

The 2007 National Asthma Education and Prevention Program Asthma Guidelines: Accelerating Their Implementation and Facilitating Their Impact on Children With Asthma

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ABSTRACT

Nearly 2 decades have elapsed since the National Center for Health Statistics raised concerns regarding the trends in increasing asthma prevalence. Additional research highlighted the large racial disparities and geographic variations in asthma morbidity and mortality rates. Although there was little national consensus on the care of children with asthma at the time, there were improvements in the understanding of the mechanisms and treatment of asthma. It was in this context that the National Heart, Lung, and Blood Institute launched the National Asthma Education and Prevention Program, which convened its first panel of experts to create the national consensus clinical practice guidelines on the treatment of asthma. More than 15 years have passed since the publication of those first guidelines and, in August 2007, the National Heart, Lung, and Blood Institute released its newest updates, which are the product of the National Asthma Education and Prevention Program third expert panel. The release of the updated guidelines serves as an occasion to examine important issues regarding the dissemination and clinical implementation of National Asthma Education and Prevention Program guidelines. The goals of this report are to examine the adoption of earlier versions of the National Asthma Education and Prevention Program guidelines and to suggest opportunities for rapid adoption of the newly released guidelines. *Pediatrics* 2009;123:S193–S198

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Key Words

practice guidelines, asthma, continuing medical education

Abbreviations

NAEPP—National Asthma Education and Prevention Program

PFM—peak flow meter

SCHIP—State Children's Health Insurance Program

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CLINICAL PRACTICE GUIDELINES, as defined by the Institute of Medicine, are “systematically developed statements to assist practitioner and patient decisions about appropriate care for specified clinical outcomes.”¹ By distributing guidelines in 1991,² with revisions in 1997³ and 2007,⁴ the National Asthma Education and Prevention Program (NAEPP) attempted to standardize asthma diagnosis and treatment into a stepwise approach, to reduce variability in practice and to improve patient care outcomes.

In 1999, the NAEPP produced an additional set of guidelines specifically tailored to physicians who care for children with asthma.⁵ At that time, the development and use of asthma guidelines were of national concern, because asthma was the most common chronic disease of childhood, with an estimated 8.9 million affected children.^{6,7} In addition, there was clear evidence that both childhood asthma prevalence and disparities in childhood asthma morbidity and mortality rates had been increasing.^{6,8–12} Also, the understanding of the pathogenesis of childhood asthma as a chronic inflammatory condition had changed, resulting in the development of new drug therapies and recommendations.^{13,14} Researchers concluded that the use of asthma guidelines by physicians who care for children could help contain or reduce the estimated \$1.3 billion in direct and indirect costs of childhood asthma,¹⁵ a large portion of which was attributable to avoidable pediatric emergency care and hospitalizations.¹⁶

In the years since the release of the first expert panel report, there have been a number of major public and private efforts to facilitate guideline adoption; examples of such efforts include broad-based NAEPP promotion of guideline dissemination through publication and continuing medical education programs. These efforts have been supported by a large number of physician organizations and other health care provider organizations. The Centers for Disease Control and Prevention have supported the National Asthma Control Program, whose purpose is to build state public health programs that promote guideline-based care,¹⁷ and the Environmental Protection Agency has supported national public awareness and campaigns in the media regarding asthma care.¹⁸ Furthermore, private-sector philanthropic organizations, such as the Robert Wood Johnson Foundation, have sponsored major national asthma initiatives that have resulted in the development of new interventions, including local asthma coalitions.¹⁹

Guideline adoption also has been facilitated by the development of national performance measures, such as those used by the National Committee on Quality Assurance. In the late 1990s, as part of its Healthcare Effectiveness Data

and Information Set program, the National Committee on Quality Assurance established a health plan performance measure regarding the distribution of antiinflammatory medications to patients with persistent asthma.²⁰ This performance measure, when linked to physician payment, may prove to be significant in facilitating rapid adoption of several guideline recommendations, specifically those regarding the use of antiinflammatory medications.

DISSEMINATION OF EARLIER NATIONAL ASTHMA GUIDELINES

In general, clinical guidelines have been shown to have limited effects in changing physicians' behavior.^{21,22} Primary care physicians caring for children with asthma, especially pediatricians, have noted some significant barriers to guideline adoption that need to be addressed in order for the guidelines to have an impact on asthma care. Barriers to the adoption of guidelines include physicians' knowledge (lack of awareness or lack of familiarity), physicians' attitudes (lack of agreement, self-efficacy, lack of outcome expectancy, and/or inertia of previous practice), and external factors (patient preferences, lack of time or resources, and organizational constraints).²³

Most studies of physicians' attitudes revealed close adherence to some of the asthma guidelines and wide variation in the application of others. Physicians' knowledge was not a barrier to adherence, because most physicians were aware of and had access to the asthma guidelines.²⁴⁻²⁶ Physicians were not familiar with all of the guidelines' recommendations, mainly because the physicians thought that the presentation of information was poor and the guideline descriptions were tedious, repetitive, and unclear.²⁷ Physicians disagreed about the categories used to describe patients, the timeliness of therapeutic recommendations, and the "stepwise" and simplistic nature of the guidelines.²⁷ Self-efficacy barriers included difficulty applying guideline categories, lack of time and reimbursement for following recommendations, and lack of follow-up care. Issues regarding outcome expectancy included patient noncompliance, denial, lack of understanding, and lack of patient appreciation for preventive care.²⁷

Other studies of physicians focused on the guidelines' clinical recommendations.²⁵⁻²⁸ Approximately 50% of pediatricians adhered to the NAEPP recommendations for prescription of corticosteroids.²⁵ Barriers to prescription of daily corticosteroid treatment included physicians' concerns regarding long-term effects of inhaled corticosteroids, such as growth delay, cushingoid effects, and osteoporosis. Physicians also stated that parental concerns regarding use of corticosteroids made prescription difficult.^{24,25,27}

Although the guidelines state that patients with daily asthma symptoms should monitor peak flow on a daily basis, one study reported that ~60% of pediatricians and ~50% of family practitioners recommended daily peak flow meter (PFM) measurements²⁴; another study reported that only 39% of pediatricians had instructed patients to perform PFM measurements on a daily ba-

sis.²⁵ Physicians disagreed with the usefulness of PFMs and reported using them selectively. Self-efficacy barriers included lack of office time to measure peak flow properly, inadequate staff member or physician training, and poor follow-up monitoring to collect PFM measurements.²⁷ Poor patient compliance and inability of patients to purchase PFMs because of insurance limitations also were mentioned.²⁷

The recommendation that physicians screen and counsel parents regarding smoking cessation was followed by 53% of pediatricians; 43% of them also counseled their patients about smoking.²⁵ Barriers to this recommendation included low self-efficacy regarding physicians' ability to counsel parents on smoking cessation and physicians' discomfort in prescribing anxiolytic agents, antidepressants, or nicotine replacement therapy for smoking cessation.²⁷ Other barriers included lack of time and lack of community resources or clinics to which parents could be referred.²⁷

Similar barriers existed for counseling patients regarding allergen exposure. Lack of time to sit with patients and to counsel them was mentioned, along with the difficulty of families giving up a pet and families' inability to afford other changes, such as removal of wall-to-wall carpeting.²⁷

The NAEPP also listed criteria regarding when a primary care physician should refer a child for specialty care. More than 90% of physicians would refer a patient who had a life-threatening asthma event, atypical asthma, or severe persistent asthma; however, 40% of physicians would refer a patient who had 2 exacerbations necessitating oral corticosteroid treatment, which is an indication that should prompt referral, according to the NAEPP guidelines.^{24,26}

Studies examining physician compliance with the NAEPP guidelines' diagnostic criteria for a child with asthma also yielded varied results. Rates of objective measurement of lung function (eg, spirometry) were low, compared with guideline recommendations.²⁸ Similarly, a survey in Chicago, Illinois, reported spirometry rates of 55% and chest radiography rates of 54% among patients with new asthma diagnoses, although the latter is not recommended routinely.²⁶ These studies also showed low rates of compliance with recommendations for written asthma treatment plans and routine follow-up visits.²⁴ In the aforementioned Chicago study, physicians reported developing a written treatment plan for 48% of their patients with moderate/severe persistent asthma, although the majority of physicians did schedule regular follow-up visits.²⁶

Adults and children with asthma also have been shown to be noncompliant, with less than one third of them following the NAEPP guidelines, specifically regarding use of corticosteroids, use of a PFM, calling or going to see the doctor, and going to the emergency department.^{29,30} Studies showed that poorly controlled asthma remains a significant problem and that many aspects of the guidelines, including preventive strategies and home management of exacerbations, are not being followed.^{29,30}

Although there are few national measures of success

ASTHMA MEDICATION USE		
TRENDS, 1998 - 2006		
YEAR	COMMERCIAL	MEDICAID
2006	91.6	87.1
2005 ^a	89.9	85.7
2004	72.9	64.5
2003	71.4	64.1
2002	67.9	62.8
2001	65.6	60.1
2000	N/A	N/A
1999	62.6	57.4
1998	57.7	N/A

FIGURE 1

Trends in appropriate use of asthma medication, 1998–2006.⁴⁸ N/A indicates not applicable. ^a Due to a change in measure specifications, rates are unrendable from 2004 to 2005. (Reproduced with permission from National Committee for Quality Assurance. *The State of Health Care Quality 2007*. Washington, DC: National Committee for Quality Assurance; 2007).

in guideline implementation, some data look encouraging. First, the National Committee on Quality Assurance reported that overall use of appropriate antiinflammatory medications for treatment of asthma has increased (Fig 1). This result must be considered with caution, however, because the measurement specifications for the Healthcare Effectiveness and Data Information Set have changed over time, and the reported increase may be attributable, at least in part, to improved measurement. Also, overall trends in US hospitalization and mortality rates for childhood asthma have begun to indicate decreases. Although these combined trends suggest success, disparities in asthma mortality rates for children are increasing.¹⁰ The latter finding is a somber reminder that more work is needed to improve asthma care across the US population.

RELEASE OF THE 2007 UPDATE OF THE NAEPP ASTHMA GUIDELINES PROVIDES OPPORTUNITIES FOR IMPROVEMENT

Since the 1991 release of the original NAEPP asthma guidelines, much has been learned about efforts to change the health care system through guideline adoption. Most notable is the observation that widely used, continuing medical education delivery methods, such as passive dissemination through written educational materials and traditional medical education conferences, may not be effective in changing health care systems.^{31–34} Practice-based interventions and clinical educational outreach are more useful in improving compliance with guidelines.^{34,35}

Clinical educational outreach (“academic detailing”), as described in 1990,³⁶ has been shown to reduce inappropriate prescribing and unnecessary health care expenditures. Some of the most important academic detailing techniques include: (1) conducting interviews to investigate baseline knowledge and motivations for current prescribing patterns; (2) focusing programs on specific categories of physicians and their opinion leaders; (3) defining clear educational and behavioral objectives;

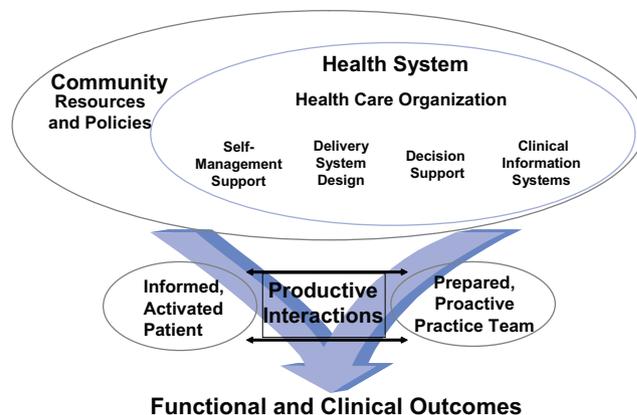


FIGURE 2

Chronic care model (the Improving Chronic Illness Care program is supported by the Robert Wood Johnson Foundation, with direction and technical assistance provided by the Group Health MacColl Institute for Healthcare Innovation). (Reproduced with permission from Wagner EH. *Effective Clinical Practice*, Vol 1. Chronic Disease Management: What Will it Take to Improve Care for Chronic Illness?; 1998. Available at: www.improvingchroniccare.org/index.php?p=The_Chronic_Care_Model&s=2).

(4) establishing credibility through a respected organizational identity, referencing authoritative and unbiased sources of information, and presenting opposing sides of controversial issues; (5) stimulating active physician participation in educational interactions; (6) using concise graphic educational materials; (7) emphasizing and repeating the essential messages; and (8) providing positive reinforcement of improved practices in follow-up visits.³⁶

Guideline adherence also could be improved by providing concise evidence summaries and decision support tools, such as easy-to-follow decision trees through which clinicians can easily access information applicable to their patients.³⁷ A recently published, comprehensive, evidence-based review of asthma guideline implementation strategies provides insight into a number of additional effective strategies.³⁸

Although improving physician compliance with the NAEPP guidelines is a key component of improving asthma care for children, the seminal report of the Institute of Medicine, *Crossing the Quality Chasm: A New Health System for the 21st Century*, indicated that quality of care for persons with chronic illnesses is based not only on individual provider changes but also on health system changes.³⁹ Central to these findings was the chronic care model, which identified 4 key domains of health care system change, including self-management support, delivery system design, decision support, and clinical information systems, as well as the importance of community-level influences external to the health care team (Fig 2). The model also emphasizes the role of the patient as essential to achieving positive clinical outcomes.⁴⁰

The Pediatric Asthma Care Patient Outcomes Research Team II Study was perhaps the largest clinical trial focused on implementation of asthma guidelines.⁴¹ The study examined the comparative effectiveness and cost-effectiveness of state-of-the-art physician education (in-

cluding academic detailing) and physician education with practice redesign consistent with the chronic care model. The study found that, although physician education was modestly effective, greater changes in patient outcomes were associated with system redesign. Physician education was found to be more cost-effective than system redesign, although it also resulted in less-frequent adoption of guideline recommendations.⁴² In addition to efforts to promote physician education practices and health care system redesign, there have been recommendations for performance-based payment models, including compensation that is calibrated to performance and alignment of incentives with evidence-based high-quality care.⁴³

During the past decade, a number of other key factors in national policy and the marketplace might have been important influences on the adoption of pediatric guidelines. The national policy with the greatest potential to affect asthma care for children was the expansion of coverage for children through the State Children's Health Insurance Program (SCHIP).⁴⁴ The SCHIP program was enacted by Congress in 1997 to address the problem of uninsured children and is supported by federal and state funds. By making the role of publically supported financing of health insurance for children substantially larger, this program gave government a potential role in defining performance expectations for the clinical care of children.

Payment for performance and other incentives as means of health system accountability have become more common across the United States. Because of the escalating costs of health care, both private employers and the US Congress are increasingly holding health care plans and providers (specifically hospitals, physicians, and skilled nursing facilities) to performance goals. Health plans have been incorporating several incentive methods to meet these expectations, most notably pay-for-performance models.^{45,46} More recently, through the Physician Quality Reporting Initiative, the Centers for Medicare and Medicaid Services initiated a program that includes a financial incentive for eligible health care professionals who report successfully the designated set of quality measures.⁴⁷ Although this campaign is currently aimed at the Medicare program, it is easy to anticipate that Congress' concern for health system accountability would eventually include health care for children, which would affect Medicaid and SCHIP programs.

It is with a better understanding of the evidence base for guideline implementation, better-articulated models of chronic care, and new public and private sector performance accountability measures that implementation opportunities emerge for the most recent NAEPP guidelines. Although there can be no list of strategies that are certain to secure rapid uptake of the new guidelines, such a list might contain the following elements. To improve individual physician guideline adherence, (1) implement practice-based interventions and clinical educational outreach for providers, particularly physicians and nurses (performed by individual practices or through local or national professional organizations), (2)

improve decision support tools, noting the key components of the NAEPP guidelines (the improved tools should include concise graphic educational materials, such as efficient decision trees), and (3) emphasize and repeat the essential NAEPP guideline messages and provide positive reinforcement of improved practices in follow-up visits.

To encourage health care system change, (1) review, update, and if necessary develop new performance measures for hospital care, emergency department care, and outpatient care for children with asthma, (2) institute performance incentives for providing preventative treatment along with acute care for asthma and performance disincentives for hospital and emergency care that results in the patient being readmitted to the hospital or returning to the emergency department shortly after discharge (eg, 30–60 days), (3) draft model health benefit designs that private health plans can use to optimize asthma care, (4) enlist the health information technology marketplace to develop new tools for electronic health records, for use in decision support and performance measurement dashboards for asthma care, and (5) draft model legislation and promote state-level adoption of legislation that best supports guideline-based asthma care through Medicaid/SCHIP benefit design and performance measures, as well as public health surveillance programs. To promote community initiatives, (1) draft school-based policies to support local implementation of key asthma guidelines in schools and (2) initiate a national awareness campaign that highlights the key messages from the updated guidelines. These lists are not meant to be comprehensive; rather, they are intended to emphasize that only a portion of guideline implementation efforts should be aimed at individual physicians. Significant progress in asthma guideline implementation likely will require larger health system changes and assessment of community factors.

CONCLUSIONS

As early as 1991, the National Heart, Lung, and Blood Institute identified growing public health concerns regarding the increasing prevalence, morbidity, and mortality rates associated with pediatric asthma. In response, it developed the NAEPP and, with it, the first national consensus guidelines on asthma. The National Heart, Lung, and Blood Institute has continued to update these guidelines on a periodic basis; the most comprehensive update was released in August 2007.

There seem to have been decreases in pediatric asthma morbidity and mortality rates in the United States since publication of the initial asthma guidelines. However, these improvements have not been uniform; racial disparities in asthma mortality rates among children seem to have increased.

In the 15 years since initial publication of the NAEPP guidelines, it seems that there has been steady, albeit slow, adoption of some of the key guideline messages. Now, with the publication of a major update of these guidelines, it is time to consider the best way to implement them. One component of the implementation strategy is physician education. Clinical educational out-

reach and improved physician decision support tools need to be developed, either through individual practices or through local and national professional organizations. Larger health system changes, including health system redesign, accountability, and financing of asthma care, also are required. These strategies can be used to accelerate the adoption of the newest guideline update, a move that should help to affect childhood asthma in a positive manner.

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