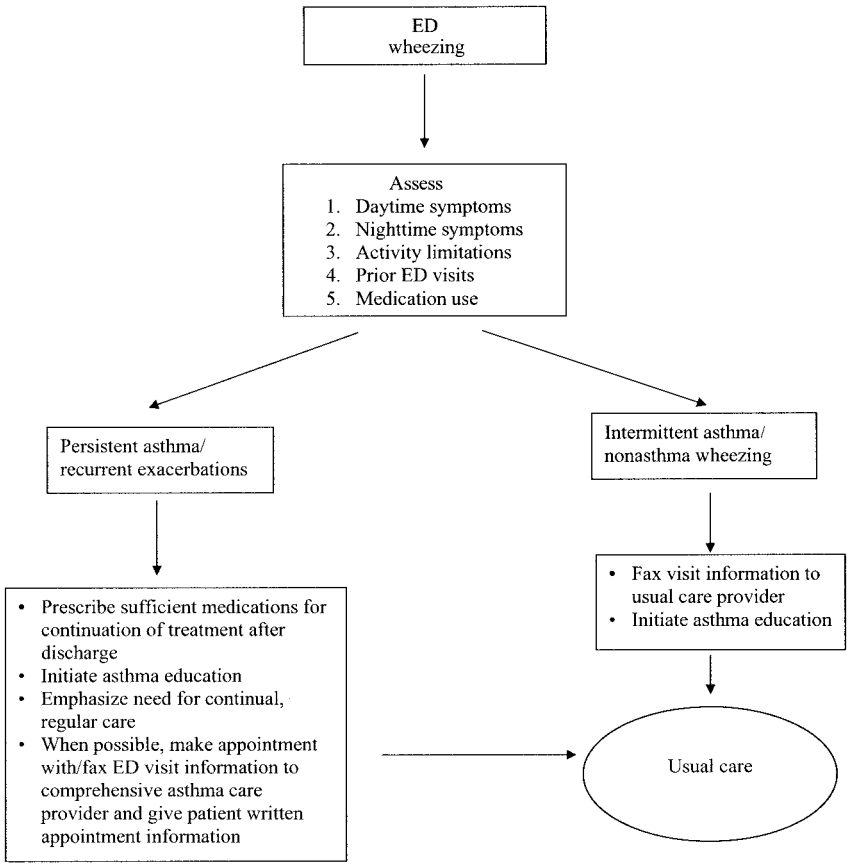

FIGURE 1
The ED bridge to appropriate asthma care.

agement. Typically, the evaluation and care of the patient will include history, physical examination, appropriate medical diagnostics, education, medication and device demonstration, and pulmonary-function testing. Such visits may take 60 to 90 minutes and should be reimbursed by health insurers accordingly.

To best ensure that this comprehensive care is initiated, it is recommended that, when possible, the ED make the appointment with the care system during the ED visit or as soon as possible thereafter.[6] It is also recommended that, when possible, the ED fax the ED visit information to the provider to whom the patient is being referred. Preferably, the provider's office will confirm the appointment with the patient or family.[7]

Consider Therapeutic Recommendations

Depending on the ED's circumstances and characteristics of the patient population it serves, ED staff should consider making chronic-care therapeutic recommendations at discharge. As indicated in Figs 2 and 3, reproduced from the 2002 *Expert Panel Report 2*,[8] therapy prescriptions and therapeutic devices need to be tailored to the patient's asthma severity level.

THE ED AS AN EDUCATIONAL VENUE

Although asthma is a chronic health condition, appropriate asthma education and medications can help many patients with asthma keep their disease under control and stay nearly free from acute exacerbations. Because education is helpful and patients benefit from message reinforcement, logic would suggest that all asthma health care encounters should include at least some asthma education. Although primary care providers (PCPs) and asthma specialists provide their asthma patients with asthma education, ED providers (who are accustomed to treating acute illnesses and injuries) have usually played a more minor asthma education role. The Emergency Department Demonstration Program and CDC projects offered select EDs across the country an opportunity to provide asthma education to persons with asthma coming to the ED. In light of the projects' preliminary findings, as well as their own experience, meeting participants discussed how the ED can serve as an effective venue from which to deliver health education and skill improvement and offered the following comments for additional consideration.

Recognize Teachable Moments

Asthma ED visits offer teachable moments that need to be recognized and used for providing appropriate asthma education to every patient with asthma. Educational approaches and strategies tailored to particular ED settings (reflecting such considerations as staffing, technologic sophistication, and financing) can help ensure effectiveness and sustainability.

The best staff-training models for providing asthma education to patients (1) include training for everyone who sees the patient, including reception staff, triage nurses, nurses, respiratory therapists, and physicians and (2) are supported by hospital administrators.

Moreover:

- Educational messages need to be simple, straightforward, culturally and linguistically appropriate, and primarily visual.
- A multifaceted, automated system that includes reminders, incentives, and positive feedback seems promising.
- Identifying a champion for the ED "asthma care" effort, such as an ED physician or nurse leader, can help ensure success. It is also important to identify specific staff responsibilities and accountabilities and provide incentives accordingly.

An important goal of staff education is to change staff perceptions of themselves as providers of acute care to providers who also play a necessary educational role in caring for persons with chronic diseases such as asthma.

Focus on Initial Elements of Asthma Education

The asthma education role of EDs is distinct from the broader, long-term educational role of PCPs and asthma specialists. To maintain this distinction and serve as a bridge to long-term care, ED-based education should focus on the basic or initial elements of asthma education, such as how to recognize symptoms and when and how to use medications. (Because medication use varies according to chronic-severity level, ED staff must understand the asthma-severity–classification system.) Key messages could include the following.

- Asthma is a chronic inflammatory disease.
- Regular follow-up care from a PCP or asthma specialist is necessary.
- Patients need to understand the difference between antiinflammatory (controller) and quick-relief (rescue) medications, as well as when and how they should be used.
- Inhaled corticosteroids are safe and effective.
- Asthma is life threatening but can be controlled.

It can be helpful to create a message acronym (such as "CART" for chronic, antiinflammatory, rescue medications, and techniques) to aid recall of the major teaching objectives.

The experience of one project suggests that a return visit to the ED for follow-up education offers some promise for improving patient outcomes and reducing ED readmissions for asthma. In light of this evidence, it is recommended that additional research be conducted to more fully assess the effectiveness of this strategy. Moreover, a return-visit strategy ought to be stratified,

Classify Severity: Clinical Features Before Treatment or Adequate Control	Symptoms/Day Symptoms/Night	Medications Required To Maintain Long-Term Control Daily Medications
Step 4 Severe Persistent	Continual Frequent	■ **Preferred treatment:** – **High-dose inhaled corticosteroids** AND – **Long-acting inhaled beta$_2$-agonists** AND, if needed, – Corticosteroid tablets or syrup long term (2 mg/kg/day, generally do not exceed 60 mg per day). (Make repeat attempts to reduce systemic corticosteroids and maintain control with high-dose inhaled corticosteroids.)
Step 3 Moderate Persistent	Daily >1 night/week	■ **Preferred treatments:** – **Low-dose inhaled corticosteroids and long-acting inhaled beta$_2$-agonists** OR – **Medium-dose inhaled corticosteroids.** ■ Alternative treatment: – Low-dose inhaled corticosteroids and either leukotriene receptor antagonist or theophylline. If needed (particularly in patients with recurring severe exacerbations): ■ Preferred treatment: – **Medium-dose inhaled corticosteroids and long-acting beta$_2$-agonists.** ■ Alternative treatment: – Medium-dose inhaled corticosteroids and either leukotriene receptor antagonist or theophylline.
Step 2 Mild Persistent	>2/week but <1x/day >2 nights/month	■ **Preferred treatment:** – **Low-dose inhaled corticosteroids (with nebulizer or MDI with holding chamber with or without face mask or DPI).** ■ Alternative treatment (listed alphabetically): – Cromolyn (nebulizer is preferred or MDI with holding chamber) OR leukotriene receptor antagonist.
Step 1 Mild Intermittent	≤2 days/week ≤2 nights/month	■ No daily medication needed.

Quick Relief
All Patients

- Bronchodilator as needed for symptoms. Intensity of treatment will depend upon severity of exacerbation.
  - Preferred treatment: **Short-acting inhaled beta$_2$-agonists** by nebulizer or face mask and space/holding chamber
  - Alternative treatment: Oral beta$_2$-agonists
- With viral respiratory infection
  - Bronchodilator q 4–6 hours up to 24 hours (longer with physician consult); in general, repeat no more than once every 6 weeks
  - Consider systemic corticosteroid if exacerbation is severe or patient has history of previous severe exacerbations
- Use of short-acting beta$_2$-agonists >2 times a week in intermittent asthma (daily, or increasing use in persistent asthma) may indicate the need to initiate (increase) long-term-control therapy.

Step down
Review treatment every 1 to 6 months; a gradual stepwise reduction in treatment may be possible.

Step up
If control is not maintained, consider step up. First, review patient medication technique, adherence, and environmental control.

Goals of Therapy: Asthma Control

- Minimal or no chronic symptoms day or night
- Minimal or no exacerbations
- No limitations on activities; no school/parent's work missed
- Minimal use of short-acting inhaled beta$_2$-agonist
- Minimal or no adverse effects from medications

Note

- The stepwise approach is intended to assist, not replace, the clinical decision-making required to meet individual patient needs.
- Classify severity; assign patient to most severe step in which any feature occurs.
- There are very few studies on asthma therapy for infants.
- Gain control as quickly as possible (a course of short systemic corticosteroids may be required); then step down to the least medication necessary to maintain control.
- Minimize use of short-acting inhaled beta$_2$-agonists. Overreliance on short-acting inhaled beta$_2$-agonists (e.g., use of short-acting inhaled beta$_2$-agonist every day, increasing use or lack of expected effect, or use of approximately one canister a month even if not using it every day) indicates inadequate control of asthma and the need to initiate or intensify long-term-control therapy.
- Provide parent education on asthma management and controlling environmental factors that make asthma worse (e.g., allergens and irritants).
- Consultation with an asthma specialist is recommended for patients with moderate or severe persistent asthma. Consider consultation for patients with mild persistent asthma.

FIGURE 2
Stepwise approach for managing infants and young children (≤5 years old) with acute or chronic asthma. (Reproduced from National Heart, Lung, and Blood Institute; National Asthma Education and Prevention Program. *Expert Panel Report 2: Guidelines for the Diagnosis and Management of Asthma*. Bethesda, MD: National Institutes of Health; 1997. NIH publication No. 97-4051; updates *Expert Panel Report 2* figures 3-4a and 3-6.).

Classify Severity: Clinical Features Before Treatment or Adequate Control	Symptoms/Day Symptoms/Night	PEF or FEV_1 PEF Variability	Medications Required To Maintain Long-Term Control Daily Medications
Step 4 Severe Persistent	Continual Frequent	≤60% >30%	■ **Preferred treatment:** – **High-dose inhaled corticosteroids** AND – **Long-acting inhaled beta$_2$-agonists** AND, if needed, – Corticosteroid tablets or syrup long term (2 mg/kg/day, generally do not exceed 60 mg per day). (Make repeat attempts to reduce systemic corticosteroids and maintain control with high-dose inhaled corticosteroids.)
Step 3 Moderate Persistent	Daily >1 night/week	>60% – <80% >30%	■ **Preferred treatment:** – **Low-to-medium dose inhaled corticosteroids and long-acting inhaled beta$_2$-agonists.** ■ Alternative treatment (listed alphabetically): – Increase inhaled corticosteroids within medium-dose range OR – Low-to-medium dose inhaled corticosteroids and either leukotriene modifier or theophylline. If needed (particularly in patients with recurring severe exacerbations): ■ **Preferred treatment:** – **Increase inhaled corticosteroids within medium-dose range and add long-acting inhaled beta$_2$-agonists.** ■ Alternative treatment: – Increase inhaled corticosteroids within medium-dose range and add either leukotriene modifier or theophylline.
Step 2 Mild Persistent	>2/week but < 1x/day >2 nights/month	≥80% 20–30%	■ **Preferred treatment:** – **Low-dose inhaled corticosteroids.** ■ Alternative treatment (listed alphabetically): cromolyn, leukotriene modifier, nedocromil, OR sustained release theophylline to serum concentration of 5–15 mcg/mL.
Step 1 Mild Intermittent	≤2 days/week ≤2 nights/month	≥80% <20%	■ **No daily medication needed.** ■ Severe exacerbations may occur, separated by long periods of normal lung function and no symptoms. A course of systemic corticosteroids is recommended.

Quick Relief
All Patients

- Short-acting bronchodilator: 2–4 puffs **short-acting inhaled beta$_2$-agonists** as needed for symptoms.
- Intensity of treatment will depend on severity of exacerbation; up to 3 treatments at 20-minute intervals or a single nebulizer treatment as needed. Course of systemic corticosteroids may be needed.
- Use of short-acting beta$_2$-agonists >2 times a week in intermittent asthma (daily, or increasing use in persistent asthma) may indicate the need to initiate (increase) long-term-control therapy.

Step down
Review treatment every 1 to 6 months; a gradual stepwise reduction in treatment may be possible.

Step up
If control is not maintained, consider step up. First, review patient medication technique, adherence, and environmental control.

Goals of Therapy: Asthma Control

- Minimal or no chronic symptoms day or night
- Minimal or no exacerbations
- No limitations on activities; no school/work missed
- Maintain (near) normal pulmonary function
- Minimal use of short-acting inhaled beta$_2$-agonist
- Minimal or no adverse effects from medications

Note

- The stepwise approach is meant to assist, not replace, the clinical decisionmaking required to meet individual patient needs.
- Classify severity: assign patient to most severe step in which any feature occurs (PEF is % of personal best; FEV_1 is % predicted).
- Gain control as quickly as possible (consider a short course of systemic corticosteroids); then step down to the least medication necessary to maintain control.
- Minimize use of short-acting inhaled beta$_2$-agonists. Overreliance on short-acting inhaled beta$_2$-agonists (e.g., use of short acting inhaled beta$_2$-agonist every day, increasing use or lack of expected effect, or use of approximately one canister a month even if not using it every day) indicates inadequate control of asthma and the need to initiate or intensify long-term-control therapy.
- Provide education on self-management and controlling environmental factors that make asthma worse (e.g., allergens and irritants).
- Refer to an asthma specialist if there are difficulties controlling asthma or if step 4 care is required. Referral may be considered if step 3 care is required.

FIGURE 3
Stepwise approach for managing asthma in adults and children >5 years of age: treatment. (Reproduced from National Heart, Lung, and Blood Institute; National Asthma Education and Prevention Program. *Expert Panel Report 2: Guidelines for the Diagnosis and Management of Asthma*. Bethesda, MD: National Institutes of Health; 1997. NIH publication No. 97-4051; updates *Expert Panel Report 2* figures 3-4a and 3-4b.)

targeting high-risk and/or first-time patients; in addition, it is crucial that the visit help ensure reconnection of the patient with a PCP or asthma specialist.

ED-BASED ASTHMA SURVEILLANCE DATA

Tracking ED asthma patients offers a valuable opportunity for detecting asthma trends as well as a chance to intervene. Intervention may be particularly important, because patients who visit the ED because of asthma are at risk for repeated or even more serious asthma complications. After examining issues related to ED-based asthma surveillance, meeting participants considered the strengths and weaknesses of several surveillance data sources, including the following.

Asthma Billing Data

For surveillance purposes, asthma billing data from the ED or other administrative sources such as managed care or the state Medicaid system can be useful.

Strengths

- Data allow for identification of high-burden locations and populations; such information can be used to develop interventions.
- Data can serve as a baseline against which to monitor future incidence, prevalence, and cost trends.

Limitations

- Data are not timely. Identified trends may not reflect current patterns.
- Data are not always specific enough to catalyze targeted interventions.
- The primary purpose of billing data is to secure payment for services. Coding errors may confound the data.

Behavioral Risk Factor Surveillance System and National Asthma Survey Data

For additional surveillance purposes, the Behavioral Risk Factor Surveillance System (BRFSS) optional asthma module as well as National Asthma Survey questions can also be useful.[9–16]

Strengths

- Relatively low cost.
- Can be compared with billing data.
- Year-to-year comparisons can detect trends.
- Data allow researchers to examine covariates associated with ED use.

Limitations

- Statewide or city-level data are not always available and fail to represent the finest degree of resolution.
- Self-reported.
- The BRFSS does not provide information on children.

ED-Based, Real-time Tracking Data

Meeting attendees agreed that if EDs ask every pediatric patient with asthma a series of questions, as noted below, the answers would be of value in providing optimal clinical care.

As described elsewhere in this supplement, the Milwaukee[17] and Texas[18] studies describe effective models for this type of real-time or prospective tracking system. Data collection in EDs for management of acute strokes is another model. The Joint Commission on Accreditation of Healthcare Organizations asthma-accreditation data elements represent a third model.[19]

Questions yielding the most valuable chronic-care data would include the following.

- What is the frequency of your child's daytime symptoms?
- What is the frequency of your child's nighttime symptoms?
- Over the past 12 months, how many times has your child visited a hospital ED because of asthma? [Don't count current visit.]
- Do your child have a PCP?

Other questions could include the following.

- Have you ever been told by a physician that your child has asthma?
- Acute severity assessment: Is your child's β-agonist canister empty? How many times has your child used a β-agonist in the past 24 hours? Were inhaled corticosteroids prescribed for your child/used before this ED visit?
- Over the past 12 months, how many times has your child been admitted to stay overnight in a hospital because of asthma?
- Are you the child's primary caregiver?
- Is there a smoker in the household or the child care setting?
- Did you try to contact your PCP before coming to the ED
- Have you seen your PCP in the past year?
- What medications has your child taken in the past year?

Strengths

- Assures that the ED provider has essential information for appropriate management of the patient.
- Underscores the need to refer patients or family members to appropriate programs, such as tobacco cessation.
- Facilitates local assessment of quality of care (if data are aggregated over time and analyzed by the provider or the facility).
- Provides an opportunity to identify high-risk (repeat) ED visitors at the local level for timely impact and action.

Limitations

- Significant challenge to implement and sustain within the ED setting; requires buy-in and championing from national ED leaders and professional associations.
- Data management infrastructure will not be available everywhere.
- Potential complications with the Health Insurance Portability and Accountability Act (HIPAA)/institutional review boards (however, if surveillance questions represented the standard of care, HIPAA/institutional review board issues would not come into play).

When local asthma projects design quality-improvement projects for asthma care, meeting participants saw value in encouraging them to use asthma data collected through simple, low-cost, real-time, ED-based surveillance systems. The data elements listed above can help projects define target populations and shape their interventions accordingly.

Usefulness of This Approach

- The tight link between intervention and data collection assures that the information has value in evaluating and modifying interventions.
- There is a relatively low cost.
- Depending on the intervention target and data collection system, trend data can show a rapid change when the intervention is successful in effecting a change.

Limitations of This Approach

- Because the primary purpose of the data-collection system is to provide intervention feedback, data will not be generalizable beyond the target population.
- Similarly, data systems that are designed to provide intervention feedback may not give true rates and may have inadequately defined biases

Environmental Data

ED-utilization data can be valuable in assessing the impact of environmental exposures on ED visits for asthma. Such assessments require specialized expertise and are not required on a continuous basis. The availability of confidential ED data and publicly available environmental data are a prerequisite for such analyses. These analyses should be conducted at centers with requisite methodologic expertise and could be used to provide community profiles of the impact of air pollution on asthma.

Participants hoped that several audiences will consider these analyses of data sources. They recommended, for example, that state asthma-control programs pay particular attention to the possibility of collecting and analyzing administrative and billing data within the context of their overall plan for asthma surveillance. The academic and professional ED physician societies as well as ED committees have a stake in developing models for optimal management of asthma in the ED and in linking to the larger health care system to assure optimal control of asthma in the community. These data sources and their analyses are part of assuring better care and better control for children with asthma. Organizations and institutions that pay for asthma care, employers, state Medicaid agencies, and Children's Health Insurance Programs (CHIPs) could use these analyses as a basis to improve asthma control and lower costs. Similarly legislatures, the ultimate funding source for much of the public funding of asthma care, would benefit from having a better picture of asthma care.

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