Welcome

Welcome to the Snowdrift Frontline Treatment Monographs. The authors welcome you to this series of monographs that aim to disseminate worldwide new knowledge about common pulmonary disorders. We offer our messages to anyone who will find them useful in the diagnosis and treatment of the many pulmonary disorders that continue to plague mankind around the world. We invite you to download these monographs and use them in your teaching and practice of medicine. We feel a fraternal connection to all practitioners who serve the suffering. We hope that we can move toward the prevention of disease as an alternative to premature morbidity and mortality.

The Authors.

Mission Statement

The Snowdrift Pulmonary Conference is a not-for-profit corporation that is dedicated to the dissemination of knowledge about the lungs and lung diseases. Composed of both private practice pulmonologists and academicians, the conferees have launched a consumer-oriented program for primary care practitioners and the patients they serve. As a result, the following concise and authoritative monographs have been written.
Books in the Frontline Series

*Frontline Treatment of COPD, 2000*
*Frontline Treatment of Asthma, 1997*
*Frontline Treatment of Common Respiratory Infections, 1998*
*Frontline Treatment of Venous Thromboembolism, 1999*
*Frontline Assessment of Common Pulmonary Presentations, 2000*
*Frontline Assessment of Lung Cancer and Occupational Pulmonary Diseases, 2001*
*Frontline Pulmonary Procedures and Interventions, 2001*
*Frontline Cardiopulmonary Topics / Dyspnea, 2001*
*Frontline Advice for COPD Patients, 2002*

* Available on the web for downloading
Frontline Advice for COPD Patients

The Authors

David D. Collins, MD
Winston-Salem, NC

Dennis E. Doherty, MD
Lexington, KY

J. Roy Duke, Jr., MD
West Palm Beach, FL

James T. Good, Jr., MD*
Denver, CO

Leonard D. Hudson, MD
Seattle, WA

Thomas M. Hyers, MD
St. Louis, MO

Michael D. Iseman, MD
Denver, CO

Thomas L. Petty, MD*
Denver, CO

Donald R. Rollins, MD
White Sulphur Springs, WV

Charles H. Scoggin, MD
Boulder, CO

*Co-editors
Contents

Preface / 1

A. The Normal Lungs / 3

B. Chronic Obstructive Pulmonary Disease (COPD) / 5

C. Early Identification / 9

D. Smoking Cessation / 14

E. Prevention and Treatment of Infections / 20

F. Other Medical Treatments / 24

G. Oxygen / 30

H. Pulmonary Rehabilitation / 35

I. Patient Support Groups / 53

J. Surgery / 55

K. Nutrition / 58

L. Sexuality / 62

M. Osteoporosis / 67

N. Depression / 70

O. End-of-life Issues / 74

P. The Internet: The Search for Reliable and Relevant Information / 78

Q. Future Directions / 81

Postscript and Biographical Sketches of Authors / 82

Index / 91

Credits / 99
Tables

Table 1  Smoking-related Cancers / 14

Table 2  Smoking Cessation Resources / 15

Table 3  Useful Resources to Quit Smoking / 16

Table 4  Typical Manifestations of Acute Exacerbation of Chronic Bronchitis (AECB) / 20

Table 5  Types of Chronic Bronchitis / 21

Table 6  Selected Antibiotics Commonly Used with Acute Worsening of COPD (AECB) / 22

Table 7  Summary of Common Bronchodilator Inhalers / 27

Table 8  Some Theophylline Tablet Medications / 28

Table 9  Corticosteroid Medications / 28

Table 10  Leukotriene Inhibitor Medications / 28

Table 11  Diuretic Medications / 28

Table 12  Selected Portable Oxygen Systems / 32

Table 13  Approved Products for Erectile Dysfunction / 64

Table 14  Risks Factors for Osteoporosis / 68

Table 15  Good Sources of Calcium / 68

Table 16  Common Signs or Symptoms of Depression / 71

Table 17  Anti-depression Medications by Type / 71

Table 18  Lung Information Sites on the Internet / 79

Table 19  National Organizations for Patients with COPD / 80
# Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Normal Lungs and COPD Lungs</td>
<td>4</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Comparison of Normal and Overinflated Lungs</td>
<td>6</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Using a Spirometer</td>
<td>12</td>
</tr>
<tr>
<td>Figure 4</td>
<td>How to Use an MDI</td>
<td>26</td>
</tr>
<tr>
<td>Figure 5</td>
<td>Two Methods of Oxygen Delivery</td>
<td>32</td>
</tr>
<tr>
<td>Figure 6</td>
<td>The Downward Spiral of Deconditioning</td>
<td>35</td>
</tr>
<tr>
<td>Figure 7</td>
<td>Conditioning Exercises</td>
<td>37–48</td>
</tr>
<tr>
<td>Figure 8</td>
<td>Breathing Exercises</td>
<td>49–51</td>
</tr>
<tr>
<td>Figure 9</td>
<td>Lung Volume Reduction Surgery</td>
<td>56</td>
</tr>
<tr>
<td>Figure 10</td>
<td>Energy-saving Positions for Sexual Intercourse</td>
<td>64</td>
</tr>
</tbody>
</table>
Preface*

Chronic obstructive pulmonary disease (COPD) is America’s fastest growing health problem. COPD is now the fourth most common cause of death and the only one in the top ten that continues to rise. We know that tobacco smoking is responsible for at least 90% of COPD. COPD is mainly a smoker’s disease that commonly occurs in more than one member of a family and gets worse with age. This means that a family predisposition (heredity) is a factor.

This short book is written for you, the patient with COPD, and for your family. After reading this book, you should be able to help take charge of your own COPD treatment. You should participate in treatment decisions in partnership with your physician.

This book explains the lungs and how they function. COPD is described in simple and understandable terms. We (the authors) are both teaching and practicing pulmonary specialists. We offer you advice on coping with COPD in all of its stages. We have cared for thousands of patients with COPD. We understand the suffering and frustrations that COPD patients face. We have organized this book into chapters about treatment of all stages of COPD. Each chapter contains a complete and specific message about common problems people with COPD face. Some material has been repeated in more than one chapter to help you understand each issue better.

We believe that the information provided in this book on the treatment of major complications of COPD and some side effects of treatment will interest both patients and physicians. We have written it as if we were your physician, discussing and advising you on your own individual condition. Thus, we use the second person throughout. However, when we are discussing general information that might not directly apply to you, the third person is used.

This book will assist you in understanding COPD and how to cope with it. We wish you continued good health and easy breathing.

The Authors

* Any drugs or medical equipment mentioned in this book are not meant to be an endorsement by the authors, but rather examples of products available, to simplify reading for the COPD patient.
A. The Normal Lungs

Breathing is essential for life. The lungs are magnificent organs in your body that serve many important and vital functions every second of your life. Every cell in your body is like an engine that needs fuel (oxygen) to work. It also requires an exhaust system to get rid of byproducts (such as carbon dioxide). Carbon dioxide is sometimes referred to as “used air.”

With each breath you take in, your lungs inhale the vital gas from the air called oxygen. With each breath out, your lungs exhale the gas carbon dioxide, a byproduct of cells working in your body, to produce energy through the process of metabolism. A normal amount of carbon dioxide is needed to control the acid level in your blood, and a material from the kidney called bicarbonate (similar to baking soda) balances the effect of carbon dioxide to control the acid range in the blood. Oxygen is needed for the healthy function and metabolism of every cell in your body. The lungs are necessary for your survival. Without oxygen, your brain, heart, kidneys and other organs could not function to keep you alive.

The air (oxygen) you breathe enters your lungs through the main windpipe (trachea). The trachea branches into two main tubes (airways) supplying your right and left lung with air. These tubes branch 22 additional times forming more than 100,000 smaller tubes (bronchi or even smaller bronchioles). They eventually make 300 million air sacs (alveoli) that are only 0.3 mm wide (less than the point of a pin). (See Figure 1.) So, the surface area of the lung is huge. It is larger than the surface of all of your skin. In fact, if you spread out all of these airways and air sacs flat on the ground, their surface area would take up over 100 square yards (larger than the size of a tennis court)! The walls of these air sacs are 1/50th the thickness of tissue paper and are surrounded by millions of tiny blood vessels called capillaries. Because these airways are so tiny, it is easy for carbon dioxide to pass out of the cells of the lungs and for oxygen to pass into the lungs from the air you breathe.

The lungs receive the entire flow of used blood that comes from tissue metabolism. This venous blood is high in carbon dioxide and low in oxygen. The capillary network surrounds the lungs’ thin air sacs with red blood cells so your lungs can control the intake of oxygen and the disposal of carbon dioxide. Each red blood cell spends about one second in the capillary network traveling around two or three of the air sacs. Along the way, the red blood cells release the carbon dioxide that was picked up in the body to be exhaled. At the same time, inhaled oxygen binds to these red blood cells and is transported throughout the body to be released for use in the brain and other important organs.

The lungs are also very important in your body’s defense against infection and other harmful environmental factors. Your nose is the first line of defense against inhaled materials. Your lungs provide the second line of defense. Particles mixed with the air you breathe (such as smoke or pollution) or infectious agents (such as bacteria or viruses) which pass through your mouth or nose lodge in your lungs. Mucus, a sticky fluid made in your lungs, can trap these inhaled particles and help the lung’s protective white blood cells in their fight against bacterial and other harmful materials. Coughing is the best way to get rid of mucus and other materials from the lungs. In addition, tiny hair-like cells (cilia) on the inside of the larger airways of the lungs beat with a
Figure 1
Normal Lungs and COPD Lungs

BRONCHUS
BRONCHIOLE
TRACHEA
AVEOLI

EMPHYSEMA
BREAKDOWN OF DIVIDING WALLS AND DISTENDED AVEOLAR SACS

CHRONIC BRONCHITIS SHOWS INFLAMMATION OF THE BRONCHIOLE WALLS
rhythm, fast enough and with sufficient force to move mucus and cells up the airways to be coughed out or swallowed. When you smoke, these cilia are damaged or destroyed and they cannot help you clear excessively thick mucus from your lungs.

Another protective fluid produced in the lung is called surfactant. This substance lubricates the small air sacs keeping them open to receive oxygen. Surfactant also helps to fight infection.

The blood supply to the lungs carries white blood cells that attack disease-causing bacteria and viruses we inhale every day.

The lungs are truly amazing. They regulate how much oxygen and carbon dioxide are in your body and defend your body against infection.

B. Chronic Obstructive Pulmonary Disease (COPD)

Chronic obstructive pulmonary disease (COPD) is a term used to describe either one or a combination of lung disorders characterized by airflow obstruction (difficulty in blowing air out). The common medical illnesses that the term “COPD” includes are severe chronic asthma, emphysema and chronic bronchitis. The basis of emphysema is loss of elasticity of the small air sacs of the lung. This produces over expansion of the lung and reduces lung emptying. Chronic bronchitis and asthmatic bronchitis involve inflammation, swelling and spasm of the conducting airways of the lungs. Patients with COPD may complain of one or many symptoms. One of the most distressing symptoms is breathlessness, which occurs most commonly with activity but in severe cases may occur at rest. The major cause of breathlessness is the obstruction to airflow. Many patients may sense that the major abnormality is the inability to take in a deep breath. This is because the lungs become over-inflated due to emphysema or air passages that are plugged with mucus and inflammation are often narrowed by bronchospasm. Other major symptoms include cough, mucus production, chest tightness (heaviness), wheeze, increasing tiredness and the inability to perform activities at expected levels. While some individuals deny or totally ignore these symptoms, others are quite frightened and postpone a visit to the doctor because they are afraid they have a horrible illness that will only progress, regardless of medical actions taken. Fortunately, this is not true.

Most people with COPD are (or have been) cigarette smokers. There is no doubt that other factors such as exposure to fumes at work, breathing second-hand smoke, certain lung infections, and inherited disorders (such as alpha-one-antitrypsin), may help cause COPD. But cigarette smoking is by far the most common cause of COPD. Anyone who has smoked one pack of cigarettes per day for 30 years (30 pack-years), could have evidence of COPD if tested by spirometry (see below). However, only one in five smokers develops symptoms of COPD. The reasons why some smokers are protected from COPD are not known. At least half of all smokers develop some form of tobacco-related disease such as heart attacks, stroke, lung cancer or other cancers. (continued)
Emphysema feels like shortness of breath or the inability to get air “in” but it is actually a result of not being able to get air completely “out.” With normal lungs, the diaphragm is curved and moves downward to “pull” air into your lungs and moves upward to its resting position when you breathe out. This can be thought of as “tension and relaxation” for this large muscle. When you develop emphysema, air remains trapped in the lungs even after you have exhaled because your lungs have lost some of their elasticity, resulting in “overinflated” lungs and a flattened diaphragm. The lungs become larger than normal. Because of this overinflated condition, when you next inhale you cannot draw in as much new air. This is what causes shortness of breath. The “accessory” muscles of your upper chest must compensate for your flattened diaphragm and do much of the work of breathing. This contributes to the feeling of fatigue.
When someone (including family members) is concerned about any of the above symptoms or is worried an individual might have COPD, a visit to a doctor is needed. Be honest! Tell your doctor what is bothering you and your concerns. After a history and physical examination by the doctor, most patients will receive a few basic studies including a breathing test (spirometry), a chest x-ray (to evaluate the heart and lungs) and an oxygen test (oximetry). With this information, your physician can tell if you have COPD, and how severe it is. Cigarette smokers with 20 or more pack-years (e.g., 1 pack/day for 20 years or 2 packs/day for 10 years) should be evaluated even if no symptoms have been noticed.

Once COPD is diagnosed, there are many interventions and lifestyle changes that can (and should) be made. These are discussed in more detail in the following Sections, but will be briefly outlined here.

**Stop Smoking**

*The single most important step to take once COPD is diagnosed is smoking cessation!* This allows your lungs to recover from years of smoke pollution. In most cases lung function improves. Symptoms of cough, wheeze, breathlessness and mucus production may not entirely disappear, but most get better. Even if you do not perceive any improvement, the cause of continued damage to the lung has been eliminated. Stopping smoking quickly reduces the risk of heart attack and stroke. The risk of lung cancer is reduced by quitting, but never returns to that of a nonsmoker.

**Medicines**

There are several medications that improve lung function and symptoms. Many medicines can be taken by breathing them in through the mouth. Inhaled medicines concentrate the medication in the lungs where the effect is desired and minimizes systemic effects. There are oral medications (pills and capsules) which also help. Many times a combination of inhalers and pills are necessary to get the best results. Medications do not restore lung function that has been lost because of destruction of lung tissue, but they can help repair “partially damaged” lung tissues that have some chance for recovery.

**Exercise and Nutrition**

Even if significant damage to your lungs has occurred, physical conditioning is important. The ability to adequately perform activities depends on the combination of heart, lung and muscle function. If lung capacity is greatly reduced then heart and muscle conditioning needs to be at 100%. This means exercise must be done regularly. Regular exercise improves the heart’s function (ability to pump blood to the body) and also improves the muscles’ ability to use oxygen. When COPD limits the ability to get oxygen into the body, heart and muscle function must be at their best.

Over the past several years, nutritional aspects of healing and wellness have received much attention. The basic concepts of a balanced diet, appropriate caloric intake (only take in what you burn up) and use of supplemental vitamins are valid. Some people with severe lung disease complain of no appetite and a feeling of “being full” with minimal food intake. Because the lungs are hyperinflated
(over expanded), they push down on the stomach and produce a full feeling. If this occurs, eating smaller meals more frequently (up to 6 to 8 times per day) may help increase food intake. With severe COPD, the work of breathing may be so great that you may have difficulty maintaining body weight and nutritional supplements are indicated.

Oxygen

When oxygen levels are consistently low, extra stress is put on your body. Many people with COPD have low oxygen levels continuously or especially with any activity. There is a myth among patients with COPD regarding the need for supplemental oxygen. Many individuals think they will become “addicted” to oxygen and therefore refuse to use it. The truth is, all humans are addicted to oxygen. If lung disease prevents oxygen levels from being normal, then bad things will happen. Individuals become lethargic, they complain of breathlessness and excessive fatigue, the heart begins to weaken and memory is impaired. They may become more withdrawn, refuse to participate in activities and become more isolated. Depression may set in. In some situations, patients with COPD may have severe breathlessness and still have normal oxygen levels. In this case, the use of supplemental oxygen will not help the shortness of breath and other forms of therapy are necessary.

However, in those patients with documented low oxygen levels, the use of supplemental oxygen (given in appropriate doses), usually makes most of the above problems go away. You can think of supplemental oxygen as the single most important treatment available for the management and improvement of the quality of life in COPD patients with low oxygen levels.

Lung Volume Reduction Surgery and Lung Transplantation

When a person with COPD has followed all the above suggestions and their quality of life continues to be poor, surgery may be considered. In the early 1990s there was considerable excitement about removing the upper part of the lungs, either with lasers or by more traditional surgical techniques. In a few well-selected patients, this procedure produced good results. Unfortunately, it is very difficult to know which patients will have a good response to this treatment. A recently published, large, multicenter study to evaluate the safety and usefulness of lung volume reduction surgery found that many patients with severe COPD do not benefit from this surgery.

Lung transplantation (putting another person’s lung in your body) has had some success. However, this is “one tough procedure” and requires the strictest and most concentrated patient effort and cooperation. Patients need to be less than 65 years old and must be highly motivated. This is not appropriate in most patients with COPD.

COPD is a long-term illness usually caused by cigarette smoking, which impacts millions of Americans. COPD is not a death sentence. Many actions can improve the quality and length of life of people with COPD. With continued patient education and active participation, one can change the expected progression of this disease.
C. Early Identification

Chronic obstructive pulmonary disease (COPD) is the fourth leading cause of death and is the only one of the top 10 killers in the United States that continued to rise in the past decade. The major cause of COPD is smoking. Over 120,000 Americans die of COPD each year, but more than 400,000 people die of all smoking related illness. It’s the number one preventable public health problem. Approximately 16 million people have been diagnosed with COPD, leading to healthcare costs exceeding $34 billion a year for this disease alone. However, it is estimated that only half of the cases of COPD have been diagnosed (over 30 million Americans actually have COPD), due to a lack of early identification of the disease and its symptoms.

In its early stages, COPD can be completely silent. The symptoms of COPD may not become apparent or recognized by a patient or their healthcare provider for 30 or more years after the disease has begun. One reason for this is that patients often downplay their symptoms during the early stages of COPD and view them as nonspecific. They often attribute their symptoms of cough, mucus production, wheeze and shortness of breath on exertion (dyspnea) to other causes. Some recognize that these symptoms are present, but rationalize that they are expected from smoking. A typical statement is, “I have a morning cough and bring up mucus, but that’s ok because I smoke.” Symptoms may also not be recognized because individuals may unknowingly change their lifestyle, decreasing their exertion level so that the symptoms are not as noticeable. They adapt to the slowly progressing disease.

Early identification of COPD is extremely important from both a health and an economic point of view. Early detection can sometimes help motivate patients to discontinue smoking and to follow their doctor’s advice more exactly (see Section D). Finding the disease early, and making changes like stopping smoking, can prevent COPD from getting worse. Most importantly, early disability and premature death can be avoided.

Normal lungs hold three to five liters (quarts) of air. This lung capacity (the volume of air your lungs can hold) varies from person to person and is dependent on age, height and sex. For most patients only 30% of this volume is needed to live comfortably and to efficiently perform non-strenuous daily activities. Thus, an individual has a large reserve and can lose a lot of lung capacity before any problems are noticed. After reaching adulthood, your lungs will begin to lose lung volume. Normal people can expect to lose approximately 20 cc to 30 cc of volume (two tablespoons) every year. But, this rate of loss is so slow that we never lose enough capacity to cause noticeable changes in activity or to cause disability. Many smokers lose lung function quicker than nonsmokers. This leads to symptoms of COPD, early disability and death. Unlike asthma, the symptoms of COPD are constant and progress slowly over time.

Later stages of COPD include a continuous cough and mucus production, frequent infections of bronchial tubes or shortness of breath with mild exertion. In late stages of COPD, shortness of breath happens even when a person is resting. Other consequences include loss of work and hospitalizations due to lung illness, a need for extra (supplemental) oxygen and ultimately, early death.
The following questions should routinely be asked by both the patient and the doctor to diagnose COPD early:

- Do you smoke?
- Do you cough? At times do you bring up colored and/or thick mucus?
- Are you able to keep up with your friends and family during routine activities?
- Has your exercise capacity decreased over the years faster than your peers (i.e., the number of stores you can walk in the mall, the distance you can walk on flat ground or up a hill without becoming short of breath)?
- Does your breathing or coughing keep you from doing things that you used to do and enjoy?
- Have you missed days at work or been hospitalized for lung problems?
- Do you have “good” days and “bad” days that dictate your daily work activities or your recreational and social activities?
- Does COPD (long-term bronchitis, emphysema, asthmatic bronchitis) or symptoms of these diseases run in your family?

If the answer is yes to any of the questions above, you might have COPD.

In addition to asking these questions, there are tests that your healthcare provider can use to find out if you have COPD. Chest x-rays are not very useful in finding early COPD. An x-ray can be normal despite significant changes in the lungs and presence of the symptoms above. By the time the chest x-ray shows COPD, the disease is usually far advanced. X-rays are used to look for advanced complications of lung disease, such as pneumonia or lung cancer. An electrocardiogram (EKG) is also not useful in the early detection of COPD. It monitors heart changes often associated with advanced COPD (abnormal heart rhythms or heart strain). Spirometry is the best test to find COPD early.

In general, a patient with early or mid-stage COPD can breathe in (inhale), the same amount of air as someone without COPD, but they have difficulty breathing out (exhaling). People with COPD exhale more slowly than normal due to narrowed or blocked air tubes (airway obstruction). A simple machine (spirometer), can measure your lung capacity, how much air you breathe in and out (airflow), and determine if airway obstruction is present. In short, a spirometer can show if COPD exists and indicate how severe it is. If a spirometer test (spirometry) is given early enough, it can identify COPD before the loss of lung function is great enough to cause disabling symptoms (when COPD is still in its ‘silent phase’).

Spirometry is a simple and inexpensive test. You do not have to undress. You take in as deep a breath as possible and blow it out into a machine as hard and as fast as you can, for as long as you can (for a minimum of six seconds). The spirometer determines the amount (volume) of air exhaled in one second (forced expiratory volume in one second, or FEV₁) and the total amount of air exhaled (forced vital capacity or FVC). Normal lungs empty in six seconds. Therefore, the forced expiratory volume in six seconds (FEV₆) is used as a substitute for FVC. The FEV₁ and the ratio FEV₁/FVC (or FEV₁/FEV₆) help to identify patients with an obstructive problem. Normal values for FEV₁ and FEV₁/FVC vary depending on your age,
height and sex. The numbers are higher the younger you are, the taller you are or if you are a man. The test results are shown as a percentage of the numbers expected for “normal” lungs in a person your age, height and sex. If results of FEV₁ and FEV₁/FVC are less than 70% of the predicted value, this indicates disease.

Who should have a lung test with a spirometer? As also mentioned in Section B, smoking is the leading cause of COPD. Accordingly, anyone who is a current or former smoker over the age of 45 should be tested. Also, people (smokers and non-smokers), of any age who have one of the common symptoms of COPD (persistent cough, mucus production, wheeze or shortness of breath on exertion), should have the test. These individuals should be tested at least once a year. Those with a family history of COPD should also be tested periodically.

Spirometry can also track the progression of COPD. Accordingly, patients and their healthcare providers should measure and record the FEV₁ and FEV₁/FVC each year. If these numbers are recorded yearly, they can be recorded and a graph constructed which shows how fast the patient is losing lung function. This graph will show accelerated reductions in lung function if the patient is more sensitive to the damaging effects of tobacco or other causes of COPD.

Smokers who have a “normal” spirometry should still be concerned about the other bad effects of tobacco and should stop smoking. Annual testing may still show that lung function is being lost faster than normal over time. Even if this is not the case, smokers should stop smoking, because tobacco use also leads to the development of heart disease, stroke, lung cancer and many other health problems.

The National Lung Health Education Program (NLHEP) is a new major healthcare initiative designed to raise public awareness of COPD and to identify patients in the early stages of COPD who have not been diagnosed in the United States. Assisted by governmental, medical, and other health professional organizations, the NLHEP aims to promote lung health and to prevent lung disease. One of the NLHEP’s missions is to have spirometry testing available in the office of every primary care and subspecialist healthcare worker. The NLHEP recommends that the lung function of all patients at risk for developing COPD be measured routinely. Spirometry should be used to monitor and record lung function often, just like a blood pressure cuff is used to routinely measure blood pressure. Most patients know their blood pressure (the top number [systolic pressure], and the bottom number [diastolic pressure]). They should also remember their lung function numbers (FEV₁ and FEV₁/FVC). The mottoes of the NLHEP are: “Test Your Lungs. Know Your Numbers.” and “Prevent Emphysema.” Current information on the NLHEP and other agencies can be found on the Internet at www.nlhep.org.
Figure 3
Using a Spirometer

“...a spirometer can show if COPD exists and indicate how severe it is. If a spirometer test is given early enough, it can identify COPD before the loss of lung function is great enough to cause disabling symptoms...”
Put’m Out
Keep’m Out!
D. Smoking Cessation

The single most important step you can take to improve your health and to increase longevity is to avoid tobacco smoking. Naturally, it is best to have never started smoking, but it is never too late to reap the benefits of stopping. Sure, it is difficult to stop, but not impossible. Millions of Americans stop smoking every year. Nothing can be more physically or psychologically rewarding than kicking the tobacco habit. This Section will hopefully acquaint you with information that will help you to understand the problem of tobacco addiction, motivate you to quit and outline steps that can lead you to a tobacco-free life.

Why Quit?

Tobacco use is the most preventable cause of death in our society. A majority of Americans are fully aware of the health consequences of tobacco use and express a desire to quit, yet are seemingly powerless to do so. Many are pressured to quit by family members and friends. Some have symptoms such as a chronic cough or shortness of breath, while others have smoking-related diseases such as chronic obstructive pulmonary disease (COPD), lung cancer and cardiovascular disease.

COPD and Tobacco

Smoking causes 90% of COPD cases. Sixteen million U.S. patients have been diagnosed with COPD. It has been estimated that an equal number are presently undiagnosed. COPD is the fourth leading cause of death. Chemicals in tobacco smoke cause inflammation in the lungs leading to the production of mucus, destruction of the air sacs and narrowing of the airways (see Section B).

Tobacco and Cancer

Tobacco use is the single most preventable cause of cancer deaths. The general public is familiar with this relationship. They are not as aware, however, of the relationship between tobacco and cancer of the mouth, larynx, pharynx, esophagus, pancreas, urinary bladder and other malignancies (see Table 1).

Table 1

<table>
<thead>
<tr>
<th>Smoking-related Cancers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult acute leukemias (AAL)</td>
</tr>
<tr>
<td>Adult chronic leukemias (ACL)</td>
</tr>
<tr>
<td>Cervical cancer</td>
</tr>
<tr>
<td>Esophagus cancer</td>
</tr>
<tr>
<td>Laryngeal cancer</td>
</tr>
<tr>
<td>Lung cancer</td>
</tr>
<tr>
<td>Kidney cancer</td>
</tr>
<tr>
<td>Oropharyngeal cancer</td>
</tr>
<tr>
<td>Pancreas cancer</td>
</tr>
<tr>
<td>Stomach cancer</td>
</tr>
<tr>
<td>Urinary bladder cancer</td>
</tr>
</tbody>
</table>

Tobacco, Heart Disease and Stroke

Cardiovascular diseases such as heart attack, stroke and aneurysms are the number one killers of both men and women in the United States. Tobacco smoking is one of the most preventable causes of cardiovascular disease. By avoiding tobacco, it is possible to substantially reduce the risk of dying from cardiovascular disease. For example, smokers who have a heart attack are two to four times more likely to die suddenly (within an hour) than are non-smokers.

Is Tobacco Addictive?

The answer is clearly “Yes.” Nicotine is the drug in tobacco that leads to addiction. Nicotine is a powerfully addictive substance. Users become
physically as well as psychologically dependent. Addicting drugs, including tobacco, have the following characteristics:

- There is a compulsion to take the drug in the face of knowledge of negative health consequences
- The user needs more frequent and larger doses of the drug to experience the same effect
- Withdrawal symptoms occur when the drug is discontinued or the dose is reduced
- Symptoms of withdrawal include anxiety, irritability, anger and difficulty concentrating

Recent research into tobacco addiction has focused on the effects of nicotine on the brain. Cigarette smoking delivers a sudden jolt of nicotine to the brain. This rapidly increases levels of the brain chemical (dopamine) in brain tissue, leading to a transient feeling of pleasure and a sense of well-being. These pleasurable feelings last only a few minutes. The smoker must continue to use nicotine throughout the day to maintain these feelings. As nicotine levels fall, smokers experience intense cravings, often described as a “nicotine fit.” Over time, more frequent and larger doses of nicotine are needed to avoid cravings and withdrawal symptoms. The smoker is ultimately smoking, not to feel good, but to not feel bad!

**Quitting Smoking**

Quitting smoking is never easy. There is no single “best way” to stop. What works for one person might not work for another. The first step to quitting is to become highly motivated. Seek advice from your physician or other healthcare provider. Your physician should take a smoking history during check-ups. His or her staff should make a note in your record to ask about your smoking at each follow-up visit.

Many smokers become committed to quitting after discussing the problem with their physician or healthcare provider. Your physician may point out your need to quit based on your family history, presence of risk factors for cardiovascular disease, an abnormal pulmonary function test, your current symptoms and other factors. Your family and friends may be able to motivate you. Some smokers are motivated to quit because of the high cost of smoking. Calculate the cost of your tobacco use for one year. Use the savings to treat yourself to a vacation, a trip to a spa, a fishing trip or other luxury item with the money you have saved.

Many self-help publications are available at no cost from organizations such as the American Lung Association and the American Cancer Society. The American Lung Association offers programs for those wishing to quit. A wealth of information is available on the Internet. (See Tables 2 and 3.)

### Table 2

**Smoking Cessation Resources**

Useful Resources to Quit Smoking

You Can Quit Smoking
http://www.cdc.gov/tobacco/quit/canquit.htm This is an on-line version of the consumer guide entitled “You Can Quit Smoking.” This popular U.S. Public Health Service (PHS) brochure provides practical information and helpful tips for those who plan to quit smoking.

Don’t Let Another Year Go Up In Smoke: Quit Tips
http://www.cdc.gov/tobacco/quit/quittip.htm Are you one of most smokers who want to quit? Then try following this advice.

I QUIT!: What to Do When You’re Sick of Smoking, Chewing, or Dipping
http://www.cdc.gov/tobacco/educational_materials/iquit.htm Cessation guide targeted to teens who are trying to quit cigarettes or smokeless tobacco. It includes tips for dealing with nicotine withdrawal and for handling the situations that may lead to relapse.

Treating Tobacco Use and Dependence: A Clinical Practice Guideline, Public Health Service
http://www.cdc.gov/tobacco/quit/guidline.htm Health care professionals have new evidence and tools to help patients quit using tobacco, according to a report issued by the U.S. Public Health Service (PHS). To obtain this report you can fax 301-594-2800 [Press 1]; or call 1-800-358-9295 for physician materials and a “You Can Quit Smoking” consumer guide.

The QuitNet
http://www.quitnet.org The QuitNet offers smokers an on-line support community, forums moderated by counselors and individually tailored advice to help them kick their nicotine addiction.

California Smokers’ Helpline
Visit the California Smokers’ Helpline for information on methods to quit smoking and strategies to keep from starting back. Note: This site requires you to register.

The PATCH Project—Program Against Teen Chewing
The PATCH Project—Program Against Teen Chewing is a research study funded by the National Cancer Institute through the UAMS College of Nursing and the Arkansas Cancer Research Center. Their goal is to help adolescent males quit using spit tobacco (snuff or chewing tobacco). This site provides information on how to quit using spit tobacco, as well as the potential dangers of spit tobacco.

Agency for Health Care Policy and Research,
Clinical Practice Guidelines on Smoking Cessation, Instant Fax 301-594-2800 [Press 1]; or call 1-800-358-9295 for physician materials and a “You Can Quit Smoking” consumer guide.
http://www.ahcpr.gov

American Cancer Society
1-800-ACS-2345 http://www.cancer.org

American Heart Association
1-800-AHA-USA1 http://www.amhrt.org/hs96/cigcVD.html

American Lung Association
1-800-LUNG-USA http://www.lungusa.org

California Smokers’ Helpline
http://www.nobutts.ucsd.edu

National Cancer Institute (NCI)
1-800-4-CANCER
http://www.nci.nih.gov/occdocs/occ.htm

Nicorette/Nicoderm—
http://www.niconews.com

Office on Smoking and Health
1-800-CDC-1311 http://www.cdc.gov/tobacco/index.htm

Stop-Tobacco.Ch
http://www.stop-tabac.ch/en/welcome.htm
Pick a Quit Date

Once you have become motivated and have made up your mind to quit smoking, set a “quit date.” At this point it may be helpful for you to consult your healthcare professional to see if you are a candidate for nicotine replacement therapy. The “quit date” should be chosen carefully. Choosing a specific quit date will greatly increase your chances for success. Once you have set and reached your quit date, follow the guidelines below to help build success in your smoking cessation program:

- Inform your family and friends of your intention to stop and ask for their support
- Avoid situations that you always associate with smoking, such as talking on the telephone, having a cocktail or a cup of coffee
- Avoid stressful situations, both at home and at work
- Avoid being around family or friends who smoke
- Remove cigarettes from home, car and workplace

Exercise

Moderate daily exercise can generate endorphins or “feel good chemicals” in the brain that may alleviate withdrawal symptoms. Exercise can also help reduce the tendency to gain weight that frequently sabotages efforts to quit smoking. Walking for 30 minutes daily at a brisk pace is a great way to relieve stress and to improve your spirits. Some patients have been successful by joining a gym or getting a personal trainer during the first few weeks of quitting.

Weight Gain

Many smokers, particularly women, avoid quitting smoking for fear of gaining weight. Others resume smoking because of it. The average weight gain is about 7 to 10 pounds. Try to minimize weight gain by eating a healthy diet and by making an effort to exercise regularly. Don’t try to lose weight and stop smoking at the same time. This can be both difficult and discouraging. A modest gain in weight is a small price to pay for all of the benefits you will derive from stopping smoking. You are much healthier a few pounds heavier without cigarettes.

Nicotine Replacement Therapy (NRT)

What is the rationale of using nicotine to stop tobacco use? Aren’t you just replacing one source of nicotine for another? The answer is, “No.” Nicotine is the principal addictive substance in tobacco that causes dependence. Withdrawal from nicotine may precipitate a variety of withdrawal symptoms including irritability, difficulty concentrating, anxiety, sweating and insomnia. These symptoms keep the tobacco user from quitting and staying quit.

The use of nicotine replacement therapy (NRT) can reduce the severity of withdrawal symptoms and has been demonstrated to double the quit rate when compared with a placebo. Tobacco smoke contains many harmful substances other than nicotine, including cancer causing substances (carcinogens) and carbon monoxide. In fact, over 4,000 compounds have been found in tobacco. Carbon monoxide reduces oxygen delivery to the body tissues by displacing oxygen from red blood cells. The carcinogens, carbon monoxide and the other compounds in tobacco are
responsible for the illnesses caused by tobacco. Pure nicotine delivered in proper doses has been found to be safe and effective with minimal side effects when used in treatment for tobacco addiction. In the United States, four delivery systems are available for NRT:

- Nicotine transdermal patches (Nicoderm® CQ® Patch, Habitrol® Transdermal System, Nicotrol® Patch, Prostep®)
- Nicotine chewing gum nicotine polacrilex (Nicorette® gum)
- Nicotine inhalers (Nicotrol® inhaler)
- Nicotine nasal spray (Nicotrol® nasal spray)

Nicotine Transdermal Patches

Nicotine patches are available by prescription as well as over the counter. They deliver a fixed dose of nicotine through the skin, into the blood stream and then to the brain, thus suppressing withdrawal symptoms. They are available in 21 mg, 14 mg and 7 mg doses. Heavily addicted patients should start on the 21 mg dosage and continue the drug for up to 10 weeks. Heavily addicted patients are those that smoke greater than 10 cigarettes daily, those smoking on awakening in the morning and those who are unable to refrain from smoking in places where smoking is prohibited. The dose is then reduced to 14 mg, then 7 mg daily at four- to eight- week intervals. Patients with a history of cardiac disease should consult their physician before embarking on NRT. Heavily addicted patients may fail NRT because they are unable to achieve blood levels sufficient to suppress withdrawal symptoms. In these cases the physician may suggest supplementing the patch with nicotine gum or nicotine inhaler. Side effects can include headache, nightmares, nausea, dizziness, blurred vision and/or redness and itching at the site of the patch.

Reducing the dose and removing the patch before going to bed can lessen side effects.

Nicotine Chewing Gum

Nicotine chewing gum was the first replacement therapy approved by the Food and Drug Administration. It is available over the counter. It comes in 2 mg and 4 mg doses. The 4 mg dose is usually required initially. One should completely stop smoking before starting the gum. When nicotine cravings are felt, chew the gum slowly several times until a tingling sensation in the mouth is noted or until the craving stops. Then, “park” the gum between your cheeks and gum until cravings return. Repeat the process. Follow the detailed instructions that accompany the medication.

Nicotine Nasal Spray and Nicotine Inhalers

Nicotine nasal spray and nicotine inhalers are available only by prescription. Your physician will decide if this form of therapy is suitable for you. In some patients, these products may be more effective than the gum or patches because they more nearly mimic the jolt of nicotine delivered by the most effective nicotine delivery system of them all, the cigarette.

In some patients, it may be difficult to achieve nicotine blood levels high enough to suppress withdrawal symptoms. In these cases, your physician may recommend the use of a combination of a nicotine patch plus nicotine gum or nicotine nasal spray.

(continued)
Bupropion (Zyban®)

Bupropion was originally marketed in the United States as the antidepressant Wellbutrin®. During clinical trials, some of the test subjects treated for depression noted a decrease in their desire to smoke. This led physicians to examine the usefulness of the drug as an aid to stopping smoking. Studies with patients who have failed in efforts to quit, have shown that bupropion SR (Zyban®) either alone or in combination with nRT had significantly higher short-term and long-term quit rates, when compared to a placebo. The drug is now marketed as Zyban® and requires a prescription. If you have had difficulty quitting smoking and have failed other methods, your physician may consider the use of Zyban® with or without nRT. Zyban® should be started at least two weeks before your “quit date” to allow for the chemical changes in the brain to take effect. Start with a single daily dose for three days. Then take one dose 2 times each day. Separate the doses by at least 8 hours. Take the second dose not later than 6 pm. Zyban® should not be taken if you have a history of a seizure disorder, uncontrolled high blood pressure or if you are taking other antidepressant medications.

Smoking cessation will pay immediate dividends. Your lung function and exercise tolerance will improve. Your risk of heart attack will decline immediately and your cancer risk will decline with time. Don’t give up if you are unable to quit the first time or if you relapse after months or years of abstinence. You will benefit even if you are able to reduce the total number of cigarettes. Most people who are motivated ultimately quit even after multiple failures. Studies show multiple attempts are sometimes necessary to eventually be successful.

Suggested Readings

Petty TL, Nett LM. Enjoying Life with Chronic Obstructive Lung Disease, 3rd edition, Laennec Publishing, Inc., Cedar Grove, NJ, 1995 pp 199. This is a great resource for the patient with COPD. It is highly recommended.


Donkersloot M, Hyder-Ferry L. The How to Quit Smoking and Not Gain Weight Cookbook. Three Rivers Press, New York, NY 1999 pp 308. Many patients fail to quit smoking because of weight gain, especially women. This book provides practical and reliable advice to the reader who is trying to cope with food craving while quitting tobacco. Menu plans and delicious recipes are a highlight.
E. Prevention and Treatment of Infections

Chronic obstructive pulmonary disease (COPD) is defined in Section B. In order to clarify the role of infection as a cause of acute worsening (exacerbation) in your COPD, it is important to reconsider the abnormal changes that have occurred in your lungs.

The commonest cause of COPD is cigarette-induced chronic bronchitis and emphysema. Tobacco smoke damages the normal cells and structure of your lungs. Typically, there is loss of the cells that line the bronchial tree and help propel mucus up and out of the airways. There is an increased number of the cells that produce the mucus, the sticky material that traps bacteria and other foreign debris. Also, there is a reduction in the elasticity of the lungs, which makes the cough less effective in clearing secretions. These factors result in the accumulation of excessive mucus, interference with breathing and promotion of infection.

A less common cause of COPD is long-term, chronic asthma in which irreversible changes in the bronchial tree occur. A particular issue in asthmatic cases is chronic sinusitis, where infections of the sinus cavities may result in increased obstruction to airflow throughout the entire bronchial tree.

Other patients may suffer from COPD that is related to still another condition, known as “bronchiectasis.” Bronchiectasis refers to dilation and irregularities of the bronchial tree. It is usually caused by chronic, unresolving infections that damage both the lining and the walls of the airways. It is diagnosed by demonstration of these findings on computed tomography (CT) scans. Recent evidence suggests that a substantial percentage of those with bronchiectasis have variants of cystic fibrosis (CF) or alpha-1 antitrypsin deficiency (alpha-1 ATD). CF and alpha-1 ATD may predispose a person to both asthma and COPD. Patients with bronchiectasis who experience acute exacerbations, whether or not associated with these conditions, are particularly prone to bacterial infections of their upper or lower airways.

Definitions

The episodic deterioration typically seen in patients with COPD has recently been labeled as acute exacerbations of chronic bronchitis (AECB). Common features of these events are listed in Table 4.

Table 4

Typical Manifestations of Acute Exacerbation of Chronic Bronchitis (AECB)

- Increased shortness of breath at rest or with exercise
- A more severe cough or a more frequent cough
- More mucus coughed up from the lungs (secretions/phlegm)
- Thicker or greenish/yellow phlegm (purulence)
- Wheezing and fast, difficult or painful breathing
- Fever or the feeling of feverishness

A chest x-ray does not show pneumonia.

The clinical management of patients experiencing AECB is usually determined by the severity of these problems. Hence, a classification system has been developed.
as represented in Table 5. We should note that, aside from chest x-ray findings, the diagnosis and severity classification can and should be done by clinical observation.

Table 5

Types of Chronic Bronchitis

- Type 1
  - Increased shortness of breath
  - Increased phlegm
  - Increased purulence (change to green or yellow color)
- Type 2: two of the above findings
- Type 3: one of the above findings

Mechanisms of Acute Exacerbations of Chronic Bronchitis (AECB)

Historically, most episodic deterioration in patients with COPD has been ascribed to “infections.” These may be bacterial infections that respond to antibiotics. Others, though, may be caused by viruses that do not benefit from such treatment. In other cases, there may be an “allergic” type reaction, which primarily responds to corticosteroids.

Diagnosis

As noted above, most episodes of AECB are recognized on clinical grounds. In patients with cigarette-induced chronic bronchitis and emphysema, routine sputum tests are of no use. However, if your COPD is associated with bronchiectasis, sputum studies may be of considerable importance. These tests are particularly relevant for patients with bronchiectasis who have received multiple, extended courses of antibiotics. In this setting, unusual sorts of bacteria may become recurring pathogens. Because their treatment entails different antibiotics than the usual COPD cases, such cultures may be quite significant.

When should your physician use aggressive means to recover lower respiratory tract secretions? Most patients with AECB readily produce secretions with spontaneous cough. Some patients, though, seem unable to bring up their secretions, due presumably to weak cough mechanisms or easily collapsible airways. In some cases, techniques may be used to “induce” the expectorations of sputum. But in certain cases, a diagnostic bronchoscopy may be indicated if sputum induction fails to produce a useful specimen.

Chest x-rays generally are not useful. But, if there are clinical reasons to suspect pneumonia (high fever, toxicity, abrupt deterioration, chest pain or marked white blood cell count elevation), chest x-rays should be obtained. For those patients whose history or plain x-rays suggest bronchiectasis, a CT scan is useful to confirm and characterize the bronchiectasis.

For patients with prominent nasal congestion and chronic nasal discharge, a screening CT scan of the sinuses may be appropriate. Chronic sinusitis may provoke flares of asthma and may recurrently seed the bronchial tree as the infected matter drips down into the main airway or trachea.

Treatment

The various antibiotics which can be employed in the management of AECB are represented in Table 6. Therapy of AECB should be guided by the severity of illness classification in Table 5. There is broad consensus that those with more severe episodes marked by increased cough, secretions and purulence should receive antibiotics and, in many cases, a short course of corticosteroids.
The choice of antibiotic therapy varies according to the particular aspects of the case and the patient’s prior history of treatment. Assuming that the usual bacteria found in the airways of patients with COPD are most likely to be causing the AECB, agents such as the penicillins (ampicillin, amoxicillin, Augmentin®, etc.) or cephalosporins (Keflex®, Ceftin®, Suprax®, etc.) would not be preferred given the increasing prevalence of bacteria resistant to these drugs. Drugs such as clarithromycin (Biaxin®) or azithromycin (Zithromax®) are also somewhat compromised by cross-resistance. Parallel to their emergence as the drugs of choice for most cases of pneumonia, the new fluoroquinolone antibiotics are emerging as the most popular choice for patients with severe but usual exacerbations of COPD. The second-generation agent, levofloxacin (Levaquin®) is active against most of the respiratory bacteria. It has the advantages of the largest and most extensive safety and side-effect profiles since we have a very good idea of the complications, that might arise from its use. Among the new fluoroquinolones, moxifloxacin (Avelox™) and gatifloxacin (Tequin™) are notable for their strong activity against the usual airway bacteria including even those isolates with substantial penicillin resistance. But less is known about the safety of these medications. Many individual patients may demonstrate better responses and/or tolerance to different medications. It is appropriate for you and your physician to try different antibiotics to find the drug that works best for you. (See Table 6.)

You should be aware that not all doctors believe in antibiotic therapy in AECB. Contrary arguments against the use of antibiotics include the facts that fewer than 50% of patients in careful scientific studies benefit from the drugs, the costs are fairly high, widespread use of these

### Table 6

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>tetracycline</td>
<td>Achromycin®</td>
</tr>
<tr>
<td>ampicillin</td>
<td></td>
</tr>
<tr>
<td>amoxicillin</td>
<td>Amoxil</td>
</tr>
<tr>
<td>cotrimoxazole</td>
<td>Bactrim®, Septra®</td>
</tr>
<tr>
<td>erythromycin</td>
<td></td>
</tr>
</tbody>
</table>

#### Older Antibiotics
(Less expensive, available as generic medication)

#### Newer Antibiotics
(More expensive, more effective against resistant bacteria)

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>amoxicillin/ clavulanate</td>
<td>Augmentin®</td>
</tr>
<tr>
<td>cefuroxime</td>
<td>Ceftin®</td>
</tr>
<tr>
<td>azithromycin</td>
<td>Zithromax® (Z-Pak)</td>
</tr>
<tr>
<td>clarithromycin</td>
<td>Biaxin®</td>
</tr>
<tr>
<td>levofloxacin</td>
<td>Levaquin®</td>
</tr>
<tr>
<td>moxifloxacin</td>
<td>Avelox™</td>
</tr>
<tr>
<td>gatifloxacin</td>
<td>Tequin™</td>
</tr>
<tr>
<td>ciprofloxacin</td>
<td>Cipro®</td>
</tr>
</tbody>
</table>
agents may accelerate the appearance of drug-resistant strains and there are potentially problematic, even life-threatening risks from these drugs.

On balance, it is believed that those patients with COPD who report significantly increased shortness of breath, increasingly productive cough, and purulent secretions should be carefully considered for a 10-day course of an antibiotic, generally a newer fluoroquinolone. Although not all patients will benefit from such therapy, we are currently unable to identify those who will do so. Thus, antibiotic therapy is recommended unless there is clear historical evidence of failure to benefit or of tolerance. The role for antibiotics is more widely accepted for those patients whose exacerbation is associated with bronchiectasis.

In addition to antibiotic therapy, treatment should probably include bronchodilating agents, anti-inflammatory drugs (including inhaled and systemic corticosteroids), and bronchial hygiene regimens. The use of agents which are designed to thin the phlegm (“mucolytics”) such as N-acetylcysteine (Mucomist®) or desoxyribonuclease (Dornase®) in patients without cystic fibrosis is controversial and is not generally advocated. Glycerol guaiacolate (guaifenesin) may be of benefit for selected patients.

For patients with simultaneous AECB and sinusitis, it is wise to consider therapy directed at relief of the sinus inflammation. Specific management might include nasal sprays containing oxymetazoline,* decongestants such as pseudoephedrine, saline nasal rinses and inhaled nasal steroids.

**Prevention**

All patients with COPD should be vaccinated early every year against the “flu” (viral influenza). They should receive Pneumovax® at least once. This vaccine is directed against the pneumococcus, the most common cause of bacterial pneumonia. It does not protect against other causes of pneumonia. Persons who suffer from frequent exacerbations should limit their exposures to groups or situations where they are apt to be exposed to persons with “colds” or “flu.” Particularly worrisome are groups of children who are prone to such infections. When exposed, it is important to know that many viruses are spread by hand-to-hand contact or using shared utensils or glasses. Frequent hand washing may be protective.

During influenza epidemics, anti-flu medications such as amantidine HCl (Symmetryl®), rimantadine HCl (Flumadine®), oseltamivir (Tamiflu™), or zanamirvi (Relenza®) may be used effectively to prevent infection for those who have not been vaccinated or who are waiting for the vaccine to take effect.

---

*Nasal sprays containing oxymetazoline include Afrin®, Allerest®, Dristan®, Neo-syneprine®, Sinarest® and Vicks Sinex®.*
F. Other Medical Treatments

Patients with chronic obstructive pulmonary disease (COPD) usually feel better on a proper medication program. Regular use of COPD medications can decrease the frequency and severity of worsening symptoms. COPD symptoms are caused by permanent lung damage from the disease and reversible factors that can be improved with medications. COPD is a disease that destroys lung tissue and reduces lung capacity. Medications don’t work on lung tissue that is lost. Medications for COPD usually treat three things:

1. Spasm of the muscles around the breathing tubes
2. Swelling
3. Increased sputum from inflammation and infection

Bronchodilators are medications that improve spasm of the muscles around the breathing tubes, thus opening them. Corticosteroids reduce swelling and mucus production. Antibiotics are used to treat bacterial infections.

Medications can improve shortness of breath and congestion symptoms. But, even with the best medicines, significant symptoms usually remain because of the permanent, irreversible damage from COPD. It is important for the patient and physician to make a realistic assessment of the patient’s response to each prescribed medication so that the patient avoids excessive costly medications that may have unpleasant side effects or don’t improve lung function or symptoms. Most guidelines for COPD treatment recommend a simple inhaler maintenance program, a breathing tablet for selected patients and stepped-up treatment for an acute increase in symptoms.

Inhaled Medications for COPD

You breathe in air and you can also breathe in medications. When you breathe medication directly onto the breathing tubes in your lungs, these medications work well in much lower doses than if the medication is taken by mouth. Most inhaled medications are given using metered-dose inhalers (MDI’s or “puffers”) or the newer “disc-inhalers” for dry powder medications. A little coordination and dexterity are required to use these devices, but most patients can use them effectively with a little instruction. Simple spacer devices may help some patients use MDI’s effectively. Newer devices are being developed to ease the use and increase the effectiveness of inhaled medications.

Nebulizer/compressor machines are used to give inhaled medications to patients with more severe COPD, and those who cannot use MDI’s effectively. These machines generate a mist of medication that is inhaled by the patient over 5 to 10 minutes. The humidification generated by the nebulizer may help the patient cough up and clear secretions.

Bronchodilator Inhalers

Bronchodilator inhalers are the most commonly used medications for COPD. Short-acting inhaled bronchodilators have a fast onset of action and last for 4 to 6 hours. Long-acting bronchodilators have a slower onset of action but last around 12 hours.

The two main classes of inhaled bronchodilators for COPD are atropine-like drugs called “anticholinergics” and
adrenaline-like drugs called “beta-agonists.” The anticholinergic ipratropium bromide (Atrovent®) works on larger airways and is effective for maintenance therapy in COPD. Fast-acting beta-agonists can give rapid relief of acute symptoms. The Combivent® inhaler combines the fast-acting beta-agonist albuterol (Ventolin® or Proventil®), and the maintenance anticholinergic ipratropium bromide. (See Table 7.)

Bronchodilator Tablets

Selected patients may benefit from theophylline medications. Theophylline medications such as Uniphyl®, Theordur®, Theo-2.4® and Uni-dur® are taken as once- or twice-a-day tablets. (See Table 8.) Theophyllines have bronchodilator activity and may improve the strength of the breathing muscles. Theophylline medications can cause nausea and other more serious side effects if too much medication is taken. It is important to take only the amount your doctor prescribes and not to increase your dose if you have worsening symptoms. Two antibiotics, Cipro® and Biaxin®, may increase theophylline levels. Your doctor can measure the level of theophylline medicine in your blood to determine your correct dosage.

Medications with Both Anti-Inflammation and Bronchodilator Activity

Corticosteroid medications such as prednisone and medrol have potent anti-inflammatory and bronchodilator activity. They are usually given in a brief, 1- or 2-week, tapering course from higher to lower dose for acute symptoms after which spirometry may be done to check response to the medication. Some patients benefit from chronic daily steroid medication, usually in a low dosage. (See table 9.) Steroids can improve breathing symptoms and increase appetite and energy level. Unfortunately, steroids given over long time periods have many side effects, including high blood sugar, weight gain, fluid retention, thinning of the skin and bones, and emotional changes. Steroid therapy has to be carefully adjusted to balance good effects on breathing against bad side effects on the rest of the body.

Steroids are also given as inhaled medication. (See Table 9.) Inhaled steroids contain much less medication than tablet steroids, and, therefore, side effects are less with inhaled steroids. Inhaled steroids may be effective for selected COPD patients.

The new leukotriene inhibitor medications can have both anti-inflammatory and bronchodilator effects. (See Table 10.) These medications are frequently used in asthmatic patients, but are used less frequently in COPD patients. Their benefit is so far unproved in COPD, but physicians may use them in selected COPD patients. These medications may be effective in COPD patients with lots of wheezing and bronchial spasm.

Antibiotics for Infection

Acute exacerbation of chronic bronchitis (AECB, see Section E) is the most frequent cause of acute worsening in COPD patients. Patients experience increased cough, congestion, wheezing, shortness of breath and sometimes fever. Many of these episodes are caused by virus infections that won’t improve with antibiotics. More severe episodes, especially those associated with change in sputum color to green, yellow or gray and fever, should be treated with antibiotics. (continued)
Figure 4
How to Use an MDI

A. Open mouth with inhaler 1 to 2 inches away

B. Use spacer

C. In the mouth for breath activated devices
### Table 7
Summary of Common Bronchodilator Inhalers

#### Medications

**Anticholinergic Inhaler**

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
<th>Onset of Action</th>
<th>Duration of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipratropium bromide</td>
<td>Atrovent®</td>
<td>15 to 30 minutes</td>
<td>4 to 6 hours</td>
</tr>
</tbody>
</table>

**Beta-agonist Inhalers**

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
<th>Onset of Action</th>
<th>Duration of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>albuterol</td>
<td>Ventolin®</td>
<td>1 to 5 minutes</td>
<td>4 to 6 hours</td>
</tr>
<tr>
<td></td>
<td>Proventil®</td>
<td>1 to 5 minutes</td>
<td>4 to 6 hours</td>
</tr>
<tr>
<td>formoterol</td>
<td>Foradil®</td>
<td>1 to 5 minutes</td>
<td>12 hours</td>
</tr>
<tr>
<td>metaproterol</td>
<td>Alupent®</td>
<td>1 to 5 minutes</td>
<td>3 to 4 hours</td>
</tr>
<tr>
<td>pirbuterol</td>
<td>Maxair®</td>
<td>1 to 5 minutes</td>
<td>4 to 6 hours</td>
</tr>
<tr>
<td>salmeterol</td>
<td>Serevent®</td>
<td>30 minutes</td>
<td>12 hours</td>
</tr>
</tbody>
</table>

**Combination Inhalers**

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
<th>Onset of Action</th>
<th>Duration of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipratropium bromide and albuterol</td>
<td>Combivent®</td>
<td>1 to 5 minutes</td>
<td>4 to 6 hours</td>
</tr>
<tr>
<td>salmeterol and fluticasone</td>
<td>Advair®</td>
<td>30 minutes</td>
<td>12 hours</td>
</tr>
</tbody>
</table>
### Table 8: Some Theophylline Tablet Medications

<table>
<thead>
<tr>
<th>Brand Name</th>
<th>Generic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uniphyl®</td>
<td>aminophyllin</td>
</tr>
<tr>
<td>Theo-dur®</td>
<td></td>
</tr>
<tr>
<td>Theo-24®</td>
<td></td>
</tr>
<tr>
<td>Uni-dur®</td>
<td></td>
</tr>
</tbody>
</table>

### Table 9: Corticosteroid Medications

#### Tablet Medications

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>prednisone</td>
<td>Medrol®</td>
</tr>
<tr>
<td>methylprednisolone</td>
<td></td>
</tr>
<tr>
<td>dexamethasone</td>
<td>Decadron®</td>
</tr>
</tbody>
</table>

#### Inhaled Corticosteroids

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>beclomethasone/dipropionate</td>
<td>Beclovent®, Vanceril®, QVAR™</td>
</tr>
<tr>
<td>fluticasone</td>
<td>Flovent®</td>
</tr>
<tr>
<td>budesonide</td>
<td>Pulmicort®</td>
</tr>
<tr>
<td>flunisolide</td>
<td>AeroBid®</td>
</tr>
<tr>
<td>triamcinolone</td>
<td>Azmacort®</td>
</tr>
</tbody>
</table>

### Table 10: Leukotriene Inhibitor Medications

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>montelukast</td>
<td>Singulair®</td>
</tr>
<tr>
<td>zafirlukast</td>
<td>Accolate®</td>
</tr>
<tr>
<td>zileuton</td>
<td>Zyflo®</td>
</tr>
</tbody>
</table>

### Table 11: Diuretic Medications

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>furosemide</td>
<td>Lasix®</td>
</tr>
<tr>
<td>hydrochlorothiazide</td>
<td>Hydrodiuril®</td>
</tr>
<tr>
<td>spironolactone</td>
<td>Aldactone®</td>
</tr>
<tr>
<td>torsemide</td>
<td>Demadex®</td>
</tr>
<tr>
<td>triamterene</td>
<td>Dyrenium®</td>
</tr>
</tbody>
</table>

#### Combination Products

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>spironolactone and hydrochlorothiazide</td>
<td>Aldactazide®</td>
</tr>
<tr>
<td>triamterene and hydrochlorothiazide</td>
<td>Dyazide®, Maxzide®</td>
</tr>
</tbody>
</table>
A chest x-ray might be needed to exclude pneumonia in severe episodes.

A supply of steroids and antibiotics may be prescribed for you to keep on hand at home, to begin at the onset of worsening in an attempt to prevent progression. A 10-day course of antibiotics is usually adequate. Older, less expensive antibiotics are often effective, but newer, broad-spectrum antibiotics may be required in patients who have needed frequent antibiotics or who have been recently hospitalized (See Table 6–Section E.)

**Diuretics (Fluid Pills)**

Like many COPD patients, you may retain fluid and develop swelling of the ankles. Patients who also have heart failure may accumulate fluid in the lungs. Fluid retention often worsens during acute exacerbation of chronic bronchitis. Steroid treatment promotes fluid retention. Diuretic medications stimulate the kidneys to eliminate salt and water. Diuretics commonly used in COPD patients are listed in Table 11. Diuretics cause the body to lose potassium, and potassium tablets are frequently prescribed with diuretics.

“The oxygen level in the blood can also be measured as the ‘arterial oxygen saturation’ using an oximeter device that fits on a finger or an ear. Oximetry reports the percentage of red blood cells that are carrying oxygen.” (See page 30.)
G. Oxygen

Oxygen from the air is necessary for your body’s efficient energy production. Oxygen itself does not contain energy, but it allows your body to produce energy by the burning (metabolism) of food. Oxygen allows for the transfer of a series of body chemicals and electrons through a chain of chemical reactions that fuels your body’s system functions. Without oxygen, critical cells of the body begin to die within a few minutes. The percentage of oxygen in the air is 21%, and this percentage stays the same regardless of altitude. At sea level, the air is thicker, more compressed and contains more oxygen because of the higher atmospheric pressure that concentrates or thickens the air.

The oxygen level in your blood depends both on the atmospheric pressure in the air that concentrates oxygen and pushes it through the lungs into your blood and the capacity of your lungs to take up the oxygen. People with normal lungs can have very low levels of oxygen at high altitudes where the atmospheric pressure is low and the air is thin. People with normal lungs who live at high altitude compensate for lower oxygen levels in their blood by pumping more blood through their lungs and raising red blood cell levels in the blood to increase the amount of oxygen the blood carries.

Chronic obstructive pulmonary disease (COPD) reduces breathing capacity and, in advanced stages, limits the ability of the lungs to transfer oxygen into the blood. A patient with milder COPD has some reduction in the oxygen level in the blood similar to the reduction seen in someone with normal lungs who breathes thinner air at an intermediate altitude of 5,000 to 7,000 feet. A patient with more severe COPD may have a more severe decrease in the blood oxygen level comparable to the reduction seen in someone with normal lungs breathing thin air at altitudes above 10,000 feet. Even at sea level, many patients with more severe COPD have oxygen levels low enough to put a strain on the heart, increase the blood hemoglobin level and decrease brain and kidney function.

The following are common questions often asked by patients who are prescribed oxygen by their doctor.

**How is the Level of Oxygen Measured?**

The oxygen level in your blood is measured directly by drawing a sample of arterial blood. Arterial blood has just passed through the lungs and carries a replenished oxygen supply. The arterial “PO2” should be above 80 in normal people at sea level. The oxygen level in the blood can also be measured as the “arterial oxygen saturation” using an oximeter device that fits on a finger or an ear. Oximetry reports the percentage of red blood cells that are carrying oxygen. An oximeter does not require drawing a blood sample. Normal people have an oxygen saturation above 95% at sea level.

**How Will My Doctors Know When I Need Oxygen?**

Your need for oxygen is guided, in part, by measurement of the arterial blood oxygen level. A PO2 level of 55 measured by arterial blood gas or a saturation of 88% measured by an oximeter qualifies a COPD patient for home oxygen. Patients with normal oxygen levels at rest may qualify for home oxygen if the oxygen level falls significantly with exercise, or if nighttime monitoring shows a fall in oxygen level with sleep.

(continued)
I Have COPD and I’m Short of Breath. Why Does My Doctor Say I Don’t Qualify for Oxygen?

Shortness of breath does not necessarily indicate a need for oxygen. There are many other factors that contribute to shortness of breath other than a low oxygen level. Oxygen is only prescribed and effective if your oxygen is low at rest, with exercise or with sleep. Many of the most short of breath COPD patients have normal oxygen levels, and therefore do not qualify for oxygen therapy. Many patients are less short of breath when wearing oxygen, but some are not. Many patients who are not short of breath have low oxygen levels and need home oxygen. Patients, of course, are more likely to wear oxygen if it makes them feel better when the oxygen is on. Medical studies have shown that patients have a low oxygen level before it will pay for oxygen.

Will I Become Addicted to Oxygen?

Many patients fear that oxygen is “addicting” and that the more it is used, the more it will be needed. Oxygen is a requirement for life, but the use of oxygen does not lead to an addiction or increasing need for oxygen. Oxygen is needed continuously by the body, and when the lungs are not able to keep up with the body’s oxygen needs, it is a good thing that modern medicine can supply patients with the extra oxygen that they need to assure good function of the body’s organs. When COPD patients need oxygen, the need continues regardless of if or how much a patient wears oxygen.

If I Start Using Home Oxygen, Will I Ever Get off of It?

Some patients who are started on oxygen during times of acute worsening will improve over a short period of time to where they no longer require oxygen. Most COPD patients who have low oxygen levels when their disease is stable will require lifetime home oxygen.

How Long Will I have to Use Oxygen?

Unfortunately, the body can’t build up a large storage supply of oxygen. The oxygen level falls back to a low level within 10 minutes after oxygen is stopped, regardless of whether the oxygen has been worn for an hour or 12 hours.

Will I Need More Oxygen as Time Goes By?

Not usually. Most COPD patients require 2 or, at most, 3 liters of oxygen per minute. They don’t require increasing amounts of oxygen over time. Some patients will need more oxygen with exercise and may be instructed to increase their oxygen flow with activity.

Do I Have to Wear My Oxygen All the Time?

If your oxygen level is low off of oxygen, the more time that you wear it each day, the better. Medical studies have shown that patients with low oxygen, who wear oxygen 12 to 15 hours a day, do better than patients who don’t wear any oxygen. Patients who wear oxygen 24 hours a day do better than patients who wear oxygen only 15 hours a day.

What Will Happen If I’m off Oxygen for a While? What if My Oxygen Falls off During the Night?

Usually nothing happens. Patients who are less short of breath with oxygen will be more short of breath when off oxygen. Most COPD patients have a mild reduction in the oxygen level that takes a toll on the
## Table 12

### Selected Portable Oxygen Systems

<table>
<thead>
<tr>
<th>Type</th>
<th>Type Weight</th>
<th>Duration at 2 Liters Continuous Flow</th>
<th>Duration at 2 Liters Pulsed Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compressed Gas Cylinders</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-Cylinder</td>
<td>11.00 pounds</td>
<td>4.5 hours</td>
<td>10.0 hours</td>
</tr>
<tr>
<td>D-Cylinder</td>
<td>7.50 pounds</td>
<td>3.0 hours</td>
<td>6.0 hours</td>
</tr>
<tr>
<td>M9-Cylinder</td>
<td>5.00 pounds</td>
<td>2.0 hours</td>
<td>2.0 hours</td>
</tr>
<tr>
<td>M6-Cylinder</td>
<td>3.50 pounds</td>
<td>1.0 hour</td>
<td>2.0 hours</td>
</tr>
<tr>
<td><strong>Portable Liquid Oxygen Systems</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puritan Bennett Mark 5</td>
<td>8.00 pounds</td>
<td>7.0 hours</td>
<td>NA</td>
</tr>
<tr>
<td>Puritan Bennett Mark 6</td>
<td>5.50 pounds</td>
<td>4.0 hours</td>
<td>NA</td>
</tr>
<tr>
<td>Puritan Bennett Mark 7 (Pulse dose)</td>
<td>5.50 pounds</td>
<td>NA</td>
<td>8.0 hours</td>
</tr>
<tr>
<td>Puritan Bennett Helios System</td>
<td>3.75 pounds</td>
<td>NA</td>
<td>8.5 hours</td>
</tr>
</tbody>
</table>

### Figure 5

Two Methods of Oxygen Delivery

The nasal cannula is fed oxygen by a tube worn under your chin, up over your ears and down to your nose.

“Oxygen can be given directly into the windpipe or trachea using a catheter. This is called transtracheal oxygen.” (See page 55.)
body over time, but doesn’t cause immediate dangers. Some patients with more severe symptoms and lower oxygen levels can tell immediately when they are off of oxygen. These patients are careful to wear their oxygen all the time. Some patients will awaken immediately if their oxygen falls off at night. Even if the oxygen falls off for a good portion of the night, it usually does not cause any problem.

**What Will People Think When They See Me Wearing Oxygen in Public?**

There are nearly a million people in America who wear home oxygen, so most people are used to seeing people wearing oxygen in public. Patients are sometimes sensitive to anything that detracts from how they appear to other people, but today people are used to seeing fellow citizens with many different assistive devices such as crutches, wheelchairs and casts, and think little or nothing unusual about someone wearing oxygen.

**How Will I Get Oxygen at Home?**

Your doctor will order oxygen through a homecare company. That company will deliver your oxygen equipment to your home. Most patients on home oxygen use an oxygen concentrator. This is a device that filters and concentrates oxygen out of the air using a dry sieve. It is electrically powered. You will have a large reserve oxygen cylinder to use in case the power in your home goes off or the concentrator stops working. You will also receive small portable oxygen cylinders to use when walking or when away from home. Some patients may receive liquid oxygen systems. These systems combine a large reservoir of liquid oxygen kept in the home and lightweight portable containers for activities away from the home reservoir. Liquid oxygen has been more expensive to supply in the past. It had been less available in recent years because of shrinking government reimbursement. However, newer liquid oxygen systems cost the supplier about the same as concentrators and small high pressure tanks that are wheeled outside the home. Some patients may use a combination system with a concentrator for home use, and a liquid portable system.

**How Can I Wear Oxygen Comfortably Away From My Home?**

There are many lightweight portable oxygen systems that allow you to be active while wearing oxygen away from your main oxygen supply. Portable oxygen systems vary in size, weight, and convenience. Table 12 shows a variety of available portable oxygen systems.

E-cylinders and other heavier devices are usually carried on a lightweight wheeled cart. Lighter units can be carried on a shoulder strap or concealed in an over-the-shoulder bag. Oxygen-conserving pulse devices that supply oxygen only when a patient breathes in can extend the duration of portable oxygen tanks. Pulse devices may not give an adequate oxygen supply to all patients but do extend the duration of portable tanks for those patients who can use them.

**A Friend of Mine Has Oxygen That Goes Into His Neck. You Can’t Tell That It’s On. Should I Consider That Kind of Oxygen?**

Oxygen can be given directly into the windpipe or trachea using a catheter. This is called transtracheal oxygen. Transtracheal oxygen requires a procedure to place the catheter in the neck. The catheter is more expensive and complicated to maintain than regular oxygen. Transtracheal oxygen is
appealing to patients because the oxygen is not worn on the face, and can be concealed under a shirt collar. Trans-tracheal oxygen doesn’t work well in COPD patients who produce a lot of secretions, as the secretions can gather on the catheter and create large plugs of mucus.

What Will Happen if I Smoke with My Oxygen On?

Oxygen is not explosive or even flammable. It does support combustion and will make any fire burn more brightly. If you smoke with your oxygen on, you run the risk of igniting your oxygen tubing and sustaining burns to your face. No one should smoke cigarettes around you when you are wearing oxygen. You should stay at least 8 feet away from any open flame. Do not use oxygen around any open gas flame such as a gas barbecue.

How Can I Prevent My Nose and Ears From Getting Sore When I Wear Oxygen?

Many patients who start oxygen therapy develop a sore nose. This usually gets better over a fairly short period of time. Sometimes, water-based lubricants such as KY Jelly help. Many patients notice drying in their nose from oxygen, even at low flow rates. This may be improved with the addition of a water bubbler humidifier device to your oxygen system. You can hold your oxygen in your mouth to rest your nose for short periods of time. Foam tubing placed around your oxygen tubing where it crosses the ears often helps protect the ears.

I Breathe Through My Mouth When I Sleep or Exercise. Will My Oxygen Still Work if I Wear it in My Nose?

Yes. Oxygen running into your nose fills the nasal cavity and back of the throat with oxygen that gets drawn into the lungs even if you breathe through your mouth. The physical principle that draws the oxygen down into the lungs is called the “Venturi Effect.”

Oxygen is Expensive. Can I Afford Oxygen?

Your medical insurance will cover most of the cost for your oxygen. For example, a Medicare patient with supplemental insurance who is renting a concentrator and portable system usually pays nothing for oxygen. Patients with Medicare, but no co-insurance, may be required to pay 20% of the oxygen charge, which is usually around $30 or $40 a month. Most insurance plans fund oxygen on a rent-to-own basis. After a certain period, you own your equipment. Insurance usually doesn’t cover the cost of electricity required to run an oxygen concentrator.

Will I Be Able to Travel with Oxygen?

Many patients travel long distances in their cars using larger compressed gas cylinders that are supplied by their homecare company. Most airlines will supply oxygen for you in airplanes, but there is an additional charge not covered by insurance. Your airline may help arrange oxygen for you in the airport, or your homecare company may need to arrange oxygen for you in the airport before you board the plane. Arrangements for oxygen on airplanes need to be made well in advance of planned travel. Oxygen is widely available nationwide. Your homecare company can help arrange oxygen supplies for you at your destination so that the supplies are in place and waiting for you at your destination.
Patients with chronic obstructive pulmonary disease (COPD) may have a variety of symptoms, including cough, sputum production and recurrent bronchitis. The symptom of shortness of breath or dyspnea is the complaint that most often brings patients to the doctor’s office. As the disease progresses, patients begin to notice that certain activities once taken for granted now provoke discomfort described as shortness of breath. This causes conscious and subconscious restriction of activity resulting in getting “out of shape” or deconditioning and a downward spiral compounding the effects of lung disease. Deconditioning is the process that occurs when shortness of breath limits physical activity, leading to loss of muscle strength and cardiac function. In the early 1970s, physicians at the University of Colorado and others pioneered the concept of reversing this downward spiral by comprehensive pulmonary rehabilitation.

Pulmonary rehabilitation programs have been highly successful in reducing the impact of COPD and other chronic lung diseases. The goals of pulmonary rehabilitation therapy are:

- Improve overall level of physical fitness
- Reduce shortness of breath and control breathing difficulties
- Desensitize the patient to dyspnea and assure that moderate shortness of breath with exercise is not harmful
- Improve quality of life

Pulmonary rehabilitation programs are available in most communities. Whether your symptoms are moderate or severe, pulmonary rehabilitation can help. Your physician may refer you to a program after doing a thorough physical examination, chest x-rays and pulmonary function testing. These programs should be tailored to the individual but usually include the following components:

- Education about the disease process
- Breathing retraining
- Aerobic exercises
- Lightweight training to increase strength in the upper and lower extremities
- Proper use of medications and oxygen
- Nutritional support
- Psychological support

**Walking**

Walking should be the cornerstone of any exercise program for anyone who is able. Daily progressive walking increases the strength of many of the muscles in your body, including the heart muscle. All you need is a pair of comfortable shoes and (text continues on page 52)
The photographs in this section are of real patients who are benefiting from pulmonary rehabilitation, which has become the state of the art treatment for patients with advanced stages of COPD. (See Section H.)

Many are receiving oxygen to improve the quality and length of their life. Oxygen is the only treatment for advanced COPD that has been proven to change the course of disease. (See Section G.)

Many of these patients are enjoying the benefits of participating in patient support groups. (See Section I.)

Earlier Sections stress the identification and treatment of early or symptom free stages of disease. Through early identification, smoking cessation and other therapies, we believe that advanced stages of disease can be prevented.

The Authors.
Exercise periods often start with a glass of juice and relaxation. It is important to start with stretches to limber up and get “loose.” This includes stretching arm, leg and back muscles. Note these COPD patients have a chair next to them in case they get dizzy. Depending on your physical condition, some form of leg lifts and sit-ups will strengthen your abdominal muscles. At first you may find it difficult to sustain long periods of exercise. Start with short workouts and gradually increase the time. Your goal is better physical conditioning and increased activity.
Exercise is an important part of your daily activities. If you become breathless, try resting in a position where your shoulders are supported. The COPD patients shown here are doing upper body training to increase the strength and endurance of their arms, shoulders, chest and abdominal muscles. These muscles are the “helper muscles of breathing,” and as they are trained they become more efficient, permitting you to engage in more strenuous activities.
Arm Raises
Raise one arm above your head as you breathe out. Hold, then slowly lower your arm. Repeat and then switch to your other arm. (You may do this and some of the following exercises while seated and you may also consider using light dumbbells or other light weights.)

Elbow Circles
Sit or stand with your feet slightly apart. Place hands on shoulders, with elbows at shoulder level. Circle elbows forwards, up and out. Breathe out as elbows move forwards and up and breathe in as you return to starting position.

Arm Extensions
Arms at sides. Breathe out as you raise your left arm to shoulder level. Hold, then as you breathe in, return arm to your side. Repeat with your other arm.

Pulmonary rehabilitation can help you maintain a lifestyle you enjoy. >
Frontline Advice for COPD Patients

Elbow Breathing
Lift your elbows to shoulder level so that your finger tips are touching in front of your chest. While breathing in pull your elbows back so that finger tips separate. Breathe out and finger tips return to starting position.

Side Bends
Right arm across body and right hand on left lower ribs. Breath in slowly through your nose as you bend over to your left and let your left hand drop towards floor. Return to start as you breath out through pursed lips. Repeat with other arm.

Hand Behind Head
Stretch right arm above your head and then bend elbow and lower right hand to back of neck. Return to start and repeat 3 times before switching to other arm.
Knee Extensions
Sit with feet slightly apart. As you breathe out raise one leg to straighten your knee. Breathe in as you return your foot to the floor. Alternate legs.

Leg Lifts
Sit with feet slightly apart. As you breathe out raise one knee towards your shoulders. Breathe in as you return your foot to the floor. Alternate legs.

Step Ups
Use a small step with something nearby you can hold onto if necessary. Breathe out as you step up and breathe in as you step down. Alternate legs.

With pulmonary rehabilitation many patients get out and carry on independent activities.
Lie flat and rest left hand across your chest and right hand on abdomen. Breathe in deeply through your nose letting abdomen rise. Breathe out through pursed lips while pressing your abdomen firmly up towards your chest. Repeat. Remember, breathe in, abdomen out, breathe out, abdomen in. Relax your chest and try not to let the hand on your chest move.

Place hands on lower ribs and upper abdomen with shoulders down, elbows straight out, fingers rigid. As you breathe out through pursed lips apply firm pressure to ribs and abdomen. Release pressure slightly and breathe in. Repeat. Try to practice these abdominal breathing exercises for 10 to 15 minutes every three to four hours. Rest if you feel dizzy.

As a result of pulmonary rehabilitation I can read to kindergarten children twice a week. They call me the story lady.” >
Pursed-lip breathing is often the easiest breathing technique to learn and use. Try inhaling through your nose for several seconds with your mouth closed. Then exhale slowly with your lips in a whistling position as if you are blowing on hot coffee or soup. For a more detailed description see page 52.
possibly supplemental oxygen, if prescribed by your physician. You should start your walking program on level ground. During bad weather, you may walk in air-conditioned or heated stores or malls. Begin your exercise gradually by walking at a comfortable pace until you are breathless or fatigued, and then rest until recovered and repeat the process. Increase your walking time gradually until you are able to walk for 25 to 30 minutes with brief periods of rest. Walk as frequently as possible but at least 4 days per week. The hardest part of any exercise program is getting started and sticking with it.

**Stationary Bicycle**

The use of a stationary bicycle may be useful in training for some individuals, especially those with the need for supplemental oxygen. Some bikes, such as the Schwinn Aerodyne have the added advantage of strengthening the upper body muscles as well as the legs.

**Weight Training**

Upper body training increases the strength and endurance of the arms, shoulders, chest and abdominal muscles. These muscles are accessory muscles of respiration, or “helper muscles of breathing.” As these muscles are trained, they become more efficient and they use less oxygen. This makes common tasks such as lifting, housework, gardening, bathing and dressing much easier.

Weight training is an integral part of formal pulmonary rehabilitation programs but it can be done at home, as well. Ask your physician about getting started and what specific exercises and weights are right for you. Dumbbells in the one to two-pound range are usually good starting weights (See Figure 7.)

**Pursed-lip Breathing**

Pursed-lip breathing is a technique that many patients with emphysema instinctively use to cope with shortness of breath. (See Figure 8, page 49.) This technique can help you to reduce shortness of breath and to avoid air trapping in the lungs. It can help in “panic” situations. If done properly, pursed-lip breathing may reduce the use of inhaled bronchodilators. The technique is as follows:

Inhale through your nose on the count of “1 or 2.” Your stomach muscles should move outward as air goes into the lungs.

Exhale through your pursed lips (as if you are whistling or blowing out a candle).

Exhale at 2 to 4 times longer than inhaling. This keeps the small air passages in the lung from “slamming shut” and “trapping” air in your chest, relieving the sensation of air hunger.

When you become comfortable with this maneuver, you can then practice it while walking slowly. Take one step forward while inhaling through the nose. Then walk 2 to 3 steps with the lips pursed and repeat the cycle.

In “panic” situations stop what you are doing; use your power of concentration to slow down your breathing with the pursed-lip breathing technique.

An exercise program should be included in the treatment plan for every patient with COPD. Your physician may refer you to formal rehabilitation, or he or she may outline a plan for you to exercise on your own at home. Remember, no one is too weak, too short of breath or too sick to benefit from exercise training.
I. Patient Support Groups

Many patients with COPD derive great benefit from participating in patient support groups. Most participants are graduates from a pulmonary rehabilitation program. One of the pioneering programs was known as the Patient Education Program (PEP) Pioneers. PEP could also stand for Patient Energizing Program. The founder of the PEP Pioneers, Mary Burns, R.N., BS, in southern California, is one of the leaders in pulmonary rehabilitation in the country. She and her colleagues have pioneered the organization of patient support groups. They have developed adventurous programs, such as trips to the beach, parks, zoos, the horse track for gambling and even an ocean cruise to the Gulf of Mexico. Developing the logistics of supplying oxygen for patients who needed it required dealing with multiple bureaucratic agencies, and in spite of several roadblocks it was eventually a major success.

A major purpose for patient support groups is for social interaction and to obtain knowledge about new developments in respiratory care. Most of the authors of this monograph have participated in both formal and informal social gatherings. A typical meeting will include refreshments, which may be simple or as elaborate as a potluck lunch or dinner. A medical or non-medical lecture that is relevant to the interests of the group is often scheduled. Even patients with mild forms of disease may benefit by learning from those more experienced through their own adjustment and adaptation to more advanced stages of disease. A better understanding of the disease processes that their loved one has, and how doctors and other healthcare providers attempt to deal with these issues, also helps families. Although some patients and their families may feel self conscious when first receiving oxygen therapy, or in dealing with social situations where dyspnea may be a problem, participation in patient support groups creates an atmosphere of comfort and friendship that may be very gratifying.

Members of patient support groups may also participate in clinical research studies designed to learn more about the physical, psychosocial and nutritional aspects of COPD. These patients may also become subjects for new therapeutic trials for use of oxygen or breathing devices. Working together with experienced physician researchers, nurses and respiratory therapists, patients with COPD can continue to contribute to our knowledge about how to deal with all of the problems that occur with the various stages of COPD. A current listing of pulmonary support groups in the U.S. and around the world can be found on the Internet at www.copdadvocate.com/support.

Resources

A. Patient Support Groups

1. Second Wind. Pulmonary Education and Research Foundation.
   P.O. Box 1133, Lomita, CA 90717-5133.
   Editor: Mary R. Burns, R.N., BS; phone: 310-539-2295

2. PREP Airwaves. Mission Hospital Regional Medical Center.
   27700 Medical Center Road, Mission Viejo, CA 92691.
   Editor: Jim Barnett, RRT; phone: 949-364-1400

3. Cape Cod COPD Support Group.
   1223 Main Street, Chatham, MA 02633.
   Editor: Jo-Von Tucker; phone: 508-945-7771; e-mail: clambake@capecod.net
1300 West 7th Street, San Pedro, CA 90732. Editor: Kris Brust, RN; phone: 310-832-3311 x 6268
5. EFFORTS (Emphysema Foundation For Our Right To Survive).
President: Gary Bain; Claycomo Plaza, 411 Northeast U.S. Highway 69, Claycomo, MO 64119. web site: www.emphysema.net
6. The Breath Savers Support and Education Group at Citrus Valley Medical Center “Our Daily Breath” 210 West San Bernardino Road, Covina, CA
President: Fran Pentz; phone: 626-962-1220; e-mail: franpentz@prodigy.net

B. Publications
172 East 4th Street, #11-F New York, NY 10009. Editor: John Leaman; phone: 212-777-0486
2. BreatheWell, Boehringer Ingelheim Pharmaceuticals, Inc. Clinicians Group, LLC, 2 Brighton Road, Suite 300 Clifton, NJ 07012. Senior Editor: Claire R. Connelly; phone: 973-916-1000
web site: www.staywell.com ; phone: (800) 333-3032
4. The Pulmonary Paper. Editor: Celeste Belyea; P.O. Box 977 Ormond Beach, FL 32175. e-mail: belyea@aol.com

C. A New National COPD Advocacy Organization, National Emphysema/COPD Association, NECA
This not-for-profit corporation is a patient membership organization. Barbara Rogers, President; Hannah Hedrick, Vice-president; PO Box 11725, Kimberly Square Center, Albany, NY 12211-0725

D. Other Internet Web Sites
www.floridahealthsite.org
(click on “Chronic Illnesses” then “COPD”)
www.airwavesonline.com
(created by Boehringer Ingelheim Pharmaceuticals, Inc.)
www.copd-support.com
(COPD Support, Inc., P.O. Box 490714, Ft Lauderdale, FL 33349)
www.thebreathingspace.com
(created by Boehringer Ingelheim Pharmaceuticals, Inc.)
www.thriveonline.oxygen.com/medical/library (type in “COPD”)
www.mayohealth.org
(type in “COPD”)
www.nlm.nih.gov/medlineplus/copdchronicobstructivepulmonarydisease
www.cheshire-med.com/programs/pulrehab/rehinfo
www.mtsinai.org
(select pulmonary medicine)
www.medscout.com
(select diseases/respiratory)
www.healthfinder.gov
(type in “COPD”)
www.vh.org
(type in “COPD”)
J. Surgery

Both chronic bronchitis and emphysema are the result of inflammation of the airways and loss of alveoli, which are the delicate membrane of the lungs that transfers oxygen into the blood and carbon dioxide out of the blood. COPD progresses over time. For many years, there has been hope that some surgical procedure could improve lung function and symptoms, and thus the quality of life. Three surgical approaches have been introduced that meet some of these goals.

Transtracheal Oxygen Delivery

Direct delivery of oxygen into the windpipe (trachea) is helpful in selected patients who require oxygen in the long term. Figure 5 (see page 32) illustrates how oxygen can be delivered directly by a small plastic tube that is placed in the windpipe, just above the collar bone and under the Adam’s apple. There are several advantages to directly delivering oxygen into the lung. The nasal cannula, which may cause nasal irritation, is avoided. Pain over the ears from the cannula is also eliminated. Since oxygen is flowing directly into the lungs, it actually provides some assistance to breathing. Thus, it may also help shortness of breath. In addition, the direct delivery of oxygen into the upper airways is more efficient. On average, the liter flow to maintain normal oxygen levels by transtracheal oxygen delivery is about 50% of that which is required by nasal cannula.

The use of a transtracheal device requires an involved and committed patient who knows how to remove the device, clean it and reinsert it each day. Patients with large amounts of mucus are not good candidates for transtracheal oxygen because excessive mucus may create mucus plugs, also known as mucus balls.

See Section G for other details about oxygen therapy.

Lung Volume Reduction Surgery (LVRS)

In the mid-1950s, surgeons designed operations to try and deal with mechanical derangements for advanced stages of emphysema where the lung is significantly blown up, known medically as overinflation (hyperinflation). Since most emphysema is located in the upper parts of the lung (apices), major damage may be present in these regions with relatively good lung structure and function in lower lung zones. The removal of relatively useless or even space-occupying, and nonfunctioning lung, seemed reasonable. By removing damaged lung tissue, the remaining lung has space for further expansion. By re-expanding, the elastic recoil forces of the lung improve. The original surgical technique for lung volume reduction surgery (LVRS), was abandoned in the early 1960s because of many surgical complications and an unacceptably high death rate directly related to the operation. A more important reason why LVRS was abandoned in the 1960s was the new understanding of the value of oxygen therapy, particularly ambulatory oxygen, and the development of exercise programs for pulmonary rehabilitation. Together, pulmonary rehabilitation and oxygen therapy in selected patients proved to be lifesaving. Oxygen and pulmonary rehabilitation also improved the quality of life in most patients.

Now, in the modern era, there is a new interest in LVRS. Today, with superior surgical techniques and better care after surgery, the death rate of LVRS has been reduced to approximately 5% to 10%, depending upon selection of patients and the experience of the surgeon. However,
The surgical stapling device is first placed over the damaged lung tissue.

While holding lung tissue with lung-grasping forceps, the surgeon fires the surgical stapler.

The surgeon removes the suture material and the paper backing material.

The surgeon removes the surgical stapler and cuts away the hardened lung tissue above the staple line.
some experts believe that sufficient knowledge already exists to be able to select patients who can benefit from LVRS. The authors believe that LVRS should only be done at centers with a proven record of success and low mortality rates.

Today, Medicare will not reimburse for LVRS, because it is still considered experimental. Comparison studies of LVRS and pulmonary rehabilitation are going on in 17 centers in the United States at the present time to learn more about LVRS. This study is known as the National Emphysema Therapy Trial (NETT). It will probably be five to ten years before the final outcomes become known.

**Lung Transplantation**

The most dramatic way to improve lung function and quality of life is by lung transplantation. Both single and double lung transplantation is now established for highly selected patients with advanced stages of emphysema and in other lung disease states such as interstitial fibrosis and cystic fibrosis. The limitations of lung transplantation are the short supply of organs and the problem of rejection of the newly transplanted lungs. Although lung transplantation definitely improves the quality of life, the length of life is not greatly improved because of rejection with inflammation of the small air passages, in a process known as bronchiolitis obliterans. Although transplant rejection medications may help reduce this problem, so far its solution has eluded transplantation experts and immunologists. Very likely, the lung, which is so intimately exposed to environmental insults, continues to be vulnerable, particularly in the setting of requirements for immunosuppressive therapy to prevent lung rejection.

**Lung Cancer**

The close association between lung cancer and emphysema is well established. A requirement of the NETT study is the protocol of CT scanning to determine the location of regions of damage. Since all patients who are candidates for LVRS today receive CT scans, many small apical shadows (nodules), are being identified. Approximately 10% of these are lung cancer. Since LVRS may actually improve lung function, many patients who were previously thought to have too advanced emphysema to be able to tolerate lung cancer surgery are now being reassessed with this new perspective. In very selected patients, the removal of useless lung tissue, along with an associated lung cancer, may provide improved lung function and symptoms and treat the associated lung cancer.
K. Nutrition

Good nutrition is an essential element of good health. Are there any special nutritional needs for the patient with chronic obstructive pulmonary disease (COPD)? This is not an easy question to answer for several reasons.

First, a wide variety of individuals have COPD. One of the ways they vary is in their metabolism, the way they process food into energy. Some patients have other coexisting diseases such as heart disease, high blood pressure and diabetes. Because of differing metabolisms, different coexisting diseases and other aspects unique to any given individual, different patients have different nutritional needs. Therefore, no single nutrition plan fits all patients with COPD.

Second, nutrition studies in patients with COPD are difficult to carry out. Right now the answers on the best nutrition for a given patient are limited. There is little scientific evidence that any given nutritional strategy, diet or dietary supplement is beneficial (for example, it improves lung function, reduces symptoms or improves the way you feel or the components of your quality of life). Scientific evidence refers to studies with large numbers of patients, which show objective benefits. At the same time, it is important to remember that the absence of proof doesn’t necessarily mean that a given diet or approach to nutrition might not help you. “Absence of proof is not proof of absence.” The “right” study may not have been done yet. Most nutritional studies in patients with COPD have not included enough subjects to give a definite answer.

So, what should be done when science doesn’t provide definite or definitive answers? The most reasonable approach is to fall back on common sense, based as much as possible on sound scientific theory—the facts as best they can be understood. There are recognized limitations to this approach, but it’s the best that can be done until good scientific research provides better answers.

This Section first will review what is known about nutrition in patients with COPD. Then, what is not known will be discussed. A common sense approach to nutrition and answers to some common questions will be offered. Practical answers will be sought. Since all patients with COPD are different, some trial-and-error testing is often required.

What You Should Know About Nutrition

- Patients with more severe lung disease tend to be underweight. This weight loss comes from both loss of fat and loss of muscle.
- Being underweight is associated with poor outcomes. Those individuals with COPD who are underweight don’t live as long as those whose weight is normal.
- Although the exact cause for the tendency to be underweight as COPD progresses is not known—and there are probably many reasons—most scientists believe that it is due in part to the fact that patients with more severe COPD, especially severe emphysema, have to work harder to breathe. This increased work uses up energy, so these patients have higher nutritional requirements. The increased work of breathing is recognized by the patient as being associated with shortness of breath. (continued)
Other possible reasons people with 
COPD are underweight may include:

Some patients with severe COPD have a 
tendency to develop depression with an 
accompanying loss of appetite.

Eating and digesting food itself may be 
associated with so much work that it’s 
hard to keep up with the energy 
requirements. If eating is associated 
with work and shortness of breath, 
patients may eat less to be more 
comfortable.

The comfort of eating and the comfort 
of breathing are associated in another 
way. Patients with COPD often have big 
lungs (known as hyperinflation because 
they have difficulty getting air out and 
trap air in their lungs). These “big 
lungs” push down on the abdomen and 
compress the stomach, which can make 
you feel full sooner during a meal. If 
the stomach contains gas, it can push 
up on the lungs and increase the feeling 
of shortness of breath.

Physicians and patients both know that 
it is difficult for these underweight 
patients with severe disease to gain 
weight. A few studies have shown 
success in COPD patients gaining 
weight, but it is difficult.

Even though patients with severe 
disease tend to be underweight, some 
patients with COPD are obese. 
(Remember, everyone is different and 
may have different metabolisms.) Being 
overweight with COPD is also a 
problem because being overweight 
itself requires more work. This 
increased work may also be associated 
with increased shortness of breath.

Practical Approaches to Nutrition in 
Patients with COPD

A general approach includes eating foods 
that you like, and finding ways to eat 
healthy things that you also like.

Balanced Diet

Most nutritionists recommend a balanced 
diet. A balanced diet contains calories 
from a combination of protein, fat (from 
animal or vegetable sources) and 
carbohydrates (sugars and starches). A 
balanced diet should also contain an 
adequate number of the essential minerals 
and vitamins. If you are too thin or losing 
weight, you should try to eat more. This 
usually means more frequent, small meals. 
The possible advantage of eating this 
extra food as protein or fat rather than 
carbohydrates is discussed below.

Foods to Avoid

There are no special foods you need to 
avoid. Some people find that milk and 
other dairy products tend to either make 
more phlegm or make it thicker. If you 
produce a lot of phlegm, try reducing 
dairy products for yourself. This helps 
some people, but not others. If you like 
milk and cheese and it doesn’t seem to 
make your phlegm worse, then drink and 
eat them. If you find an increase in phlegm 
production or phlegm thickness when you 
eat milk products, then you’ll want to 
avoid them. If other foods cause a 
particular problem for you, then avoid 
them. For example, if a particular food 
causes you to have gas, which may be 
uncomfortable and also distend your 
stomach and cause you to eat less, avoid 
this food.
Low Carbohydrate Diets and Food Supplements

If you eat the same amount of calories in the form of carbohydrates (sugar and starches) compared to fat or protein, you will produce relatively more carbon dioxide. Since you eliminate carbon dioxide by breathing, this means you will have to breathe more to get rid of carbon dioxide if your diet is high in carbohydrates. On the other hand, carbohydrates can be converted to energy more quickly than fat or protein. The greater carbon dioxide production from carbohydrate is not usually an important issue for patients with COPD and should not be a major factor in determining the balance between protein, fat and carbohydrate food sources. An exception might be the patient with severe COPD under stress with an acute episode (acute exacerbation of chronic bronchitis). See Section E.

The food industry has promoted the use of canned food supplements. Commercial food supplements targeted at patients with COPD are relatively low in carbohydrates and high in protein and fat. These commercial food supplements tend to be relatively expensive. The same effect, a higher intake of calories to counteract weight loss, can be achieved more economically by eating normal food. Food supplements may be useful in selected patients, but even then, less expensive alternatives are usually just as effective. Talk this choice over with your doctor.

Vitamins and Other Supplements

Most balanced diets contain enough vitamins to meet your basic needs. On the other hand, taking a multi-vitamin is safe and may be helpful. COPD, especially the emphysema part, is a disease thought to involve so-called oxidant injury. This is injury to the body’s tissues (in this case, to the walls of the air sacs in the lung) that is caused or enhanced by oxygen changing into toxic forms. The toxic forms of oxygen that can cause tissue injury are called free oxygen radicals. So, oxygen that is necessary for life, has the potential for causing harm if free oxygen radicals are formed. Antioxidants counteract this effect by either removing or chemically changing the toxic free oxygen radicals. An antioxidant is any chemical or substance that has this ability to scavenge or detoxify these toxic forms of oxygen.

Vitamin A and vitamin E are known to have antioxidant effects. Coenzyme Q is also an antioxidant. There is no study that proves that these antioxidants help prevent the progression of lung disease or result in other beneficial or helpful effects. Taken in recommended doses, they are safe (very high doses may cause problems) and they may have some benefit.

Special combinations of antioxidants, other vitamins and minerals are available in health food stores but tend to be expensive and have no scientific research to support their widespread use at this time. If you choose to take antioxidants, we recommend the cheapest generic forms available, usually found in any drug store or supermarket.

Frequent, Small Meals

Because of the “war” between big lungs pushing down and compressing the stomach and a large stomach distended with food or gas pushing up and compressing the lungs, eating frequent, small meals (“grazing”) will be more comfortable and allow a greater daily food intake. (continued)
Water and Fluid Intake

Having a high water and fluid intake, in general, is helpful. It may be particularly important in patients with COPD with excessive phlegm production. Liberal drinking of water may allow the body to thin the mucus or phlegm so it is easier to cough out. Expensive bottled water has no benefit over tap water. The timing of fluid intake may be important to those patients who have to get up at night to urinate. Drinking more fluid earlier in the day may help avoid extra trips to the bathroom at night.

Fluid retention with swelling of the legs can be a problem, particularly for patients with COPD and heart disease. Fluid retention is more a problem of excessive salt intake than excessive fluid intake. Salt causes you to hold the fluid in your body. If you limit salt in your diet, then the water that you drink will not be held in the body but will be eliminated in the urine or by perspiration. If you have fluid retention, the best therapy is limiting salt intake or combining that with a diuretic (“water pill”), not limiting the amount of water you drink. Chronic fluid retention may be more troublesome and should be discussed with your doctor.

Alcohol

Excessive amounts of alcohol can be harmful (for anyone). High alcohol levels can interfere with breathing. But small amounts of alcohol (for example, a drink before dinner or a glass of wine or beer with dinner), can enhance your appetite and may be beneficial. If you enjoy alcoholic beverages, use moderation and continue to enjoy them.

Other Considerations

Nutritional needs are tied to other aspects of your health, including your lung problems. Other aspects discussed in this book may allow you to preserve your energy and still maintain your activity. For example, learning to be more efficient (get things done with less work) using the muscles of breathing while you exercise can modify your nutritional needs. If you are losing weight, consider ways to reduce your work of breathing. Consider the use of oxygen if appropriate (if your blood oxygen level is low), and consider balancing the adverse nutritional effects of medications (especially corticosteroids), against the potential beneficial effects.

Anabolic corticosteroids (the same medicine used—or abused—by bodybuilders) and growth hormone have been tested in experimental animals and are beginning to be tested in humans. Studies in patients with COPD are beginning to suggest benefit. More studies are needed analyzing the use of hormones.

Balanced nutrition is a part of good health. Nutritional needs are tied to other aspects of your health, including your lung problems. Discuss your nutritional concerns with your doctor, a dietician or a nutritional specialist. These specialists are available in most medical centers and medical communities. Try what makes sense to you. Natural foods and generic vitamins are generally as effective as more expensive alternatives. Try to find healthy foods, which you also like. Follow the nutritional program that makes you feel the best. Eating should be a source of pleasure. Try to make eating one of your pleasures and not an ordeal.
L. Sexuality

The desire to have sex and the ability to perform sexually naturally declines with age in healthy individuals. This decline can begin sooner and may be more noticeable in individuals with long-term sickness like chronic obstructive pulmonary disease (COPD). However, both healthy older people and those with long-term diseases can find sexual activity satisfying if they invest a little time and imagination. This Section gives an overview of medicines and actions that may help sexual experience for patients with long-lasting disease, particularly those with COPD.

COPD is a long-term disease that affects several parts of the body. Because the patient has abnormal lungs and trouble breathing, doctors may minimize other conditions that are associated with COPD. In addition to a cough and shortness of breath, patients with advanced COPD are often out of healthy physical condition (out of shape). Individuals with COPD may also be undernourished and depressed. Any of these conditions can cause sexual problems. Men with COPD who continue to smoke cigarettes, pipes or cigars are more likely to have trouble getting a firm erection of their penis (erectile dysfunction), since blood vessels in the penis can be damaged from nicotine and other substances found in tobacco. Because human sexuality is complex, sexual problems often have more than one cause, so deciding the right treatment is difficult and takes time. Nevertheless, with a doctor’s advice, many patients with COPD can notice enough improvement that sexual activity seems attractive and appropriate again.

Stop Smoking

Beautiful women and strong, healthy men continue to be shown in cigarette advertising. This artful deception misleads both men and women. In truth, smokers generally have more gum disease and tooth loss, skin wrinkling and cataracts (clouding of the eye lens). These changes from smoking can reduce a person’s attractiveness to the opposite sex. Men who smoke suffer more erectile dysfunction than non-smoking men in nearly every published survey. Nicotine and other products of burning tobacco directly injure the network of veins of the penis (corpus cavernosus) that are responsible for its erection. Stopping smoking completely leads to noticeably better (more firm) erections and more successful sexual intercourse.

There are now many proven ways to stop smoking. The Smoking Cessation Section of this book (Section D) gives many helpful details on how to stop smoking. Some people try to change the events that make them want to smoke (going to places where other people are smoking, while eating, with a cocktail, etc.). Other people successfully stop smoking when they replace the nicotine they get from smoking with the nicotine in gum, a patch, or a nasal spray or inhaler. In addition to nicotine replacement, there are other drugs that can keep the body from wanting nicotine. Total and long-term smoking cessation is the most important thing men with COPD can do to improve their ability to have an erection and to enjoy sex. Other drugs, such as alcohol and many heart and blood pressure medicines may also prevent a full erection from happening. Once smoking is stopped, be sure that other drugs are not interfering with erection. (continued)
How tobacco changes female sexual performance is more difficult to understand. Tobacco products may interfere with women’s physical sexual arousal, although few studies clearly prove this. The wrinkles women experience in their face, tooth loss, dulling of tooth color and mouth odors from smoking seem to especially bother women. Complete smoking cessation benefits the ability to have sex in both men and women.

Change Behaviors and Habits

One reason why patients with COPD have sexual problems is because they get out of breath easily. If both the patient and their sexual partner practice slower sex, they are more likely to enjoy their time together. The patient must also accept partial rather than complete sexual satisfaction with some sexual activities. Sexual activity, particularly for men, can be hurried and feverish.

Orgasm itself causes faster breathing and faster heart beats. Sex for COPD patients is more satisfying when it is done slowly, more deliberately and leisurely. With thoughtful preparation and planning, satisfactory sex can be achieved, even for patients with serious lung disease. Some ideas on how to change behaviors leading up to and during sex include:

- **Prepare and perform:** Be rested. Take your bronchodilator medicine regularly. Be sure you take all recommended lung medicines before sex. Don’t have sex after a large meal or at the end of a tiring day. Do have sex at home or where you feel most secure and confident. If you are strongest in the morning or early afternoon, that’s the time for sex. Try different and more comfortable positions. One position for intercourse that often works well for individuals with COPD is with the woman on her back with legs across the man’s buttocks. The man lies on his side at a right angle to her. Both partners can maintain the position with little energy. Successful intercourse can happen without a full erection. Four energy-saving sexual positions are shown in Figure 10. For the patient with severe shortness of breath, taking a small dose of a relaxer (tranquilizer) or opiate drug before sexual activity begins may be helpful to lessen the sensation of shortness of breath.

- **Imagination and ingenuity:** Remember that satisfactory sex is 75% between your ears and 25% between your legs. Use music, scents, movies and other cues to remind you of pleasant sexual memories. Conserve your energy during foreplay. Expect to move slowly. Talk to each other during the encounter. One useful technique is to make love with your eyes open. Focus on your partner. This approach forces you to concentrate more on your partner than yourself. Don’t be afraid to masturbate each other or even yourself during the encounter. Above all, remember that good sex is whatever brings you and your partner pleasure. Be willing to accept less than “perfect” sex. If you do this, you don’t have to fear sex or avoid it completely.

- **Desire and anticipate:** Patients with long-term disease often need to begin preparing for sex an hour or two before it actually happens. When a desire for sex with a willing partner is noticed, take care of personal hygiene. Shower, shave, brush your teeth and use the toilet. Try to plan a time and place where the encounter will not be interrupted for an hour or more.
Figure 10
Energy-saving Positions for Sexual Intercourse

Partners on side facing each other allows for free breathing and oxygen use. Woman on her back supported by pillows. Oxygen can easily be worn.

Man on his back with a pillow for support. Woman’s weight is on her elbows and knees.

Both partners on their side and man enters from behind.

Table 13

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
<th>Reason to Use</th>
<th>Reasons Not to Use</th>
<th>How to Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>yohimbine HCL</td>
<td>Aphrodyne®</td>
<td>Psychogenic &amp; vascular causes</td>
<td>Kidney failure, depression</td>
<td>Swallow capsule</td>
</tr>
<tr>
<td>prostaglandin E-1 (PGE-1)</td>
<td>Caverject®</td>
<td>All causes</td>
<td>Peyronie’s disease, etc.</td>
<td>Shot in the penis</td>
</tr>
<tr>
<td>prostaglandin E-1 (PGE-1)</td>
<td>MUSE®</td>
<td>All causes</td>
<td>Peyronie’s disease, etc.</td>
<td>Place suppository in urethra</td>
</tr>
<tr>
<td>sildenafil citrate</td>
<td>Viagra®</td>
<td>All causes</td>
<td>Already taking nitrate medications</td>
<td>Swallow tablet</td>
</tr>
</tbody>
</table>
Erectile Dysfunction

Men often have more difficulty getting an erection of their penis as they get older. By age 50, most men have had a time when their penis would not get hard or would not stay hard. Most men don’t like to talk about this problem. In the last few years, there have been many advertisements on TV, the radio, newspapers, magazines and the Internet trying to sell drugs that claim to help erectile dysfunction. The release of Viagra® (sildenafil citrate) received more attention from the press with attention-getting commercials and jokes than perhaps any other drug ever sold. Table 13 gives a summary of four approved products for erectile dysfunction.

Research is less convincing on the effectiveness of yohimbine HCl. This drug may simply produce a feeling of happiness (euphoria), which may lead to more pleasurable sex.

Prostaglandin E-1 (PGE-1), helps make an erection by increasing the size of the veins of the penis, allowing the veins to fill with blood and make an erection. This drug is delivered by a needle injection into the penis or by a suppository inserted into the urinary opening. Erection happens in about 80% to 90% of patients who use PGE-1. Being sexually excited is not necessary before using this drug. The drug is particularly useful after a male’s entire prostate gland has been removed (radical prostatectomy).

A dose of 50 mg to 100 mg of Viagra® causes enough of an erection for intercourse to take place in about 50% to 80% of men. A sugar pill (placebo) did the same thing in 20% of men tested. There must be sexual excitement for Viagra® to work. The firmest erection happens one to two hours after the pill is swallowed. This is about the same amount of time it takes people with a long-term illness to prepare for satisfying sex. Side effects include congestion in the nose and eyes, mild headache and temporary blue-tinted vision. Viagra® can be used safely by patients with heart disease if they are not taking nitrates in any form.

When Viagra® is taken with a strong nitrate-based vein opener (nitroglycerin, Nitrodur® etc.) severe low blood pressure (hypotension) can happen and cause a sudden clot in the heart arteries (heart attack or acute myocardial infarction), which can result in death. Claims that Viagra® helps female sexual performance are not yet scientifically proven.

New drugs for erectile dysfunction are being developed. Some of these drugs are likely to soon be approved by the Food and Drug Administration (FDA). Once approved, these drugs can be purchased at pharmacies with a doctor’s prescription.

Some sources claim specific herbs can help men with erectile dysfunction. These herbs include Cinnamomum Aromaticum (Chinese cinnamon), and Pulsatilla Pratensis (Pasque flower). These herbs are swallowed. At this time, there is no convincing scientific evidence that these herbs help erectile dysfunction. Chinese cinnamon comes from a plant found in Southeast Asia. It contains cinnamaldehyde, which is probably the active chemical. This herb has been most commonly studied and used for painful digestion (dyspepsia). It has also been recommended for erectile dysfunction. Pasque flower is grown in central and eastern Europe. What makes it work is probably the chemical anemonine, which is a blistering agent when taken in a high dose. In smaller amounts, the drug can mildly irritate the lining of the mouth and stomach. It may cause erection by mild irritation of the veins of the penis.
Hormone Replacement Therapy (HRT)

The female hormone, estrogen, naturally decreases in women after menopause. Replacing this natural hormone with a pill form of estrogen has many benefits for sexual activity in women. For instance, estrogen moistens the vagina in preparation for sex.

Men usually produce less of the male hormone testosterone as they age. Some early tests have shown that giving older men additional testosterone may increase their feeling of general well-being and make a satisfying sexual experience more likely. Taking testosterone does not guarantee an erection. Replacing estrogen in women and replacing testosterone in men should only be done when a doctor has found that an individual’s natural hormone level is lower than accepted healthy levels. Few side effects are noticed when men with low levels of testosterone in their body take testosterone. It has not been proven that increasing a man’s testosterone level causes the prostate to get bigger (prostatic hypertrophy). Testosterone should not be given to men with cancer of the prostate or serious liver disease. Estrogen replacement for women can be supplied by vaginal creams, swallowed in a tablet, placed on the skin as a patch (transdermal) or through injections into the skin. In some cases, application of testosterone gel to the skin of women is useful to stimulate sexual desire.

Plant products contain chemicals that are similar to human estrogens and testosterone. These products are widely promoted to improve individual feelings of well-being and sexual performance. That these products lack human hormone-like molecules is not a concern. These products contain these molecules, but the problem is that these products are not standardized and their effects are unpredictable. These phyto-estrogen and androgens obtained from plants should not be used when a person is taking hormone therapy for breast, ovary or prostate cancer. They should also not be used in healthy but naturally hormone-deficient people using medical hormone replacement.

Suggested Readings


Osteoporosis is the reduction in bone mass or density that results in skeletal fragility (“soft bones”) and increased risk of bone fracture. Osteoporosis is more common in women than men and more common in Caucasians than Asians or Blacks. Patients with chronic obstructive pulmonary disease (COPD) are at particularly high risk to develop osteoporosis. It is estimated that half of women who have reached the age of 50 will sustain an osteoporotic fracture during their remaining life. In recent years, it has been realized that osteoporosis is not as rare as previously thought in men. One-third of all hip fractures occur in men. At age 60, the fracture risk in men is nearly half that of women.

Normal Bone

Your skeleton is strongest during your 30s. After this age, there is a gradual decrease in bone mineral density caused by an increase in bone resorption or “thinning” of bones, such as hip, back and wrist bones, as people grow older. The composition of bone includes minerals bound in a collagen or protein matrix and water. There are cells that make bone called osteoblasts, and cells that reabsorb bone called osteoclasts. The mineral calcium accounts for about two-thirds of the total dry weight of bone and is essential for strong bones. Vitamin D is necessary to absorb calcium eaten in your diet into the blood stream from the gastrointestinal tract. To evaluate how healthy your bones are, a bone mineral density test called a DEXA scan is performed. This measures the calcium content of bone in the hip, wrist, ankle or back.

After age 30, gradual loss of bone (bone demineralization) occurs in normal men and women. During and after menopause, much more rapid loss of bone calcium begins in women because of the decrease in estrogen levels in the body. Other important factors that cause an acceleration of bone resorption include a non-active (sedentary) lifestyle, or long-term diseases, such as COPD and continued cigarette smoking. Certain medicines, such as corticosteroids, can also stimulate the osteoclasts to increase bone calcium loss and cause osteoporosis. The cumulative “lifetime” losses of bone mass range from 20% to 30% for men to 40% to 50% for women. After a certain time, in both men and women, decreased bone mass make bones more fragile and fractures to occur more easily. Since this takes place sooner in women than men, women typically will also develop fractures earlier in life. Age, sex, diet, activity level and overall health influence the lifetime risk of developing a fracture.

Prevention of Osteoporosis

You can help to prevent osteoporosis by walking daily and by eating or taking extra calcium and vitamin D. Good sources of calcium are shown in Table 15.

Remember, you need to consume 1,000 mg to 1,200 mg of calcium each day in your diet.

Women should consider hormone replacement therapy (HRT) with estrogen, if appropriate, after reviewing the benefits and potential risks with their clinician. An alternative to estrogen therapy is raloxifene (Evista®), which stimulates bone formation without most estrogen side effects. To prevent bone thinning and resorption, both men and women will want to consider anti-resorptive therapy with “biphosphonates” (Fosamax® or
Table 14

Risks Factors for Osteoporosis

Age: risk increases with each decade
Genetic: Caucasian risk is more than Asian and more than Black
Environment: calcium deficiency, lack of activity
Medicines: corticosteroids, excess thyroid medications
Lifestyle: smoking, alcohol, frequent falls
Estrogen deficiency: menopause or surgery
Long-term diseases: COPD, thyroid, liver
Testosterone deficiency: in older men and women

Table 15

Good Sources of Calcium

<table>
<thead>
<tr>
<th>Milk and Milk Products</th>
<th>Calcium Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk, low fat</td>
<td>1 cup 315 mg</td>
</tr>
<tr>
<td>Yogurt, low fat</td>
<td>1 cup 415 mg</td>
</tr>
<tr>
<td>Skim Milk powder</td>
<td>1/4 cup 400 mg</td>
</tr>
<tr>
<td>Ricotta (skim milk)</td>
<td>1/2 cup 335 mg</td>
</tr>
<tr>
<td>Mozzarella cheese</td>
<td>1 oz. 260 mg</td>
</tr>
<tr>
<td>Cheddar cheese</td>
<td>1 oz. 205 mg</td>
</tr>
<tr>
<td>Cottage cheese</td>
<td>1/2 cup 75 mg</td>
</tr>
</tbody>
</table>

Green Vegetables

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Calcium Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnip greens, cooked</td>
<td>1 cup 250 mg</td>
</tr>
<tr>
<td>Broccoli, cooked</td>
<td>1 cup 180 mg</td>
</tr>
<tr>
<td>Dandelion greens, cooked</td>
<td>1 cup 145 mg</td>
</tr>
<tr>
<td>Collards, cooked</td>
<td>1 cup 150 mg</td>
</tr>
<tr>
<td>Spinach, cooked</td>
<td>1 cup 145 mg</td>
</tr>
<tr>
<td>Mustard greens, cooked</td>
<td>1 cup 100 mg</td>
</tr>
<tr>
<td>Okra, cooked</td>
<td>1 cup 100 mg</td>
</tr>
</tbody>
</table>

Legumes and Soy

<table>
<thead>
<tr>
<th>Food</th>
<th>Calcium Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soy Milk (fortified)</td>
<td>1 cup 300 mg</td>
</tr>
<tr>
<td>Tofu, firm</td>
<td>1/2 cup 260 mg</td>
</tr>
<tr>
<td>Soybean nuts, roasted</td>
<td>1/2 cup 230 mg</td>
</tr>
<tr>
<td>Garbanzo beans, cooked</td>
<td>1 cup 80 mg</td>
</tr>
<tr>
<td>Kidney beans, cooked</td>
<td>1 cup 60 mg</td>
</tr>
</tbody>
</table>

Miscellaneous

<table>
<thead>
<tr>
<th>Food</th>
<th>Amount</th>
<th>Calcium Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackstrap molasses</td>
<td>1 Tbsp.</td>
<td>135 mg</td>
</tr>
<tr>
<td>Figs, dried</td>
<td>5</td>
<td>135 mg</td>
</tr>
<tr>
<td>Sesame butter (tahini)</td>
<td>2 Tbsp.</td>
<td>130 mg</td>
</tr>
<tr>
<td>Almonds</td>
<td>1 oz.</td>
<td>75 mg</td>
</tr>
</tbody>
</table>
Actonel®). This is especially true if you have decreased bone density on a DEXA scan and if you must take frequent cortisone pills for your COPD. Intranasal calcitonin-salmon (Miacalcin®) is a hormone, that stimulates bone formation. Patients who cannot tolerate bisphosphonate therapy but have definite osteopenia can use it.

An Osteoporosis Prevention Program

- Calcium, 1,000 mg to 1,200 mg daily
- Vitamin D, 400 units twice a day
- For women, consider estrogen replacement
- For women, consider raloxifene (Evista®)
- Bisphosphonate therapy (Fosamax®, Actonel®)
- Intranasal calcitonin-salmon (Miacalcin®)
- Daily exercise

Treatment of Osteoporosis

Treatment of osteoporosis involves several key steps to optimize calcium availability to the bone, and to stimulate new bone formation. In addition to calcium and vitamin D, daily exercise (preferably walking) is very important to stimulate the bone mechanically. New bone growth can be encouraged with estrogen or raloxifene (Evista®), therapy, intranasal calcitonin-salmon (Miacalcin®), and parathyroid hormone injections. Bone demineralization can be slowed with bisphosphonate therapy. Either 5 mg (preventive dose) or 10 mg (treatment dose) of alendronate (Fosamax®) can be taken daily, or 70 mg can be taken once a week. Risedronate (Actonel®) can be taken 5 mg daily or 30 mg per week. Both of these medications must be taken in the morning with a large glass of water. The patient must remain upright and not eat breakfast, drink coffee or take other medication for 45 to 60 minutes. This is to ensure absorption of the medication and to prevent reflux of the pill into the esophagus where it can cause a serious irritation. Patients with gastroesophageal reflux disease or ulcers may not tolerate this class of medication until a physician adequately treats their symptoms.

Osteoporosis Treatment Program

- Calcium, 1,200 mg to 1,500 mg per day
- Vitamin D, 400 units twice a day
- For women, estrogen replacement should be considered, or raloxifene (Evista®), 60 mg daily
- Daily exercise (walking is best)
- Bisphosphonate therapy (Fosamax® or Actonel®)
- Intranasal calcitonin-salmon (Miacalcin®)

Parathyroid Hormone Injections

Your physician should monitor a program of treatment for osteoporosis and follow-up visits should be planned to discuss possible side effects of therapy. Regular bone mineral density measurements should be recorded periodically to gauge the effect of treatment.
N. Depression

Human emotional states typically vary widely within any given period of our lives. Moods may range on a normal day from happy to discouraged, affectionate to angry. However, when a person’s spirits remain “stuck” in a negative range for weeks to months, we talk of being “depressed.”

Depression in a person with an active medical illness is sometimes difficult to describe. Is it due to the grim recognition of one’s current or impending suffering or death? Could it be related to the stress of coping with the disease, its treatment or its future implications? Is it due to direct effects of the underlying medical disease? Or, could it be related to the medications one is using?

The clinical definition of depression and the particular aspects of chronic obstructive pulmonary disease (COPD) and depression are discussed below. The actual causes, features, treatment and prevention of depression are also reviewed.

What is Depression?

Since it is normal to periodically feel “low,” when does one become “depressed”? There are a variety of symptoms that are related to the conditions that are labeled as depression or depressive disorders. The more common findings are listed in Table 16. It is important to note that virtually all of these can be part of the normal spectrum of human experience. It is mainly a matter of severity and consistency of these findings that leads to the diagnosis (and treatment) of depression.

If you experience multiple features noted in Table 16 and these persist or worsen over several weeks, you should visit your physician about the possibility of being “depressed.” It is important to recognize if you are depressed. Drug treatment and talking with a skilled clinician to identify and resolve problems (psychotherapy) are very helpful in resolving the condition. It is important to realize the far-ranging impacts of depression at home, work or school. Furthermore, it is most important that your doctor be aware of your condition since depression may affect the quality of medical treatment. (For example, the depressed individual may not take drugs as prescribed.) The emotional changes may be due to side effects of the drugs!

COPD and Depression

Persons suffering from COPD are vulnerable to depressive events for a variety of reasons. For some patients with cigarette-associated chronic bronchitis and emphysema, the realization that their use of tobacco is the reason for their illness generates anger, both towards themselves and the industry that has promoted this destructive practice. They may also be frustrated at their inability to stop smoking. For some who do manage to quit smoking, nicotine withdrawal may result in severe depression. Other patients mourn their inability to work, to exercise, to participate in recreational sports, to conduct the usual activities of daily living or to enjoy their sexuality. For some patients, long-term use of oral corticosteroids (such as prednisone) may cause swings of mood ranging from depression to euphoria.

Treatment

The attitudes regarding the treatment of depression can be complex. Unlike
Table 16

Common Signs or Symptoms of Depression

- Sad or unhappy mood most of the day, nearly every day for two or more weeks
- Decreased interest in or pleasure derived from events, things or persons, including sex or food
- Weight loss not related to diet or an obvious medical problem
- Insomnia (difficulty falling asleep or early awakening)
- Hypersomnia (extended sleep at night, napping during day)
- Prolonged periods of agitation/restlessness or lethargy/indifference
- Feeling continually worthless or guilty
- Decreased ability to focus on issues or to make decisions
- Recurring thoughts of death (not just dying from the illness)
- Ongoing thoughts of suicide

Legend: Typically, the depressed patient who suffers these experiences will feel distressed and have a difficult time functioning at home, work or school. While persons who have suffered a severe loss (a spouse, child or parent), will commonly go through various combinations of these feelings, they usually begin to show signs of improvement within a few months or so.

Table 17

Anti-depression Medications by Type

<table>
<thead>
<tr>
<th>Type/Description</th>
<th>Drugs by the Chemical (and Brand) Name</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Serotonin-reuptake Inhibitors (SRIs)</td>
<td>Bupropion (Wellburtin®, Zyban®) Fluoxetine (Prozac®, Serafem™) Sertraline (Zoloft®) Paroxetine (Paxil®) Fluvoxamine (Luvox®) Citalopram (Celexa®) Venlafaxine (Effexor®) (Others)</td>
<td>Drugs of this type are generally not sedating. They may result in upset stomach, mild weight gain and reversible sexual dysfunction. Also, they may cause temporary insomnia as “energy” increases.</td>
</tr>
</tbody>
</table>

(Continued on next page)
## Anti-depression Medications, by Type *(continued)*

<table>
<thead>
<tr>
<th>Type/Description</th>
<th>Drugs by the Chemical (and Brand) Name</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>II. Tricyclic Antidepressants (TCAs)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>These agents tend to increase the level of another important brain chemical, norepinephrine. Despite a long list of possible complications, they are effective and widely used</td>
<td>Amitriptyline (Elavil®) Doxepin (Sinequan®) Imipramine (Tofranil®) Desipramine (Norpramin®) Maprotiline (Ludiomil®) Nortriptyline (Pamelor®) Protriptyline (Vivactil®) (Others)</td>
<td>Typically result in weight gain and sleepiness, which may occasionally be severe. Also, cause problems passing urine, constipation, dry mouth and, in some cases, difficulty focusing eyes. Other risks include low blood pressure, rapid pulse and convulsions.</td>
</tr>
<tr>
<td><strong>III. New Agents</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drugs of this group work through combined or not fully recognized mechanisms.</td>
<td>Buspirone (BuSpar®) Nefazodone (Serzone®) Mirtazapine (Remeron®)</td>
<td>BuSpar® has been found helpful in smoking cessation.</td>
</tr>
<tr>
<td><strong>IV. Monoamine Oxidase Inhibators (MAOIs)</strong></td>
<td>Monoamine oxidase (Nardil®) Tranylcypromine (Parnate®)</td>
<td>The MAOIs are not commonly used due to the availability of more effective agents. It is critical to beware of interactions with other medications and certain foods.</td>
</tr>
</tbody>
</table>

**Legend:**
This Table is not intended to be a comprehensive listing of antidepressant drugs or their side effects. It is intended to help patients and their families to recognize the type(s) of drug(s) they are taking. It should be noted that, while the SRIs (Type I) are the most popular antidepressants today, various patients might do better with other drugs or combinations.
seeking relief from physical pain, which almost all patients universally do, there is a general tendency to ignore the emotional distress or to blame one’s self as “weak” or “flawed.” Many think that they can simply will themselves to improve or to “snap out of it.” Or, once depression has set in, individuals often do not have the energy or resolve to take action.

What is vital for both patients and families to realize is that clinical depression is actually associated with chemical imbalances in the brain. These chemical changes have profound effects on the way we feel, coloring one’s world “blue” (the reverse of “looking at the world through rose-colored glasses”).

Modern medical therapy can substantially reverse these chemical abnormalities. The various types or individual drugs listed in Table 17 have been shown to be highly effective at restoring the normal range of moods. However, it may take several weeks or occasionally longer to achieve optimal results.

In many cases, psychotherapy (talking through the problem with a specially trained clinician) is helpful. Often a clinical psychologist (not a physician psychiatrist) or clinical social worker may help you. This may be of particular importance early in treatment, before the effects of medicines can help. Without such support, it is very common for patients to become discouraged and to abandon their medication.

**Prevention**

Knowing that depression is a significant problem for persons with COPD, it is important for you, the patient, to be alert to the early signs of this condition. It is often difficult to talk about these feelings, particularly for males who may regard such discussions as “wimpy,” “unmanly” or “unwomanly.” In fact, being able to get these problems off your chest early may prevent you from sliding into a deep depression that is difficult to dig yourself out.

Family members can help by being supportive of their loved one seeking treatments and remaining “positive” with their care and encouragement.

Prolonged feelings of sadness, discouragement, low self-esteem and lack of pleasure are very painful to experience and can be extremely disruptive to life. Patients with COPD are prone to such experiences. It is important for patients and physicians to identify and to cope with these problems. Patients should not try to “tough it out” when an ankle is broken. Similarly, you should not ignore conditions such as depression, which, in their severe forms, may even be life threatening. Relief can be had!
Patients with chronic obstructive pulmonary disease (COPD) all reach a point where they are concerned about death and dying. Some individuals have an immediate fear when first told of their disease. Overwhelming anxiety may exist and panic attacks may produce as much misery as the underlying COPD. For others, it may take years of dealing with the daily inconvenience, physical limitation and severe breathlessness before they confront the reality of death.

A diagnosis of COPD is not a death sentence. All steps to appropriately manage the patient’s illness need to be taken before a patient says, “I give up. Just let me die.” The purpose of this Section is to explore the topics associated with end-of-life issues including living wills, advanced resuscitation directives, durable medical power of attorney and “the end of life decision.” The purpose is to foster hope, courage and support through education. If an individual does not outline his or her needs, desires, beliefs and wishes, then difficult end-of-life decisions will be left to others (family, friends, doctors and other healthcare professionals).

Will Rogers once commented that, “the only two things in life we have to do are to pay taxes and die.” Most Americans have taxes withdrawn from monthly paychecks and, when necessary, file quarterly estimated tax returns. All of this effort prepares for the annual April 15 tax-filing deadline. Fortunately, death doesn’t come on an annual basis. For all persons, the exact timing of death is unknown. Whether people like it or not, everyone will die. Death is the natural extension of the process of life. The issues discussed in the following pages refer to all adults with or without short-term (acute) or long-term (chronic) illness.

A lot of confusion and misinformation exists about advanced directives and how they apply. Advanced directives include any communication (written or verbal) that defines an individual’s wishes about continued medical treatment, especially death and dying. The emotions arising from a COPD patient suddenly becoming worse can polarize family and friends. Responses to these emotions may not always be in the patient’s best interest or more importantly, what he or she wants. Clear, written advanced directives are very helpful. This is especially true in situations where the patient is in critical condition, is unconscious or unable to make important decisions. Ideally the directives should be outlined before the patient is seriously ill. The specific written advance directives most commonly used include:

- The Living Will
- Advance Resuscitation Directive (Do Not Resuscitate or DNR)
- Durable Medical Power of Attorney

The Living Will

The living will is a document that allows the patient to express, in advance, his or her wishes regarding the use and duration of extraordinary means of medical care. This document goes into effect when a patient is no longer able to express his or her desires about continued medical treatment. As long as the individual is alert and responsive, the living will is not active. In the United States, the details of the living will may vary from state to state, but the overall concepts are similar. In some states, this document only places limits on the duration of advanced life...
support measures and does not address those specific issues covered by the advanced resuscitation directive (see below). In other states, the living will and advanced resuscitation directive may be combined, if the patient outlines this as a specific request.

An example of a hypothetical patient with COPD who has a living will illustrates some important points. Because of worsening COPD, the patient comes to the hospital breathless, confused, agitated and incapable of making decisions. The patient gets worse and is placed on a form of advanced life support, called a mechanical ventilator (breathing machine). In this case, the living will does not prevent the use of advanced life support measures. It prevents prolonged use of life support in a situation where recovery is unlikely. The patient continues to do poorly and the question of discontinuing the ventilator is addressed. If, in the opinion of two physicians, there is no reasonable likelihood for the patient to recover, then support may be withdrawn. In most states, the life support is continued for at least five days, but this is variable. If recovery is expected, then support should be continued.

Even when the patient has a living will, the situation may not be clear, which makes continued life support decisions more difficult. In the above example, assume the patient did not wake up and could barely breathe on his own. Even though the breathing machine is removed, the patient remains alive but does not respond to voices, motion or pain. Should intravenous fluids (to provide food and water) and other lesser support measures be continued? Unless an individual has a very specific living will, no one will know what the patient wants done. When the patient has made it clear that no prolonged life support is wanted, then comfort measures (a pleasant environment, oxygen therapy, pain control) become the most important therapy. In these situations, minimizing patient discomfort by the use of analgesics and narcotics is essential.

Nutritional support has a special section in most living wills. Because nutritional support must be given artificially (by feeding tubes into the stomach or feeding intravenously) many consider this a form of “advanced support.” Living wills have a provision for the use and duration of such support. In the naturally dying state, the body does not use water or food. There is a misconception that withholding nourishment is cruel and causes additional suffering. In fact, the opposite is true. As the body prepares to die, it begins to “shut down” all systems. Continuing nutritional support interferes with this natural process.

In summary, the living will is a legal document that a patient must sign while alert. The individual needs to be as specific as possible regarding end-of-life requests. These wishes should be discussed with his or her physician. The purpose of the living will is to direct the duration and type of medical treatment the patient receives when he or she is incapable of making these decisions. The more specific the requests, the more likely they can be granted.

Advanced Resuscitation Directives

This is the document patients need to sign when they want no advance life support measures. (See below for a discussion of who should have an advanced resuscitation directive.) Frequently, advanced resuscitation directives are confused with the living will. In contrast to the living will, the advanced resuscitation directive is quite specific as
to what type of resuscitation may be performed. In its broadest (and most commonly used form), the directive states that advanced life support measures are not to be used in any circumstance. There are “limited” directives, which specify what types of support may be given. This is a complicated issue and should be reviewed with your doctor before making a decision.

The patient may choose to refuse these common forms of advanced life support:

1. No intubation (breathing tube in throat),
2. No mechanical ventilator (breathing machine),
3. No defibrillation (electrical shock to the heart),
4. No cardiac drugs to support blood pressure,
5. No cardiac drugs to treat irregular heartbeats, or
6. All of the above (“I want no advanced life support”).

The use of antibiotics to treat infection, intravenous fluids for dehydration, insulin to treat diabetes and diuretics to treat fluid overload and heart failure are examples of more routine supportive therapy. Unless the patient has specifically requested that these routine therapies not be used, they are automatically done when the physician believes they are needed.

The advanced resuscitation directive allows the patient to select specifically which treatment they want to be used. Without a directive, all of the advanced support methods listed above are commonly used in critical and emergent situations.

Who Should Request a Do Not Resuscitate (DNR) Directive?

For most patients and families, this is an emotional and difficult decision. The patient must consider how long he or she is expected to live, the amount of daily suffering they experience, what gives their life meaning and their overall quality of life. This is an individual decision. Unfortunately, many patients will not express their desire for no advanced resuscitation because they do not want to disappoint family members. Families must honor and respect the patient’s requests.

Spirituality plays an important role for many patients. Individuals should share their spiritual and religious beliefs with their doctor and other professionals. Recent information indicates that as many as 80% of patients use prayer as a means of helping them make difficult medical decisions.

When a person’s current lifestyle is uncomfortable, there is no joy and feeling of well-being in life and physical suffering is unbearable, a do not resuscitate (DNR) directive is appropriate. Once this decision is made, many patients have a tremendous sense of relief and peace. Most patients continue to use their regular medicines, supplemental oxygen and breathing treatments. Additional ways to comfort the patient (such as regular use of narcotics) may be added. The patient now has control!

Another way of evaluating the appropriateness of DNR status is to answer the following question. “If advanced life support can reverse a short-term illness such as pneumonia or heart failure, is my
quality of life good enough that I want to continue living as I did before the illness started?” If the answer is “yes,” then advanced support should be used. If the answer is “no,” then a DNR directive is appropriate.

**Durable Power of Attorney for Medical Decisions**

This document appoints someone the patient trusts to make all future medical care decisions for him or her. This person is the patient’s chosen replacement when medical decisions must be made. This selected person is to try to make the same decisions that the patient would, if he or she were still capable of making decisions. The durable power of attorney for medical decisions (sometimes referred to as “the agent”) may request copies of medical records, deal with insurance companies, give, stop or change permission for medical treatment. The agent can also make arrangements for long-term medical care. Because the patient’s chosen agent is authorized to make decisions daily, he or she is in the best position to be a true advocate when or if the patient’s medical condition changes. Many patients prefer a durable power of attorney for medical decisions directive because an individual they trust and love is in control. In order for this to work best, it is important that the patient and agent discuss specific situations that might develop so the agent knows what the patient wants. The agent should not be the patient’s physician.

Most physicians, nurses, social workers and therapists want what is best for the patient. Frequently, however, there is no one answer to this question. The patient has the best chance of having his or her wishes followed if a legal advocate (an “agent”) understands the information from all professionals involved in the medical care.

**The End-of-life Decision or “I Take Control”**

The day comes when we all must face our death. Very few of us “want to die.” Most of us are frightened by the concept of our death. We want to know: How will it happen? Will I suffer? Will I suffocate? Will I have uncontrolled anxiety? Will I writhe in pain? Will I agonize? Or, is it possible to face death with some control over these fears?

All patients should know there are many medications that can control pain and anxiety. Patients do not need to have “everything done” to provide for their comfort and quality of life. A breathing machine may not be needed to stop the feeling of suffocation with a severe attack of COPD. Appropriate use of narcotics and sedatives can control shortness of breath and pain.

A frequent question for physicians treating patients with severe COPD is “Doc, how long do I have to live?” The honest response is “I don’t know.” Two patients with COPD may have identical seriousness of illness medically, yet one lives several months, even years longer than the other does. Why?

In Dr. Viktor Frankl’s classic, *Man’s Search for Meaning*, he describes the terrible suffering of prisoners in German concentration camps during World War II. This Austrian psychiatrist (himself a long-term prisoner) observed that while the horrid conditions and misery seemed the same for all prisoners, some died a few days after arriving at the camp. Others lived for years. Dr. Frankl concluded that as long as a person’s life has meaning (e.g.
staying alive to see a loved one, a desire to complete works, religious beliefs, a desire to participate in a future event) the individual had the will and inner strength to fight and to continue to live. When life has no meaning, death is usually near.

For patients with severe COPD, there may come a time when quality of life is so poor, breathlessness becomes intolerable, the desire to take food and drink leaves, and life seems to have no purpose. At this point, the patient’s emotional and physical comfort must come first. The goal is no longer to “grind-it-out,” but to find peace and comfort within one’s self, with family and with friends. This acceptance and use of comfort measures does not mean death is immediate. It means the patient has taken control. COPD no longer controls their daily life and routine.

For many patients, when the decision not to continue living has been reached, support from hospice and other homecare agencies may be welcomed. Patients have the choice of spending their final days at home or in a facility operated by hospice. Hospice workers offer quality of life, compassion and dignity. Physical, emotional and spiritual support is provided. Control is returned to the patient.

The use of advanced directives clarifies what patients want regarding their medical care. Their purpose is to make certain each individual’s desires and wishes are followed. Advanced directives do not remove hope or the desire for life. They simply give patients control, freedom, comfort and peace.

P. The Internet: The Search for Reliable and Relevant Information

The Internet is an increasingly important source of health information. In the year 2000, it was estimated that 60 million persons searched for information using the Internet. The Internet and “World Wide Web” are increasingly important sources of information and communication for patients, their loved ones and healthcare professionals. This Section will discuss:

1. Healthcare Websites that provide information,
2. Things to think about when using a Website for information,
3. How a patient or someone concerned about a patient, should use Web information during doctor visits and
4. The Internet as a communications tool.

Healthcare Websites

Healthcare Websites that have a large amount of medical information are called, “portals.” Portals are like a medical textbook. “Medscape” (www.medscape.com) and “Intellihealth” (www.intellihealth.com) are examples of portals. Just like medical journals and magazines, advertising supports them. Some Websites are sponsored by not-for-profit organizations, such as the Mayo Clinic Health Oasis (www.mayohealth.com). There are also Spanish-language Web health portals, such as Graciasdoctor (continued)
Portals may be “professional,” meaning they are aimed towards doctors and other healthcare professionals. Some portals are specifically for consumers, such as patients and their loved ones. Medscape is an example of a professional portal, and its consumer counterpart is CBS Healthwatch (www.cbshealthwatch.com). Many consumers prefer to use the professional Websites so that they read the same things as their doctors.

Specialty Websites

In addition to portals, there are specialized sites that deal with specific conditions and disease. Like portals, specialty sites may be written for healthcare professionals or consumers. Table 18 lists specialty Websites for persons seeking information about lung diseases. One Website of particular interest to anyone with a health problem is “Quack Watch,” www.quackwatch.com. It is a non-profit site devoted to helping people identify and deal with health fraud and quackery.

### Table 18

**Lung Information Sites on the Internet**

- www.airwaves.com
- www.breathingspace.com
- www.copdadvocate.com
- www.copd-support.com
- www.dailylung.com
- www.lungdz.com
- www.lungsusa.com
- www.nationaljewish.org
- www.nlhep.org

### Things to Think About When Looking for Information

There are some important considerations when choosing where to get information on the Internet. Questions to ask include:

1. Is the Website associated with a reputable healthcare organization? For instance, www.mayohealth.com is affiliated with the Mayo Clinic and www.intellihealth.com with Massachusetts General Hospital.

2. How current is the information? Good sites should indicate when the information was last updated.

3. Does the site adhere to the criteria developed by several organizations to guide quality of health-related Web-based information? These organizations include: HON Code, American Medical Association, Internet HealthCare Coalition, Hi-Ethics and MedCertain.

4. Is anyone monitoring the quality of information being discussed in the “chat rooms” of online support groups and communications networks? Such information may be helpful, but unfortunately highly opinionated individuals can dominate some of the discussions. Consequently, information may be wrong or not relevant to a particular patient’s circumstance.

### How to Use Internet Information When Visiting the Doctor

Some patients and their loved ones, bring information found on the Internet with them when they visit their doctor. They want the doctor to comment on what they have found. Patients should not be reluctant to do this. There are two things that will be helpful to the doctor. First, try
only to bring those articles that you feel to be most relevant to your situation. Busy doctors will appreciate this, rather than a large stack of papers. Second, before your visit, write down those questions that are most important to you. Again, keeping questions brief and specific will help your doctor to be able to answer the questions.

The Internet as a Communications Tool

E-mail is one of the most popular uses of the Internet. Currently, most doctors do not correspond with their patients by e-mail. This is for several reasons:

1. Concern about privacy of the information. E-mail messages may go to a computer where someone other than the patient can read them.

2. Concerns about liability. Urgent or important messages may not be read or the severity of the situation might not be clear.

3. Limited experience has shown that some patients use this method of communication too often.

4. Because of new federal regulations regarding privacy and security of health information, new limitations on e-mail are likely to be imposed.

E-mail is a valuable means for family members to correspond with one another. The sharing of information among family members and friends can help everyone to have the same information and to be kept up-to-date on the patient’s condition. Finally, the Internet may offer a way for patients and their loved ones to correspond with international experts.

The Internet is still in its infancy as a source of healthcare information and services. While it already contains a vast amount of information, finding and trusting the information presents many difficulties for patients and their loved ones. In addition, studies have shown that reading healthcare material on the Internet requires at least the ability to read at a high school level. While animation and Web-based videos may help those with reading impairments, the availability of these services is very limited. Nevertheless, it is certain that over time, patients will be able to look to the Internet as a source of more and more information and services. For some of the most informative Internet sites for COPD, see Table 19.

| Table 19 |
| National Organizations for Patients with COPD |

American Association for Respiratory Care (AARC) [www.aarc.org](http://www.aarc.org)

National Emphysema Prevention Program (NEPP) [www.nepp.org](http://www.nepp.org)

American Lung Association (ALA) [www.lungusa.org](http://www.lungusa.org)

National Lung Health Education Program (NLHEP) [www.nlhep.org](http://www.nlhep.org)
Q. Future Directions

It is now known that the inflammatory processes that result in COPD are different from those involved in asthma. This new knowledge has encouraged drug companies to explore and to develop new compounds to deal with the basic processes that damage both alveoli and airways. Many new types of drugs are being produced, some of which may be available at the time that this monograph is published.

One of the most promising drugs is long-acting anticholinergics which are given by the inhaled route. It is effective for 24-hours or more. The drug, tiotropium, is chemically related to ipratropium, an anticholinergic agent now widely used in COPD.

Two new oral drugs that combat airway inflammation are called Ariflo® and Roflumilast. Both are being extensively studied in the U.S. and in Europe. Those drugs are distant relatives of theophylline.

Other new products that regulate mucus production (mucoregulators), or alter immune processes (immunomodulators) can deal with basic inflammatory processes in the lungs. In the future, additional medications will be available to primarily deal with mild to moderate stages of COPD. The early identification and intervention in COPD remains an imperative (See Section C.)

Emphysema is a primary reason for premature mortality and morbidity. Thus the goal of early identification and treatment is essential. This is a major reason why the National Lung Health Education Program (NLHEP) has launched the National Emphysema Prevention Program (NEPP). The NLHEP is working in partnership with the American Association for Respiratory Care (AARC). Together, these organizations are now implementing new programs for early identification and intervention (See Table 19). By developing grass-roots, community-oriented programs for all stages of COPD, we will finally make progress against this growing health problem as we move into a new era of promotion of lung health.
Postscript and Biographical Sketches of Authors
Postscript

It should be obvious that the authors are enthusiastic about the progress that has been made in the understanding of the diagnosing and treating of COPD. The established treatments described in this book have increased both the length and quality of life of millions of people. Early identification of COPD and stopping smoking can reduce the number of people who notice the symptoms and life-changing effects of COPD.

Lung damage and repair are under thorough study and will help us develop more effective treatment for COPD in the future. New discoveries in tobacco addiction will create ways to make it easier to stop smoking.

Because the future looks bright, this book is ended on a note of optimism.

Quotations on optimism:

*Do not expect the world to look bright, if you habitually wear gray-brown glasses.*

Charles Eliot

*The only limit to our realization of tomorrow will be our doubts of today.*

Franklin Delano Roosevelt

*The habit of looking on the bright side of every event is worth more than a thousand pounds a year.*

Dr. Samuel Johnson

*Keep your face in the sunshine and you cannot see the shadow.*

Helen Keller
Co-editor: James T. Good, Jr. MD

Dr. Good received his MD degree from the University of Kansas in Kansas City, where he completed a medical internship, residency and chief medical residency. He then undertook a 3-year pulmonary and critical care fellowship at the University of Colorado in Denver, where he remained for the next four years as Assistant Professor of Medicine and Medical Director of both the Respiratory Therapy Department and the Critical Care Unit of Denver General Hospital. Dr. Good is currently in private practice in pulmonary and critical care medicine in south Denver and is Medical Director of the Swedish/Columbia Critical Care Unit.

A fellow of the American College of Physicians and the American College of Chest Physicians (ACCP), Dr. Good served as the governor of the ACCP’s Colorado and Wyoming Divisions from 1988 to 1994. His scientific interests include management of critical patients with acute respiratory failure, pleural diseases and asthma. He remains actively involved in clinical research, teaching medical students and residents, and contributing to continuing medical education programs.

Co-editor: Thomas L. Petty, MD

Dr. Petty received his MD degree at the University of Colorado in Denver in 1958. He interned at Philadelphia General Hospital and began his residency training at the University of Michigan in Ann Arbor before returning to Denver to complete it at the University of Colorado. A board-certified internist and pulmonologist, Dr. Petty is Professor of Medicine both at the University of Colorado Health Sciences Center and at Rush University in Chicago. He was previously head of the Division of Pulmonary Sciences at the University of Colorado and, from 1971 to 1985, Director of the fellowship training program there. Having served most recently as Director of the HealthONE Center for Health Sciences Education, he is now a consultant to HealthONE and other medical institutions throughout the United States.

Dr. Petty was the organizer and founding president of the Association of Pulmonary Program Directors. He has served as president of the American College of Chest Physicians (ACCP) and is a former member of the Board of Governors of the
American Board of Internal Medicine. He is currently co-chairman of the National Lung Health Education Program (NLHEP).

In 1995 Dr. Petty received the distinguished service award of the American Thoracic Society, was elected to the Colorado Physicians’ “Hall of Fame,” received the annual award for excellence of the American Association for Respiratory and Cardiovascular Rehabilitation, and was elected master fellow of the ACCP. In 1996 he received the Master Award of the American College of Physicians. In 1999 he received a fellowship Award of the American Association for Respiratory Care. He remains active in teaching, patient care and research. He enjoys fishing, small game hunting and playing with his three “kids” and eight grandchildren.

David D. Collins, MD

Dr. Collins is a pulmonologist who has practiced in Winston-Salem, North Carolina, for 18 years. He is Medical Director of Respiratory Therapy and Intensive Care Medicine at Forsyth Medical Center. He is on the clinical faculty of the Wake Forest University School of Medicine. He is involved in ongoing clinical research on techniques of non-invasive ventilation.

Dr. Collins is a graduate of the Duke University School of Medicine and did his residency, chief residency and pulmonary fellowship at the University of Colorado Health Sciences Center.

Dr. Collins is married to Carole and has two high-school aged children, Michael and Julie. His recreational interests include fly fishing, bicycling, cabinet making and cooking.
Dennis E. Doherty, MD, FCCP

Dr. Doherty is Professor of Medicine and Chief of the Division of Pulmonary and Critical Care Medicine and the Medical Director of Respiratory Care Services at the University of Kentucky, Chandler Medical Center, and the Lexington Veterans Administration Medical Center. He completed his medical school and internal medicine residency training at the Ohio State College of Medicine in Columbus, Ohio between 1977 and 1983. His pulmonary and critical care fellowships were received from the University of Colorado Health Sciences Center in Denver, from 1983 to 1986, where he remained on faculty for 11 years.

In 1996 Dr. Doherty relocated to the University of Kentucky to serve as Chief of Pulmonary and Critical Care Medicine. He has been principal investigator on over 35 basic science and clinical grants and has published numerous articles and chapters on the subjects of acute and chronic lung inflammation, obstructive lung disease and pulmonary fibrosis. He is the Co-chairman of the National Lung Health Education Program, a fellow of the ACCP, and is President of the Kentucky Thoracic Society.

Dr. Doherty is an avid home winemaker, a former national champion in handball and enjoys spending time with his wife, Kim, and two children, Erin and Collin.

J. Roy Duke, Jr., MD

Dr. Duke was born in Ocala, Florida and attended Tulane University School of Medicine in New Orleans, Louisiana, obtaining his medical degree in 1960. After a two-year assignment in the U.S. Air Force, he completed his postgraduate training in pulmonary medicine at Tulane in 1967.

Dr. Duke joined the Palm Beach Medical Group in West Palm Beach, Florida, in 1967 and has practiced pulmonary medicine and internal medicine there to the present. He has served as Chief of Medicine and Chief of Staff of Good
Samaritan Hospital in West Palm Beach and is currently the Director of Pulmonary Services.

He has an interest in hyperbaric medicine, which is an extension of his hobbies of scuba diving and underwater photography. He is also an avid fly fisherman and fly tier. Dr. Duke is married to Bobbye Craig Duke and has two children, Denise and Christopher.

**Leonard D. Hudson, MD**

Dr. Hudson received his BS from Washington State University in Pullman, Washington, and his MD from the University of Washington in Seattle. He did his internship at Bellevue Hospital Center located in New York and his residency at New York Hospital, Cornell Medical Center (New York), and at the University of Washington, in Seattle. From 1971 to 1973 Dr. Hudson was an attending physician at Colorado General Hospital, in Denver. In 1973 he moved to Seattle’s Harborview Medical Center, where he rose to Associate Physician-in-chief in the Department of Medicine. In 1985 Dr. Hudson became Head of Pulmonary and Critical Care Medicine at the University of Washington. Since 1982 he has been Professor of Medicine at the University of Washington, Seattle.

Dr. Hudson’s honors include Outstanding Resident, Harborview Medical Center; American Thoracic Society Fellowship in Pulmonary Disease; Chair, Pulmonary Disease Subspecialty Board, American Board of Internal Medicine; and Chair, Critical Care Medicine Test Committee, American Board of Internal Medicine. He was President of the American Thoracic Society from 1995 to 1996.

**Thomas M. Hyers, MD**

Dr. Hyers received his MD degree from Duke University in 1968. He completed his medical internship at Cleveland Metropolitan General Hospital in 1969 and then served three years in the U.S. Public Health Service at the National Institutes of Health, where he helped coordinate early studies of urokinase and striptokinase in the treatment of pulmonary embolism. He did his medical residence and chief residence at the University of Washington in Seattle and
then completed a pulmonary fellowship at the University of Colorado in Denver. He served for five years as a faculty member at the University of Colorado, Denver Veterans’ Administration Medical Center and then moved to St. Louis University, where he was Director of the Division of Pulmonary and Occupational Medicine from 1982 to 1997.

Dr. Hyers has held the rank of Professor of Internal Medicine at St. Louis University since 1985. He has a longstanding interest in thrombosis and antithrombotic therapy and has conducted clinical research in the diagnosis, treatment and prevention of venous thromboembolism. Dr. Hyers continues to write and lecture frequently on this topic.

Since 1997 Dr. Hyers has maintained a private practice in pulmonary and occupational medicine at St. Joseph’s Hospital in Kirkwood, Missouri, a suburb of St. Louis. Recently, he developed an interest in Internet education and, with a great deal of help, designed a website (www.careinternet.com) to help caregivers deliver antithrombotic therapy more effectively.

Dr. Hyers is married with two grown sons. In his spare time, he enjoys creative writing, gardening and fishing.

Michael D. Iseman, MD

Mike Iseman grew up in Fremont, Nebraska. He received his undergraduate degree from Princeton University, where he majored in history and played football. He attended Columbia’s College of Physicians and Surgeons, receiving his MD in 1965. He received his training in internal medicine and pulmonary medicine in New York City between 1965 and 1972.

Joining the faculty of the University of Colorado in 1972, he spent 10 years at Denver General Hospital. He moved to Denver’s National Jewish Hospital in 1982 as Head of the Clinical Mycobacterial Diseases program. His primary research interests relate to drug-resistant tuberculosis and disease due to the “atypical mycobacteria.” He currently
is Professor of Medicine in the Divisions of Pulmonary Medicine and Infectious Diseases. He is also editor in chief of the International Journal of Tuberculosis and Lung Diseases.

Donald R. Rollins, MD

Dr. Rollins received his BA at St. Olaf College and his MD from the University of North Carolina. He did his internship, residency and pulmonary fellowship at the University of Texas.

Dr. Rollins is a consultant in Internal Medicine and Pulmonary Disease at Greenbrier Clinic in White Sulphur Springs, West Virginia. Previously, he was a pulmonologist engaged in clinical practice in Loveland, Colorado, where he was Medical Director of the Cardiopulmonary Department at McKee Medical Center. He is a Fellow of the American College of Chest Physicians. He was an Associate Clinical Professor in the Pulmonary Division at the University of Colorado Health Sciences Center in Denver and continues to be actively involved with clinical research.

He enjoys fishing with friends and playing string bass and guitar with his daughter, Elizabeth, and his wife, Susan, both accomplished musicians.

Charles H. Scoggin, MD

Dr. Scoggin received his medical degree from the University of Colorado, training in internal medicine at Duke University and pulmonary medicine and critical care in the Division of Pulmonary Sciences at the University of Colorado. He also trained in molecular and cellular biology at the University of Colorado and Eleanor Roosevelt Institute.

He has held the positions of Professor of Medicine, Clinical Director of the Department of Medicine, Director of the House Staff Training Program of the Department of Medicine and Head of the Adult Human Genetics Section, all at the University of Colorado. He was also Senior Scientist and Vice President of the Eleanor Roosevelt Institute.

During his academic career, Dr. Scoggin received numerous awards and
recognition. He was Teaching and Research Scholar of the American College of Physicians, a Fellow of the American College of Physicians, Research Scholar of the American Lung Association and Fellow of the American College of Chest Physicians.

Dr. Scoggin is currently Chairman, President and Chief Executive Officer of Medrock, Inc., a Boulder, Colorado, and Cambridge, Massachusetts-based company focused on providing assistance to family members and loved ones of patients experiencing a medical crisis. He enjoys fishing, hunting, his family and good friends.
Index

A
AARC. See American Association of Respiratory Care
Accolate, 28
Achromycin, 22
Actonel, 69
Acute exacerbation of chronic bronchitis, 20
   defined, 20
   mechanisms of, 21
Addiction
   to oxygen, lack of, 31
   to tobacco, 13-15
Advair, 27
Advanced resuscitation directives, 75-76
Advocacy organization, proposed, 54
Agency for Health Care Policy and Research, 16
Airways, function of, 3
Albuterol, 27
Albuterol, 25
Alcohol, 61
Aldactazide, 28
Aldactone, 28
Alendronate, 69
Alpha-1 antitrypsin deficiency, 20
Alpha-one-antitrypsin, 5
Alupent, 27
Alveoli, function of, 3
Amantidine HCL, 23
American Association of Respiratory Care, 80
American Cancer Society, 15, 16
American Heart Association, 16
American Institute of Life-Threatening Illnesses and Loss, 81
American Lung Association, 15, 16, 80
Aminophyllin, 28
Amitriptyline, 72
Amoxicillin, 22
Ampicillin, 22
Anabolic corticosteroids, 61
Aneurysms, smoking and, 14
Anti-depression medications, 71
Antibiotics, 22, 24, 25-29
Anticholinergics, 24, 25
Anxiety, withdrawal from nicotine and, 15
Aphrodyne, for erectile dysfunction, 64
Arousal, sexual, tobacco, effect on, 63
Asthma, as cause of COPD, 5, 20
Atrovent, 25, 27
Augmentin, 22
Avelox, 22
Azithromycin, 22
B
Bacterial pneumonia, pneumococcus, 23
Bactrim, 22
Beclomethasone, 28
Beta-agonists, 25, 27
Better Breathers’ Club, 54, 81
Biaxin, 22, 25
Bicycle, stationary, use of in pulmonary rehabilitation, 52
Bisphosphonate therapy, 69
Bladder, cancer of, tobacco and, 14
Blood supply to lungs, 5
Bottled water, tap water, compared, 61
Brain tissue, dopamine, 15
Breath Savers Support and Education Group, 54
Breathing test. See Spirometry
Breathlessness, with COPD, 5
Bronchi, function of, 3
Bronchial hygiene regimens, 23
Bronchiectasis, 20
Bronchioles, function of, 3
Bronchitis, 5
   chronic
      acute exacerbations of, mechanisms of, 21
      cigarette-induced, and emphysema, 20
types of, 21
Bronchodilators, 24
   inhalers, 24-25, 27
tablets, 25
Budesonide, 28
Bupropion, 19, 71
Burns, Mary, founder of PEP Pioneers, 53
BuSpar, 72
Buspirone, 72

C
Calcium, osteoporosis and, 67-69
California Smokers’ Helpline, 16
Cancer, 5
- quitting smoking and, 14
- smoking-related, 14
- surgery, 57
Cape Cod COPD Support Group, 53
Capillary network, lung, function of, 3
Carbon dioxide, exhalation of, 3
Carbon monoxide, in tobacco smoke, 17
Carcinogens, in tobacco smoke, 17
Cataracts, from smoking, 62
Caverject, for erectile dysfunction, 64
Ceftin, 22
Cefuroxime, 22
Ceflexa, 71
Cheese, phlegm production with, 59
Chest x-ray, 7, 10
Chewing gum, nicotine, 18, 62
Chronic bronchitis
- acute exacerbation of, 20, 21
- cigarette-induced, 20
- types of, 21
Chronic obstructive pulmonary disease.
See COPD
Cigarettes. See Smoking
Cinnamonum Aromaticum, for erectile dysfunction, 65
Cipro, 22, 25
Ciprofloxacin, 22
Citalopram, 71
Clarithromycin, 22
Coenzyme Q, antioxidant effects, 60
Collins, David D., MD, biography of, 85
Combination inhalers, 27
Combivent, 25, 27
Compressed gas cylinders, oxygen, 32
Compressor machines, 24
Concentration, difficulty with, withdrawal from nicotine and, 15
COPD
- breathlessness with, 5
- causes of, 5
- defined, 5
- depression, 70-73
end-of-life issues, 74-78
future developments, 81
identification of, 9-10
internet, 78-80
lungs of, normal lungs, compared, 4
mortality from, 9
nutrition, 58-61
osteoporosis, 67-69
oxygen, 30-34
patient support groups, 53-54
prevention, 20-24
pulmonary rehabilitation, 35-52
sexuality, 62-66
smoking cessation, 13-19
surgery, 55-57
symptoms, 9
- treatment, 20-26
Corticosteroids, 21, 23, 24, 25, 28, 61
Cost of oxygen, 34
Coughing, 5
CQ Patch, nicotine replacement, 18
Cravings, withdrawal from nicotine and, 15
Cystic fibrosis, 20

D
D-cylinder, oxygen, 32
Date, setting, for quitting, 17
Demadex, 28
Department of Health and Human Services, 15
Depression, 8, 70-73
- anti-depression medications, 71
- defined, 70
- monoamine oxidase inhibitors, 72
- prevention of, 73
- serotonin-reuptake inhibitors, 71
- symptoms of, 71
- treatment, 70-73
- tricyclic antidepressants, 72
Desipramine, 72
Desoxyribonuclease, 23
Dexamethasone, 28
Diagnosis of COPD, 10
Difficulty concentrating, withdrawal from nicotine and, 15
Dipropriionate, 28
Disc-inhalers, for dry powder medications, 24
Diuretics, 28, 29
Do not resuscitate order, (DNR) 76-77
Doherty, Dennis E., MD, FCCP,
biography of, 86
Dopamine, in brain tissue, withdrawal
from nicotine and, 15
Dornase, 23
Doxepin, 72
Dry powder medications, disc-inhalers
for, 24
Duke, J. Roy, Jr., MD, biography of, 86
Dumbbells, in pulmonary
rehabilitation, 52
Durable power of attorney, 77
Dyazide, 28
Dyrenium, 28

E
e-cylinder, oxygen, 32
Effexor, 71
EFFORTS. See Emphysema Foundation
For Our Right to Survive
EKG. See Electrocardiogram
Elavil, 72
Electrocardiogram, 10
Emphysema, 5, 20
Emphysema Foundation For Our Right
to Survive, 54
End-of-life issues, 74-78
advanced resuscitation directives,
75-76
control over fears, 77
do not resuscitate order, 76-77
durable power of attorney, 77
living will, 74-75
Erectile dysfunction, 65
herbs for, 65
smoking and, 62
Erythromycin, 22
Esophagus, cancer of, tobacco and, 14
Estrogen, hormone replacement therapy
with, 67
Evista, 69
Exercise
effect of, 7-8
quitting smoking and, 17

F
Fears, at death, 77
Flu, vaccination against, 23
Fluid pills. See Diuretics
Fluid retention, 29
salt intake and, 61
Flumadine, 23
Flunisolide, 28
Fluoxetine, 71
Fluticasone, 27-28
Fluvoxamine, 71
Foradil, 27
Formoterol, 27
Fosamax, 69
Frankl, Viktor, 77-78
Fumes at work, exposure to, 5
Furosemide, 28
Future developments, in COPD treat-
ment, 81

G
Gas cylinders, compressed, oxygen, 32
Gatifloxacin, 22
Good, James T., Jr., MD, biography
of, 84
Green vegetables, as source of
calcium, 68
Growth hormone, 61
Gum, nicotine, 18, 62
Gum disease, smoking and, 62
Gum patch, 62

H
Habitrol, nicotine replacement, 18
Heart
attack, tobacco-related, 5
disease, smoking cessation, 14
weakening of, oxygen level and, 8
Herbs, for erectile dysfunction, 65
Hormone replacement therapy, 66
with estrogen, 67
Hudson, Leonard D., MD, biography
of, 87
Hydrochlorothiazide, 28
Hydrodiuril, 28
Hyers, Thomas M., MD, biography
of, 87
I
Imipramine, 72
Infection
of lung, 5
prevention, treatment, 20-26
Influenza, vaccination against, 23
Inhalers, 24
bronchodilator, 24-25, 27
combination, 27
Combivent, 25
Internet, 78-80
as communication tool, 80
healthcare websites, 78-79
looking for information, 79
patient support, 54
specialty websites, 79
use of information with doctor, 79-80
Intranasal calcitonin-salmon, 69
Ipratropium, 25, 27, 81
Irritability, withdrawal from nicotine
and, 15
Iseman, Michael D., MD, biography
of, 88
K
Kutscher, Austin H., Dr., 81
L
Larynx, cancer of, tobacco and, 14
Lasix, 28
Legumes, as source of calcium, 68
Leukotriene inhibitor, 25, 28
Levaquin, 22
Levofloxacin, 22
Liquid oxygen systems, portable, 32
Living will, 74-75
Ludiomil, 72
Lung
blood supply to, 5
cancer, 5
function of, 3, 6
infections, 5
information sites, 79
normal, 3-5
transplantation, 8, 57
volume, 9

volume reduction surgery, 8, 55-57
Medicare, lack of reimbursement
for, 57
Luvox, 71
M
M6-cylinder, oxygen, 32
M9-cylinder, oxygen, 32
Man’s Search for Meaning, 77-78
Maprotiline, 72
Maxair, 27
Maxzide, 28
MDIs. See Metered-dose inhalers
Meals, frequent, small, 60
Measurement, oxygen level, 30
Medicare, lack of reimbursement for lung
volume reduction surgery, 57
Medrol, 25
Memory impairment, oxygen levels
and, 8
Menopause, hormone replacement
therapy, 66
Metabolism, oxygen, 30
Metaproterenol, 27
Metered-dose inhalers, 24
how to use, 26
Methylprednisolone, 28
Miacalcin, 69
Milk
phlegm production with, 59
as source of calcium, 68
Mirtazapine, 72
Monoamine oxidase inhibitor, 72
Montelukast, 28
Mortality from COPD, 9
Motivation, for quitting smoking, 15
Mouth, cancer of, tobacco and, 14
Moxifloxacin, 22
Mucolytics, 23
Mucomist, 23
MUSE, for erectile dysfunction, 64
N
N-acetylcysteine, 23
Nardil, 72
Nasal spray, nicotine, 18, 62
National Cancer Institute, 16
National Emphysema Prevention
Program, 80, 81
National Emphysema Therapy Trial, 57
National Lung Health Education Program, 11, 80, 81
Nebulizer machines, 24
Nefazodone, 72
NEPP. See National Emphysema Prevention Program
NETT. See National Emphysema Therapy Trial
Nicoderm, nicotine replacement, 16, 18
Nicorette, nicotine replacement, 16
Nicorette gum, nicotine replacement, 18
Nicotine, 14
in gum, 18, 62
inhalers, 18
nasal spray, 18
policrilex, 18
replacement therapy, 17-18
transdermal patches, 18
withdrawal, symptoms of, 15
Nicotrol inhaler, 18
Nicotrol nasal spray, 18
Nicotrol Patch, nicotine replacement, 18
NLHEP. See National Lung Health Education Program
Normal lungs, 3-5
COPD lungs, compared, 4
Norpramin, 72
Nortriptyline, 72
Nutrition, 7-8, 58-61
alcohol use, 61
antioxidants, 60
dairy products, phlegm production with, 59
diet, 59
diuretics, 61
fluid intake, 61
food supplements, 60
foods to avoid, 59
frequent, small meals, 60
low carbohydrate diets, 60
low weight, 58
oxidant injury, 60
phlegm production, 59
supplements, 60
vitamin E, antioxidant effects, 60
vitamins, 60
water, 61

O
Office of Smoking and Health, 16
Orgasm, 63
Oseltamivir, 23
Osteoporosis, 67-69
calcium, 69
sources of, 68
estrogen replacement, 69
normal bone, 67
parathyroid hormone injections, 69
prevention, 67-69, 69
risk factors for, 68
treatment, 69
vitamin D, 69
Oximetry, 7
Oxygen, 30-34
function of, 8
heart, weakening of, 8
liquid, portable, 32
with lung disease, 8
metabolism, 30
questions asked by patients, 30-34
smoking while carrying, 34
smoking with oxygen on, 34
supplemental, 8
systems, 32
Oxygen test. See Oximetry

P
Pamelor, 72
Pancreas, cancer of, tobacco and, 13
Parathyroid hormone injections, with osteoporosis, 69
Parnate, 72
Paroxetine, 71
PATCH Project—Program Against Teen Chewing, 16
Patches, transdermal, nicotine, 18
Patient Education Program Pioneers, 53
Patient support groups, 53-54
advocacy organization, proposed, 54
Better Breathers’ Club, 53-54
Breath Savers Support and Education Group, 54
Cape Cod COPD Support Group, 53
Emphysema Foundation For Our Right to Survive, 54
Internet Websites, 54
Patient Education Program
Pioneers, 53
PREP Airwaves, Mission Hospital
Regional Medical Center, 53
publications, 54
resources, 53-54
Second Wind, Pulmonary Education
and Research Foundation, 53
Paxil, 71
PEP Pioneers. See Patient Education
Program Pioneers
Petty, Thomas L., MD, biography of, 84
Pharynx, cancer of, tobacco and, 13
Phlegm production, dairy products
and, 59
Phlegm-thinning agents, 23
Pirbuterol, 27
Pneumococcus, cause of bacterial
pneumonia, 23
Pneumonia, pneumococcus, 23
Power of attorney, 77
Prednisone, 25, 28
PREP Airwaves, Mission Hospital
Regional Medical Center, 53
Prostaglandin E-1, for erectile
dysfunction, 64, 65
Prostep, nicotine replacement, 18
Protriptyline, 72
Proventil, 25, 27
Prozac, 71
Publications, for patient support, 54
Puffers. See Metered-dose inhalers
Pulmonary rehabilitation, 35-52
goals of, 35
program components, 35
pursed-lip breathing, 52
stationary bicycle, 52
weight training, 52
Pulsatilla, for erectile dysfunction, 65
Puritan Bennett Helios System, liquid oxygen, 32
Puritan Bennett Mark 5, liquid oxygen, 32
Puritan Bennett Mark 6, liquid oxygen, 32
Puritan Bennett Mark 7, liquid oxygen, 32
Pursed-lip breathing, in pulmonary
rehabilitation, 52
Q
Questions asked by patients
prescribed oxygen, 30-34
Quitting smoking, 7, 14-19, 62-63
addiction, to tobacco, 14-15
bupropion, 19
cancer, 14
cancers from, 14
date, for quitting, 17
exercise, 17
heart disease, 14
nicotine chewing gum, 18
nicotine inhalers, 18-19
nicotine nasal spray, 18-19
nicotine replacement therapy, 17-18
nicotine transdermal patches, 18
with oxygen on, 33
rationale, 14
resources for, 16
stroke, 14
weight gain, 17
R
Raloxifene, 69
Rehabilitation, pulmonary, 35-52
goals of, 35
program components, 35
pursed-lip breathing, 52
stationary bicycle, 52
weight training, 52
Relenza, 23
Remeron, 72
Resources, for patient support, 53-54
Resuscitation directives, 75-76
Rimantadine HCL, 23
Rollins, Donald R., MD, biography of, 89
Risedronate, 69
S
Salmeterol, 27
Salt intake, fluid retention, 61
Schwin Aerodyne, in rehabilitation, 52
Scoggin, Charles H., MD, biography of, 89
SDRIs. See Serotonin-reuptake inhibitors
Second-hand smoke, 5
Second Wind, Pulmonary Education and Research Foundation, 53
Septra, 22
Serafem, 71
Serevent, 27
Serotonin-reuptake inhibitors, 71
Sertraline, 71
Serzone, 72
Sexuality, 62-66
arousal, tobacco’s effect on, 63
behavior changes, 63-64
desire, 63
erectile dysfunction, 65
herbs for, 65
products for, 64
hormone replacement therapy, 66
imagination, 63-64
orgasm, 63
performance, 63
positions, 64
smoking cessation and, 62-63
Sildenafil citrate, for erectile dysfunction, 64
Sinequan, 72
Singulair, 28
Skin wrinkling, smoking and, 62
Smoke, response to, 5
Smoking, 2, 5, 7, 9, 14-19. See also Quitting smoking
addiction, to tobacco, 14-15
bupropion, 19
cancer, 14
cancers from, 13
date, for quitting, 17
exercise, 17
heart disease, 14
nicotine chewing gum, 18
nicotine inhalers, 18-19
nicotine nasal spray, 18-19
nicotine replacement therapy, 17-18
nicotine transdermal patches, 18
with oxygen on, 33
rationale, 14
resources for, 16
stroke, 14
weight gain, 17
Soy, as source of calcium, 68
Spirometry, 7, 10, 12
Spirolactone, 28
Spray, nicotine, 18-19
Stationary bicycle, in pulmonary rehabilitation, 52
Steroids, 25
Stroke, 5
Supplemental oxygen, 8
Supplemental vitamins, 7
Support groups, for patients, 53-54
advocacy organization, proposed, 54
Better Breathers’ Club, 54
Breath Savers Support and Education Group, 54
Cape Cod COPD Support Group, 53
Emphysema Foundation For Our Right to Survive, 54
Internet Websites, 54
Patient Education Program (PEP) Pioneers, 53
PREP Airwaves, Mission Hospital Regional Medical Center, 53
publications, 54
resources, 53-54
Second Wind, Pulmonary Education and Research Foundation, 53
Surfactant, 5
Surgery, 55-57
lung cancer, 57
lung transplantation, 57
lung volume reduction surgery, 55-57
Medicare, lack of reimbursement for, 57
transtracheal oxygen delivery, 55
Symmetryl, 23
Symptoms
of COPD, 9
of withdrawal from nicotine, 15
T
Tamiflu, 23
TCAs. See Tricyclic antidepressants
Tequin, 22
Tests, for COPD, 10
Tetracycline, 22
Theo-24, 25, 28
Theodur, 25, 28
Theophylline, 25, 28
Tiotropium, 81
Tobacco smoking, 1, 5, 7, 9, 14-19
addiction, to tobacco, 14-16
bupropion, 19
cancers from, 14
carbon monoxide in, 17
carcinogens, 17
cataracts from, 62
date, for quitting, 17
effect on sexual arousal, 63
exercise, 17
heart disease, 14
nicotine chewing gum, 18
nicotine inhalers, 18-19
nicotine nasal spray, 18-19
nicotine replacement therapy, 17-18
nicotine transdermal patches, 18
with oxygen on, 33
quitting. See Quitting smoking
rationale, 14
resources for, 16
smoking-related cancers, 13
stroke, 14
weight gain, 17
what will happen if I smoke with my
oxygen on?, 34
Tofranil, 72
Tooth loss, smoking and, 62
Torsemide, 28
Trachea, function of, 3
Transdermal patches, nicotine, 18
Transplantation, lung, 8, 57
Transtracheal oxygen delivery, 55
Tranylcypromine, 72
Travelling, with oxygen, 34
Triamcinolone, 28
Triamterene, 28
Tricyclic antidepressants, 72

V
Vaccination
against viral influenza, 23
Vegetables, as source of calcium, 68
Venlafaxine, 71
Ventolin, 25, 27
Viagra, for erectile dysfunction, 64, 65
Viktor Frankl, 77-78
Viral influenza, vaccination against, 23
Vitamin A, antioxidant effects, 60
Vitamins, 7
Vivactil, 72

W
Websites. See Internet
Weight gain, quitting smoking and, 17
Weight training, in pulmonary
rehabilitation, 52
Wellbutrin, 71
Withdrawal, from nicotine, symptoms
of, 15

X
X-rays, 7, 10

Y
Yohimbine HCL, for erectile
dysfunction, 64

Z
Zafirlukast, 28
Zanamirvi, 23
Zileuton, 28
Zithromax, 22
Zoloft, 71
Zyban, 19, 71
Zyflo, 28
Credits


3 Illustrations of positions for sex. Courtesy of Ms Mary Gilmartin, National Jewish Medical and Research Center, Denver, CO.