Improving Physician Adherence to Asthma Guidelines

Michael D. Cabana, MD, MPH, and Toby C. Lewis, MD, MPH

Asthma is a major public health concern in the United States. In 1994, an estimated 13 million people reported having asthma [1]. Despite recent advances in knowledge about the disease and its treatment, prevalence and death rates for asthma have increased over the past 15 years [1]. To improve asthma care and to decrease morbidity and mortality attributable to asthma, the National Heart, Lung, and Blood Institute (NHLBI) established an expert panel to develop guidelines that would provide a common and advanced standard of care for all asthma patients. The guidelines, first released in 1991 and revised in 1997 [2], have been widely disseminated to clinicians and other health professionals. A summary of their major recommendations is shown in Table 1.

Over the last decade, the use of clinical practice guidelines has become a common method for improving the quality of patient care [3]. However, physicians do not always follow guidelines (Table 2). This article uses clinical scenarios to frame a discussion of the NHLBI recommendations and to consider reasons for poor adherence to guideline recommendations. It also recommends some strategies for overcoming physician nonadherence.

Scenario 1

A 9-year-old boy is brought by his mother for evaluation of worsening asthma symptoms. The patient was diagnosed with asthma several years ago. The patient has been using an inhaled short-acting bronchodilator (β2 agonist) as needed for symptoms of wheezing and shortness of breath. The patient and his mother now report that he has daily symptoms and nighttime symptoms approximately 3 times per week. Based on this information, you decide to:

1. Make no change in therapy (ie, continue the short-acting β2 agonist as needed).
2. Continue the short-acting β2 agonist as needed and add daily inhaled cromolyn.
3. Continue the short-acting β2 agonist as needed and add a daily inhaled corticosteroid.
4. Continue the short-acting β2 agonist as needed and add a daily leukotriene modifier.

This scenario highlights the variable nature of asthma and the need to tailor pharmacologic management to the needs of a given patient at a given time. Because asthma may improve or worsen over time, the NHLBI guidelines recommend regular monitoring of patients so that treatment can be adjusted as needed to gain and then maintain control of asthma symptoms. The guidelines clearly distinguish between medications used to achieve control of persistent asthma (ie, inhaled corticosteroids, inhaled long-acting bronchodilators) and those used to provide prompt symptom relief (ie, short-acting β2 agonists). To guide decisions regarding treatment, NHLBI suggests a system for classifying asthma severity based on frequency of symptoms, the occurrence of symptoms at night, and the results of lung function tests (Table 3) [2].

According to the NHLBI severity classification system, this patient’s daily symptoms place him in the category of moderate persistent asthma, which requires a daily long-term control medication to better control symptoms (Figure 1). The NHLBI guidelines recommend a stepwise approach to the use of medications, beginning with aggressive therapy to gain control of symptoms as quickly as possible. Following this approach, the preferred medication regimen for the patient in this scenario is a daily inhaled corticosteroid (answer 3). Corticosteroids are recognized by many asthma experts as the most effective anti-inflammatory medication available (Figure 2) [4,5]. An inhaled long-acting bronchodilator also may be useful for this patient’s nighttime symptoms.

Barriers to Adherence—Lack of Agreement with Guidelines

Evidence suggests that many physicians do not follow the recommendation to use daily inhaled corticosteroids for patients with moderate persistent asthma, despite wide distribution of

From the Division of General Pediatrics (Dr. Cabana) and the Division of Pediatric Pulmonology (Dr. Lewis), University of Michigan Health System, Ann Arbor, MI.
GUIDELINE ADHERENCE

Table 1. Major Recommendations from the NHLBI Asthma Guidelines

<table>
<thead>
<tr>
<th>Diagnose asthma and initiate partnership with patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnose asthma</td>
</tr>
<tr>
<td>- Establish a history of recurrent symptoms</td>
</tr>
<tr>
<td>- Establish reversible airflow obstruction using spirometry</td>
</tr>
<tr>
<td>- Exclude alternative diagnoses</td>
</tr>
<tr>
<td>Establish patient-clinician partnership</td>
</tr>
<tr>
<td>- Address the patient’s concerns</td>
</tr>
<tr>
<td>- Agree upon the goals of asthma therapy</td>
</tr>
<tr>
<td>- Agree upon a written action plan for patient self-management</td>
</tr>
<tr>
<td>Reduce inflammation, symptoms, and exacerbations</td>
</tr>
<tr>
<td>Prescribe anti-inflammatory medications (ie, inhaled steroids, cromolyn, nedocromil) to patients with mild, moderate, or severe persistent asthma</td>
</tr>
<tr>
<td>Reduce exposures to precipitants of asthma symptoms</td>
</tr>
<tr>
<td>- Assess the patient’s exposure and sensitivity to individual precipitants (eg, allergens, irritants)</td>
</tr>
<tr>
<td>- Provide written and verbal instructions on how to avoid or reduce factors that exacerbate the patient’s asthma</td>
</tr>
<tr>
<td>Monitor and manage asthma over time</td>
</tr>
<tr>
<td>Train all patients to monitor their asthma</td>
</tr>
<tr>
<td>- All patients should monitor symptoms</td>
</tr>
<tr>
<td>- Patients with moderate to severe persistent asthma also should be instructed to monitor their peak flow</td>
</tr>
<tr>
<td>See patients at least every 1 to 6 months</td>
</tr>
<tr>
<td>- Assess the patient’s concerns and attainment of goals of asthma therapy</td>
</tr>
<tr>
<td>- Adjust treatment, if needed</td>
</tr>
<tr>
<td>- Review the action plan with the patient</td>
</tr>
<tr>
<td>- Check the patient’s inhaler and peak flow technique</td>
</tr>
<tr>
<td>Treat asthma episodes promptly</td>
</tr>
<tr>
<td>Prescribe short-acting β₂ agonists promptly</td>
</tr>
<tr>
<td>If episode is moderate to severe, initiate a 3- to 10-day course of oral steroids</td>
</tr>
<tr>
<td>Ensure prompt communication and follow-up between the patient and clinician</td>
</tr>
</tbody>
</table>


Possible local side effects of inhaled corticosteroids include oral candidiasis and reflex cough; potential systemic side effects include linear growth retardation, effects on bone metabolism (eg, osteoporosis), and depressed function of the hypothalamic-pituitary axis [9]. However, the possible adverse effects of inhaled corticosteroids must be balanced against the potential long-term physiologic effects of uncontrolled asthma, such as airway remodeling [10], as well as the impact that asthma may have on quality of life, such as school or work absenteeism, decreased physical activity, and disruption of family activity [11]. The NHLBI guidelines state that “the potential but small risk of adverse events from the use of inhaled corticosteroids is well balanced by their efficacy” [2]. Of note, recent studies have shown that steroids prescribed in appropriate doses have minimal systemic side effects [12,13].

Overcoming Barriers

Involving physicians in guideline development. Active physician participation in the development of clinical practice guidelines should lead to greater agreement with and subsequent adoption of those guidelines [14]. This phenomenon may be due to an increased attitude of ownership or improved knowledge of the evidence behind a guideline. For whatever reason, the trend for individual institutions, hospitals, and managed care groups to develop their own (“local”) clinical practice guidelines has been accompanied by reports that attribute greater physician adherence to guidelines to the meaningful involvement of those physicians in their development and implementation [15,16].

Picken et al [17] documented the effects of physician participation in the creation of local asthma guidelines compared with existing national asthma guidelines. When there was strong evidence to support the guidelines and physicians had the opportunity to review such evidence, physicians agreed with national experts. For example, locally developed guidelines were similar to national guidelines with respect to recommendations accompanied by strong, evidence-based support in the literature (eg, pharmacotherapy with anti-inflammatory medications) [18].

Evaluate guidelines. Physicians may disagree with or have concerns about the validity of guideline recommendations. Reasons may include differences in interpretation, lack of confidence in the guideline developer, or lack of applicability to specific patients in their practice [19]. Thus, it is important for physicians to be able to critically evaluate the quality of evidence presented in guidelines [20] as well as the validity and applicability of guidelines to their individual patients. Evaluation also is important because guidelines can come from many different sources and may be of variable quality.

Physicians should consider the following when evaluating a guideline:
Table 2. Barriers to Physician Adherence to Guidelines

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of awareness</td>
<td>Guidelines have little impact if physicians are not aware of them. More than 820 are included in the National Guideline Clearinghouse database (<a href="http://www.guidelines.gov">www.guidelines.gov</a>).</td>
</tr>
<tr>
<td>Lack of familiarity</td>
<td>Physicians not only must have copies of guidelines, but they also must be familiar enough with their details to use them correctly.</td>
</tr>
<tr>
<td>Lack of agreement</td>
<td>Physicians may disagree with the concept of guidelines in general. Physicians also may disagree with a guideline’s recommendations because of their interpretation of the evidence, the guideline’s applicability to their patients, or their lack of confidence in the guideline’s author(s).</td>
</tr>
<tr>
<td>Lack of self-efficacy</td>
<td>Physicians may believe that they cannot perform the recommendations of a guideline because they lack appropriate training or experience. This barrier often is associated with preventive health guidelines that recommend that physicians counsel or educate patients.</td>
</tr>
<tr>
<td>Lack of outcome expectancy</td>
<td>Even if physicians believe that they can perform a guideline recommendation, they may not believe that it will affect patient outcomes. This barrier may result from a physician previously obtaining underwhelming outcomes following performance of guideline recommendations. This barrier also is associated with preventive health guidelines that recommend that physicians counsel or educate patients.</td>
</tr>
<tr>
<td>The inertia of previous practice</td>
<td>Physicians may not follow guidelines that recommend changes in practice (ie, modifying habits or old routines), despite their proper knowledge of and attitudes about a guideline.</td>
</tr>
<tr>
<td>External or practice-related barriers</td>
<td>Physicians may be unable to overcome barriers in their practice environment, such as lack of time, lack of reimbursement for following guidelines, or limited staff to carry out guidelines. Physicians may be unable to reconcile patient preferences with guideline recommendations. Guidelines themselves may be confusing or unclear.</td>
</tr>
</tbody>
</table>


- What diagnostic and therapeutic options were considered by the guideline?
- What process was used to develop the guideline (ie, an evidence-based approach or an informal consensus of experts)?
- What is the impact of uncertainty on the evidence used for the guidelines? In many cases, evidence is not available to answer a specific guideline question. As a result, guideline authors may qualify the strength of their recommendations.
- How applicable are the recommendations to a physician’s patients?
- What values were used to develop the guidelines? For example, was the guideline developed solely to improve quality of care or also to promote cost-effective care? If cost-effectiveness was a criterion for the guideline recommendations, was this evaluated from a patient, health system, or societal point of view? The explicit or implicit criteria used, as well as the perspective taken, can influence a guideline’s formal recommendations.

The credibility of the authoring or sponsoring organization can be a factor in how physicians evaluate a guideline. Not surprisingly, in repeated studies, physicians have indicated more confidence in guidelines developed by their own specialty organizations [21,22].

**Scenario 2**

A 19-year-old college student comes in for a routine follow-up visit for asthma. The patient was diagnosed when she was 8 years old and has been taking moderate-dose inhaled corticosteroids and a long-acting bronchodilator for several years. She has been hospitalized multiple times, including 1 admission earlier this year when she presented to the emergency department with severe symptoms and required intubation. At that time, she reported that she did not feel symptoms of her asthma until a few hours before she went to the hospital. When asked about her current level of symptoms, she replies that she “feels fine” and is not bothered by her asthma. On further questioning, however, you learn that she recently dropped out of the school band because she is having trouble marching and playing her trumpet at the same time. She also is doing poorly in her first class of the day because she has difficulty waking up in time to attend lecture. She states that sometimes this results from staying up late to talk with friends, but at other times she “tosses and turns all night coughing.” She thinks that the coughing at night is worse now compared with the beginning of the semester but cannot be more specific about the frequency or severity of this symptom.
You are concerned that her asthma is poorly controlled and decide to increase her dose of inhaled steroids. You schedule a follow-up visit in 3 weeks to evaluate the change in therapy. At the next visit you plan to:

1. Review a daily symptom diary you have asked the patient to fill out over the next 3 weeks.
2. Ask the patient about any school absences, reduction in activity, or sleep disturbances over the 3-week period.
3. Ask the patient how often she needed to use a short-acting $\beta_2$ agonist over the 3-week period.
4. Review a daily diary of peak flow meter readings you have asked the patient to fill out over the next 3 weeks.

This scenario highlights the importance of periodic clinical assessment of asthma patients and establishing a partnership through patient education and shared monitoring. Patients must be taught many essential concepts about asthma to be active partners in their own care, including how to accurately assess their asthma. Several methods of self-monitoring may be used, including tracking symptoms and other effects of asthma (eg, missed work or school, sleep disturbance), monitoring the amount of quick-relief medication (short-acting $\beta_2$ agonist) used per month, and tracking peak flow measurements daily.

All patients should be taught to recognize asthma symptoms. However, some patients are less perceptive about changes in pulmonary function than others and are considered “poor perceivers.” Patients at risk for being poor perceivers include those who have had poorly controlled airway inflammation for an extended period of time and those who have had near-fatal exacerbations [23,24]. In the case of this patient, the combination of her near-fatal exacerbation and indications from her history that she is unaware of having asthma symptoms should heighten concern about the need for an objective method to monitor her pulmonary function. All of the listed approaches are useful for evaluating changes in clinical status. Properly performed peak flow monitoring (answer 4) is particularly useful because it offers a very sensitive and objective measure of the effects of changing the patient’s therapy. Peak flow meters are useful for providing simple, quantitative measures of airflow obstruction and, in this case, may be more sensitive to airway changes that could signal an oncoming exacerbation.

The NHLBI guidelines recommend daily peak flow monitoring for all patients with moderate to severe persistent asthma (ie, daily or more frequent symptoms) and for any patient who has experienced a severe asthma exacerbation. In addition to assessing response to changes in long-term therapy, peak flow readings are useful for evaluating the severity of asthma symptoms to help guide self-management. The guidelines offer explicit recommendations for teaching and using peak flow monitoring in practice as well as a suggested patient education handout (Figure 3).

### Barriers to Adherence—Low Expectations
As in the first example, despite wide dissemination of the NHLBI guidelines, ample evidence exists that many physicians do not follow the recommendation to use peak flow monitoring. In a study at 1 urban medical center, only 30% of families reported having a peak flow meter following hospitalization of an asthmatic child [25]. In a survey-based study of patients with moderate to severe asthma in Oregon, less than half (44%) of patients indicated that they were prescribed a peak flow meter [26].
Focus group discussions with physicians suggest that several factors contribute to poor physician adherence to recommendations to teach and use peak flow monitoring [8]. For example, older physicians may be inadequately trained in the use of peak flow meters, particularly if their clinical training occurred before these devices were commonly used. Also, some physicians report that patients may be unable to obtain peak flow meters for their patients due to lack of insurance coverage. In addition, physicians note that peak flow meter readings can be inconsistent depending on patient technique. However, because peak flow meters must be used consistently by patients to be helpful, physicians most often mention patient nonadherence as a reason for not following the NHLBI recommendation for peak flow monitoring.

---

### Long-Term Control

Preferred treatments are in **bold** print.

**Step 4: Severe Persistent**

<table>
<thead>
<tr>
<th>Daily medications:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Anti-inflammatory: <strong>inhaled steroid (high dose)</strong> AND</td>
</tr>
<tr>
<td>- Long-acting bronchodilator: either <strong>long-acting inhaled β₂ agonist</strong> (adult: 2 puffs q 12 hr; child: 1–2 puffs q 12 hr), or sustained-release theophylline, or long-acting β₂ agonist tablets AND</td>
</tr>
<tr>
<td>- Steroid tablets or syrup long term; make repeated attempts to reduce systemic steroid and maintain control with high-dose inhaled steroid.</td>
</tr>
</tbody>
</table>

**Step 3: Moderate Persistent**

<table>
<thead>
<tr>
<th>Daily medications:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Anti-inflammatory: <strong>inhaled steroid (medium dose)</strong> OR</td>
</tr>
<tr>
<td>- <strong>Inhaled steroid (low-to-medium dose)</strong>, and add a long-acting bronchodilator, especially for nighttime symptoms: either long-acting inhaled β₂ agonist (adult: 2 puffs q 12 hr; child: 1–2 puffs q 12 hr), or sustained-release theophylline, or long-acting β₂ agonist tablets.</td>
</tr>
<tr>
<td>- If needed:</td>
</tr>
<tr>
<td>→ Anti-inflammatory: <strong>inhaled steroids (medium-to-high dose)</strong> AND</td>
</tr>
<tr>
<td>→ Long-acting bronchodilator, especially for nighttime symptoms: either long-acting inhaled β₂ agonist, or sustained-release theophylline, or long-acting β₂ agonist tablets.</td>
</tr>
</tbody>
</table>

**Step 2: Mild Persistent**

<table>
<thead>
<tr>
<th>Daily medication:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Anti-inflammatory: either <strong>inhaled steroid (low dose)</strong>, or cromolyn (adult: 2–4 puffs tid–qid; child: 1–2 puffs tid–qid), or nedocromil (adult: 2–4 puffs bid–qid; child: 1–2 puffs bid–qid). (Children usually begin with a trial of cromolyn or nedocromil.)</td>
</tr>
<tr>
<td>- Sustained-release theophylline to serum concentration of 5 to 15 mg/mL is an alternative, but not preferred, therapy. Zafirlukast or zileuton also may be considered for patients aged ≥ 12 years, although their position in therapy is not completely established.</td>
</tr>
</tbody>
</table>

**Step 1: Mild Intermittent**

No daily medication needed.

### Quick Relief

**All Patients**

Short-acting bronchodilator: **inhaled β₂ agonist** (2–4 puffs) as needed for symptoms. Intensity of treatment will depend on severity of exacerbation.

---

**Figure 1.** The stepwise approach to pharmacologic treatment of asthma in adults and children older than 5 years presents general guidelines to assist in clinical decision making. Asthma is highly variable, so clinicians should tailor medication plans to the needs of individual patients. Clinicians should attempt to gain control of a patient's asthma symptoms as quickly as possible. Begin with aggressive therapy (eg, add oral steroids or higher dose of inhaled steroids to a regimen that corresponds to a patient's initial step of severity), or begin at the step corresponding to a patient's initial severity. Step up or step down therapy as necessary, based on review of patient use of prescribed medications and patient inhaler technique, compliance, and environmental control (ie, avoidance of allergens or other precipitant factors). (Adapted from National Heart, Lung, and Blood Institute, National Asthma Education and Prevention Program. Practical guide for the diagnosis and management of asthma. Based on the Expert Panel report 2: guidelines for the diagnosis and management of asthma. Bethesda [MD]: U.S. Department of Health and Human Services, National Institutes of Health; 1997:11. NIH Pub. No. 97–4053.)
monitoring [8]. A single peak flow reading is not as useful as several readings over time, because the changes in peak flow readings can signal a need to change therapy. As a result, the value of peak flow meters depends on consistent use by the patient at home.

Poor patient adherence to using peak flow meters has been documented [27]. As a result, convincing patients to use peak flow meters appropriately can be frustrating, and physicians may have “low outcome expectancy” [28], that is, they may not believe instructing patients will affect patient outcomes. If outcome expectancy is low, the likelihood of performing the behavior intended to affect outcome is low. In this case, physicians are less likely to instruct patients in the use of peak flow meters because they do not believe their patients will actually use them.

It is important to note that perceived patient disinterest or noncompliance may actually result from poor patient health literacy or poor physician cultural competency [29–31]. Before blaming poor outcomes on patient disinterest or nonadherence when prescribing this or any treatment, physicians should be aware of their patient’s economic status, cultural mores, and ability to comprehend the therapeutic regimen.

Overcoming Barriers

**Build a partnership.** A cardinal element of the NHLBI guidelines is to establish a patient-clinician partnership (or, if the patient is a child, a family-clinician partnership). Simple techniques such as attentive listening, praising effective self-management, and asking open-ended questions can promote open communication to elicit patient perceptions or questions about asthma. Because nonadherence can originate from lingering questions or misperceptions, patients are more likely to follow physician recommendations if such issues are elicited and addressed [32]. Assessing and encouraging family awareness and involvement is similarly important in the care of pediatric patients.

To further strengthen the physician-patient partnership, the NHLBI guidelines recommend working together to develop individualized goals of asthma therapy. A key to success is eliciting the patient’s personal goals. Whereas the physician may want to achieve improved lung function, decreased or no emergency department visits, and less reliance on inhaled short-acting β₂ agonists, these goals may be too abstract for the patient. To establish joint goals of treatment, the patient should be encouraged to talk about how
How to Use Your Peak Flow Meter

A peak flow meter is a device that measures how well air moves out of your lungs. During an asthma episode, the airways of the lungs usually begin to narrow slowly. The peak flow meter may tell you if there is narrowing in the airways hours—sometimes even days—before you have any asthma symptoms.

By taking your medicine(s) early (before symptoms), you may be able to stop the episode quickly and avoid a severe asthma episode. Peak flow meters are used to check your asthma the way that blood pressure cuffs are used to check high blood pressure.

The peak flow meter also can be used to help you and your doctor:
• Learn what makes your asthma worse
• Decide if your treatment plan is working well
• Decide when to add or stop medicine
• Decide when to seek emergency care

A peak flow meter is most helpful for patients who must take asthma medicine daily. Patients age 5 and older are usually able to use a peak flow meter. Ask your doctor or nurse to show you how to use a peak flow meter.

How to Use Your Peak Flow Meter

Do the following 5 steps with your peak flow meter:
1. Move the indicator to the bottom of the numbered scale.
2. Stand up.
3. Take a deep breath, filling your lungs completely.
4. Place the mouthpiece in your mouth, and close your lips around it. Do not put your tongue inside the hole.
5. Blow out as hard and fast as you can in a single blow.

Write down the number you get. If you cough or make a mistake, don’t write down the number. Do it over again.

Repeat the above 5 steps 2 more times, and write down the best of the 3 blows in your asthma diary.

Find Your Personal Best Peak Flow Number

Your personal best peak flow number is the highest peak flow number you can achieve over a 2- to 3-week period when your asthma is under good control. Good control is when you feel good and do not have any asthma symptoms.

Each patient’s asthma is different, and your best peak flow may be higher or lower than the peak flow of someone of your same height, weight, and sex. This means that it is important for you to find your own personal best peak flow number. Your treatment plan must be based on your own personal best peak flow number.

To determine your personal best peak flow number, take peak flow readings:
• At least twice a day for 2 to 3 weeks
• When you wake up and between 12 noon and 2:00 PM
• Before and after you take your short-acting inhaled β₂ agonist for quick relief, if you take this medicine
• As instructed by your doctor

The Peak Flow Zone System

Once you know your personal best peak flow number, your doctor will give you the numbers that tell you what to do. The peak flow numbers are put into zones that are set up like a traffic light. This will help you know what to do when your peak flow number changes. Record your personal best peak flow number and peak flow zones in your asthma diary.

Green Zone: More than ___ L/min (80% to 100% of your personal best number). Signals good control. No asthma symptoms are present. Take your medicines as usual.

Yellow Zone: Between ___ L/min and ___ L/min (50% to 79% of your personal best number). Signals caution. You must take a short-acting inhaled β₂ agonist (quick-relief medicine) right away. Also, your asthma may not be under good day-to-day control. Ask your doctor if you need to change or increase your daily medicines.

Red Zone: Below ___ L/min (below 50% of your personal best number). Signals a medical alert. You must take a short-acting inhaled β₂ agonist (quick-relief medicine) right away. Call your doctor or emergency room and ask what to do, or go directly to the hospital emergency room.

Use the Diary to Keep Track of Your Peak Flow

Measure your peak flow when you wake up, before taking medicine. Write down your peak flow number in the diary every day, or as instructed by your doctor.

Actions to Take When Peak Flow Numbers Change

• Peak flow goes between ___ L/min and ___ L/min (50% to 79% of personal best, Yellow Zone).
  ACTION: Take a short-acting inhaled β₂ agonist (quick-relief medicine) as prescribed by your doctor.

• Peak flow increases 20% or more when measured before and after taking a short-acting inhaled β₂ agonist (quick-relief medicine).
  ACTION: Talk to your doctor about adding more medicine to control your asthma better (for example, an anti-inflammatory medication).

Figure 3. Example of a handout for patients on how to use peak flow meters. (Adapted 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]: U.S. Department of Health and Human Services, National Institutes of Health; 1997. NIH Pub. No. 97-4051.)
asthma interferes with his or her life, and this information should be incorporated into goal planning. Thus, additional goals might be full participation in basketball games, sleeping soundly through the night, or not missing work due to asthma in the next year.

A written asthma action plan that is jointly negotiated with the patient also can promote adherence. This plan should include instructions for taking daily control medications and monitoring peak flows. Rather than dictating specific times, the physician might ask the patient, “When is a good time for you to use your control medication and to measure your peak flow? What will be easy for you to remember?” Allowing the patient to tailor his or her plan to accommodate school, work, or home routines will help ensure adherence. The jointly developed action plan also should include a blueprint to help the patient make decisions during an asthma exacerbation. For example, the plan might list warning signs such as a cough or wheeze, difficulty at work or play, waking up at night, or a peak flow that is 50% to 80% of expected. In response to such signs, the plan might instruct the patient to start using an inhaled short-acting β₂ agonist and, with worsening symptoms, to take the β₂ agonist more frequently, start the first dose of an oral steroid, or contact the physician’s office.

Provide patient education. Although patient education is perceived as time-intensive, several studies have shown asthma education to be cost-effective [33,34]. In addition, Clark et al [35] demonstrated that physicians who incorporated many of these techniques in their asthma management were more efficient and spent less time on average with patients. In general, establishing patient education as early as possible can help patients manage their asthma more quickly and effectively. As a result, time during follow-up visits can be focused on preventive issues as opposed to managing asthma symptoms that have spun out of control.

Several strategies may be helpful in delivering patient education. For example, patients should not be inundated with every educational point at a single visit. Rather, these messages can be delivered and reinforced over time during follow-up visits. A team approach, using office staff, nurse educators, and other clinicians (eg, pharmacists and respiratory therapists during a hospitalization), can be an efficient way to educate patients. Although the physician need not be the primary educator, the physician should initiate patient education and allow the team to reinforce the messages. Patient education can be supplemented with written or audiovisual materials, some of which are available from medical societies and other organizations concerned with asthma care (eg, American Lung Association, NHLBI, Asthma Allergy Foundation of America). In addition, many health systems and managed care organizations have instituted disease management programs for asthma [36] that often incorporate patient educational components.

Scenario 3

A 24-year-old man presents for removal of stitches from a laceration that was treated 1 week ago in the local emergency department. As an aside, he asks for a refill prescription for 1 of his asthma medications. The patient, who is well known to you, has a history of mild intermittent asthma (no hospitalizations or emergency department visits) and has been using an inhaled short-acting β₂ agonist as needed for occasional asthma symptoms.

The patient also has a 5-year history of cigarette smoking (about 1 pack per day). During many past visits, you have pursued smoking cessation counseling without any success. The patient has a routine appointment scheduled for next month, when he turns 25. You remember his smoking habit, but also consider your previous lack of success in counseling. You decide to:

1. Mention smoking cessation only if he raises the subject.
2. Mention smoking cessation only if he has an urgent medical visit or hospitalization related to his smoking.
3. Make a note to discuss smoking cessation at his routine examination next month.
4. Mention smoking cessation again today and make a note to revisit the subject at any appointment or hospitalization.

The NHLBI guidelines recommend that all asthma patients be asked about exposure to environmental irritants and other factors (eg, allergens, tobacco smoke) that may provoke or worsen asthma symptoms [2]. In addition to its direct inflammatory effects on the lower respiratory tract, tobacco smoke is a common trigger of symptoms in all asthma patients [37,38]. Any physician encounter with an asthma patient who smokes represents an opportunity to initiate smoking cessation counseling to mitigate the deleterious effects of tobacco smoke on asthma and overall health. Physician counseling performed on a regular basis at any appointment or hospitalization (answer 4) is the best strategy for improving the chances of smoking cessation in this patient.

The importance of consistent, frequent physician messages about the merits of smoking cessation is echoed in other clinical practice guidelines. For example, the U.S. Preventive Services Task Force guidelines state that the most effective clinician message is a brief, unambiguous, and informative statement on the need to stop using tobacco and
that repeated messages over long periods of time are associated with the greatest success in helping patients achieve abstinence [39]. Similarly, the recently updated smoking cessation guideline published by the U.S. Public Health Service recommends that clinicians and health care delivery systems institutionalize the consistent identification, documentation, and treatment of every tobacco user at every visit [40].

Barriers to Adherence—Low Self-Efficacy
Despite the importance of this intervention, many physicians do not counsel patients to quit smoking on a regular basis [41]. Many physicians feel that despite their best efforts to counsel asthma patients about smoking cessation, they rarely have much influence on patient health behavior [8]. In addition, physicians may focus only on patients with more severe asthma [8].

Infrequent counseling may be due to low self-efficacy, or the belief that one lacks the ability to perform the behavior (ie, counsel for smoking cessation) [42]. Infrequent counseling may also be due to low outcome expectancy. These concepts also apply to patient behavior. Thus, for a patient to adopt a behavior (quit smoking), the patient must believe that he or she has the ability to quit (self-efficacy) and that smoking cessation leads to improved health (outcome expectancy).

Although the term self-efficacy may be unfamiliar to clinicians, a review of studies investigating physician self-efficacy shows its value as a concept in physician behavior. For example, Hyman et al [43] surveyed 119 primary care physicians about adherence to the National Cholesterol Education Program and noted that high physician self-efficacy in prescribing cholesterol-lowering medication was associated with the initiation of therapy consistent with national guidelines. Cheng et al [44] surveyed 556 pediatricians about preventive care counseling and found that physician self-efficacy and outcome expectancy were associated with pursuing counseling consistent with preventive care guidelines. In addition, Pololi and Potter [45] demonstrated that physician self-efficacy in preventive medicine counseling could be improved with an educational intervention involving standardized patients.

When counseling is performed consistently by a physician, 2 or 3 persons out of a group of 100 smokers will quit [46]. From a population perspective, even this small change has important public health implications. Because physicians see patients individually, however, they may not discern success at the population level. Warner and Warner [47] describe this low self-efficacy and perceived lack of outcome expectancy from the individual physician’s perspective. They report that physicians are uncomfortable delivering a message (to quit smoking) that makes patients “squirm” and about which they have received little training (ie, in behavioral counseling). Because the vast majority of patients counseled to quit smoking remain smokers after 1 year, many physicians may deem the intervention to be an “abject failure” or “waste of time.”

Low self-efficacy may result in part because smoking cessation training is not included in most medical school curricula. Most medical schools (70%) do not require clinical training in smoking cessation [48]. Surveys of recently trained physicians also document a perceived lack of formal training in this area [49].

Overcoming Barriers
Look at the big picture. In this scenario, the physician has had a history of failure in getting his asthma patient to quit smoking, and the patient now presents for an unrelated problem. The prospect of success seems slim. Why should the physician try to change this patient’s behavior? When physicians consider themselves as part of a greater health care system, or are able to consider the effects of interventions on a larger scale, the value of consistent smoking cessation counseling may become more apparent. Despite physician perception that counseling is ineffective, a meta-analysis of 39 controlled studies showed that the impact of even brief physician cessation counseling was effective [50]. Although at first glance a quit rate of 5% may seem dismal, these “quitters” might avoid a smoking-related illness and theoretically save up to 20 years of life expectancy [47]. In addition, helping a smoker to quit benefits other household members who have been exposed to second-hand smoke [51]. From this public health perspective, the importance of physician counseling in triggering this change is crucial.

Physicians also should appreciate that patients move through stages of change. The “readiness to change” model proposed by Prochaska and DiClemente [52] suggests that patients progress through a continuum of steps in the process of quitting smoking: precontemplation (have not considered), contemplation (have considered), preparation (considered and made plans), action (have attempted quitting), and maintenance (have successfully quit). Rather than measuring the success of counseling only by the number of patients who quit smoking, an alternative measure of success might be the number of patients who have “progressed” to the next step toward quitting.

A quick chart note (eg, “considering, but no plans”) to track a patient’s progress can be used as a starting point when the topic is revisited. At the next visit, the physician might initiate a discussion by saying, “I remember you were considering quitting but hadn’t made any plans. Have you thought about any plans to quit?” This technique preserves continuity in the message, allows for easy repetition (an important component for success), and allows the physician to tailor the message to the patient.

Develop new skills. Physicians must continually seek ways to develop and refine their clinical skills. By participating in
GUIDELINE ADHERENCE

effective continuing medical education programs and continuous quality improvement activities in their own practice settings [53], physicians can identify and overcome deficiencies in their training.

Scenario 4

After seeing several patients with asthma, you decide to review available asthma guidelines. You ask a partner if she has a copy of the NHLBI guidelines, but she threw her copy out because it was published in 1991 and was out of date. Several colleagues claim they have never heard of the guidelines. When you ask a pediatrician colleague, he states that you must be mistaken because the asthma guidelines were written by the American Academy of Pediatrics (AAP). Another partner claims that the guidelines actually were written by the American Academy of Allergy Asthma and Immunology (AAAAI). A colleague trained outside the United States gives you a copy of some asthma guidelines developed by the British Thoracic Society (BTS).

Barriers to Adherence—Lack of Awareness or Confusion About Guidelines

Lack of awareness of guidelines is a common reason for non-adherence. Despite major efforts to develop and implement clinical practice guidelines, the constant changes in medical knowledge make it difficult for any physician to know about every applicable guideline. It is estimated that the typical physician has only 3 hours per week to read any of the 4000 medical journals in circulation [54]. In an analysis of 46 surveys that measured physician awareness of published guidelines, most surveys showed that at least 10% of respondents were not aware of the guidelines in question [19].

Another factor that may contribute to nonadherence is confusion caused by multiple guidelines on a given clinical topic. For example, asthma guidelines are available from NHLBI [2], AAP [55], AAAAI [56], and BTS [57]. In addition, local medical societies and managed care organizations may develop their own guidelines for asthma management. Although most asthma guidelines tend to include similar recommendations, differences may exist [58].

Overcoming Barriers

Be aware of guideline resources. Although guidelines should help consolidate new medical information and, as a result, help physicians stay up-to-date, the number of guidelines can be overwhelming. When faced with a specific clinical issue, health care providers can use the following resources to search for applicable clinical practice guidelines:

- A clinical practice guidelines directory is published by the American Medical Association [59].
- The U.S. Preventive Services Task Force Guide to Clinical Preventive Services contains recommendations on preventive practices for over 70 conditions, as well as shows how their recommendations compare with those of other organizations [39].

Conclusion

The application of guideline recommendations by physicians in practice is critical for translating research findings into improved patient care. However, factors such as lack of awareness, lack of agreement, low self-efficacy, and low outcome expectancy may prevent physicians from following guidelines. We have suggested some strategies for overcoming these barriers to guideline use.

The application of guideline recommendations can improve the quality of care delivered to patients. However, it should be remembered that practice guidelines can quickly become obsolete. Guideline developers are challenged to reassess and update recommendations regularly to keep them useful and timely. In addition, guidelines may not be applicable across populations. Nutting et al [60] used decision analysis to examine the outcomes of applying a uniform mammography policy for breast cancer screening in American Indian populations with differing baseline breast cancer rates. In this unique population, applying the uniform screening strategy would result in less favorable outcomes compared with outcomes in the general population.

Sox and Griner [61] comment that a vigorous and critical debate about a clinical practice guideline is a sign of a healthy profession. However, lack of agreement that is reflexive (ie, due to nonacceptance of evidence-based medicine or clinical practice guidelines in general) rather than reflective (ie, due to an understanding of the limitations of a specific guideline) can create gridlock and hinder practice improvement. A thorough, well-researched, and well-formatted clinical practice guideline should be able to detail its limits for everyday application, and its thoughtful application by physicians is a key component in improving patient care.

Corresponding author: Michael D. Cabana, MD, MPH, Div. of General Pediatrics, D3255 Medical Professional Bldg., 1500 E. Medical Center Dr., Ann Arbor, MI 48109-0718.

References


51. Murray AB, Morrison BJ. The decrease in severity of asthma in children of parents who smoke since the parents have been exposing them to less cigarette smoke. J Allergy Clin Immunol 1993;91(1 Pt 1):102–10.
56. Practice parameters for the diagnosis and treatment of asthma. Joint Task Force on Practice Parameters, representing the American Academy of Allergy Asthma and Immunology, the American College of Allergy, Asthma and Immunology, and the Joint Council of Allergy, Asthma and Immunology. J Allergy Clin Immunol 1995;96;707–80.