

# **ESSENTIALS OF PULMONARY REHABILITATION**

**A Do It Yourself Guide To  
Enjoying Life With Chronic Lung Disease**

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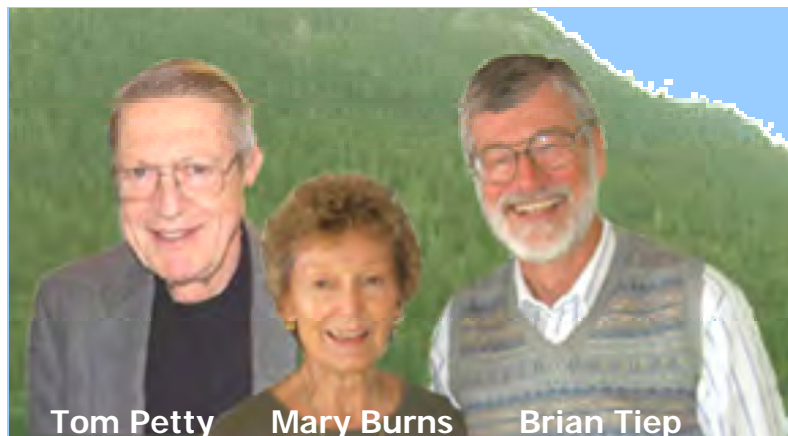
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## PREFACE

The Pulmonary Education and Research Foundation (PERF) proudly presents this booklet which is designed to introduce the methods of pulmonary rehabilitation to patients and their families. This booklet is an updated version of three separate booklets our foundation published in the early 1990's: Essentials of Pulmonary Rehabilitation, Parts I, II and III.

We have tried to describe the methods of treatment that are part of pulmonary rehabilitation, which can enhance the lives of many people with advanced breathing disorders. The first part of this booklet focuses on the common problems of emphysema, chronic bronchitis and asthmatic bronchitis; known collectively as chronic obstructive pulmonary disease (COPD). Many of the principles of management for COPD are also applicable to other forms of breathing disorders including pulmonary fibrosis.

We have tried to explain the basic nature of COPD and deal with some of the key features of pulmonary rehabilitation programs, including physical conditioning and breathing training. The second part of the booklet focuses on issues that require further explanation, including inhaled bronchodilators, corticosteroids, theophylline, antibiotics, mucolytics, oxygen and some quality of life issues.

We have been gratified by the enthusiastic reception that the previous version of these booklets has received. Your support of our efforts is greatly appreciated. Further, we have composed a DVD, Essentials of Pulmonary Rehabilitation - Taking Control of Life Again, that gives both the patient and the primary care health professional an introduction to the benefits of pulmonary rehabilitation. This material can be obtained through the Pulmonary Education and Research Foundation, P.O. Box 1133, Lomita, California, USA 90717-5133



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## About Pulmonary Education and Research Foundation

PERF, the Pulmonary Education and Research Foundation, is a small but vigorous foundation that focuses on practical projects which can bring benefits in the short term. Overhead expenses are extremely low since the Board of Directors receives no financial compensation and office space and much of the help are donated.

PERF supports all aspects of pulmonary rehabilitation but is also interested in educating the public about prevention and early diagnosis of respiratory disease. Our special interests are research contributing to the scientific basis for pulmonary rehabilitation, oxygen use, and improving exercise capacity. We work closely with the California Society of Pulmonary Rehabilitation and California Thoracic Society. We support a visiting scientist from a 3<sup>rd</sup> world country. We print a monthly 10-page newsletter, *The Second Wind*. The PERF website [www.perf2ndwind.org](http://www.perf2ndwind.org) is geared toward both patient and professional. PERF is especially proud to be the principal supporter for the *Alvin Grancell-Mary Burns Chair in the Rehabilitative Sciences*, the world's first endowed chair supporting a pulmonary rehabilitation scientist.

### PERF

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# INTRODUCTION

The Pulmonary Education and Research Foundation proudly presents this "self-starter" program for you, your family, or anyone else interested in improving their health and happiness in spite of a chronic respiratory impairment. Its purpose is to offer practical information about pulmonary rehabilitation and to serve as an adjunct to your personal physician's care.

## What is Pulmonary Rehab?

Pulmonary Rehabilitation is the medical art and science by which people disabled with lung disease are returned to a more active and enjoyable life style.

## Where Should I Start?

Check with your physician to find the nearest pulmonary rehabilitation program.

Immediately stop smoking! It is hard to overcome the ravages of lung disease if you continue to smoke.

## What is the Nature of COPD?

Chronic Obstructive Pulmonary Disease (COPD) is a combination of emphysema, chronic bronchitis and asthmatic bronchitis. In the past it was identified by its components, however over the years, people with emphysema or chronic bronchitis were found to have some of the other components as well. COPD is a disease caused largely by smoking. It tends to run in families.

The disease process covers a 20 to 30-year life span. COPD can be dealt with most efficiently if patients are identified and treated early, but even patients with advanced stages of disease can be optimistic about their future. COPD is characterized by cough, sputum, and shortness of breath. COPD is identified by simple measurements of airflow and air volume by a device called a spirometer.

The "O" of COPD means *obstructed* breathing. This can be measured by breathing tests called spirometry. Primary care physicians should offer spirometry as a part of their basic evaluation along with temperature, heart rate, and blood pressure. The methods of pulmonary rehabilitation are also useful for people with other lung diseases such as asthma and pulmonary fibrosis (scarring).

### **What Medications Can I Take?**

Of course this will have to be determined by your doctor. But almost everyone with difficult breathing can have improved airflow by the inhalation of drugs which dilate (open) the bronchial passages in the lungs. *Bronchodilators* are very well tolerated and usually improve airflow. These drugs are generally delivered through a device known as a metered dose inhaler (MDI). However, it is important that you are well instructed and practiced in its use so that you derive the greatest benefit. Be sure your doctor measures your airflow with a spirometer.

Medications such as antibiotics and anti-inflammatory drugs may help stem the tide of disease. Other drugs may help remove mucus. All of these drugs should be prescribed by your doctor.

### **How To Get the Best Results From Your Inhaled Medication**

Patients with COPD and asthma, as well as physicians, nurses, and respiratory therapists have, together, learned to appreciate the effectiveness of bronchodilators delivered by the metered dose inhaler (MDI). This is the most rapid method of relief and the most effective in the long term. MDIs generally work as well as the motor driven nebulizers and often with fewer side effects. Because skill is required to effectively deliver medications to the lower airways rather than deposit in the mouth, spacers (chambers) are often prescribed in conjunction with the MDI to improve the timing and effectiveness of drug delivery. Newer dry powder inhalers, new drugs, and combinations of drugs have recently been introduced. The dry powder inhalers do not require spacers and are more convenient. They are gradually replacing the MDIs which use a propellant.

### **What About Vaccinations?**

You should have influenza vaccination each fall. Many people with chronic illnesses fall prey to the flu each year and this is preventable. The nature of the flu virus changes each year and that is the reason why you need to repeat your "flu shot." Also be sure you get a "pneumonia shot," which will provide approximately 80% protection against the commonest pneumonia in patients with COPD - pneumococcal pneumonia. Unfortunately there are no other vaccines for COPD.

### **How to Talk to Your Doctor**

The evaluations of COPD described briefly above and the strategies used in selecting the most appropriate medication, plus the techniques of rehabilitation described in greater detail below, require the development of good communication with your doctor. Your doctor should become your consultant, your teacher (literally the definition of "doctor"), and your friend. You should try to become an expert in the management of your own disease. It takes both time and commitment to achieve this ideal patient-doctor relationship. Ideally your doctor or healthcare team should provide you with instructions on self management and the means to recognize early signs of a COPD flare-up. You should have a *Rapid Action Plan* with instructions on how to stop a flare-up in its tracks including calling your doctor.

We suggest that you work on methods of communication by telling your doctor that you really seek such a partnership. Your doctor will probably welcome this concept but this takes time. Be concise in describing your progress and efficient in asking your questions. If your

doctor is unclear, please ask for clarification. It's fine to make a list of questions to be answered. Also carry a list of your medications at all times.

### **Can I Improve My Breathing?**

Of course you can! The key is to learn to breathe in a more effective and efficient manner. Forget about working so hard to breathe air in and concentrate on getting air out of your over-inflated lungs. Take much more time to exhale than inhale. Exhale in a slow, controlled fashion through pursed lips (see below), as in the act of whistling; take a shorter time for inspiration. Thus, as you walk, concentrate on breathing twice as long as you breathe in.

Walk each day! Begin with one or two minutes and increase daily. Work up to at least 20 minutes daily – ideally 30-60 minutes per day. You will find that walking one or two miles per day actually relieves your shortness of breath over time. The reason that it does is that you learn to use your breathing muscles more efficiently; you use oxygen more effectively; and you also get the "high" of exercise performance, very much as an athlete does.

## **DEVELOPING A WALKING DIARY**

Has it been a while since you were on a regular walking program? If so, it is important to start slowly and remember to PACE YOURSELF! Endurance is more important than speed! It is possible to start out walking for a minute or less and work up to 60 minutes a day. However, if you walk for such short periods of time it is *essential* to do so 5 to 10 times a day as you gradually increase your endurance and get into better physical condition.

A little shortness of breath does no harm but don't exhaust yourself. If your muscles become sore, allow them to rest for a day or so before increasing your walking time. Walk in the house in front of the TV if you are limited to a few minutes. Stay on a level surface and take your pulse before and after walking as you increase your walking time. Be aware of an increase in "skipped beats." If your heart rate increases too much you may be walking too fast.

The Borg Scale [Figure 1] is one way you can gauge your exertion. Don't go over a 3. A little shortness of breath on exertion can't hurt you but don't push yourself too hard.

Keep track of your time in your *Walking Diary* [Figure 2] rather than guessing; enjoy watching your improvement.



### **What is Pursed-lip Breathing?**

Pursed-lip breathing (PLB) is a technique you can use to help you breathe more effectively, allowing you to get the oxygen you need to your lungs. PLB trains you to exhale more slowly, so you breathe easier, at a more comfortable rate, whether you are resting or moving about.

This breathing technique may help you feel better physically *and* mentally. When you are less short of breath, you can probably walk farther, climb stairs easier, and be more active in general — this could give you a more positive outlook.

### **How Does It Work?**

The reason PLB helps is that people with COPD tend to trap air (have a more than normal amount of air in the lungs at the end of exhalation). This aggravates shortness of breath. Forcing yourself to exhale more rapidly only causes more air trapping and more shortness of breath. Pursed-lip breathing helps you to empty your lungs and to slow your respiratory rate. PLB helps to restore the position of the diaphragm, the breathing muscle located under your lungs. Normally, the diaphragm is curved upward; when a person breathes in, the lungs inflate and the diaphragm moves downward [Figure 3].

PLB also causes you to contract your abdominal muscles when you breathe out. This forces the diaphragm upward, and helps you to empty your lungs. As a result, you breathe more slowly and more efficiently. Pursed-lip breathing may also prevent collapse of the air passages in the lungs. This may help you maintain good airflow and blood flow throughout your lungs. [Figure 4]

Practice:

1. Inhale through your nose
2. Exhale more slowly through pursed lips – (purse your lips like whistling)
3. Practice at rest and during your walk; perhaps 2-3 minutes every hour. Relax!

## HOW TO PRACTICE PURSED-LIP BREATHING

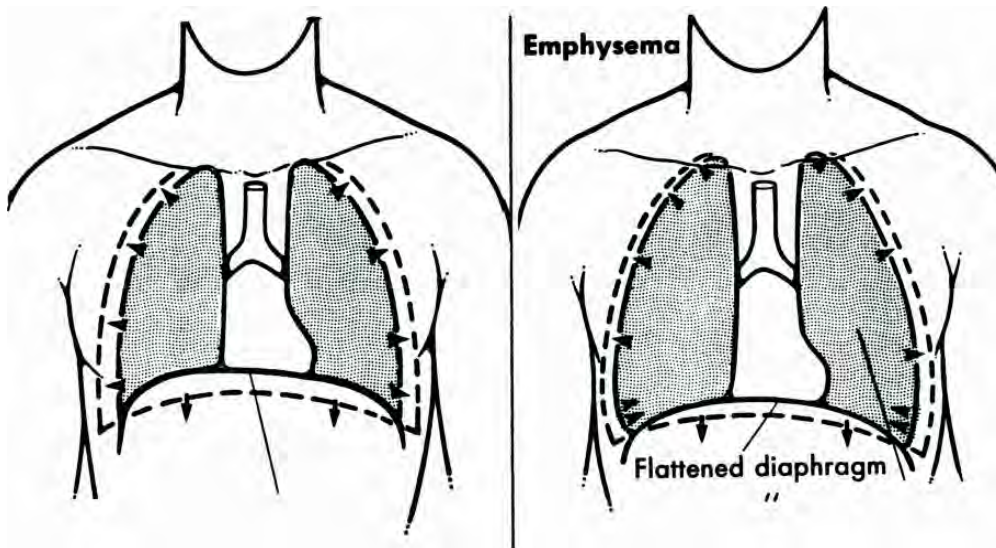


Figure 3 — The normal, curved diaphragm moves downward when the lungs are inflated, then returns to its resting position when a person breathes out. If you have emphysema, air remains in the lungs even after you breathe out, causing "overinflated" lungs, a flattened diaphragm, and shortness of breath. The lower chest may even draw inward when you breathe in.



Figure 4 — When practicing pursed-lip breathing, shape your mouth as though you are whistling, and breathe out slowly to resist the speed of the air leaving your lungs.

## HOW TO PRACTICE ABDOMINAL BREATHING

If you have COPD, you may be using the muscles of your upper chest and neck, rather than your diaphragm, when you breathe. This requires more of your energy and prevents your lungs from working as well as they can. You can learn to breathe with your diaphragm by practicing a breathing technique called "abdominal breathing". It is sometimes called "diaphragmatic breathing".

### What is Abdominal Breathing?

Abdominal breathing uses your abdominal muscles to help raise and lower your diaphragm, the large muscle beneath your lungs that usually does most of the "work of breathing" [Figure 5]. The diaphragm moves downward to help you take air into your lungs, and upward to push out air when you exhale. As your diaphragm contracts and moves downward during inhalation, it pushes your abdomen outward. When you exhale your abdominal muscles contract and push the diaphragm upwards so that it can be ready to contract for the next inhalation.

### How Will It Help Me?

If you have chronic obstructive lung disease, such as emphysema, your lungs may be "overinflated" with trapped air causing you to breathe through stale air. This also causes the diaphragm, which is usually rounded, to flatten. When the diaphragm is flattened, it doesn't move up and down as well as it normally would, and the "accessory" muscles in your upper chest and neck take over the burden of breathing. This causes you to become more short of breath particularly when you are active or exercising. When you breathe in, your abdomen should move *outward* because of the downward movement of the diaphragm. But because of your lung disease, your abdomen moves *inward* and your chest moves outward with the movement of the accessory chest muscles.

Abdominal breathing can help you gradually change your breathing pattern back to normal. By using the abdominal muscles to restore the diaphragm as the major muscle of breathing, it can help your lungs work more efficiently and with less effort. It can also help slow down your rate of breathing; bring more oxygen to your lungs; help you to relax, both at rest and during exercise; make you less short of breath; a perfect companion to pursed lip breathing.

## TO PRACTICE ABDOMINAL BREATHING

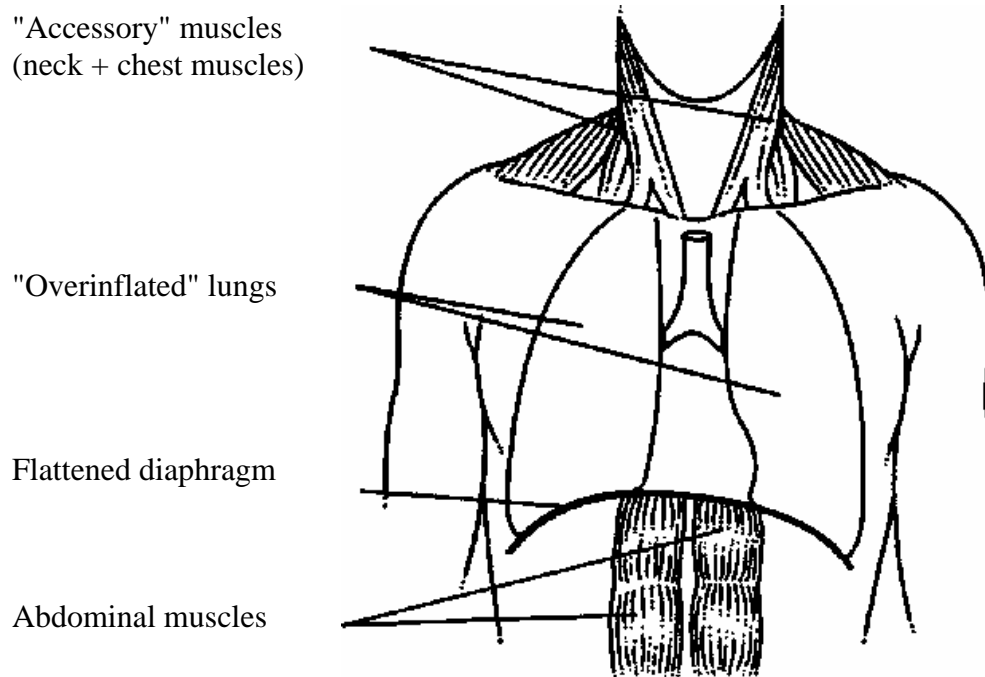


Figure 5 — The diaphragm is the large muscle below the lungs that moves downward when you inhale, upward when you exhale. If your lungs are "overinflated" due to lung disease, your diaphragm becomes flattened and can do less of the "work of breathing." The "accessory" muscles of your upper chest then do more of this work, but it takes more energy to do so.

## How Do I Do Abdominal Breathing?

Earlier we showed you how to do pursed lip breathing (PLB). PLB works by slowing your exhalation so that you can do a better job of emptying your lungs. The benefits of PLB and abdominal breathing are complementary. So use PLB with your abdominal breathing.

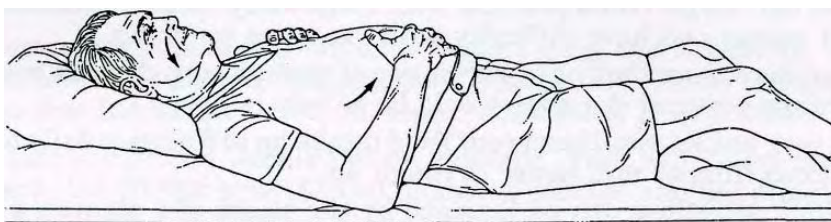
Here are instructions for abdominal breathing:

1. Lie down on your back on a couch or bed with a pillow under your head and another under your knees. Make sure you are comfortable and relaxed [Figure 6].
2. Place one hand on your abdomen and the other on your upper chest.
3. Inhale slowly and deeply through your nose, imagining that you are taking air into your abdomen. The hand on your abdominal muscles should move upward, and the hand on your upper chest should not move.
4. Exhale slowly through pursed lips while you tighten your abdominal muscles. At the same time, use your hand to gently push inward and upward on your abdomen. Again, your chest should not move.

Remember: *breathe in, abdomen out; breathe out, abdomen in*. Keep your chest relaxed and use your abdomen to do the work of breathing. You may wish to place a Kleenex box on your abdomen; so that you can better observe your breathing techniques.

## TO PRACTICE ABDOMINAL BREATHING

Breathe in, abdomen out



Breathe out, abdomen in

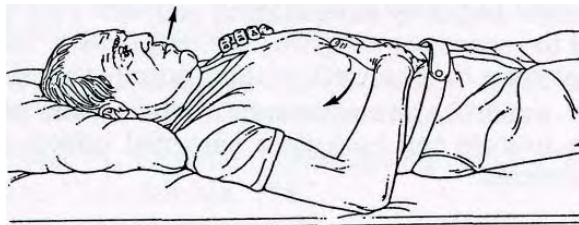


Figure 6 — When you practice abdominal breathing, concentrate on moving your abdominal muscles outward as you breathe in. The hand on your chest should not move. As you breathe out through pursed lips, push gently inward and upward with your other hand.

### When Should I Practice It?

Try to practice abdominal breathing for 3 or 4 minutes every three to four hours until it becomes automatic. Be sure to rest if you feel dizzy.

Once you feel comfortable using abdominal breathing while lying down, try it while sitting, then while standing, and finally while walking. The more comfortable you feel with abdominal breathing, the more you'll use it throughout the day. The exercise may be difficult to master, especially if your breathing pattern has been reversed for a long time. But be patient! You're likely to find that the benefits make all the practice worthwhile.

## Controlled Coughing

Coughing is a normal process by which we remove foreign bodies or excess mucus from our lungs. Some patients with respiratory disease produce large amounts of mucus and have difficulty with excessive coughing.

If you produce more than one quarter cup of sputum each day, ask your doctor if he thinks postural drainage or some of the mucous mobilizing devices would be of help.

Unless your ankles swell (edema), keep your fluid intake up to 6 glasses daily to keep your secretions thinner and easier to cough up.

Very thick secretions can be loosened by the steam of a shower, a facial steamer or a cup of steaming water. Inhale the steam and take a few sips of liquid.

The HUFF COUGH is a series of 8 or 10 gentle coughs that escalate mucus up and out of the lungs. Begin by oxygenating yourself with 2 or 3 pursed lip breaths. If you need to repeat the coughing technique take "sniffing" breaths through the nose between coughs, rather than gulping breaths of air.

Look at the color, amount and consistency of the sputum you have brought up. [Figure 7] Yellow or green or thick sputum may indicate a bacterial infection and should be reported to your physician. You may be having a flare-up. Set up a rapid action plan with your doctor.



Figure 7 – Cough with secretions. Yellow, green or brown most likely signals a flare-up and requires rapid treatment.

## What About Oxygen?

Oxygen is valuable for patients whose lungs do not provide adequate amounts of oxygen to meet the body's needs. This lack needs to be measured by analysis of arterial blood (blood gases) or by pulse oximetry (the finger clip). [Figure 8] Know your numbers! Know your arterial blood gas oxygen level (normally higher than 80 mm Hg at sea level), and know your oxygen saturation (normally higher than 90% at sea level). Learn what your carbon dioxide level is. Normal is 40-45 at sea level. If you require supplemental oxygen, be sure that your physician orders a portable oxygen light weight system, so that you can use oxygen while exercising and in other demanding activities of daily living. Take your oxygen as your doctor prescribes. You cannot always feel your need for oxygen and you can do harm to your body by not using it if your blood oxygen level is too low. Your doctor should measure your oxygen saturation at the end of a typical walk in the hallway and adjust your oxygen flow to during exertion. [Figure 9]

Figure 8 – Oximeter

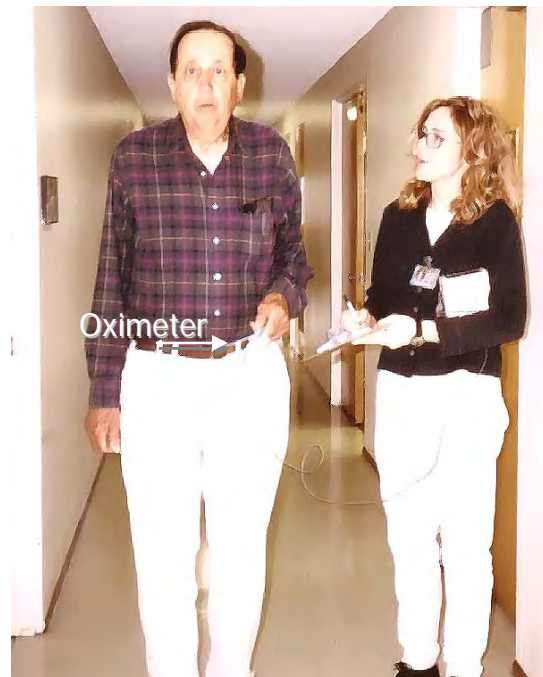


Figure 9 – Oximeter walk

## What Else Can I Do?

Either join or initiate a patient support group in your community. Patients learn from each other as well as the volunteer health care professionals. Programs such "Better Breathers Clubs" provide important social contact and are fun.

You can adopt an attitude of self improvement. The key to self improvement is to understand the nature of disease. Here is a list of general reading sources for your possible interest. These are:

1. *Letters From Tom*, a compilation of over 240 newsletters by Thomas L. Petty, M.D. PERF Web Site: [perf2ndwind.org](http://perf2ndwind.org)
2. Good JT Jr. & Petty TL: Frontline Advice for COPD Patients. Snowdrift Pulmonary Conference. 2002. Available at [www.NLHEP.org](http://www.NLHEP.org) and soon to be reprinted. 99 p.
3. Schachter N: Life and Breath. Broadway Books, NY 2003, 367 p
4. Shambert EF: Coping with Chronic Obstructive Pulmonary Disease. St. Martin's Griffin, New York, 2003, 224 p
5. Carter R, Nicotra B, Tucker J, Courage and Information for Life with Chronic Obstructive Pulmonary Disease..New Technology Publishing, Inc, MA 1999, 266 p
6. American Thoracic Society and European Respiratory Society Guidelines for the Diagnosis and Management of COPD. [www.thoracic.org/copd](http://www.thoracic.org/copd)
7. Global Initiative for Chronic Obstructive Lung Disease: [www.goldcopd.com](http://www.goldcopd.com)

## USING THE METERED DOSE INHALER

The metered dose inhaler (MDI) is the fundamental device for the delivery of aerosolized medicines. Bronchodilators are most commonly delivered by an MDI. Also, other drugs such as anti-inflammatory medicines are usually delivered by an MDI. The typical MDI contains the medicine along with a surrounding propellant, stabilizers, and flavoring agents. Since the medications in most metered dose inhalers are suspensions, the devices should be shaken before using. It is best if the mouthpiece of the device is held two to four inches in front of the open mouth, and that inhalation of the contents takes place from the end of a resting expiration [Figure 10]. It is not necessary to force all of the air out of the lungs before inhaling from the MDI. It is important to inhale slowly and deeply; then pause for 10 seconds; then exhale slowly against pursed lips. This process allows the medicine to reach the lower bronchial passages where it can deposit along the walls.

When you discharge an MDI it comes out as a jet. If you place the MDI in the mouth, the jet of droplets will hit the back of the throat and then be swallowed. To illustrate this, hold a metered dose device in front of a well-lighted window and notice how far the spray goes before it disappears – several feet. Consequently, when using an MDI it is best to use a spacer.

The spacer is a holding chamber that gives the particles the time and space to slow down before they have to take turn at the throat and head down into the lungs. It also helps you to time your discharge with the beginning of your inhalation so that the medication will go to the target location.



Figure 10 – MDI with Spacer

### HOW TO USE THE METERED DOSE INHALER

As previously stated the MDI shoots particles capable of traveling 3 to 4 feet. The larger particles deposit mostly in the mouth. The smaller ones land in the smaller airways. The smallest particles may reach the periphery of the lung through a process called gravitational sedimentation. Thus, several seconds of breath holding should be allowed for this process to become maximally effective. Often, if your physician prescribes it, the first inhalation is followed by a second, one to two minutes later.

Many MDIs are now provided in dry inhaler form. One popular product is illustrated below. [Figure 11]



Figure 11 – Dry Powder Inhaler

### **MEDICATIONS DELIVERED THROUGH THE METERED DOSE INHALER**

These medicines include bronchodilators such as Albuterol and Atrovent, which are the mainstay drug treatment for COPD patients. [Table 1]. Inhaled corticosteroids, for example flunisolide (AeroBid), triamcinolone acetonide (Azmacort), budesonide (Pulmicort), and fluticasone (Flovent), are also delivered by an MDI. These agents are used to combat inflammation in the conducting air passages of the lungs. Inhaled corticosteroids are most valuable in asthma; they appear to be less effective in patients with COPD. The oral corticosteroid, prednisone, described below, is generally more effective in dealing with flare-ups of COPD, which may or may not be caused by infectious inflammatory processes. [Table 2] The final class of agents delivered by metered dose inhalers is cromolyn (Intal), a preventive agent that inhibits the release of inflammatory mediators in asthma. Cromolyn is probably not beneficial for patients with COPD.

**Table 1. INHALED MEDICATIONS COMMONLY USED IN COPD**

**A. Beta Agonists**

<u>Chemical Name</u>	<u>Brand Name</u>
Albuterol	Proventil, Ventolin
Metaproterenol	Alupent
Formoterol	Foradil (dry powder)
Pirbuterol	Maxair
Salmeterol	Serevent

**B. Anticholinergics**

<u>Chemical Name</u>	<u>Brand Name</u>
Ipratropium	Atrovent
Tiotropium	Spiriva

**C. Beta Agonist and Anticholinergics Combination**

<u>Chemical Name</u>	<u>Brand Name</u>
Albuterol and Ipratropium	Combivent

**D. Long Acting Bronchodilator / Corticosteroid Combination**

<u>Chemical Name</u>	<u>Brand Name</u>
Fluticasone and Salmeterol	Advair(dry powder combination)

**E. Inhaled Corticosteroids**

<u>Chemical Name</u>	<u>Brand Name</u>
Flunisolide	Aerobid
Triamcinolone	Azmacort
Fluticasone (dry powder inhaler)	Flovent
Budesonide (dry powder inhaler)	Pulmocort

## BRONCHODILATORS

Bronchodilators are medications that relax the muscles that encircle the airways (bronchial muscles), reduce mucous and enable hyperinflated lungs to empty. Because of these actions bronchodilators relieve breathlessness and enable patients to be more active with less shortness of breath. Most patients feel better when they take them. Long acting bronchodilators work over a 12 to 24 hour period. Examples include Serevent, Foradil and Spiriva. Short acting bronchodilators provide quick relief and are useful in preventing or minimizing shortness of breath during exertion. They are often taken 10 to 20 minutes prior to exercise. Examples are Albuterol and Atrovent.

The bronchodilators that are most commonly used are listed in the Table 2. Inhaled bronchodilators come in two classes: beta agonists and anticholinergics. Only one drug in each class should be used a time. However, the classes can be combined. For example Albuterol and Atrovent are combined in a single MDI called Combivent. These medications are complementary and work better than each separately. Taken together, the beta agonists give the most immediate improvement, but a shorter duration of peak activity, while the anticholinergic has a slower onset of activity but a longer duration of significant activity. Thus these two agents may compliment each other.

These drugs are safe and effective when used as prescribed. Even more frequent than average use is commonplace and apparently quite safe. However, if your need for bronchodilators should suddenly increase, you may be having a flare-up of your disease. You should consult your doctor right away. In fact, you should have a plan with your doctor so that you can recognize a flare-up in its earliest stages and be treated rapidly.

## THEOPHYLLINES

Theophyllines [Table 2] are oral drugs that are prescribed for patients with asthma and COPD. Theophyllines work through mechanisms different from the inhaled bronchodilators discussed above. Theophyllines are in a class of drugs called methylxanthines. They are closely related to caffeine. Theophyllines are modest bronchodilators and they also stimulate clearance of mucus just as the inhaled beta agonists do. In addition to being bronchodilators, theophyllines strengthen the breathing muscles of the diaphragm and chest wall. Thus, they may help prevent muscle fatigue when air flow is quite limited. They may also help to make steroids more effective in COPD. Theophyllines also have a mild beneficial effect in improving heart function and they act as a mild stimulant to respiration by affecting the respiratory center in the brain. On the downside, theophylline may stimulate the secretion of gastric acid. This can cause heartburn if the connection between the stomach and esophagus becomes relaxed, another action of theophyllines. This can be undesirable in certain patients. The heart and brain stimulation may also be undesirable in some people. So you can see that theophyllines have a number of effects on the body, both good and bad.

The main side effects of theophyllines are due to excessive blood levels. The stomach upset and central nervous system irritability are some of the earlier signs of toxicity. Dangerous

convulsions can occur from excessive doses. Most patients don't need repeated blood level measurements if simple rules are followed. If your appetite remains good, heart burn is absent and you sleep well, it is highly doubtful that you are getting too much theophylline. It may be important to determine if enough is being given. Thus, one or two blood levels are performed common when theophylline is first started.

Many things affect the metabolism of theophyllines. These include smoking and the use of barbiturates which speed up the metabolism or clearance of theophylline. Other drugs including some antibiotics, e.g., erythromycin, Cipro, etc., increase theophylline blood levels. Age and food have variable effects.

Theophyllines are not the most potent bronchodilators. After full doses of theophylline further bronchodilatation still occurs with the use of an inhaled bronchodilator taken from a metered dose inhaler. Both drugs work well together.

New drugs that are related to theophyllines but are more effective are soon to be released. These are in the class of so-called phosphodiesterase 4 inhibitors.

## CORTICOSTEROIDS

Prednisone is in a class of drugs called corticosteroids, related to the cortisone produced by the body. These drugs are highly useful in the management of asthma and some patients with COPD, and are considered fundamental for dealing with severe flare ups of bronchitis. This statement has to be tempered with a clear understanding of the "down side" of these valuable drugs, and this can be substantial. *Yet* many of the side effects can be avoided or minimized with certain treatment strategies. [Table 2]

### ORAL CORTICOSTEROIDS

Prednisone is a potent anti-inflammatory drug and thus deals with inflammation of conducting air passages in the lung. Inflammation may be present in both asthma and COPD. The strategic use of prednisone can soothe and thus heal the delicate lining layer of these passageways making them more resistant to bronchospasm. Prednisone has another effect in preserving or even increasing the beta receptors necessary for the maximum effect of some inhaled bronchodilators. Thus, prednisone is used both to combat inflammation and to enhance the effectiveness of one of the most valuable bronchodilators we have for asthma and COPD. The down side of prednisone is well known. It causes wear and tear on the bones (osteoporosis) and, in some patients the acceleration of cataract formation and the worsening of glaucoma (high pressure in the eyes). The bone problem is much worse in women than men and it is a particular problem in small boned light skinned women beyond the menopause. On the other hand, large boned, dark skinned people have relatively little trouble from prednisone. Men have far less trouble than women probably because their bones are larger and more dense to start with. The bone problem can be largely prevented by the appropriate use of calcium. A quart of skim milk gives 1,000 mg of calcium, and simple medications such as Tums contain a lot of calcium. Physicians believe between 1,000-1,500

mg per day is necessary to help prevent osteoporosis. Exercise also helps protect the bones and, of course, being able to breathe makes this exercise possible. Also, medications such as Fosamax® may help to save bone.

Anybody receiving long term prednisone should have an annual eye exam and, of course, plenty of people have cataracts and glaucoma without the use of steroids. If steroids are making things worse, that fact can be dealt with, using medications and cataract surgery if necessary. Short courses of prednisone cause almost no harm and even low maintenance doses given each morning or evening in a single daily dose have minimal side effects in most patients. Most of the other rumors about prednisone are exaggerated, but it is true that some folks have more trouble from prednisone than others. It's hard to discuss all of the ins and outs of prednisone therapy in one booklet, but the "bottom line" is that prednisone is very useful in many patients and *usually* does a lot more good than harm when used judiciously.

When prednisone is used only for short periods, such as 5-10 days to treat acute attacks of flare-ups, almost no side effects occur. Of course, if one attack follows another and you are on prednisone almost all of the time, you frequently do get side effects. One treatment strategy is to use prednisone only in 5 mg tablets. Thus, the common dose for attacks is eight 5 mg tablets or 40 mg daily. They should be taken all at once in the morning. The reason for the 5 mg tablets is that this allows for smoother tapering (when necessary) in small steps. 40 mg each A.M. for 5-10 days is a common dose for a severe flare up of bronchitis or asthma. Using such a short course renders tapering unnecessary. The key is to start prednisone, antibiotics and an inhaled bronchodilator at the very earliest signs of a flare-up, under your doctor's supervision. Longer courses of prednisone will require a tapering schedule such as 7, 6, 5, 4, 3, 2, 1. This takes 7 days to taper. By now the attack should be over. If several weeks intervene before the next attack and use of prednisone, steroid side effects are minimal.

The methods of using prednisone in asthma attacks are a little bit different from how flare-ups of emphysema and chronic bronchitis are treated. The trick here is to use them quickly when an asthma attack is just starting.

## **INHALED CORTICOSTEROIDS**

Flunisolide (AeroBid), triamcinolone acetonide (Azmacort), budesonide (Pulmicort), and fluticasone (Flovent) are examples of inhaled corticosteroids delivered by an MDI. These agents are used to combat inflammation in the conducting air passages of the lungs. These products are most valuable in asthma; they appear to be of much less value in patients with more advanced forms of COPD. The oral product, prednisone, described above, is generally more effective in dealing with flare-ups of COPD, which may or may not be caused by infectious inflammatory processes (see above).

**Table 2 Medications for Patients with Symptomatic COPD**

**Beta Agonists**

Properties of Drug	Drug	Typical Dose	Comments
Long acting	Salmeterol/Formoterol (Serevent/Foradil)	1-2 puffs twice a day 1 capsule twice a day	Tremors common. Slow onset of action; do not use for acute episodes.
Short acting	Albuterol	2-4 puffs 4 times a day as needed	Quick relief of shortness of breath
Combined long acting	Salmeterol/Fluticasone (Advair Discus)	1 puff twice a day	Dosages of Salmeterol/Fluticasone: 100/50, 250/50, 500/50 are available
Combined short acting	Albuterol/Ipratropium (Combivent)	2-4 puffs 4 times a day or as needed	This combination provides better response than either bronchodilator alone

**Anticholinergics**

Short acting	Ipratropium (Atrovent)	2-4 puffs every 6 hours and as needed	Maintenance + PRN
Long acting	Tiotropium (Spiriva)	1 capsule daily	Better response than Salmeterol
Combine short acting	Albuterol/Ipratropium (Combivent)	2-4 puffs 4 times a day or as needed	This combination provides better response than either bronchodilator alone

**Corticosteroids**

Inhaled via MDI	Fluticasone (Flovent MDI)	1-2 puffs twice a day	Dosages: 44, 110, 220
	(Flovent Discus)	1 blister twice a day	Dosages: 50,100,250
	(Flovent Rotodisk)	1 blister twice a day	Dosages: 50,100,250
	Triamcinolone (Azmacort)	2 puffs twice a day	
	Flunisolide (Aerobid)	2 puffs twice a day	Aerobid M has menthol flavor
	Budesonide (Pulmocort)	1-2 puffs twice a day	Unique inhalation device requires training
	Beclomethasone (Qvar or Vanceril MDI)	1-2 puffs twice a day	Qvar comes in 40 and 80 mcg Vanceril only in 42 mcg

**Mucolytics/Expectorants**

Mucolytics	N-Acetyl-Cysteine (Mucomyst)	3-5ml of 20% sol'n 3 times a day by nebulizer	May irritate in high concentration
Expectorant	Guaifenesin (Humabid)	200 mg 4 or 4 times a day 1200 mg twice a day of SR	Some compounds may be accompanied by pseudoephedrine

**Theophylline**

Extended release	Theophylline Theodur Unidur Uniphyll Theolair 24	Average daily dose is 400 mg; may give once or twice a day according to the compound	Ideal blood levels = 8 to 15 mg/l . Blood levels are influenced by food and other medications. Cipro and erythromycin increase blood levels; Dilantin decreases blood levels.
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## ANTIBIOTICS

Antibiotics are prescribed to treat infections caused by bacteria. We have recently learned that far more organisms can attack the lung than we originally thought. Your doctor is learning the latest facts about bacterial infections of the lung — the result of recent research. And industry is producing more antibiotics to deal with these newly identified organisms and the older culprits which may have "learned" how to become resistant to the older antibiotics.

Bacterial invasion often follows a virus infection such as the common cold or other viruses, including influenza. When this occurs, fever and increased colored sputum, e.g., yellow or green occurs. These signs do not prove the presence of bacterial invasions. However the old approach of culturing (growing) the organisms is not very accurate and can be misleading. Some organisms just won't grow well and others come from the mouth and not the lungs and thus create confusion. Both you and your doctor will likely want to start antibiotics on what is termed "empiric grounds," i.e., the strong presumption of bacterial infection. When a sudden increase in shortness of breath cough and colored sputum occurs, this should be a "call to action!" There are many antibiotics to choose from today and some are more effective than others for various respiratory infections.

Antibiotics go hand in hand with a short prednisone course as they work against both the inflammatory and infection components of a flare-up. Prednisone is not an antibiotic but it will clear up inflammation not attacked by the antibiotic, and its anti-inflammatory action will often help to clear your flare-up.

## VACCINES

All patients with chronic respiratory disease and, indeed, anyone over age 50 should receive a "flu shot" each fall. The susceptibility to the various changing strains of a serious viral cause of acute bronchitis or pneumonia is high in all persons, particularly those with chronic respiratory disorders and people of middle age or older. Each year a new multiple strain vaccine is produced to deal with current viruses, which usually begin their spread somewhere in Asia. Thus a new "flu shot" is required each fall, usually in November or just before each year's influenza epidemic is expected. A vaccine that is effective against a common bacterium, the pneumococcus called Pneumovax — contains antigens against 24 strains. Pneumovax should be given twice in a lifetime about 5 years apart.

## MUCUS CLEARANCE

Many patients with chronic respiratory diseases have difficulty clearing mucus from their lungs. Mucus formation is a normal part of the lung's defense mechanism against inhaled infectious particles and irritants. Normally mucus is moved from the distal (far) regions of the lung's small air passages upward toward the larger passages by a process called mucociliary clearance. Mucus which is sticky traps particles and bacteria. This protective mucus is swept toward the throat and mouth by cells with hair-like whips (cilia) with a broom-like, propelling action. This normal clearance mechanism becomes impaired in inflammatory states such as in chronic smoking where abnormally thick or sticky mucus is often formed. When this happens, the ciliary clearance mechanism may become overwhelmed leading to inflamed airways clogged with mucous. [Figure 12] The lung's backup system for clearing excessive and stagnated mucus is cough. Cough propels mucus to portions of the lung where expectoration or removal begins, i.e., the larger airways of the lungs. But cough is a double-edged sword. It is necessary, but it requires energy. In addition, cough may interfere with eating, talking and sleeping. Finally cough itself may be irritating and thus cause further inflammation and mucous formation.



Figure 12 – Normal Bronchus vs. Inflamed Bronchus

How to deal with the excessive mucus factor in chronic respiratory disease states is a complex matter. Mucus is a necessary and protective substance in the lungs, but it can cause trouble if it becomes excessive and plugs airways. One way to deal with mucus is to reduce inflammation and thereby reduce its excessive production. The best ways are to stop smoking, clear infections, and treat inflammatory processes with anti-inflammatory drugs such as inhaled corticosteroids, as discussed above. But this may still not be enough. Another way to deal with excessive and abnormal mucus is to thin it and help the normal clearance systems to work more efficiently. There is no ideal mucus clearance drug. Guaifenesin, present in many so-called expectorant prescriptions, may have value in some patients. Adequate fluids are always important in clearing secretions.

The patient's own assessment of the effectiveness of these agents designed to help clear mucus seems to be the best way to judge their effectiveness. They should be tried for several weeks to see if the expectorant is helpful when mucus retention does not respond to other treatment measures.

## OXYGEN

Oxygen is the basic molecule of life! Inside the cell it is used along with the food you eat to manufacture the body's chemicals and to produce energy. All people need oxygen! Since oxygen comprises about 20.9% of the air you breathe, people with normal lungs can gather sufficient oxygen from the surrounding atmosphere to meet their needs. This is true even for many patients with lung disease. However, many other patients with lung disease require additional oxygen that must be supplied from a container.

### Do you need oxygen?

The real question is whether **you** need oxygen. Your body may not adequately sense your need for oxygen. It is natural to think that your shortness of breath is due to an oxygen lack. This may or may not be true. You can be short of breath and still have enough oxygen. Or conversely, you can be breathing comfortably and *not* be getting enough oxygen. The only way to tell for sure is to be *tested*. This means blood gases or oximetry. Blood gases are taken via a needle directly from your artery. Oximetry does not involve drawing blood. Blood gases are the more accurate and informative of the two tests, as they measure your blood oxygen, carbon dioxide, whether it is acid or alkaline, and other important information as well. All patients who receive oxygen will have several blood gas tests in their lifetimes. [Figure 13]



Figure 13 – Drawing arterial blood for blood gas analysis.

The oximeter measures your oxygen through a finger clip. [Figure 14] It uses a light that shines through your skin and an electronic sensor that tells how red the light is that emerges from the other side. The oximeter displays your oxygen saturation on a meter. While there are other instances that require the more accurate blood gases, oximetry will suffice in most other instances, such as determining your oxygen level during exertion.



Figure 14 – Oximeter with a finger probe

### What does oxygen do?

Your body requires oxygen constantly. Your body needs oxygen to utilize your food to give you energy. Your body is warm because it is constantly working, manufacturing chemicals and burning the body's fuels (nutrients). Oxygen is essential to all of these processes. It is important to remember that *the body's requirement for oxygen is continuous*. Unfortunately, *your body cannot store oxygen*, but the need for oxygen is greater when you are exercising or exerting yourself because more oxygen is utilized during that activity. You also need oxygen more during sleep because your breathing slows down during sleep.

### Take your oxygen as prescribed!

This is an important message. Since you cannot always feel your need for oxygen, you must trust your doctor's test equipment to determine your requirement for oxygen and the proper flow setting. You can do damage to your body by not getting adequate oxygen. Conversely, you can live a longer, healthier and higher quality life if you take your oxygen as prescribed. This is in spite of the inconvenience of having to carry the oxygen with you.

### How is oxygen supplied?

Oxygen can be provided in several different ways, but all oxygen is the same by the time that it reaches your body. The different oxygen systems include: 1) compressed gas oxygen, 2) liquid oxygen, and 3) concentrator oxygen. The major difference is how it is "packaged and delivered." [Figure 15]



Figure 15 – Gas

Liquid

Concentrator

Compressed gas oxygen is oxygen pressurized in a heavy, strong metal cylinder. The major advantages of compressed gas oxygen are its availability and simplicity. The disadvantages are its inability to store large amounts of oxygen relative to the weight you must carry, as well as its lack of convenience in safely trans-filling oxygen from a larger to smaller container. However, many patients can do this each day without hazard if properly instructed.

Liquid oxygen has been super cooled to the point that it can be stored in its liquid state. Liquid oxygen is not stored under high pressure. The major advantages of liquid oxygen are its ability to store much greater amounts in smaller and lighter containers and the ability to transfill oxygen from a larger reservoir delivered to your house into a portable unit for use outside of the home. The ultra-light liquid systems which weigh 3.5 lb and provide up to an 8 hour supply are worn on the body. They are the most practical systems for fully ambulatory patients with high daily activity levels. [Figure 16]



Figure 16 Lightweight liquid oxygen systems with a conserving device: Helios® and Spirit®

Concentrator oxygen is oxygen that is taken directly from the air. The oxygen concentrator is a machine that you plug into the wall. In some cases the battery of your car can be used with a special wiring system which can be installed in most auto mechanic garages or full service gasoline stations. An oxygen concentrator separates oxygen from nitrogen and other gases in the air. It provides you with oxygen that is about 95% pure and gets rid of the nitrogen. The main advantages are its low cost and the fact that the device constantly produces oxygen. Its major disadvantages are its lack of portability and the fact that one of the other systems must still be used for portable oxygen. Otherwise, it is a good stationary source of oxygen where an electrical outlet is available and reliable. New portable oxygen concentrators have been recently introduced that weigh under 10 lb with batteries lasting 1-3 hours. [Figure 17]



Figure17 Battery powered oxygen concentrators: Inogen® and Lifestyle®

New oxygen concentrators refill 3.5 lb portable oxygen cylinders rendering oxygen therapy entirely self contained within the home and portable outside the home. No home delivery is necessary. The brand names are Venture Home Fill® by Invacare and Total O<sub>2</sub>® by CHAD Therapeutics. This is one alternative to a fully portable oxygen concentrator. [Figure 18]



Figure 18 – Oxygen concentrator that refills portable oxygen cylinders. Total O<sub>2</sub>®

### How is oxygen administered?

The most common way that you get oxygen is through a nasal cannula, i.e., tubing that delivers oxygen from the oxygen container to your nose [Figure 19]. This method is simple and effective. However, it is inefficient since a lot of oxygen is wasted during the time you are exhaling. Consequently, several new oxygen conserving devices have become available that deliver oxygen more efficiently and thereby reduce the amount of oxygen you need to carry around.



Figure 19 – Nasal cannula

Special oxygen cannulas (Oxymizer® and Pendant®) store oxygen in a chamber during exhalation and deliver that oxygen during inhalation. A new fluidically controlled Pendant that is small, lighter, more comfortable, and works with pursed lip breathing has been introduced. [Figure 20] There are demand oxygen systems (electronic or pneumatic switches) that deliver oxygen only when you inhale. [Figure 21] Also, there are transtracheal catheters that provide oxygen through a small opening in the neck. [Figure 22] This method not only improves oxygen delivery, but it improves the appearance of oxygen therapy as well. All of these devices are presently available and have advantages and drawbacks.



Figure 20 – Fluidic Pendant



Figure 21 – Oxymatic®



Figure 22 – Transtracheal

**Take Home Message:**

If you need oxygen, it will be prescribed by your doctor. Use it as prescribed! Learn about oxygen so that you can accept the need for it and get on with your life. Your doctor, rehabilitation team, and home oxygen supplier will be happy to answer the many questions that you are likely to have relating to your oxygen. Do not be afraid to go out of your home with oxygen. It is a tool, a medication and a way you can live a happier and more productive life. Make sure your doctor tests your oxygen saturation during exercise conditions such as a typical walk. It should be tested using the oxygen delivery device that is being prescribed because these devices vary in their effectiveness and some may not work well during exertion.

**Table 3 - Treatment Strategies in Relation to Severity of COPD**

From GOLD Guidelines

<b>INTERVENTION</b>	<b>I MILD</b>	<b>II MODERATE</b>	<b>III SEVERE</b>
Smoking Cessation	X	X	X
Vaccinations	X	X	X
Bronchodilation			
Inhaled	X	X	X
Theophylline	--	As needed	As needed
Rehabilitation		X	X
Steroids			
Inhaled	--	X	X
Systemic	--	As needed	As needed
Mucolytic Expectorant			
N-acetylcysteine	--	--	As needed
Guaifenesin	--	As needed	As needed
Mechanical Hygiene	--	As needed	As needed
Oxygen	--	As needed	As needed

## **NUTRITION**

Maintaining a good state of nutrition is fundamental in the rehabilitation of patients with chronic respiratory diseases. Common to virtually every chronic respiratory disease is increased work of breathing, meaning increased energy expenditure in the very act of breathing. Thus, in order to cope with disease, one must have enough available calories to meet the challenge. So-called resting energy expenditure (REE) is elevated in states of increased work of breathing, i.e., in asthma, chronic bronchitis, emphysema, i.e., the total spectrum of COPD. Increased calorie requirements, due to what is known as elevated metabolic rate, is also present in patients with the inflammatory and scarring or fibrotic lung disease states.

Calories come from carbohydrates, fats, and protein. The most immediate basic source of energy is from carbohydrates. The exact division and/or composition of a "balanced diet" (as your mother tried to convince you), remains a matter of controversy. The importance of normal food and plenty of it cannot be denied – unless you are obese. Couple this with the established fact of the adverse consequences of weight loss and malnutrition in COPD and we become convinced that plenty of good food leads to better health. Progressive weight loss is the result of malnutrition. Malnutrition weakens the muscles of breathing. Probably of equal importance, malnutrition diminishes the immune mechanisms we have to fight against infectious diseases. The role of malnutrition is even more complex when one considers the fact that the drive to breathe becomes blunted by malnutrition. In addition, key micronutrients which are necessary for the production of lung substances which help expand lung spaces, i.e., the so-called surfactant system of the lung, are in short supply in

malnutrition. Thus malnutrition has an adverse effect on both the control of respiration and of lung mechanical function.

What should you eat? Answer: normal food. Do not limit carbohydrate as some nutritionists suggest. Although there is a theoretic reason why carbohydrate, given in huge amounts, can elevate the carbon dioxide in the blood through increased metabolism, in practical terms this does not happen even in people who eat carbohydrate rich diets at home. Specific advice: add a daily multivitamin; eat what you want; eat adequate amounts of it; do not limit carbohydrate; limit salt, if your doctor tells you so and if you have edema (swelling of your ankles). Only take supplemental food in the form of canned agents if your doctor prescribes it. Insist upon high energy food supplements such as Ensure or its equivalent, containing a high amount of carbohydrate. Ignore advice to take dietary supplements known as PulmoCare, which have been designed to limit the amount of carbohydrate, i.e., high energy food stuffs in your diet. The scientific facts behind these bold statements are becoming well established. We are purposely dogmatic in favor of high energy nutrition versus the alternative. Eat well, feel well, and you will probably be well!

#### **Table 4 - Targets of the Treatment of Symptomatic COPD**

1. Reversible elements of airflow limitation
  - a. Mucosal edema/congestion
  - b. Mucus hypersecretion
  - c. Bronchoconstriction
  - d. Inflammation
2. Physical deconditioning
3. Hypoxemia (low oxygen levels)
4. Abnormal lung mechanics

#### **Table 5 - Potential Components of COPD Treatment**

1. Smoking cessation
2. Bronchodilation
  - a. Beta agonists
  - b. Anticholinergics: ipratropium and tiotropium
  - c. Theophylline
3. Corticosteroids
4. Inhaled
5. Systemic
6. Mucolytics/Expectorants
7. Mechanical hygiene (devices that vibrate the chest and airways to break up mucous)
  - a. Airway agitators
  - b. Flutter
  - c. Pep
  - d. Vest
8. Oxygen
  - a. Continuous
  - b. Nocturnal
  - c. Exercise
9. Preventing infection
  - a. Influenza vaccine
  - b. Pneumococcal vaccine
10. Disease management for life
11. Rehabilitation
12. Assess sleep disorder
13. Manage gastro-esophageal reflux disease (GERD)
14. Surgery
  - a. Lung volume reduction (remove diseased sections of lung in order to allow normal lung to expand and function)
  - b. Lung transplantation

# TRAVEL

Travel adds zest to life even of the patient on 24 hour oxygen. With some advance planning, you should be able to enjoy a vacation away from home. Things to consider:

1. Altitude in route and at destination.
2. Temperature and humidity.
3. Air pollution, smoke, dust, pollens and molds.
4. General itinerary plan, with rest periods.
5. Pace yourself!

Also essential in your early travel plans is an honest assessment of your physical limitations. *Now* is the time to start those reconditioning walks described earlier. The higher your level of activity, the more energy you will have and the more you will enjoy your trip.

## Appointment With Your Physician:

Next on your agenda should be an appointment with your physician, who can advise you on medical specifics. Schedule a double appointment if you have many questions. Don't forget to ask about:

1. Medication prescriptions for twice the amount needed. Allow for accidents!
2. Prednisone and antibiotics to have on hand for flare-up.
3. Stool softener and/or glycerin suppository recommendations.
4. Summary letter of your condition, including blood gases and pulmonary function results.
5. Medical emergency advice in route and at destination, including name of a physician to contact if unable to call your own.
6. Need for exercise oximetry or altitude oxygen prescription.

## If On Oxygen:

1. Oxygen prescriptions: Make enough copies for all oxygen refills anticipated, plus some spares.
2. Oxygen setting changes if going to a different altitude.
3. Letter to cruise line or airline. Regulations will vary with each company. It is *essential* that you call as early as possible to learn what is required.

## Home Medical Equipment (HME) Supplier:

If you are going to be needing oxygen on your trip, you have some additional preparations to make with the assistance of your HME.

1. Travel itinerary discussion.
2. Arrangements for rentals.
3. Letter of permission from your HME for use of their equipment.
4. Oxygen prescription.
5. Oxygen arrangements during the trip, at destination, and at home.

If you need oxygen only at night, you can rent a portable oxygen concentrator. If you are on continuous oxygen and are driving, your HME should be able to arrange ahead for all possible refill stops, making sure that there are compatible oxygen systems.

When traveling, you will have to produce an oxygen prescription, a letter of permit from the HME supplier, and be prepared to pay cash for oxygen refills no matter what kind of insurance coverage you have. The invoices should be kept for insurance reimbursement at the end of the trip if covered by insurance.

### **Flying:**

Planes are pressurized to an altitude ranging from 5,000 to 8,000 feet, and sometimes going as high as 10,000 ft. Oxygen levels can drop substantially so you should ask your physician about your need for oxygen, especially on long flights.

All airlines vary in their requirements, so it is important to start your oxygen requests as early as possible. Your doctor will have to fill out a form, often in triplicate. You are not allowed bring your own oxygen on board the plane at this time. It is wise to bring your own cannula and adapter, since some airlines still use masks. Arrive at the airport at the time suggested by your carrier. Prices vary between different airlines from \$50 to \$300 and more for each leg of the trip. Check your costs in advance! Insurance does *not* pay for oxygen used when flying. If you are on *continuous* oxygen, you must make arrangements to be met with oxygen, transported between airports, or dropped off at the plane with someone who will take your personal oxygen home. At small airports this may be done by your HME, but at large airports it is much more difficult to arrange without family or friends to provide assistance. 9/11 security measures have greatly changed all these recommendations so it is essential that you ask about all of these things well in advance of buying a ticket.

### **Cruising:**

Cruising is particularly rewarding for people with respiratory difficulties since there are no problems with altitude or pollens. If you require oxygen, have your travel agent check on the specific requirements of your chosen cruise line, and check to see if your local HME can take care of your oxygen needs. If not, ask that they go through a HME in the port of departure. *Have all of these details taken care of before buying your ticket* [Figure 23].



### **In Summary:**

Whether you wish to travel by train, plane, cruise ship, or your own car, there are many exciting options for you to choose from, even if you are on continuous oxygen. So get out the travel brochures, start on a reconditioning program, and enjoy yourself!

Figure 24 -- Ready for a long cruise with liquid oxygen reservoir, oxygen concentrator and portable liquid oxygen with Oxymatic conserving device attached.



# SEXUALITY

Many experts have reminded us that we are all sexual human beings from the moment of birth until the last days of our lives. But often the expression of this aspect of our humanism sits on the "back burner", particularly in case of chronic illness such as COPD.

The reason for this is simple. The stress of illness, frustrations over shortness of breath, fears and anxieties of harm during sexual experiences and lack of knowledge about how to deal with these matters can cause a significant reduction in sexual activity in most patients with chronic diseases; this is particularly true with COPD. The complexities of human sexuality do not allow for a simple explanation of all aspects of this feature of human experience. How the most common forms of sexual expression amongst people who love each other are impaired by disease and how the emphysema patient can learn to cope needs to be considered by doctors and their patients, spouses, and significant others. We believe that just remembering that sexuality is part of our very existence and shouldn't be ignored just because of shortness of breath, the need for oxygen, or the requirement of bronchodilators, is important. We need to emphasize that there is far more to this expression of warmth and feeling than what is best called "the main event." Touching, hugging, kissing, holding and fondling are nurturing. Sexual positions that help reduce shortness of breath are shown figure 25.

Figure 25 – Various positions for intercourse for COPD patients

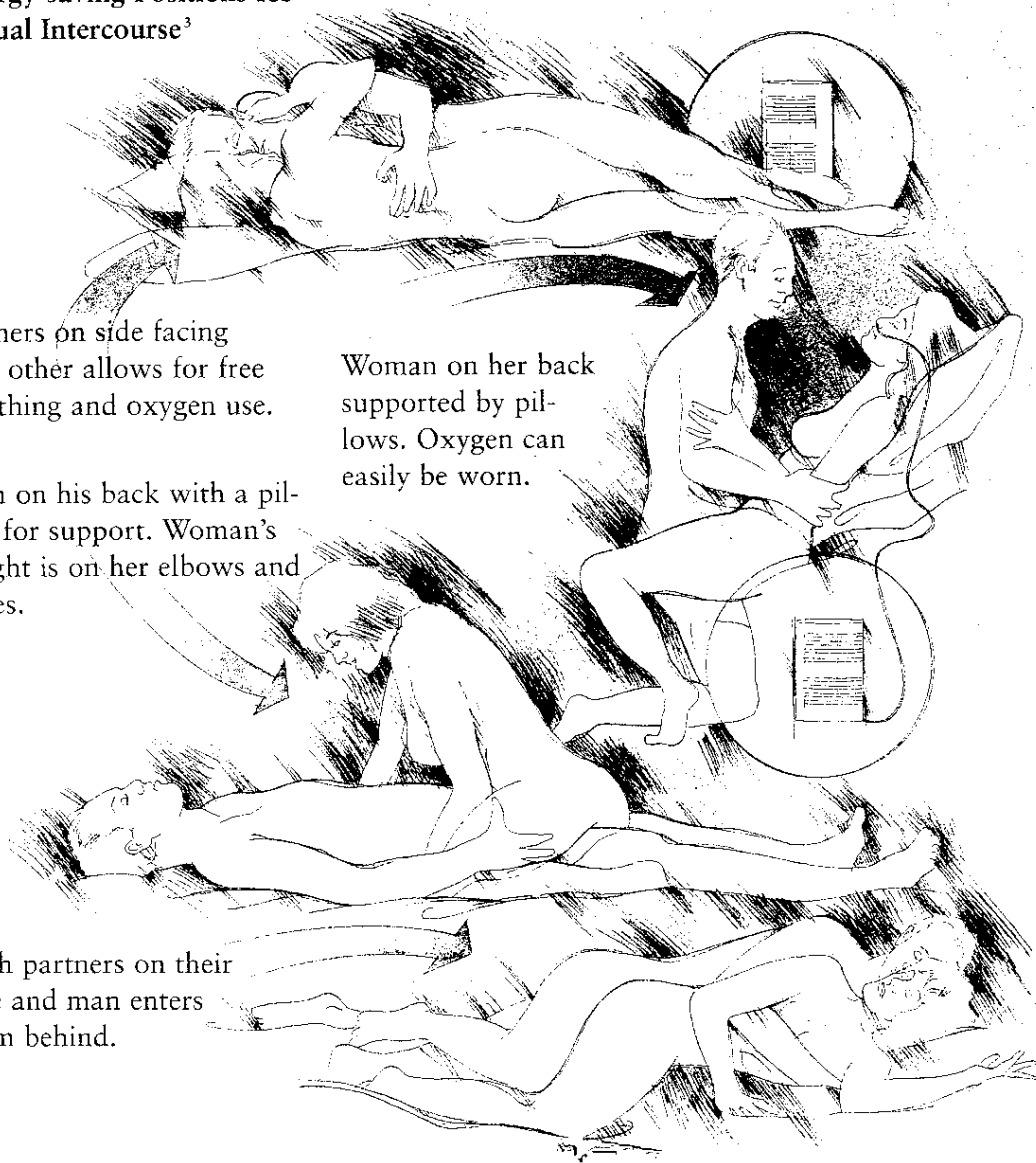
**Energy-saving Positions for Sexual Intercourse<sup>3</sup>**

Partners on side facing each other allows for free breathing and oxygen use.

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

Woman on her back supported by pillows. Oxygen can easily be worn.

Both partners on their side and man enters from behind.



Those cards, letters and phone calls can also be important symbols of these human feelings.

Three drugs are available for erectile dysfunction. They require a doctor's prescription and are usually advertised. These drugs are sildenafil (Viagra), Tadalafil (Cialis), and Vardenafil (Levitra). These drugs are also mild bronchodilators.

Just one more thing. Remember that anything that is simmering on the "back burner," no matter how long, can become "piping hot" with time and the pause or waiting may make it a little more tender and sweet. Then it takes only a little extra effort to reach the boiling point once again. At this moment it requires only a smile and taking a little more time to be together again or to remember!

## **TREAT YOURSELF AS SOMEONE SPECIAL**

Why not do yourself a favor? Treat yourself as someone very special. After all, you are unique — you are your own "special person".

Isn't this action self-serving and somewhat selfish? — The answer is: Yes. We're not talking about arrogance, greed or hubris. That's bad stuff. We are only talking about being especially nice to *yourself*.

For example — do you need a new suit, whole wardrobe or something else? How about a new car? If so — go for it. Second idea: If you make plans for tomorrow, but awaken and just don't feel like it, admit that the best laid plans must and can be changed or postponed. We just can't plan everything to perfection for every day. Forget perfection — we wouldn't know it if we saw it and if we did see it, we wouldn't believe it. Consider each day as special and remember it belongs to you.

Ah Spring! Time for flowers, trees, and special things. This is always a time when spirits rise. So enjoy the season and the reason to give yourself a special time for pleasure and satisfaction. After all, you are unique and owe it to yourself and those who love you. Say "I love you" to yourself and to someone else every day.

## **WHEN THE PARTY'S OVER**

Almost everyone enjoys a good party. Human interaction, refreshments, and humor abound. People come and go at different times. Some leave too soon and others stay too long. Who likes a party after all of the fun has gone out of it and most people have gone home? Most who are left are complaining about something, or they are intoxicated or worse.

It's not that much different in life itself. Of course, some leave too soon and we miss them. Others stay too long. Now, with "life support systems," a product of the technological revolution in medicine, we also have developed what can appear to be a "technological

imperative." Sometimes life support devices are used when there is no hope of recovery. And this may deny us the right to leave "the party" just at the right time.

The common law and our constitution both guarantee us the right to self determination and the right to privacy. Accordingly, we have a fundamental right to refuse to participate in any form of medical care including life support care, if we so choose. And legally, it is an assault if medical care is imposed against a person's will. Fortunately, society has begun to understand these human rights and to say "hell-no" when they don't want to go on suffering with some form of incurable disease or misery. Living wills and durable power of attorney procedures help guide physicians in difficult decision making (see below). But having these advance directives well in place before sudden and unexpected illness occurs is not always pre-arranged. It's important to do so now!

The role of the physician and all other health workers, of course, is to promote health and treat disease states with the presumption of success in pursuit of a happy outcome on behalf of each and every patient. But when all agree, i.e., patient, family and physician alike, that the party is no longer fun and is getting boring and painful, isn't it time to quietly leave in peace?

## ADVANCE DIRECTIVES

Today the public is increasingly aware of the fact that they are in the position of guiding the healthcare givers about treatment options at all times, but especially in the final stages of life and death. However, what many people consider the final stages of life may be a very pleasant, indefinite period of enjoyment of life's accomplishments and reflections. Many people enter hospitals with serious illnesses such as heart attack, stroke, severe gastrointestinal bleeding, etc., when all appears hopeless. Hopeless does not belong to our vocabulary but the term futile does. There is always hope. But, in all seriousness, there are times when the continuation of high technology medicine is futile. That means that it will not achieve any lasting benefit for suffering patients. Most healthcare givers would be relieved to know the wishes of their patients, expressed directly by the patient through what is commonly called the Advance Directive.

Advance directives are known as living wills, durable powers of attorney, and other clear expressions of personal attitudes and desires. Basically, a living will is a statement of personal preference for various forms of medical care or the withholding or removal of various forms of medical care under certain circumstances. Both withholding and withdrawing mechanical ventilators, oxygen, food, fluids, antibiotics, or any other drug is morally, ethically, and legally the right of any individual or a surrogate decision maker. It is the physician's responsibility to adhere to the patient's wishes in these difficult situations. Physicians are best aided by a clear expression through serious conversation and in writing about what the patient wishes to have done. The fact and basic details of this discussion should be documented in the patient's record. In the absence of an advance directive, other principles take over, such as surrogate decision-making on the part of the family based upon their clear understanding of what the patient would have wanted done and another concept known as the

principle of the patient's best interests. This "best interest" concept can mean different things to different people. From a simplistic point of view, it would be best under difficult circumstances to be able to deal with bad situations that are often pretty obvious to the patient, nurses, respiratory therapists, and the family. Hopefully, all are in agreement when withholding or withdrawing any form of supportive care that becomes necessary.

Our own view on this delicate matter is to be "up front" and to gain clear guidance about patients' wishes before it is needed. Talks about the future are a good way of initiating the dialogue. Recording that such a conversation took place in the medical records (both office and hospital) is extremely important. Documenting that all family members are in agreement, if true, is also an important principle. However, the patient's wishes are paramount and override any other consideration. Beyond question, these discussions of the advance directives are amongst the more delicate situations in medicine. The principles of informed consent apply. Informed consent requires truth telling and responsiveness to patients' needs, expectations, and a reconciliation of technological possibilities, i.e., what can be done within the realm of ethical considerations, meaning what *ought* to be done. The aim of the dialogue and decision-making process is to reconcile all principles within the context of the patient's rights of self-determination and privacy. Our own view is to present the issue of the end of life in an optimistic way. Postponing the realities of death is always a pleasant concept. No one in our society wants to contemplate their own mortality. Yet the reality of death must be confronted. Creating an optimistic and even an adventuristic attitude seems reasonable in our opinion.

Yet postponing "the trip" has its obvious advantages. Though no one has ever been able to communicate with a person after death, the likelihood of after-life remains in the religions and minds of many. Beliefs of eternity and the self-sustenance of the soul are based on both fundamental and recent religious beliefs. Our own beliefs are personal and, indeed, so are your own. Let us end with a view of a gorgeous sunset somewhere — one that has particularly beautiful memories. Let us also consider that sunsets are always followed by sunrises! [Figure 26]



Figure 26 – Sunset from NASA Website

# RECENT DEVELOPMENTS

## REPLACEMENT THERAPY FOR PATIENTS WITH INHERITED EMPHYSEMA

Most patients with chronic obstructive pulmonary disease (COPD) develop their disease because of tobacco smoking. However, a small group (1-2%) of COPD patients have a much higher risk for developing lung disease, often early in life. These patients lack an important substance in their lungs that normally protects against lung damage. This group of patients is particularly susceptible to the harmful effects of tobacco smoke and other pollutants and they consequently develop their disease much earlier in their lives. Their inherited condition is called alpha-1-antitrypsin deficiency. About 40,000 people in the United States alone have this deficiency. If you developed your lung disease early in life, say in your 20's, 30's or 40's, and if other blood relatives have had chronic lung disease, you might have this deficiency.

Testing for alpha-1-antitrypsin deficiency is easy. Your doctor will draw a blood sample and send it to the lab for analysis. If alpha-1-antitrypsin is missing from your blood, you might benefit from replacement therapy. The alpha-1-antitrypsin replacement products that are available include Prolastin®, Zemaira®, and Aralast® which are produced from human blood that has been carefully sterilized to eliminate all viruses. It does not impose a risk of hepatitis or Human Immunodeficiency Virus (HIV).

Weekly or, at times, monthly intravenous infusions (injections) are required to produce a protective level of alpha-1-antitrypsin. Although these products are safe and each weekly infusion is usually well tolerated, this treatment is extremely expensive and time consuming. This form of therapy is covered by most comprehensive insurance plans, but it is certainly not available to all patients who could benefit from it.

The rationale for prescribing this therapy is to protect patients against the progressive destruction of the lungs from emphysema. Questions continue regarding its effectiveness in halting or altering the natural course of the disease. A large Registry of patients with alpha-1-antitrypsin deficiency in the United States is presently gathering data to answer this and other important questions.

The reason that replacement therapy is currently so expensive is that it is obtained from human blood. Intense research and development is underway to create a less expensive, synthetic, form of alpha-1-antitrypsin. An inhaled form is being studied which, if successful, would deliver the product directly into the lungs at a lower dose and lower cost.

## LUNG TRANSPLANTATION AND LUNG VOLUME REDUCTION

The ideal solution for bad lungs would simply be to replace them with good lungs. Successful lung transplantation eluded research surgeons for many years. Major problems included surgical techniques, infection, and rejection of the transplanted lung. The first breakthrough began with the first heart and lung transplants. Later, double lung transplants became successful and most recently single lung transplants are almost commonplace in certain large medical centers. Single lung transplants are technically easier to perform and one donor can serve 2 patients. However, patients with serious underlying infection (common in cystic fibrosis and bronchiectasis) require both lungs to be transplanted since the remaining infected lung can infect the transplanted lung.

In general, lung transplantation is reserved for younger patients who are extremely disabled from the devastating effect that their disease has on their lungs. At the same time, the rest of their body is healthy and can support new lungs. It is generally recommended that patients receiving lung transplants undergo pulmonary rehabilitation both before and after surgery. This is to prepare the patient for surgery and to improve the chances of long-term success. The success rate of single lung transplantation is approximately 90% in major centers throughout the United States.

Thus, lung transplantation has emerged as the salvation for a growing number of selected individuals with both COPD and other kinds of respiratory disorders such as pulmonary fibrosis and cystic fibrosis. Unfortunately, it is limited by the availability of donor organs and by cost.

A lesser and potentially more available surgery is called *Lung Volume Reduction Surgery (LVRS)*. It involves removing the more damaged areas, usually in the upper lobes of the lungs, which are not contributing to gas exchange. Patients with COPD with a large emphysema component, who have most of their emphysema at the upper regions of their lungs with relatively normal lungs in the lower regions, may qualify. The emphysema portion tends to be overly expanded and crowd out the normal lung tissue. Removal of these areas will enable the normal lung to expand and function much better. This surgery also allows the diaphragm to move upward and function more effectively.

This procedure has been extensively evaluated in medical centers of excellence that have substantial experience in LVRS. A small subset of patients with poor exercise capability, following a period of pulmonary rehabilitation and with less than the most far advanced stages of disease, can benefit and increase their exercise ability and quality of life. Survival and lung function is improved in some but not all LVRS patients. This provides a substantial short term benefit for appropriate candidates.

## **NEW HOPE FOR LUNG CANCER**

There is an increasingly recognized relationship between COPD and lung cancer. Lung cancer is 6-7 times more common in patients with COPD. One of the obvious links between lung cancer and COPD is tobacco smoking. However, there is more to this relationship. Men and women with equal smoking histories are more likely to have lung cancer in the presence of COPD than without it. Also, both COPD and lung cancer tend to occur more frequently in some families and this suggests a hereditary predisposition to both diseases.

Exactly how tobacco smoke causes normal lung cells to become malignant is not known. Experience with other forms of cancer suggests that it occurs more frequently in areas of damage such as cancer of the colon in the case of ulcerative colitis, liver cancer in cirrhosis or breast cancer in mastitis. Tobacco contains over 5000 chemicals, at least 43 of which are known to cause cancer.

Today, lung cancer is almost always diagnosed from masses or shadows seen on chest X-rays or when symptoms suggest lung cancer. The diagnosis is confirmed by taking a biopsy (small surgical specimen) of the area usually through a bronchoscope. The bronchoscope is a small flexible tube that allows the physician to directly view the tumor and biopsy it.

Physicians are always looking for ways to detect cancer earlier in its development so that survival can be improved by earlier treatment. By taking a sputum specimen (sputum cytology) and CT scanning, cancer can be detected years prior to detecting it on a regular X-ray. It therefore seems prudent to screen with CT and sputum for lung cancer in people who are at high risk for developing it; highest risk is in smokers over 45 years old with a family history of cancer and COPD patients. Workers in hazardous occupations, such as uranium and chromium mining and processing, and asbestos workers, should also be screened. Again, earlier detection is the best hope for successful treatment.

While screening and early detection is important, prevention is certainly the best approach. The most important first step is to stop smoking. In addition, there is indication that dietary therapy will be found to improve the chances of avoiding lung cancer — an important adjunct to smoking cessation.

## **EARLY IDENTIFICATION OF COPD**

COPD does not just happen. It slowly develops over many years—well before it is noticed by the patient or physician. By the time it becomes symptomatic, through coughing, wheezing or shortness of breath, it is usually quite far advanced. The chest X-ray is relatively insensitive to early COPD. However, your physician can measure your lung function using an office spirometer that determines the volume of your lungs as well as airflow (how fast and how much you can blow in or out). With this information you can make important life-style changes sooner which will protect your precious breathing apparatus. Even a simple peak flow meter can help detect disease, but spirometric measurements are more accurate. Newer and more user friendly spirometers are being developed.

The aim is to get spirometry as widely used as blood pressure measurements in smokers and persons with cough, shortness of breath or wheeze. All primary care physicians should have simple spirometers in their offices and clinics. [Figure 27]



Figure 27 Spirometer  
**EasyOne®**

## METHODS TO STOP SMOKING

The most important single step any smoker can take is to *Quit Smoking!* Some people who quit do it on their own. However, many other smokers are addicted to nicotine and in some this is a very strong addiction. In fact, the pleasure that some smokers describe comes from the relief of nicotine withdrawal symptoms that builds up between cigarettes. The medical community now sees tobacco addiction as a primary disorder or chronic illness on its own. Accordingly, there is now unprecedented help and support for smoking cessation. Also, Medicare and other insurances may help to pay for it.

You should go to your doctor for education, advice and instruction on smoking cessation. A simple, serious discussion of the risks of smoking is always in order even though the dangers of smoking are well known to most patients. This is a first step in a sometimes tortuous pathway that begins with an important decision to quit, driven by dedication and cemented by commitment to remain off cigarettes. Thus, smoking cessation is not a single event, but a complex process. Your doctor should provide assistance throughout the process. Call the National Cancer Institute 1-877-448-7848. They offer over the phone assistance and will send you appropriate brochures. You can also get some of this information on their website which is [www.cancer.gov](http://www.cancer.gov). Search for “smoking cessation”. This is a good way to help you to quit successfully. Also refer to the American Thoracic Society Website on COPD [www.thoracic.org/copd](http://www.thoracic.org/copd) in the sections on smoking. California Thoracic Society’s website on smoking cessation is [www.thoracic.org/ca.html](http://www.thoracic.org/ca.html).

The first step in smoking cessation is to seriously try to stop. Some people are able to be successful on the first try. The best approach is to pick a *Quit Date* and try to stick to it. If that is not successful, see your doctor about techniques for smoking cessation. If a first visit to your doctor has not been successful, then you may need extra help. [Figure 28]

**Figure 28 – GOLD Guidelines on Smoking Cessation.** [www.goldcopd.com](http://www.goldcopd.com)

According to the GOLD guidelines, “Smoking cessation is the single most effective—and cost-effective—way in most people to reduce the risk of developing COPD and stop its progression.”<sup>1</sup>

Counseling and patient education have been proven effective in helping smokers to quit. Therefore, all patients with COPD should be advised about smoking cessation on every visit. Several pharmacologic therapies are now available.

DRUGS USED FOR SMOKING CESSATION		
Drug and Route	Unit Dose	Dose Interval
Nicotine polacrilex, oral	2–4 mg	Every 1–2 hours*
Transdermal nicotine patch	21, 14, and 7 mg 15, 10, and 5 mg 22 and 11 mg	Over 24 hours Over 16 hours Over 24 hours
Nasal nicotine spray	0.5 mg per inhalation per nostril	8–40 mg/day in hourly or as needed
Nicotine inhaler	10 mg per inhaler	Inhale for 20 minutes, 6 to 16 times/day
Bupropion sustained-release tablets	150 mg	150 mg for 3 days, then 300 mg/day
Buspirone tablets	15, 10, and 5 mg	Starting dose: 7.5 mg twice daily; maximum dose: 60 mg/day

\*15–30 pieces may be chewed over 24 hours.

Source: National Lung Health Education Program, 2004.<sup>2</sup>

References: 1. Global Initiative for Chronic Obstructive Lung Disease. *Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease: Updated 2004*. Bethesda, Md: National Heart, Lung, and Blood Institute. March 2001. Updated July 2004; 2. National Lung Health Education Program. Frontline Treatment of COPD [National Lung Health Education Program Web site]. Available at [www.nlhep.org/books/TrtmntCOPD/9\\_management\\_COPD\\_ph1.html](http://www.nlhep.org/books/TrtmntCOPD/9_management_COPD_ph1.html). Accessed October 22, 2004.

#### FIVE AS TO HELP YOUR PATIENT QUIT SMOKING

- 1. ASK:** Systematically identify all tobacco users at every visit.  
Implement an officewide system that ensures that for EVERY patient at EVERY clinic visit, tobacco-use status is queried and documented.
- 2. ADVISE:** Strongly urge all tobacco users to quit.  
In a clear, strong, and personalized manner, urge every tobacco user to quit.
- 3. ASSESS:** Determine willingness to make a quit attempt.  
Ask every tobacco user if he or she is willing to make a quit attempt at this time (eg, within the next 30 days).
- 4. ASSIST:** Aid the patient in quitting.  
Help the patient with a quit plan; provide practical counselling; provide intratreatment social support; help the patient obtain extratreatment social support; recommend the use of approved pharmacotherapy except in special circumstances; provide supplementary materials.
- 5. ARRANGE:** Schedule follow-up contact.  
Schedule follow-up contact, either in person or via telephone.

Source: Global Initiative for Chronic Obstructive Lung Disease, 2004.<sup>1</sup>

Reference: 1. Global Initiative for Chronic Obstructive Lung Disease. *Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease: Updated 2004*. Bethesda, Md: National Heart, Lung, and Blood Institute. March 2001. Updated July 2004.

## NICOTINE GUM

Nicotine containing gum, Nicorette®, released in 1984, has helped many people to quit smoking. However, it is only an adjunct to a full program of cessation. It is most effective for people who are highly motivated to quit and need that extra boost. The Nicorette® gum takes the edge off the craving. The gum must be chewed in a manner that causes a slow release of its nicotine for absorption through the lining of the mouth. It has the disadvantage of having a bitter taste and it can upset the stomach, however, most people are able to tolerate it. Nicotine gum is available without a prescription in drug stores as an over the counter medication.

## NICOTINE PATCH

To solve some of the above problems, the nicotine patch, that slowly releases nicotine through the skin, has been introduced. It is available in four products: Nicoderm®, Prostep®, Habitrol® and Nicotrol®. It is of interest that these products are now being advertised directly to patients on television and in magazines. While some question this practice, this advertising is probably of benefit to society since it raises the consciousness of smokers about quitting. Moreover, these products are probably the most effective single agents for smoking cessation.

When the nicotine patch is prescribed, a definite quit date should be selected. Again the patch should not be the single method of quitting. It would be helpful to use the American Lung Association's *18 Days to Smoking Freedom*, which includes the quit date strategy. The patches come in several strengths and generally people require the higher strength to begin with. After 4-6 weeks, lower strength patches can be used. A typical strategy for using Habitrol® or Nicoderm® is to apply the 21 mg patch for 6 weeks, then 14 mg patch for 2 weeks then the 7 mg patch for 2 weeks. Another strategy is to use each size patch for 1 month each. Prostep® is available in 22 mg and 11 mg sizes for gradual replacement therapy while Nicotrol® is available in 15 and 7 mg sizes for use in daytime control of nicotine withdrawal symptoms (16 hours). Sometimes the Nicotine Gum is used to augment the patch at times of stress and heightened craving. Patches are available without prescription.

## NICOTINE SPRAY and INHALER

This is a new preparation used to replace nicotine by a simple nasal spray and is now available by prescription. This adds another approach to the treatment of nicotine withdrawal symptoms. This nicotine vapor delivery device looks like a cigarette and is useful in some patients. It is available only by prescription

## BUPROPION (Zyban®)

Bupropion was formerly utilized as an anti-depressant drug. However, it was found to reduce the craving for cigarettes among addicted smokers. It provides substantial support for patients who are intent on quitting. The quit day should be about 1 week after starting Bupropion. Treatment continues for 7-12 weeks. In some it may be more effective than

nicotine replacement. It may prevent the weight gain for those who have that tendency. It also may be used in combination with nicotine replacement.

## BETTER OXYGEN SYSTEMS AND METHODS

The last decade has seen the introduction of devices and methods of delivering oxygen to patients more efficiently and with improved appearance and comfort. Oxygen cylinders are becoming smaller, lighter and easier to carry. Oxygen conserving devices include the electronic and pneumatic demand delivery devices, transtracheal catheters, and reservoir cannulae (oxymizer and pendant). These devices increase the efficiency of oxygen delivery. A new fluidic pendant has just been released that supports the benefits of pursed lip breathing. Also, the Sage® is a demand device with a motion sensor that automatically adjusts between rest and exercise. Patients can remain well oxygenated during both rest and while exerting. [Figure 29]



Figure 29 – Therapeutic oxygen delivery that automatically adjusts the oxygen setting during rest and exercise.

These devices lower the amount of oxygen required by each patient and thereby allow for smaller, more portable oxygen systems. They also help to reduce the cost of oxygen therapy. Liquid portable devices are now smaller and lighter than ever before. The lowest weight is 3.5 pounds for a 6 to 8 hour supply. New portable oxygen concentrators which weigh 9.5 pounds have just been introduced. They are among the most practical ambulatory oxygen systems for travel. Liquid oxygen is often delivered by the pulse method today. Newer concentrators refill portable oxygen cylinders making home deliveries unnecessary.

## **HUMOR, LAUGHTER & POSITIVE ATTITUDE TOWARD LIFE**

The benefits of humor and laughter and a positive attitude are general principles that are good for everyone. Laughter and participating in enjoyable activities is good medicine. Most people respond to humor. Norman Cousins introduced the concept that humor and laughter has healing power. We do not fully understand how humor and laughter actually help people to feel better. We do know that there are biochemical changes in the body associated with different emotions. People with chronic lung disease are often anxious or depressed and laughter is a pleasurable experience. Each of us, (Tom, Mary and Brian), have made it our top priority to bring a smile or laughter to patients and family members. And we also feel better in the process.

For years, Dr. Tom Petty has taught that people with lung disease should be able to enjoy life. Consistent with that philosophy, Mary Burns has taken patients to the race track and as well as the first ocean cruises. Mary has provided the Southern California patients with an annual Respiratory Rally in which respiratory patients and staff have the opportunity to enjoy themselves together. Dr. Brian Tiep and daughter Rebecca also entertain patients with their violins and mandolins. Most of the events were strictly for fun. In fact, humor has been the main theme in several of these events. Doctors, nurses, respiratory therapists, patients and family members took turns at telling jokes and funny stories.

There is no medicine or therapy that replaces humor. We all understand that a positive approach toward life will reduce disability and alleviate suffering. Humor and laughter are helpful in creating and maintaining a positive attitude.

## **WISH LIST**

### **SMOKE FREE SOCIETY**

At the top of any wish list is a hope that someday we will finally rid ourselves of the cause of most lung diseases, heart disease and lung and other cancers—tobacco smoking. It is unfortunate that this is such a profitable product because it is most deadly. At least 434,000 Americans die from the direct effects of tobacco and another 50,000 die of exposure to other people's smoke. We as a society must finally become smoke free. It is our fondest wish that the tobacco industry will somehow be forced to stop its multi-billion annual advertising budgets aimed at recruiting new teenage smokers to replace those who die or quit. The tobacco industry must stop advertising to children!

## **GREATER AVAILABILITY OF PULMONARY REHABILITATION**

It is now recognized that Pulmonary Rehabilitation is the *Treatment of Choice* for patients with chronic lung disease such as COPD and pulmonary fibrosis. This booklet describes a number of the methods used in pulmonary rehabilitation. We hope these methods will be useful to millions of lung disease sufferers in this and other countries around the world.

Ideally, patients with COPD and other chronic lung diseases will have the opportunity to undergo pulmonary rehabilitation. If you have insurance or Medicare through an HMO, you should make sure your plan provides pulmonary rehabilitation. It is now the standard of care and you should demand it. It can make the difference between extreme disability and an active, enjoyable life-style. It is also true that pulmonary rehabilitation can actually reduce the cost of health care by preventing hospitalization and nursing home care.

## **AVAILABILITY OF OXYGEN DURING AIR TRAVEL**

Presently patients who require oxygen aboard commercial aircraft must make arrangements in advance and pay extra for the airline to supply their oxygen. Patients are not allowed to carry their own oxygen systems aboard commercial flights in the USA as they are in some instances in Europe. In addition, patients do not receive oxygen while boarding and disembarking from the aircraft. We would like patients to be able to carry their own oxygen system on commercial aircraft. The use of oxygen in this manner is very safe. Patients who are oxygen dependent should have impediments to their mobility removed. Progress is being made. We are actively working on this problem and we are expecting a solution in the foreseeable future. Soon portable oxygen concentrators will be allowed in air travel.

## **EARLY DETECTION OF LUNG DISEASE**

We have discussed the importance of early detection of lung disease. With earlier detection, people can change their life style, stop smoking, and take special precautions to protect their lungs. Also, families of smokers should take the same precautions, particularly by quitting smoking.

A major initiative on early identification and intervention has been established, beginning in 1997, called the National Lung Health Education Program (NLHEP). A global initiative was launched in 2000. Both are directed at early identification and treatment of all stages of COPD.

## **PORTABLE BATTERY DRIVEN OXYGEN CONCENTRATORS**

As previously described, the oxygen concentrator is an excellent source of stationary home oxygen. Practical portable battery driven units that weigh less than 5 lb are yet to be developed. Presently, the motor, pump and the battery are too large and heavy to be fully practical. Small battery driven units would be very desirable. They would free patients from a stationary oxygen source and greatly improve patient mobility. A reasonable goal would be the development of a 5 lb unit that would operate for more than four hours between recharging. Presently, two 9.5 pound units have reached the market. A three hour rechargeable battery pack is available for one unit and a supplementary battery pack can be used for long distance travel.

There are oxygen concentrators that refill portable oxygen cylinders. The concentrators are full sized units, but they refill some of the smallest portable cylinders. These systems provide the combined benefits of concentrators while providing the full benefits of portable oxygen. Liquid portable systems are excellent, but more expensive than concentrators and small tanks. They allow for the most freedom and range of activities both in and outside the home. Also a new method of producing liquid oxygen in the home is under study at the present time. If successful, it may reduce costs of liquid while providing its most portable benefits..

### ***HOPE FOR A BETTER FUTURE***

We have described some of our hopes and ideas for a better future. We hope that we are addressing your needs and that you will be able to benefit from pulmonary rehabilitation. Please accept our best wishes for a happy and healthy future.

For Further information or to subscribe to our newsletter, the Second Wind: write to: The Pulmonary Education and Research Foundation, P.O. Box 1133, Lomita, CA 90717-5133. Visit our website at [www.perf2ndwind.org](http://www.perf2ndwind.org).



**PERF**