

Overcoming barriers to nonadherence in asthma treatment

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Inadequate patient adherence to prescribed treatment regimens is a major cause of poor clinical outcomes in the treatment of asthma. Among children with asthma, adherence rates are often below 50%. Multiple treatment-, clinician-, and patient-related barriers prevent the achievement of satisfactory levels of adherence. Treatment-related barriers include prolonged and complex regimens, adverse effects, cost, and delayed onset of action. Clinician-related barriers include difficulty in scheduling, treatment by one different care giver after another, perceived clinician disinterest, and time constraints. Patient-related barriers include mild or severe asthma, poor understanding of the need for treatment, insufficient confidence in the clinician or medication, the presence of psychological problems, and low motivation to change behavior. Although all of these factors must be addressed to maximize adherence, patient motivation may be the most critical. This task falls primarily to clinicians (physicians, nurses, staff), and it requires thorough patient and care giver education, more frequent patient contact, and the development of a patient-clinician partnership dedicated to the effective treatment of asthma. (*J Allergy Clin Immunol* 2002;109:S554-9.)

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An intractable and pervasive obstacle to effective treatment, patient nonadherence to a prescribed treatment regimen, contributes significantly to poor outcomes in the treatment of asthma. Adherence rates for asthmatic patients are particularly problematic, ranging from 30% to 70%.¹ Fewer than half of the patients taking inhaled asthma medications adhere to their prescribed regimens.^{2,3} This level of adherence is about the same for children.⁴ The control of asthma symptomatology can require a complex treatment plan that changes as presenting symptoms wax and wane. In this setting, patient adherence is fragile, and its maintenance requires exceptional vigilance. Maintaining adherence is particularly important—and challenging—in young children with asthma, a group that may be especially vulnerable to airway restructuring, which can lead to permanent and sometimes life-threatening airway obstruction. This report will explore the extent of nonadherence in children and the major barriers to adherence in asthma treatment and will also suggest strategies for promoting adherence.

Abbreviations used

ICS: Inhaled corticosteroids
LTRAs: Leukotriene receptor antagonists
NAEPP: National Asthma Education and Prevention Program

NONADHERENCE IN CHILDREN

Recent studies have demonstrated that poor adherence is a pervasive and endemic clinical problem in children. Adherence rates among 27 children with asthma were examined over a 6-month period in a study that used the Doser (MEDITRACK Products, Hudson, Mass) CT (Doser Clinical Trials version). This is a bottle cap device that attaches to the top of an inhaler and automatically monitors usage over a 45-day period.⁵ Objective data derived from the Doser CT were compared with other adherence measures including canister weight and reports from mothers and children. Although adherence assessed by data from the Doser could be as high as 90%, it was typically sporadic. For example, one child took medication on only 5 of the 45 days, and the inhaled dose was often less than that prescribed. The Doser recordings revealed a mean adherence rate of only slightly more than 50% (Fig 1). When poor inhalation techniques and accidental canister expulsions were considered, the actual dose reaching the lungs of most patients was likely to be even less than that indicated by the Doser.

While underscoring the problem of nonadherence in children, this study also highlighted the unreliability of parental reports. Mothers' reports grossly exaggerated the extent of their children's adherence, possibly out of a desire to give a socially acceptable response. Furthermore, although identifying nonadherers is a complex task, the findings of this study suggested a patient profile. Older children and adolescents, nonwhite children, and children from dysfunctional families are more likely to have adherence problems.⁵

In a separate study that monitored inhaled corticosteroid (ICS) usage over a 90-day period in 24 children with asthma, adherence rates clearly were linked to asthma control.³ For the 16 children with stable asthma (those who did not require oral steroid treatment), adherence rates averaged 65%. In contrast, adherence rates for the 8 children with unstable asthma (requiring oral corticosteroids and even hospitalization) averaged 15%. Two children with unstable asthma were hospitalized, and they used almost none of their prescribed ICS within the 2 weeks preceding their hospitalization.

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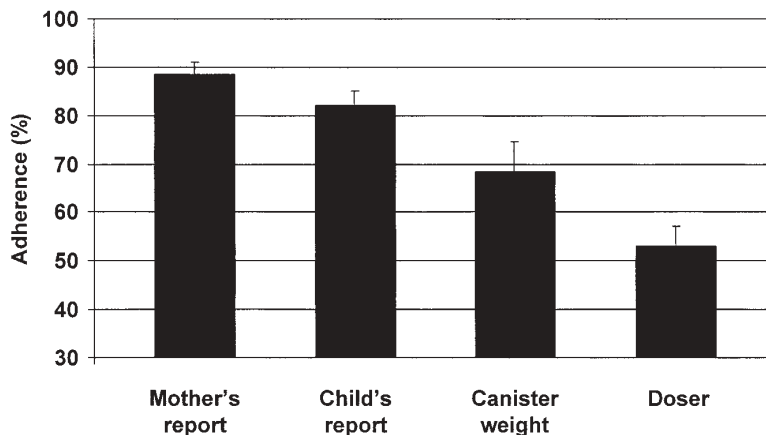


FIG 1. Comparison of four adherence measures over 6 months. Data from the Doser CT were compared with other measures of adherence and revealed a mean adherence rate of slightly more than 50%. (Adapted with permission of *Ann Allergy Asthma Immunol* 2000;85:416-21. Copyright 2000.)

Nonadherence must be dealt with at various points in the treatment process. Responsibility for change in adherence rests with clinicians (the term encompasses physicians, nurses, and staff with patient contact), who must be aware of the many barriers to adherence, including those relating to treatment, clinician, and patient.

TREATMENT-RELATED BARRIERS TO ADHERENCE

Patient nonadherence stems from a number of perceptions of and attitudes toward treatment.

Prolonged or prophylactic therapy

The perceivable benefits of treatment are usually delayed or not apparent to the patient at all. In asthma treatment, this situation describes the use of controller medication, which requires long-term use to prevent the occurrence of asthma symptomatology or exacerbations. Patients are required to take controller medications daily, often in the absence of symptoms. If patients fail to use an ICS for a few days, there probably will be no noticeable change in symptoms. As a consequence, these patients may believe that they no longer need to continue treatment, establishing a pattern of nonadherence.

Delayed effects

Generally, patients tend to favor treatments with an immediate and noticeable action, such as the rapid-onset effects seen with the use of a β -agonist. Controller medication, on the other hand, often requires long-term use to substantially reduce and prevent the occurrence of asthma symptomatology. When patients take a controller medication and their symptoms cease, they may believe that they no longer need to continue treatment.

Expense and adverse effects

Expensive medication, requiring large out-of-pocket payments or even the need for a co-pay, will decrease adher-

ence, as will a patient's belief that a medication is associated with an unacceptable level of adverse effects. Patients are very much aware of the controversies surrounding the first-line asthma therapies, and such awareness can affect their attitudes and contribute to nonadherence.¹

Complex regimen

Patients are more likely to adhere to a treatment plan if it is simple and they understand its purpose and potential benefits. In more severe patients, however, the control of asthma symptoms can require a complex treatment plan. Consequently, the very nature of such an asthma treatment regimen produces nonadherence.

A direct correlation exists between daily dosing frequency and adherence rates. A dramatic drop in adherence was noted at higher dosing frequencies in a study that randomly assigned epileptic patients receiving the same antiseizure medication (tablet form) into 4 daily dosing groups: qd, bid, tid, and qid.⁶ As the demands of the treatment regimen increased, adherence decreased: 87%, 81%, 77%, and 39%, respectively.

The prescription refill rates for 3 different categories of asthma medications (leukotriene receptor antagonists [LTRAs], long-acting β -agonists, and ICS) from March 1998 to July 1999 in 48,751 US patients were obtained from a managed care plan offering pharmacy benefits (Merck-Medco Managed Care). Patients' adherence (prescription refill rates) to a new start LTRA monotherapy was twice that of a new start ICS monotherapy (Fig 2).⁷ Higher LTRA refill rates were also seen in a separate study in the United Kingdom comparing the prescription refill rates of the LTRA montelukast with those of an inhaled β -agonist and a corticosteroid for a period of 6 months between February 1998 and February 1999 in 25,939 patients (Fig 3).⁸ In this study, refill rates varied from 45% for montelukast, 32% for the β -agonist, and 17% for the corticosteroid. The pattern that emerges from these studies is that patients are more willing to refill their prescriptions for an oral LTRA than for other com-

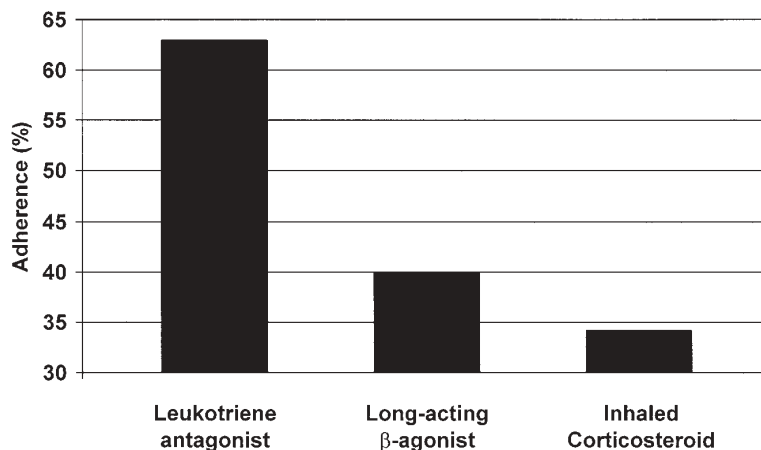


FIG 2. Adherence as determined by prescription refill. Prescription refill rates were substantially higher with leukotriene receptor antagonists in a study examining the prescription refill rates for 3 different medication categories: leukotriene receptor antagonists, long-acting β -agonists, and inhaled corticosteroids. (Data compiled from Drazen et al.⁷)

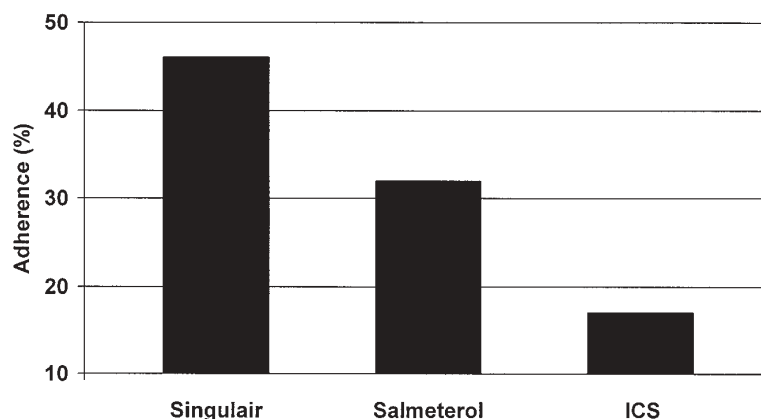


FIG 3. Percent of patients adhering to asthma therapy in the United Kingdom. In a comparison of prescription refill rates of the leukotriene receptor antagonist montelukast and those of an inhaled β -blocker and a corticosteroid, refill rates varied from 45% for montelukast, to 32% for the β -blocker, and to 17% for the corticosteroid. (From Price D, Ben-Joseph R, Zhang Q. Adherence to prescribed treatment for asthma [abstract]. *Am J Respir Crit Care Med* 2000;161:A402. Poster presented at American Thoracic Society; May 8, 2000; Toronto. With permission.)

monly prescribed inhaled asthma treatments, perhaps reflecting a greater acceptance of the simpler therapy. Although prescribing medications that are easy to take is helpful, adherence involves still more causal factors.

CLINICIAN-RELATED BARRIERS TO ADHERENCE

Certain factors involving the physician or the setting of the physician's practice can encourage or discourage adherence.

Scheduling difficulties

Patients tend to be less adherent if appointments with their physician are widely spaced or too difficult to schedule.

Patients want to see a physician regularly. If patients are discouraged in the process of scheduling an appointment, they are less likely to be adherent to their treatment regimens.

Clinician appears to be uninterested

If, during the visit, the clinician does not appear to be interested in the patient's welfare or does not take the time to explain the treatment or answer questions, the patient's adherence to therapy will decline.

Rotating care givers

If the patient is seeing a different clinician with each visit, adherence will decline. When patients are treated by more than 1 physician and receive contradictory advice, this affects their confidence in both treatment and clinician.⁹

As one might gather from the above, the most powerful component affecting adherence is the degree to which there is a good relationship between the patient and the clinician in which effective communication takes place. Such a conclusion is supported by a 2-year longitudinal study of 186 physicians and their patients (having diabetes, hypertension, and heart disease) in which the influence of the physician's attributes and practice style on patients' adherence was analyzed. Researchers examined interactions between physicians and patients by using interviews, videotapes, and observations on site. Four clinician behaviors promoted patient adherence: the clinician's displaying a willingness to answer all of the patient's questions, ordering more tests ("the physician is being very careful"), having high job satisfaction, and maintaining a busy practice ("this must be a competent physician").¹⁰ These seemingly diverse and unrelated behaviors reflected the clinician's concern, thoroughness, and competence to the patient.

Behaviors such as a physician making direct eye contact, transmitting genuine interest in what the patient says, explaining recommendations thoroughly and clearly, praising treatment adherence and problem solving, and expressing willingness to modify the treatment plan in accordance with the patient's concerns have been demonstrated as ways to also promote adherence.¹ In effect, when physicians encourage communication and when they allow their patients to have a sense of control within the relationship and with the treatment plan, adherence improves.¹

PATIENT-RELATED BARRIERS TO ADHERENCE

Attitudes and emotions the patient brings to the treatment formula may determine whether he or she will be adherent.

Understanding treatment

Patients with asthma often have difficulty understanding the need for long-term controller medication because the purpose is unclear and potential benefits seem so remote.

Mild or severe asthma

Surprisingly, patients tend to be less adherent when their asthma is either mild or severe. Poor adherence in mild asthma with infrequent symptoms is understandable ("why should I take a medicine if I feel good?"), but poor adherence in patients with severe asthma, at first glance, does not seem logical. Some of these patients do not have sufficient understanding of the role of controller medications; others feel hopeless about their chances of being able to improve or they believe their medication will not make an appreciable difference in their condition.

Insufficient faith in care giver

Patients are less adherent when they have insufficient faith in the pediatrician or in the treatment. Additionally, if a patient's asthma has been misdiagnosed, if the initial treatments are ineffective, or if the information a patient

receives is incomplete or inaccurate, he or she may be reluctant to participate fully in the treatment program.

Patient and family psychological problems

An alarming pattern of poor self-management and significant psychological dysfunction in patients and their families has been identified in children and adolescents who died of asthma.¹¹ Depression is a red flag: Clinically depressed patients are 3 times more likely to be nonadherent with medical treatment than nondepressed patients.¹² It is difficult for discouraged patients to proceed and do the work necessary to take care of their asthma. Conflict is another red flag: Conflict between family members or between family members and the clinician may indicate that a family may need psychological treatment.

High levels of family organization and closeness increase a child's adherence to therapy. In recognition of the family's critical influence, the National Asthma Education and Prevention Program (NAEPP) Guidelines recommended enlisting family support in a patient's struggle with asthma,¹³ noting that in loosely organized and nonsupportive families, adherence deteriorates. Among adolescents, family conflict and parental criticism are associated with problematic adherence.¹⁴

Patient motivation

The most important adherence variable, the patient's motivation for change and commitment to health care behaviors, is often the most difficult to assess and modify. Levels of patient motivation can vary considerably, even in the absence of psychological problems. One proposed model of behavior modification delineates several stages of change, or readiness to change, that a clinician may encounter in daily practice (Table I).¹⁵ A patient must undergo a series of behavioral adjustments to make significant modifications in health-related behaviors, including the willingness to commit to a treatment program. Patients do not move through these changes quickly, and a clinician needs to recognize at which stage a patient may be during each visit.

During the precontemplative stage, the patient is unaware of or minimizes the importance of health problems. At the first visit, for example, the clinician makes a diagnosis and is fairly confident of what the patient needs, writes a prescription, and gives the patient some instructions. The patient, however, may have very low motivation to change behaviors. After leaving the clinician's office and filling the prescription(s), the patient may take only some of the new medication but may never refill the prescription(s) or return to see the clinician until the next exacerbation.

Moving to the contemplative stage, the patient has grown aware of at least some of the risks associated with the disease or unhealthy behavior and of the need to change it but is still ambivalent about committing to appropriate actions. During the preparation stage, the patient is ready to make a commitment and has taken initial steps toward making changes. In the action stage, the patient has made the behavioral adjustments needed to

TABLE I. Stages of change

1. Precontemplation	Patient is unaware of or minimizes health problems.
2. Contemplation	Patient has some awareness of health risks and the need to change behaviors but is ambivalent.
3. Preparation	Patient is concerned about health, sees benefits of changing behaviors, begins to take steps toward change.
4. Action	Patient changes behavior to achieve a goal.
5. Maintenance	Patient continues with behaviors to maintain health.

Data from Prochaska.¹⁵**TABLE II.** Strategies to improve adherence

1. Educate:	Provide sufficient information about disease and its treatment; involve all members of the treatment team in educating patients
2. Communicate:	Discuss treatment in detail, listen to the patient, provide written instructions, build trust
3. Negotiate:	Establish treatment goals together with the patient, adapt and simplify the dosing regimen to the patient's characteristics
4. Streamline:	Eliminate barriers that prevent patient's contact with the care giver, increase frequency and availability of appointments
5. Individualize:	Be resourceful with more difficult patients, increase telephone contacts, design individualized education and action plans, involve other family members, refer dysfunctional patients for psychological help

From Milgrom H, Bender B. Nonadherence with the asthma regimen. *Pediatr Asthma Allergy Immunol* 1997;11:3-8. With permission.

achieve his or her goal and is committed to do what is necessary to treat the disease. Finally, in the maintenance stage, the patient accepts the commitment to chronic care and continues with the behavior necessary to sustain effective disease treatment over the long term.

STRATEGIES FOR PROMOTING ADHERENCE

It is obviously not enough just to write a prescription, even for an effective and convenient medication. The patient's ability to adhere to a therapeutic regimen improves when clinicians address as many factors as possible.

Simpler treatments

Adherence sharply declines with inhaled therapies and higher dosing frequencies. Refill studies, as noted, have shown that patients prefer a simpler therapy (oral, once a day). The effectiveness, the combined result of both adherence and efficacy, can be comparable to the effectiveness of an inhaled therapy requiring more frequent dosing.

Understanding both the illness and the treatment

Physicians and nurses need to devote extra time with the patient to discuss the rationale for adherence, to provide ongoing asthma education, and to encourage and answer fully any questions about the disease process and treatment. Patient education is most effectively delivered in small segments over a series of contacts; exposing the patient to large blocks of information at one time is less likely to be effective. The ongoing responsibility for providing patient education can be shared by the office staff as part of a comprehensive asthma management program. The NAEPP Guidelines provide examples of specific segments of patient education to provide over a series of visits as well as of specific questions to better address patient beliefs and perceptions.¹³

It is important in the context of patient education to dispel some of the commonly held misconceptions about asthma treatments. For example, patients may not fully appreciate that there are important differences between the anabolic steroids taken to build muscle mass and ICS, which pose minimal risks for most patients with asthma.

Faith in the physician and the treatment

If the patient has confidence in the clinician and in the treatment, he or she will feel more strongly motivated to follow the treatment plan. The NAEPP Guidelines have emphasized the need for a partnership between clinician and patient to improve treatment adherence and disease outcome.¹³ Establishing a clinician-patient partnership is a fundamental step toward improving adherence. If the clinician is nonjudgmental and nonthreatening, the patient is more likely to report adherence levels accurately. For example, the clinician's question, "are you taking that medicine I prescribed for you?" may sound judgmental and reduce the chances for an accurate or complete patient response. A question such as, "how much medicine do you have left?" may, on the other hand, be perceived as less threatening and could elicit a more accurate reply.

Addressing psychological disorders

The clinician needs to recognize the presence of the patient-related variables such as depression and family conflict that can thwart adequate adherence. Obviously, standard medical treatment alone cannot address these issues adequately. The NAEPP Guidelines recommend referring a patient to a professional such as a social worker or psychologist when emotional or social stress confounds the patient's struggle with asthma control.¹³ Until family conflict and deeper psychological problems are resolved, the family's and the child's participation in and commitment to the treatment program will be impeded.

Motivation to self-management

The clinician needs to assess the patient's readiness for change and nurture that readiness when necessary. Such recognition must begin at the initial contact. If a patient appears disengaged and does not ask questions about the

disease or treatment, then he or she is probably not ready to change behavior or adhere to the prescribed treatment plan. If a patient is engaged and asking questions such as "how am I going to do this?" or "what if I have a problem with the medication?" or "are there any adverse effects?" it usually means that he or she is thinking about and may be prepared to make changes that will enhance adherence. Increasing the level of patient motivation requires continuous education about the nature of asthma and the importance of treatment as well as careful monitoring. Table II presents strategies to improve adherence that include education, communication, negotiation of treatment goals, eliminating barriers to therapy, and individualizing therapy, especially for more difficult patients.¹⁶

In short, physicians help motivate their patients when they do not assume their job is done after the prescription is written, when they assess the patient's readiness to change, take sufficient time with the patient, promote open discussion of adherence, provide ongoing education, answer questions fully, and see the patient more often.

In this era of cost-conscious managed care, encouraging extra patient office visits may be problematic, but managed care organizations must recognize that extra visits are required to gain a patient's commitment to a treatment program and will save money over the long term. Better control will reduce hospitalizations and emergency department visits. Certainly, a case manager who monitors a patient's progress can be a link between the patient and clinician, not only encouraging adherence but also facilitating the scheduling of needed office visits. The extra time devoted to the patient will ensure that the obstacles to adherence are adequately addressed.

CONCLUSIONS

Without substantial, long-term adherence, no medication, no matter how effective, can make the full therapeutic contribution needed to control a debilitating and increasingly prevalent chronic disease such as asthma. Treatments that are easier to take invite better adherence. Patients are better motivated to adhere to a therapy regimen when they understand their illness, have faith in their physicians and treatment, and are free of psychological disorders. Improving a patient's motivation is pri-

marily a clinician's responsibility and requires thorough patient and care giver education, more frequent patient contact, and the development of a patient-clinician partnership dedicated to effective asthma treatment.

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