

Chronic Obstructive Pulmonary Disease: Developing Comprehensive Management

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The goals of managing chronic obstructive pulmonary disease include making the correct diagnosis, avoiding further risk (especially by smoking cessation), controlling symptoms (particularly dyspnea), and treating complications. Patients with chronic obstructive pulmonary disease can obtain substantial symptom relief from medications, including bronchodilators. Prescription of bronchodilators should be guided by the patient's degree of dyspnea, and response to initial therapy. In patients with severe disease and uncontrolled dyspnea, simultaneous use of multiple classes of bronchodilators provides additional benefit. Controlled investigations have found that patient adherence to prescribed therapies is less than optimal even in the best circumstances. Adherence barriers include factors related to the treatment, to the patient, and to the health care practitioner. Understanding these barriers and addressing patient adherence may improve outcomes. Health care practitioners need to develop an optimal working relationship with each patient and focus on their roles as educators and advocates for the patient's health. A collaborative self-management approach recognizes the patient's role in making his or her own health decisions and the physician's role as an educator and facilitator of the patient's health decisions. When multiple therapies are employed, a comprehensive management plan should be developed to help the patient understand and incorporate all the necessary treatments on an ongoing basis. Disease management programs may be useful in assisting health care practitioners and patients in managing chronic obstructive pulmonary disease. *Key words: chronic obstructive pulmonary disease, COPD, compliance, bronchodilators.* [Respir Care 2003;48(12):1225-1234. © 2003 Daedalus Enterprises]

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Table 1. Currently Available Therapies That May Be Useful With Selected COPD Patients

Bronchodilators: β agonists, anticholinergics, theophylline
Corticosteroids: inhaled,* systemic
Antibiotics
Smoking cessation medications: nicotine replacement, bupropion
Oxygen
Pulmonary rehabilitation
Mechanical ventilation
Surgery: lung-volume reduction, lung transplantation

COPD = chronic obstructive pulmonary disease
 *Not currently approved by the United States Food and Drug Administration for use with COPD

Table 2. Important Outcomes in Chronic Obstructive Pulmonary Disease

Function
Physiology (lung volumes, forced expiratory volume in the first second)
Functional capacity (walking capacity)
Patient Effects
Respiratory symptoms (dyspnea, cough, sputum)
Health status (health-related quality of life)
Neuropsychological function (memory, cognition)
Course of the Disease
Exacerbations
Mortality
Costs (hospitalizations, medications)
Disease
Pathophysiology
Pathology
Radiology
Other
Need for medications and therapies
Caregiver burden
Health-enhancing behaviors (smoking cessation, patient adherence to prescribed treatments)
Assistive technology (wheelchair, walker)
Satisfaction with care
Adverse effects of therapy and medications

Introduction

Chronic obstructive pulmonary disease (COPD) is a chronic respiratory disorder that cannot be cured. It adversely affects patients by causing dyspnea, which occurs with only minimal activity as the disease progresses. Since the fear-provoking symptom of shortness of breath is worsened by increased levels of activity, patients learn to avoid dyspnea by reducing their level of activity. Resultant inactivity impairs productive employment, duties within the household and family, and eventually adversely affects health status (health-related quality of life). Because bronchodilators reduce shortness of breath, they are central to the management of COPD; bronchodilator use is reviewed in the present report. Other therapies are discussed in the other conference reports in this and the January 2004 issue of RESPIRATORY CARE.

Bronchodilators are certainly not the only beneficial therapy for COPD patients. A number of therapies (Table 1) are currently available that can significantly impact outcomes of importance to COPD patients (Table 2). However, therapies applied to COPD patients can lead to beneficial outcomes only when the *medical* goals of management are consistent with the goals of each individual *patient*. Most of the COPD therapies listed in Table 1 have additional benefits when used in combination, and simultaneous application of complementary therapies is commonplace in patients with severe disease. When multiple therapies are employed, a total plan of treatment should be developed and implemented to integrate all the individual therapies into a coordinated approach. Comprehensive management can be implemented in individual and group medical practices in a variety of health care settings. Insurers and health care systems can assist practitioners and patients by implementing disease management approaches on a large scale.

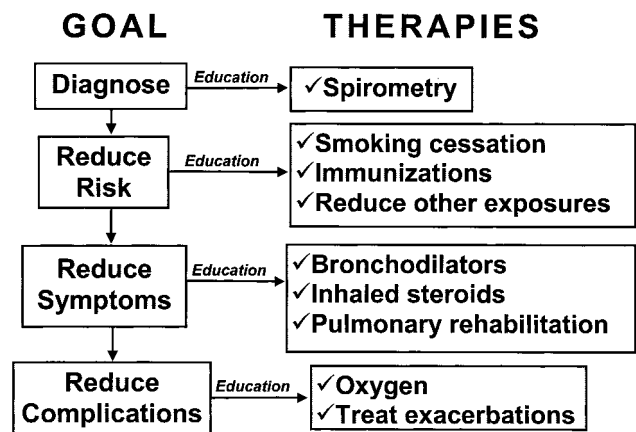


Fig. 1. The goals of therapy for patients with chronic obstructive pulmonary disease. Not all the therapies have been approved for chronic obstructive pulmonary disease by the United States Food and Drug Administration. (Adapted from Reference 1.)

Goals of Management

The goals of COPD management have been outlined in recent international guidelines: the Global Initiative for Chronic Obstructive Lung Disease (GOLD).^{1,2} Figure 1 shows these goals and the therapies that can be employed to achieve them. The 4 goals of COPD management are:

1. Make a correct diagnosis, including universal use of spirometry.

2. Reduce the risk for further progression of the underlying disease by reducing exposure to risk factors, such as cigarette smoke, and provide influenza and pneumococcal immunizations to reduce risk of further morbidity.

3. Decrease symptoms, most importantly shortness of breath because of its impact on patient function and health status, through use of bronchodilators and pulmonary rehabilitation.

4. Reduce and treat complications such as hypoxemia and COPD exacerbations.

These COPD management goals should be used by health care practitioners to guide their overall approach to COPD patients.

Some therapies should be universally provided to all COPD patients. For example, methods to reduce risk of further disease and morbidity, including smoking cessation, should be aggressively pursued with every patient. However, certain therapies are not applicable to certain COPD patients. For example, in a patient with mild airflow limitation whose shortness of breath is adequately controlled by a long-acting selective β_2 agonist and who does not require supplementary oxygen therapy, there is probably little to be gained from a comprehensive pulmonary rehabilitation program.

Bronchodilators

Bronchodilators are central to COPD symptom treatment. Despite the common belief that COPD is not responsive to therapy, multiple studies over the last 3 decades have shown that the majority of COPD patients benefit from bronchodilators, with improved forced expiratory volume in the first second (FEV₁). In a study reported in 1986, intermittent positive-pressure breathing for bronchodilator delivery was not superior to delivery via metered-dose inhaler.³ In that National Heart, Lung, and Blood Institute multicenter trial, spirometry was performed before and after β agonists throughout the 5-year study. Almost two thirds of the patients demonstrated a significant spirometric response to bronchodilators at some point during the trial.

A recent European multicenter investigation of COPD patients provided additional information about response to bronchodilators and inhaled corticosteroids.⁴ The study enrolled COPD patients who did not have a pre-study bronchodilator response (using the European criteria of an FEV₁ increase of < 10% of predicted). The mean FEV₁ of the 1,465 COPD patients in the study was 1.3 L (45% of predicted). The subjects were selected because of lack of acute improvement in FEV₁ after albuterol (an average of only a 4% improvement after use of albuterol in the laboratory). However, with regular use of salmeterol, a long-acting β agonist bronchodilator, there was a mean 60 mL (6%) increase in FEV₁, and there was a mean 160 mL

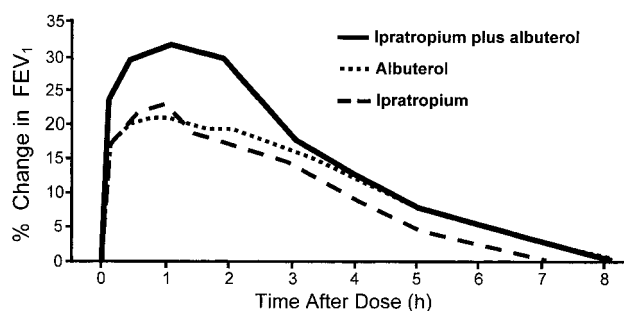


Fig. 2. Combining short-acting β agonist and anticholinergic (albuterol plus ipratropium) results in greater bronchodilation, and, thus, greater forced expiratory volume in the first second (FEV₁), than either albuterol or ipratropium alone. (From Reference 6, with permission)

(18%) increase in FEV₁ with fluticasone plus salmeterol after 2 weeks of therapy. At the end of the 1-year study there was a 3% decrease in FEV₁ with placebo but statistically significant improvement (compared to placebo) with salmeterol (2% increase), fluticasone (2% increase), and the combination of both agents (10% increase).

Airflow as assessed by FEV₁ is not the only benefit from bronchodilators. For example, Calverley et al showed that a combination of inhaled fluticasone and salmeterol was associated with an improvement in shortness of breath and a reduction in as-needed bronchodilator use for dyspnea, compared to placebo and to each individual active treatment.⁴ In addition, bronchodilators reduce lung volumes and dynamic hyperinflation.⁵ Dynamic hyperinflation refers to the increase in lung volumes seen during exercise in patients with advanced COPD, and it has been shown to be one of the most important determinants of dyspnea during exercise. Reduction in dynamic hyperinflation with bronchodilator use may lead to improved exercise performance.

There are 2 classes of inhaled bronchodilators: selective β_2 agonists and anticholinergics. These agents have been evaluated both when used individually and in combination, and it is clear that they are more effective when used simultaneously. Short-acting anticholinergic and short-acting β agonist bronchodilators were evaluated in a large-scale study.⁶ In the study, conducted in 24 centers, 584 patients with moderately severe COPD (FEV₁ 1.0 L) were randomized to receive albuterol (short-acting β agonist), ipratropium (short-acting anticholinergic), or both agents, for 85 days. The combination of albuterol and ipratropium improved airflow more than either agent alone (Fig. 2).

As long-acting β agonist bronchodilators became available, they were also shown to have greater benefit when combined with anticholinergics. Improved airflow has been reported with the use of long-acting β agonists plus short-acting anticholinergic bronchodilators. Van Noord et al showed that the combination of salmeterol plus ipratro-

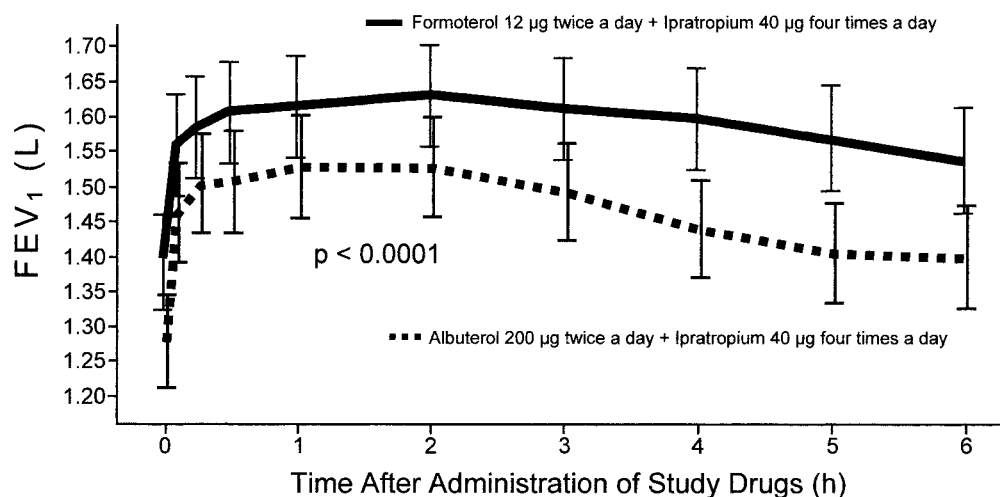


Fig. 3. The combination of long-acting β agonist plus anticholinergic (formoterol plus ipratropium) results in greater bronchodilation, and, thus, greater forced expiratory volume in the first second (FEV₁), than the combination of short-acting β agonist plus anticholinergic (albuterol plus ipratropium). (From Reference 8, with permission)

pium produced bronchodilation superior to salmeterol alone.⁷ In another study a long-acting β agonist bronchodilator (formoterol) plus a short-acting anticholinergic bronchodilator was compared to a short-acting bronchodilator plus an anticholinergic.⁸ Airflow improved more with the long-acting β agonist and anticholinergic combination (Fig. 3).

Although theophylline is not a first-line bronchodilator, it should be considered for patients who have advanced disease and patients with less-than-optimal control of symptoms with inhaled bronchodilators.^{1,2} Theophylline fell out of favor during the last several decades because of its potential for adverse effects and interactions with other drugs. When the therapeutic theophylline level is maintained in the range of 10–14 $\mu\text{g/mL}$, toxic effects can usually be avoided. A recent study showed that theophylline has additive benefits when combined with a long-acting β agonist.⁹ In a study of 943 COPD patients with a mean FEV₁ of 1.25 L (40.5% of predicted), ZuWallack et al compared salmeterol, theophylline, and the combination of salmeterol and theophylline. The group receiving the combination of salmeterol plus theophylline had greater improvement in pulmonary function, less dyspnea, reduced albuterol use, and fewer exacerbations. Target theophylline concentrations were 10–20 $\mu\text{g/mL}$, and adverse events were similar in all groups. It also appears that theophylline may have anti-inflammatory actions.¹⁰

There is no rigorously investigated algorithm for the use of bronchodilators. Nevertheless, there are 2 sets of COPD guidelines that offer some guidance for physicians.^{1,2,11} The GOLD guidelines offer several suggestions concerning the use of bronchodilators.^{1,2} First, inhaled bronchodilators are preferable to oral agents as first-line therapy. Oral bronchodilators (β agonists and theophylline) offer

less bronchodilation and have more adverse effects than inhaled agents. Second, the GOLD guidelines indicate that the choice of an inhaled bronchodilator should be guided by the availability of the drug, the individual response to therapy, and the adverse effects. In less developed countries and with patients who have fewer financial resources, cost is a major limitation to use of more expensive agents. In the United States, managed care organizations may not endorse all types and combinations of bronchodilators, and all available agents may not be covered by pharmacy benefit packages. Third, combining bronchodilators of different classes increases their effectiveness and may not result in more adverse effects. Patients with more severe disease who do not show substantial relief of symptoms from a single agent may require combinations of agents. Fourth, long-acting bronchodilators may improve the patient's long-term adherence with prescribed therapy and thus improve outcomes. Although bronchodilators are used to control symptoms, there is a general correlation between worsening airflow limitation and increasing dyspnea. Thus, GOLD suggests physicians consider the GOLD COPD stage (which is based on the percent of predicted FEV₁) as a guide to bronchodilator use. For patients with stage I COPD, as-needed short-acting bronchodilators may be used as needed to control dyspnea. For patients with more severe airflow limitation (stages II and III), physicians should consider the use of one or more bronchodilators administered on a regular schedule based on the patient's degree of dyspnea.

The American Thoracic Society guidelines suggest an approach to the use of bronchodilators that is based on the patient's shortness of breath.¹¹ There are 4 levels of outpatient therapy, based on dyspnea, outlined by the American Thoracic Society:

1. Mild, variable dyspnea occurring intermittently: short-acting β agonists should be used on an as-needed basis.
2. Mild-to-moderate continuing dyspnea: use 1 class of bronchodilator.
3. Unrelenting dyspnea: combine a β agonist and an anticholinergic.
4. Suboptimal control of symptoms: combine all 3 classes of bronchodilators (β agonists, anticholinergics, and theophylline)

Patient Adherence With Therapy

As noted throughout this Journal Conference, therapy is effective in improving a wide range of outcomes in COPD patients. Thus, the logical conclusion from this conference is that patients would in large part follow physician therapeutic advice and recommendations. However, studies have shown that COPD patients do not always adhere with physician-prescribed therapies.

It would be expected that in controlled studies of bronchodilators, medication use would be nearly perfect because of close supervision of the research subjects. However, the Lung Health Study reported relatively poor adherence with bronchodilators.¹² In the Lung Health Study, which was a 5-year, multicenter study, COPD patients 35–60 years of age with minimal-to-moderate airflow limitation were instructed to inhale bronchodilators 3 times each day. The best adherence was achieved for short periods after initiation of the study but was only 70% of the prescribed daily inhalations. Adherence fell to less than 40% by the end of 2 years. Adherence was better immediately following each study visit but declined in the time between visits. Devices to record the date and time of each actuation of the inhaler were used by 231 of the subjects. Informing patients that their use was being monitored and providing detailed feedback about their medication use resulted in increased adherence.

In the intermittent positive-pressure breathing trial, adherence with bronchodilators delivered via nebulizer was evaluated in 985 patients, using timers placed on the nebulizers.¹³ Patients were prescribed 3–4 ten-minute treatments (total of 30–40 min daily) with β agonists. Mean \pm SD nebulizer use was 26.8 ± 18.0 min/d. Based on actual nebulizer use, patients were categorized as adherent (≥ 25 min/d) or nonadherent (< 25 min/d). Only 50.6% of patients were adherent. Use among adherent patients was 40.6 min/d and among nonadherent patients was 12.5 min. Nebulizer use was best predicted by race (white), marital status (married), smoking status (nonsmoker), alcohol intake (no alcohol), shortness of breath (moderate to severe), theophylline level (≥ 9 $\mu\text{g/mL}$), and FEV₁ (lower FEV₁). Patients who were less adherent with their nebulizers also

were less adherent with their COPD oral medications and missed more clinic visits.

Although patients may not adhere with symptomatic therapy such as bronchodilators, they might conceivably have better adherence with oxygen therapy, a treatment known to improve survival. The Nocturnal Oxygen Therapy Trial randomized patients to either nocturnal or continuous oxygen therapy.¹⁴ In this multicenter trial, among the patients who were randomized to receive oxygen 24 h/d, actual use was only 19 h/d. A more recent study was carried out to determine oxygen use in the French national health system.¹⁵ COPD patients who had documented hypoxemia were prescribed oxygen for an average of 16 h/d. Less than half the patients (45%) used their oxygen ≥ 15 h/d and 30.8% used their oxygen for $< 80\%$ of the prescribed daily duration. Patients who used oxygen for longer periods were found to have more severe disease, as evidenced by lower P_{aO₂}, higher P_{aCO₂}, and lower FEV₁. Factors associated with greater daily duration of oxygen use were a physician prescription for use of ≥ 15 h/d, education by a nurse or physiotherapist, use of oxygen during domestic activities, smoking cessation, and absence of adverse effects.

Adherence with bronchodilators was also reported to be poor by Dolce et al in 1991, in a survey of patients in the community.¹⁶ They found that COPD patients were prescribed an average of 6.3 medications. Adherence was suboptimal, with 54% of patients underutilizing their medications; patients reported they forgot to take their medications in some cases and in other cases made a conscious decision not to use them. Overuse was also reported at times of increased symptoms: 50% of patients overused their prescribed bronchodilators. More disturbing was the finding that metered-dose inhaler technique was ineffective among almost a quarter of the patients.

A Spanish study (Estudi de Factors de Risc d'Agudització de la Malaltia Pulmonar Obstructiva Crònica [EFRAM]) of patients admitted to hospitals in Barcelona for COPD exacerbations found multiple modifiable risk factors for admission.¹⁷ The most important patient-related factor was patient failure in at least one of the essential steps in use of metered-dose inhalers (43% of patients). Other factors included lack of influenza vaccination (28%), lack of rehabilitation program attendance (86%), and suboptimal oxygen prescription by physicians and oxygen use by patients. These results suggest that addressing patient adherence and physician behavior may improve patient adherence with therapy and thus decrease hospital admissions. However, an important additional conclusion about the lack of optimal adherence with medications is that COPD patients may not perceive benefits from physician-prescribed therapies, possibly because of lack of effect, lack of patient knowledge, or insufficient education about the expected benefits of treatment.

Barriers to Adherence

Arguably, the single most important and, unfortunately, unstated goal of managing COPD is to assure that the patient adheres with the prescribed therapy and thereby achieves optimal outcomes. However, there are frequently barriers to the patient's long-term adherence with therapy prescribed by health care practitioners. Table 3 lists potential compliance barriers with COPD patients.

Treatment-related barriers relate to the purpose for which the therapy is used. When patients are given therapy to control symptoms that have daily impact (such as bronchodilators for severe dyspnea that causes very limited functional capacity and psychological anxiety, fear, and depression), it might be expected that adherence would be greater than when given prophylactically (such as to prevent dyspnea that occurs infrequently and only during strenuous exertion). Similarly, patients might be expected to have poorer adherence with medications that have a delayed onset of the desired effect and when the therapeutic course is prolonged. In addition, more complex therapies might be expected to have lower adherence; this situation is commonly encountered with the use of bronchodilators. There are a variety of different devices currently marketed for delivery of inhaled bronchodilators (Fig. 4). The number of delivery systems is likely to increase as new medications become available and chlorofluorocarbon-propellant metered-dose inhalers are phased out because of environmental concerns. Patients may be prescribed multiple inhaled medications that use different delivery systems, and patients may not understand the use of the different devices. This complexity may not be preventable, but adherence may be enhanced with careful instruction about the proper administration techniques. In addition, the frequency of medications may seem overly complex. For example, one medication may be prescribed twice a day and another 3 times a day, so patients may feel they need to take medications at 5 different times during the day, when in fact administration can be simplified by taking medications at the same time.

Physician-related barriers to optimal patient adherence probably occur frequently in today's medical environment, in which physicians have a limited amount of time to spend with each patient. Because physicians are busy, patients may feel reluctant to "bother the doctor" with inquiries between scheduled visits. Alternatively, it has been suggested that a busy physician may engender positive patient attitudes.¹⁸ Patients may feel that because a physician is busy with many patients, the physician must therefore be competent. Physicians should recognize that patient self-report of adherence is notoriously poor and underestimates true compliance.

There are numerous potential *patient-related barriers* to adherence. Patients need to be motivated to adhere with

Table 3. Barriers to Adherence to Prescribed Therapies in Patients With COPD

Barriers Related to Treatment
Duration of treatment (short course of treatment, prolonged use)
Purpose of treatment (symptomatic, preventive)
Onset of effect (delayed, immediate)
Expense
Complexity (multiple treatments, multiple steps to use)
Barriers Related to Health Care Practitioners
Productive practitioner-patient relationship:
Perceived interest of practitioner
Practitioner consistency (rotating practitioner, single practitioner)
Personality issues between practitioner and patient
Accessibility to patient (scheduled visit duration, telephone access, emergency care)
Consideration of patient desires and establishment of patient-centered goals
Patient Education:
Explanation of the nature and importance of COPD
Explanation of therapeutic goals
Explanation of methods of achieving desired goals
Detailed explanation of use of prescribed therapies for each individual patient
Failure to understand the barriers to adherence
Failure to recognize that patient self-reports usually underestimate adherence
Barriers Related to the Patient
Patient motivation
Acceptance of the presence and severity of COPD
Acceptance of importance of therapeutic outcomes
Acceptance of use of prescribed therapies
Psychological issues (particularly depression and anxiety) impacting recognition of disease or ability to adhere to therapy
Faith in practitioner
Understanding of details of use of prescribed therapies
Economic status
Cultural factors
Family factors:
Physical support
Psychological support
Societal factors:
Access to health care
Access to medications
Access to other therapies

COPD = chronic obstructive pulmonary disease

treatment, and motivation requires that they accept their illness, understand its severity and course, and accept the importance and role of treatment. Many COPD patients are depressed and anxious, and these psychological factors may interfere with treatment adherence.

Collaborative Self-Management

The role of the physician and the physician-patient relationship have changed markedly over the last several

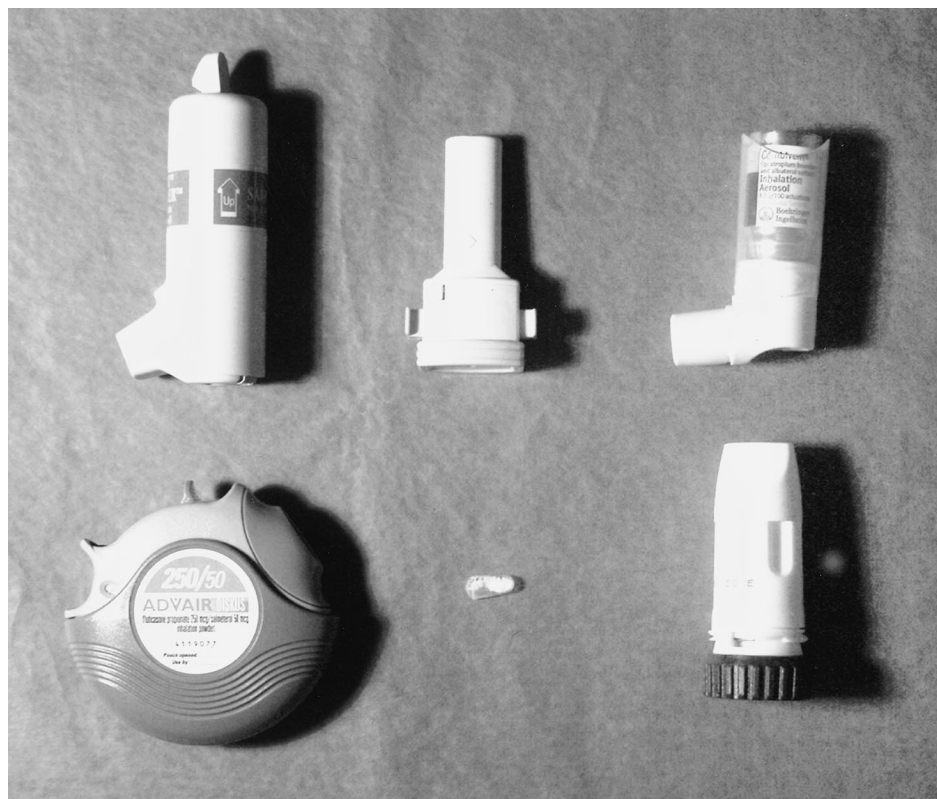


Fig. 4. A variety of different devices for delivery of inhaled medications are available. Not all of these medications are approved by the United States Food and Drug Administration for chronic obstructive pulmonary disease patients.

decades. In the past, patients expected physicians to simply tell them what to do, with little direction and little personal interaction. Physicians were traditionally male and modeled as father-like figures, dictating therapy to patients, and patients were seen as children, taking direction from the parent. Physicians were called *providers* of health care while patients were seen as *recipients* of health care. “*Compliance*” with the physician’s dictums was the term used to denote the patient’s use of prescribed treatments. Today, patients seek a practitioner who does not simply dictate treatments, but rather one who serves as a guide to the patients’ efforts to achieve optimum total physical and mental health. The term “*collaborative self-management*” conveys the concept that patients and physicians should act together in a coordinated manner and encourage patients to actively participate in their own care.¹⁹ Table 4 shows the key components of collaborative self-management. The patient is now seen as a partner in the relationship and as an active learner. “*Adherence*” has replaced “*compliance*” as the term to denote patient use of prescribed treatments. Health care practitioners must establish a relationship with the patient that embodies mutual respect and trust as the basis for collaborative self-

Table 4. Components of Collaborative Self-Management

Development of patient-practitioner partnership that encourages communication and active patient participation
Development of therapeutic goals mutually shared by patient and practitioner
Education of the patient by the practitioner, including written materials:
Patient is ready, able, and willing to learn, process, and apply medical information
Assessment of the patient’s knowledge and skill
Information presented so it can be readily comprehended and acted on by the patient
Discussion of the patient’s concerns and fears
Monitoring of the collaborative self-management process
Family involvement when appropriate

(Adapted from Reference 19.)

management. Patients need to feel that their desires are considered in treatment decisions.

The physician is considered a partner in the patient’s health, a facilitator, and an advocate for the patient’s care. The practitioner must be medically knowledgeable but more importantly must be able to communicate that knowledge

Table 5. Strategies to Improve Adherence

Educate	Routinely provide information to patients to achieve desired behaviors.
Communicate	Discuss written treatment plan in detail. Listen to the patient. Provide ongoing monitoring through health care provider visits.
Negotiate	Actively involve the patient. Mutually decide treatment goals with the patient.
Streamline	Simplify the treatment regimen. Assure access to health care providers.
Individualize	Develop a medical plan with each individual patient.

(Adapted from Reference 20.)

to the patient in a manner that the patient can understand and translate into healthy behaviors. Health care practitioners should view patient education as a priority, determine treatment goals with the patient, and clearly communicate the methods and demonstrate the skills necessary to achieve those goals. Other health professionals with specialized knowledge, such as respiratory therapists, may be helpful in providing specialized patient education. The practitioner must have insight into adult learning and the particular learning style of each patient. Patients frequently forget information conveyed during health care encounters. Anxiety is often caused by new and disturbing medical information, such as a new diagnosis, and can affect the patient's recall about information imparted during office visits. Routinely writing notes for patients or encouraging patients to write notes of their own are tools that can greatly enhance patient recall of important information conveyed during the health visit.

All health care practitioners should recognize they have a role in improving patient adherence with treatments. Table 5 shows strategies to improve adherence.²⁰

Physicians should show interest in patient concerns and assure they are accessible to meet patient needs. However, there is only limited information available to guide physicians regarding needs assessments of COPD patients. In the Netherlands, Koning et al used a 111-item questionnaire to survey needs of 121 adults with asthma and COPD.²¹ Satisfaction with generalist and specialist physicians was generally high. Approximately 77% of patients thought their doctor was understanding, 74% noted opportunity to ask questions, and 88% of patients thought the physician took complaints seriously. However, patients with greater dyspnea were less satisfied and expressed a higher need for counseling. About half the patients expressed a need for more information; 52% had a need for more written information about respiratory illness and 48% expressed a need for more information about the results of diagnostic tests and causes of the disease (eg, allergies).

Table 6. Principles of Disease Management

Identify the population
Secure physician participation and expand physician knowledge
Promote the use of evidence-based guidelines
Develop a collaborative physician-patient partnership
Enhance patient-physician communication
Raise patient empowerment, independence, and self-esteem
Assist patients in the most effective management
Effectively utilize patient counseling, education, and motivational strategies (behavior modification)
Be readily available (assure appropriate health care access)
Be aware that high health care utilization does not always reflect disease severity

About a third of patients (31%) desired more participation in treatment decisions. Results of patient needs assessments may differ in different countries, regions, and physician practices, but the latter study may serve as a model for collecting such information.

Comprehensive Management and Disease Management

Because multiple therapies are often applied to COPD patients (see Table 1), the physician and health care team should develop a comprehensive approach to management. A comprehensive approach should integrate the multiple therapies into a patient-centered plan of care. Often the physician cannot provide this service but may rely on the assistance of other practitioners, such as respiratory therapists or nurses.

How should care be integrated into a comprehensive approach? Pulmonary rehabilitation offers the best opportunity to achieve comprehensive therapy. Such programs are described elsewhere in the proceedings of this Journal Conference. Coordination of all aspects of care may be facilitated by the pulmonary rehabilitation program coordinator.

Disease management, a newer concept designed to assist in the care of patients with chronic disease, is a method of facilitating long-term comprehensive management. The goal of disease management is to provide total health care in order to maintain optimum health of all individuals with a specified disease. Disease management is frequently coordinated, not by the physician, but rather by a third party that provides education to health care professionals and patients and monitors program outcomes.

The principles of disease management (Table 6) overlap with the goals of collaborative self-management. Disease management is often accomplished by a team of health care practitioners providing care across all sites, including out-patient and in-patient settings. A major focus of dis-

ease management is prevention and education as a method to reduce health care costs and improve patient outcomes

Results of Comprehensive Management

Unfortunately, there are few investigations of the effectiveness of comprehensive management with COPD patients, whereas these principles have been more widely and successfully applied with asthma patients. Collaborative self-management programs that have been investigated have not always included all the key components in Table 4, and the role of the physician in these programs has not always been clearly defined.

Gallefoss et al have reported extensively on the results of their "self-management" program for patients with respiratory disease.^{22–25} Their studies have compared results in 78 patients with asthma and 62 COPD patients randomized to receive self-management or standard care. Their self-management program includes an educational brochure about the disease, two 2-hour education sessions with a nurse or physiotherapist, and an individual treatment plan for each patient.²⁵ Outcomes have been assessed for 1 year following the intervention. These investigators have shown this program increases inhaled steroid use among asthma patients but not among COPD patients.²⁵ Rescue, as-needed β agonist use for control of dyspnea was reduced among COPD patients but not among asthma patients. Physician visits and patient absences from work were reduced among both COPD and asthma patients. The self-management plan was found to reduce costs with COPD patients, because of reduced physician visits and reduced use of as-needed bronchodilators.²³ Quality of life was improved among asthma patients but not among COPD patients.²²

Bourbeau et al explored the efficacy of a self-management program on COPD hospitalizations.²⁶ In this controlled, randomized multicenter trial, 191 COPD patients who had at least 1 hospitalization in the previous year were enrolled from 7 hospitals. Mean post-bronchodilator FEV₁ was 45% of predicted, and mean patient age was 69.5 years. The self-management program consisted of weekly in-home education for 7–8 weeks, using written workbook education modules, which include an action plan for exacerbations, customized for each patient by the physician, and a supervised exercise session. Patients were encouraged to exercise at least 3 times a week thereafter. Compared to the patients receiving usual care, patients in the self-management group had 40% fewer hospital admissions for COPD exacerbations and 57% fewer admissions for other medical problems in the subsequent 12 months. The patients who participated in the self-management program had fewer emergency room visits and better quality of life, as assessed by the impact scale of the St George's Respiratory Questionnaire.

The National Jewish Medical and Research Center has developed a disease management program for COPD patients. Their outcomes are available on their Web site and show reductions in 6-month health care utilization, including a 77% reduction in missed work days and a 56% reduction in hospitalizations.²⁷

Summary

Therapies for COPD can be effective and improve outcomes only if they are actually used by patients. Health care practitioners should recognize the complexity of prescribed treatments and routinely utilize strategies to promote patient adherence. The principles of collaborative self-management, with the patient and all health care providers working in concert toward clearly defined goals, should be routinely incorporated into patient care. Although the principles of collaborative self-management may seem logical, reasonable, and self-evident, additional research on their long-term effectiveness is needed. The goals of collaborative self-management may be fostered by disease management programs, which can assist in improving patient outcomes.

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Discussion

Heffner: It's fascinating that when you look at a disorder like hypertension, in which patients don't get any immediate benefit or feedback from taking the anti-hypertensive agent, compliance is better with long-acting agents. But in COPD, as you pointed out, the converse may be true. What insights lie there for us? What can we learn from this observation that might help us to promote improved adherence for our patients?

Make: My answer is similar to a point made by David Mannino in his presentation.¹ COPD is simply not on the proverbial radar screen—not of the federal government, nor the patient, nor the health care provider. In contrast to COPD, hypertension *has been* in the public eye. I recall an advertisement about hypertension from the

American Heart Association; it said "Hypertension is a silent killer." Well, that more appropriately applies to COPD, a disease that is recognized only in its advanced stages. Most COPD patients do not present to the physician until their FEV₁ is about 50% of predicted. Other organizations have developed great catchy phrases for other illnesses like hypertension, which they have been promulgating for a long time. We have not been that creative. In addition, patients know what hypertension is and it's easy to measure; there are well-publicized blood pressure readings that diagnose hypertension. The numbers for COPD are somewhat more difficult to get our hands around. And I think the public's perception of this disease is poor. A commonly-voiced sentiment is that COPD patients brought the disease on themselves because they smoked cigarettes. We don't show such lack of

empathy for patients with other smoking-related illnesses, such as lung cancer and heart disease.

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Hill: To follow up on John Heffner's question, based on my experience with COPD patients' adherence during some of the noninvasive ventilation trials we've done, I've been impressed that, in comparison to your average asthma patient—and probably your average systemic hypertension patient as well—COPD patients often have many additional challenges. COPD patients are older; they tend to have less education; they often are from different cultures; they have co-morbidities; they have reimbursement issues, with limited Medicare coverage; they have

all kinds of family and psychosocial issues; it just goes on and on. These are the kinds of things that get in the way of adherence. I'm wondering if these factors were looked at in any of the studies you cited, and do you think these perhaps explain why adherence among COPD patients seems to be different than other populations?

Make: Those issues have been important determinants of adherence in some studies, but not uniformly in all studies. It is ironic that COPD patients don't have better adherence, since we know the disease and its symptoms impact patients on a daily basis, as evidenced by the "Confronting COPD" study.¹ You would expect patients to be adherent with COPD medications, because those medications reduce daily symptoms. Hypertension doesn't impact patients nearly as much as COPD. Nevertheless, it's easier to wake up in the morning and take a pill for hypertension than to have COPD staring you in the face 24 hours a day, with the constant symptoms and comorbidities.

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Stoller: Barry, you identified the paucity of studies about disease management, which raises a question. Who would conduct such studies? In what forum would such studies be done? Who would fund them? What would be the target audience? I'm anticipating your response might point out some of the paradoxes—that there's this disconnect between the issues that impact most importantly on the management of patients and the issues that are the subject of inquiry.

Make: You raise an important issue. The competitive nature of the

health care environment in the United States and the role of health care insurers make these studies difficult to undertake. I think the funding source for such studies should not be only the federal government but also the health care insurers—both of whom have a great deal to gain by improving the nation's health. It is unfortunate that the National Institutes of Health do not usually support this type of research.

Enright: You seemed worried about bronchodilator compliance, and you showed results from the Lung Health Study, in which people were given ipratropium regardless of whether they had symptoms, the idea being to see if the change in FEV₁ was altered. However, maybe patients are self-medicating *appropriately* with inhaled bronchodilators. They don't affect morbidity and mortality. They're only for short-term dyspnea relief. When I have a headache, I take aspirin as needed, and I think that when most COPD patients have dyspnea, they'll take a medication that relieves it. So when you see low adherence rates, it's probably appropriate. They're taking it when they need it and when it will work for them.

Make: I tried to set up that question by outlining the different approaches to the use of bronchodilators. Most investigators suggest—at least at this point in time—that we should use bronchodilators mainly for symptomatic relief. If that's the case, who cares whether patients are taking more or less than prescribed by the physician! If the patient gets symptomatic relief, then the patient is the best one to assess whether that outcome has been achieved and how much medication is needed to control the symptoms.

We need better tools to help us communicate with our patients—to figure out how much dyspnea they have and how much medication is appropriate for each patient. We physicians need to be on the same page as our patients.

However, there is a growing body of literature and several ongoing studies that may in the near future indicate that regular use of bronchodilators reduces exacerbations and may even alter the decline in lung function. I also discussed the use of medications other than bronchodilators (oxygen in particular) to highlight the problems with adherence with therapies that have important long-term outcomes.

MacIntyre: You implied a more hopeful scenario than I sense, which is that somehow the insurers are getting interested in preventive care. They seem to talk a lot about it, but I don't see them doing a lot about it. I think Medicare is the classic case in point. You and I have both been up there with the Center for Medicare/Medicaid Services, and if I've heard it once, I've heard it a thousand times: Medicare does not have a statute that supports preventive programs. Period. Do you think this is going to change at some point?

Make: Neil, you're a baby boomer! How can you even ask that question? Seriously, we all recognize the increasing power of the elderly and of the aging and very vocal baby boomers in the United States. They have led the effort to provide Medicare coverage for prescription medications. My hope is that patients will increasingly become their own health care advocates. Certainly, as physicians we're not doing a great job of advocating for them at the national level. Even the physicians who are in Congress aren't advocating for our patients. But patients are getting an increased sense of empowerment. My hope is that as the baby boomers get to the point where they're demanding more, we may see more changes in the health care system.

MacIntyre: It just seems to me that the insurance groups as a whole are interested in 90-day payoffs and 1-year payoffs. If you start talking about pre-

venting things a year or 2 or 3 down the road, that's just off their radar screen. They just don't want to talk about it.

Make: I agree that the insurers often *talk* one way but *act* another way, but I do see them changing. For example, last week my wife received a letter from our insurer telling her that she is due for a mammogram. We should also recognize that not only do insurers frequently have a short-term view of health care, but also patients and employers don't have any sense of commitment to the insurers. For example, over the last 6 years we have had about 4 different health care plans. And the reason we keep changing plans is because the prices have increased dramatically, and our hospital, for the benefit of its employees, attempts to choose the health care plans that are the most affordable. I don't think there's much long-term commitment of patients and employers to a single health care plan. Therefore, why should a health care plan have a longer view if patients are only in the plan for a year? I don't know what's going to change that.

MacIntyre: So you're supporting my pessimism.

Make: No, I really do believe that patients will take a more active role in their health care and learn to drive the system to change to meet their needs.

Kesten:* I want to comment about treating COPD symptoms like a headache and taking bronchodilators as needed. We face some nihilistic attitudes about COPD—the thought that, “Oh well, there's not much we can do; just treat when they have a symptom.” But COPD is not like a headache. Maybe it's more like migraine, about which people are motivated to

take preventive therapy. We have good therapies, though they may not be great by the standards of other diseases, and we have pulmonary rehabilitation. We've mentioned smoking cessation and the lack of widespread availability of preventive programs that do make a difference. It goes to your point that it's not on the radar screen enough to make an impact yet.

Make: I should comment on the COPD Coalition meeting that will take place in November in Washington DC. Professional organizations, the National Institutes of Health, and patient groups are coming together to try to influence health care policy. We have not advocated for care of COPD patients as much as people have for many other diseases. I think of the Heart Association and patients with heart disease and the Cancer Society and patients with cancer as the leaders in raising public awareness.

Mannino: At the Centers for Disease Control, although this isn't work we're funding in asthma, it could be appropriate. We've been trying to fund some novel interventions for adults. When you use the model, you have a sort of asthma support group, in which you bring 10 or 15 asthma patients together, and they all have a respiratory therapist, and perhaps a nurse; and one of the physicians was doing this within a managed care setting. I think there's one based on a Colorado model. Do you have any experience with that?

Make: Patient support groups work very well for COPD. The support group in southern California has also been successful. Bonnie Fahy might want to comment further.

Fahy: I think you can consider rehabilitation programs support groups. For a while in Phoenix I was asked to go to the Lung Association and run a support group on Wednesdays. My rehabilitation group is on Tuesdays and

Thursdays, and I couldn't get any of my patients to come on Wednesday because they said, “We have support groups on Tuesday and Thursday.” I have patients that have been attending my rehabilitation program for 13 years. It is their support group. It works very effectively. We say to them, and even the other patients say, if you stop coming to rehabilitation, you die, and it happens. Unfortunately, insurance does not cover maintenance pulmonary rehabilitation.

Make: As Neil MacIntyre mentioned, Medicare is still driven by the 1980s algorithm for providing episodic care when patients are acutely ill rather than focusing on prevention and health maintenance. So although commercial insurers, physicians, and patients are more attuned to the issues of importance in the 2000s, Medicare is not there yet.

Heffner: Respiratory therapists are highly trained professionals who interact with COPD patients in the hospital. Should we be tapping them more often to provide some of this ongoing patient education?

Make: Absolutely. You may be familiar with the phrase “teachable moment.” For example, the teachable moment with someone with coronary artery disease is when he is in the hospital with a heart attack. The most teachable moment for a COPD patient is probably when he's in the hospital with an exacerbation.

Respiratory therapists, nurses, and physicians should capitalize on the teachable moment with COPD patients, but in the hospital setting we are often too busy to stop and think about what happens after the patient leaves the hospital. What happens in the rest of the patient's life? Health care providers, including respiratory therapists, can provide input in a variety of different settings, including hospitals and out-patient settings.

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Hansen-Flaschen: Manufacturers of CPAP [continuous positive airway pressure] devices now increasingly include compliance monitors in the devices, and the insurers are taking away the devices if they are used less than 5 times a month. Why aren't we doing that with ambulatory oxygen?

Make: I have strong feelings that CPAP therapy for sleep apnea is one of the worst examples of disease management and collaborative self-management in pulmonary medicine. For example, the patient receives only one CPAP mask and one machine. At best, patients have a 5-minute equipment trial before being placed in the sleep lab. The patient then goes home and some weeks later after the sleep study report has been finalized and the insurance company and home health care equipment provider agree that the patient needs CPAP, someone drops it off at the patient's house. The patient has to use the device every night for the rest of his life, with little or no initial instruction and absolutely no long-term follow-up.

It is the antithesis of what you would do with a collaborative self-management plan. I don't think CPAP should be taken away from the patient; I think our health care system should provide education much earlier in the process; providing such information is only

common sense and common courtesy. Disease management plans are perfect for sleep apnea, but I don't know of many successful applications. The manufacturers and pharmaceutical companies should be funding *programs* (and not only funding research) to improve patient adherence. I don't think they've always shouldered their part to help us manage our patients.

Giordano:* I would like to point out that the American Association for Respiratory Care set aside \$1 million (which for us is a lot of money) several years ago to foster research to measure the impact of the appropriate use of respiratory therapists in a variety of care settings, virtually across the health care delivery spectrum. We saw a great deal of activity in terms of applications and proposals from the acute care facilities, but very little from outside of the acute care facilities; there you get into proprietary things, and some people just don't want to share their numbers.

However, that was then, and this is now. I believe the American Association for Respiratory Care has been advocating for respiratory therapists to be included as part of the home health benefit. Right now, ac-

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ording to the statute, a physical therapist or nurse can provide respiratory therapy, but a respiratory therapist (who is licensed to do that) cannot, which is part of the reason we're frustrated with the system.

Our hope is that through use of the home health benefit and being able to track the visits provided by respiratory therapists, there will be an ability to use the Center for Medicare/Medicaid Services database to look at some outcomes indicators, mainly along the lines of health care resource consumption. I'm confident that it will show a decrease in emergency department visits, decreased physician office visits, and decreased hospital admissions and readmissions, because anecdotally we know this is happening. And, as you pointed out early on in your talk, this is not rocket science. A big part of disease management is getting the right ingredients together and having them come together at just the right time so people can be empowered to do disease management, which of course results in patient empowerment.

Make: I hope you will consider the outcomes of importance in COPD and collaborative self-management programs as you hear from the other speakers at this Journal Conference and consider ways to incorporate these concepts into all aspects of patient care.