

Chronic Obstructive Pulmonary Disease (COPD)

What is chronic obstructive pulmonary disease?

Chronic obstructive pulmonary disease (COPD) is a term referring to two lung diseases, chronic bronchitis and emphysema. Both conditions cause obstruction of airflow that interferes with normal breathing. Both frequently exist together, so physicians prefer the term COPD. COPD is preventable and treatable. This definition of COPD does not include other obstructive diseases such as asthma, although uncontrolled asthma over a lifetime can result in damage and COPD.

Chronic bronchitis is the inflammation and eventual scarring of the lining of the bronchial tubes. When the bronchi are inflamed or infected, less air is able to flow to and from the lungs and a heavy mucus or phlegm is coughed up. Once the bronchial tubes have been irritated over a long period of time, excessive mucus is produced constantly, the lining of the bronchial tubes thickens, an irritating cough develops, air flow may be hampered and the lungs become scarred, eventually obstructing airflow.¹ The bronchial tubes then make an ideal breeding place for bacterial and viral infections.

Symptoms of chronic bronchitis include chronic cough, increased mucus, frequent clearing of the throat and shortness of breath.² The condition has been defined by the presence of a mucus-producing cough most days of the month, three months of a year for two years in a row without other underlying disease to explain the cough. More recent definitions include reduced lung function.

Emphysema begins with the destruction of air sacs (alveoli) in the lungs where oxygen from the air is exchanged for carbon dioxide in the blood. Damage to the air sacs is irreversible and results in permanent “holes” in the tissues of the lower lungs. As air sacs are destroyed, the lungs can transfer less and less oxygen to the bloodstream, causing shortness of breath. The lungs also lose their elasticity, which is important for keeping airways open. In advanced emphysema cases, patients are extremely short of breath.³

Symptoms of emphysema include cough, shortness of breath and a limited tolerance for exercise. As the disease advances, the work of breathing is so great that major weight loss occurs.

Smoking is the leading risk factor for COPD. Other risk factors include exposure to air pollution and second-hand smoke, a history of childhood respiratory infections and heredity. Particulate matter (PM) from cigarette smoke and air pollution, including smoke from poorly ventilated wood stoves and the burning of biomass^{1,4}, are related to lung damage. Particles that have a diameter of 2.5 to 10 microns, or less than 1/7 the diameter of a human hair, are called coarse particles and are of special concern. Larger particles are more easily trapped in the nose or throat, while smaller particles can be drawn into the small air passages.⁵

Fine particles, with a diameter of 2.5 microns or less (PM_{2.5}) represent the most serious threat. Particles this small easily reach deep into the lung and may even pass into the bloodstream.⁶ Once they have penetrated the lungs, fine particles can cause inflammation and impair immune responses.⁷

Alpha-1 antitrypsin deficiency-related (Alpha-1) emphysema is caused by an inherited deficiency of a protein called alpha -1 antitrypsin (AAT) or alpha-1 protease inhibitor. Alpha-1 emphysema is responsible for five percent or less of the emphysema in the United States.⁸ AAT, produced by the liver, is a “lung protector.” In the absence of AAT, the risk of developing emphysema is far greater than normal. Symptoms almost never appear before 25 years of age and sometimes never develop, especially in nonsmokers. In those who smoke, symptoms occur between 32 and 41 years of age, on average.⁹

Want to learn more about chronic bronchitis? Please view the disease listing at <http://www.lungusa.org/chronicbronchitis>

One study found that certain genes in mice appear to influence the risk of developing emphysema. The researchers said this may explain why some smokers remain disease-free. If similar genes are found in humans, these findings may one day help identify people who are at risk of emphysema well in advance of symptoms.¹⁰

Occupational exposure to certain industrial pollutants also increases the risk for COPD and contributes to its burden. One study found that an estimated 19.2 percent¹¹ of COPD cases among workers aged 30 to 75 years was due to occupational exposures. A combination of tobacco use and occupational exposure greatly increases the risk of developing COPD.

Who gets COPD?

Over 12.1 million U.S. adults (aged 18 and over) were estimated to have COPD in 2006.¹² However, close to 24 million U.S. adults have evidence of impaired lung function, indicating an under-diagnosis of COPD.¹³ This is a serious issue because damage to the lungs is not noticed until the disease is well-advanced, thus limiting effective treatment options.

Previously, COPD was more of a concern for men than women as women had lower prevalence rates of the disease. This was due to the far higher rate of

¹ Any organic material made from plants or animals.

smoking among men compared to women during much of the past century. As the smoking rate among women increased after World War II, so did their risk of developing COPD. Since there is a long lag period between smoking initiation and COPD diagnosis, the increased COPD prevalence rate in women has only been noticed recently. Women are twice as likely as men to be diagnosed with chronic bronchitis. In 2006, 2.9 million men were diagnosed compared to 6.6 million women.¹⁴

Want to learn more about COPD trends and data? Please view the *COPD Trend Report*, which delineates information available from national surveys on the mortality, prevalence, hospitalizations and economic costs due to COPD, at <http://www.lungusa.org/copdtrends>

The reasons behind this change and difference by gender have been understudied and are not well understood.¹⁵ A recent study found that the variation between genders in COPD rates could be due primarily to differences in smoking behavior and exposure to other environmental risk factors, such as occupations where there is a lot of dust present.¹⁶ However, women appear to have a greater vulnerability to cigarette smoking, the leading risk factor for COPD and lung cancer. This may be due to differences in how cigarette smoke is metabolized by women. Additional research suggests that women are at higher risk for DNA damage and are less able to repair DNA. While neither process is fully understood, it is likely that both contribute to the higher COPD and lung cancer rates seen in women along with other pathways that have yet to be discovered.¹⁷ For more information on gender differences in smoking-related diseases, please see the tobacco and lung cancer chapters of this report.

Research suggests that one or more inherited risk factors interact with smoking to increase COPD risk. It is not known if such inherited risk factors differ among races.¹⁸

Want to learn more about COPD? Please view the fact sheet at <http://www.lungusa.org/copdfactsheet>

COPD prevalence is estimated by results of the National Health Interview Survey (NHIS), which asks respondents if they have been diagnosed with chronic bronchitis in the last year (current prevalence), and if they have ever been diagnosed with emphysema (lifetime prevalence). COPD prevalence takes into account the overlap of persons with both diseases (approximately 10%). The total estimated COPD prevalence is then slightly less than simply adding together prevalence estimates for chronic bronchitis and emphysema. Data on numbers of deaths represent counts obtained from death certificates. COPD deaths include those from any chronic lower respiratory disease, including chronic bronchitis, emphysema and bronchiectasis, but do not include asthma.

In 2006, an estimated 9.5 million Americans were diagnosed with chronic bronchitis by a health care professional: 3.2 million 18 to 44 year olds, 4.1 million 45 to 64 year olds and 2.2 million people over 65 years of age. Chronic

bronchitis affects people of all ages, but the highest prevalence rate was seen among those 65 years of age and older at 60.9 per 1,000 persons while those ages 18 to 44 had the lowest rate estimated at 28.8 per 1,000 persons. Persons aged 45 to 64 years had a prevalence rate of 55.4 per 1,000 persons.¹⁹

White Americans appear to be more likely to have COPD than other racial or ethnic groups.²⁰ Not only are they more likely to have the disease, but they are also more likely to die from it.²¹

Chronic bronchitis prevalence had decreased in recent years but increased slightly in 2006 for both Whites and Blacks. The highest prevalence rate among Whites was in the 65 years of age and older population (63.1 per 1,000) and in the 45 to 64 years of age population for Blacks (61.7 per 1,000).²²

The emphysema prevalence rate is very low in those under age 45. Of the estimated 4.1 million Americans ever diagnosed with emphysema in their lifetime, 93 percent were 45 or older.²³ The risk of being diagnosed with COPD doubles every 10 years after the age of 40.²⁴ In 2006, the reported emphysema lifetime prevalence rate was 18.5 per 1,000 population.²⁵ Men tend to have higher emphysema prevalence rates than females. In 2006, almost 2.5 million males (23.4 per 1,000 population) had emphysema compared to 1.6 million females (13.9 per 1,000). From 1997 to 2006, the prevalence rate increased by 6 percent in women and 16 percent in men.²⁶

Emphysema rates are highest in non-Hispanic Whites (23.5 per 1,000) and lowest in Hispanics (3.9 per 1,000). Non-Hispanic Blacks have an emphysema rate of 7.4 per 1,000.²⁷

Want to learn more about COPD and diverse communities? Please view the *State of Lung Disease in Diverse Communities 2007* report at <http://www.lungusa.org/solddc-copd>

An estimated 100,000 Americans, primarily of northern European descent, have Alpha-1 deficiency emphysema. Another 20 million Americans carry a single deficient gene that causes Alpha-1 and may pass the gene on to their children.²⁸ A recent study suggested that there are at least 116 million Alpha-1 carriers among all racial groups, worldwide.²⁹

What is the health impact of COPD?

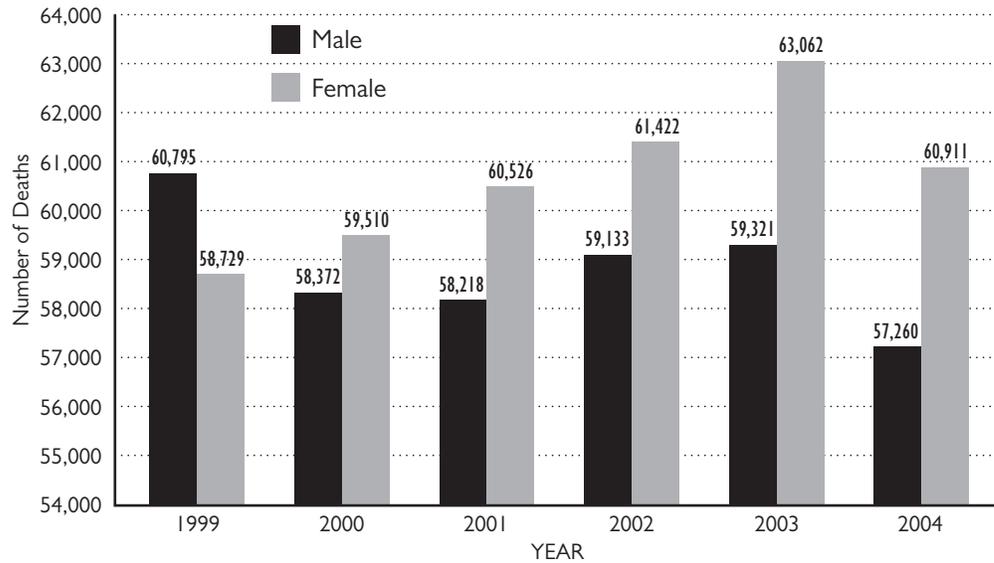
COPD is the fourth leading cause of death, claiming the lives of 118,171 Americans in 2004.³⁰ Preliminary data show this number increased to 127,000 in 2005.³¹ That is one death every four to five minutes. COPD is expected to become the third leading cause of death by the year 2020.³²

Approximately 80 to 90 percent of COPD deaths are caused by smoking. Men and women smokers are nearly 12 and 13 times as likely to die from COPD, respectively, compared to those who have never smoked.³³

Although, historically, men have been more likely than women to die of COPD, women have exceeded men in the number of deaths since 2000. In 2004,

almost 61,000 females died of COPD compared with 57,000 males.³⁴ Figure 1 displays the number of deaths due to COPD by sex from 1999 to 2004.

Figure 1: Number of COPD Deaths by Year and Sex, U.S., 1999–2004*



Source: Centers for Disease Control and Prevention. National Center for Health Statistics, Monthly Vital Statistics Report, 1999–2004.

Note:

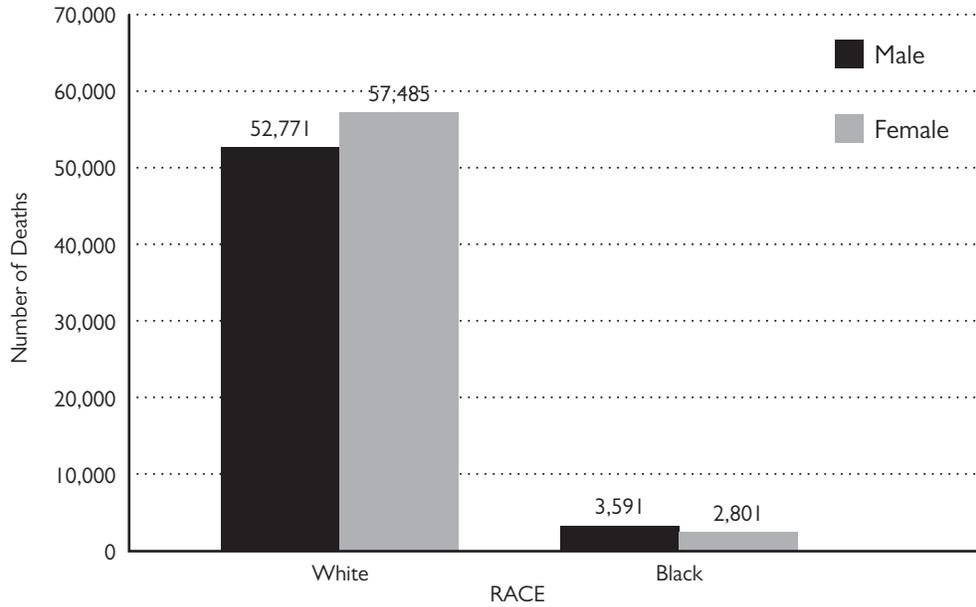
* **Comparisons should only be made between groups and diseases using rates, not number of deaths, as these do not take into account differences which may exist in population size or demographics.**

Racial and ethnic groups differ in smoking rates and patterns. Native Americans have the highest percentage of current smokers (26.9%) while Asians have the lowest (11.2%). Current smoking prevalence in Hispanics is relatively low (15.1%). Non-Hispanic Whites (21.8%) and non-Hispanic Blacks (22.6%) have similar current smoking prevalence percentages. Due to the long lag period between smoking onset and COPD presentation, future COPD prevalence rates among these groups are predicted to reflect these differences with more Native Americans and non-Hispanic Blacks presenting with the disease.³⁵

In 2004, there were 6,330 deaths due to COPD in non-Hispanic Blacks and 2,826 in Hispanics. The age-adjusted death rate for chronic bronchitis was 0.2 per 100,000 persons for both non-Hispanic Blacks and Hispanics. This rate is 50 percent lower than that for non-Hispanic Whites, 0.3 per 100,000 persons. However, emphysema leads to far more deaths than chronic bronchitis. The age-adjusted death rate for emphysema in 2004 was 2.8 among non-Hispanic Blacks and 1.6 per 100,000 persons among Hispanics. The age-adjusted death rate for emphysema in non-Hispanic Whites was 5.1 per 100,000 persons, almost two times greater than that of non-Hispanic Blacks and over three times greater than Hispanics.³⁶

Figure 2 shows the number of deaths by race and sex in 2004. White women suffered the most deaths due to COPD with almost 58,000 dying in 2004 alone.

Figure 2: Number of COPD Deaths by Race and Sex, U.S., 2004*



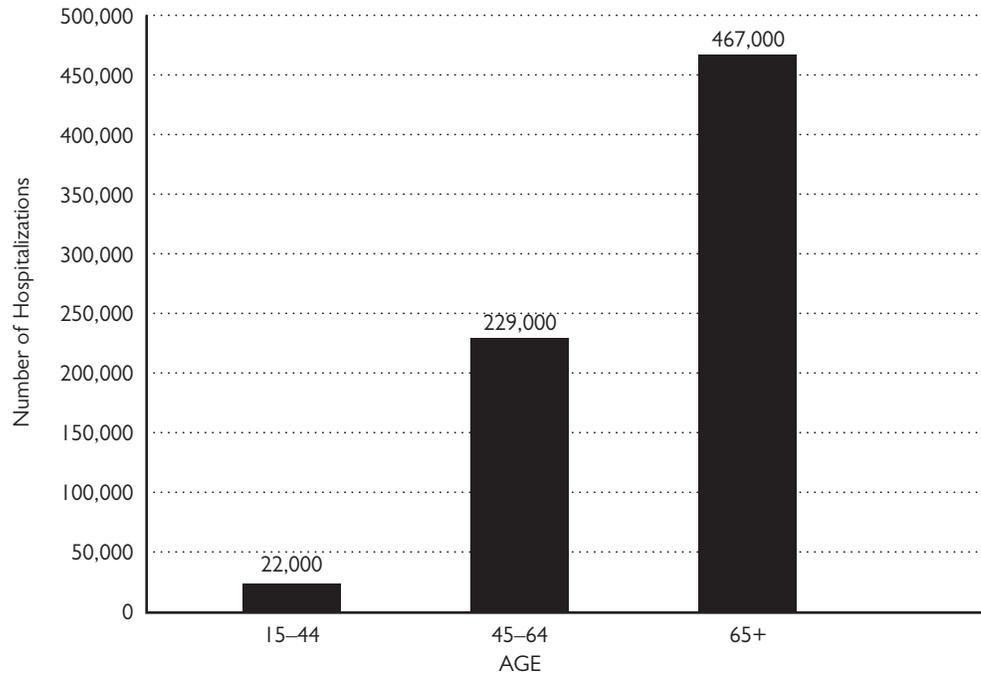
Source: Centers for Disease Control and Prevention. National Center for Health Statistics: National Vital Statistics Report. Deaths: Final Data for 2004.

Note:

* **Comparisons should only be made between groups and diseases using rates, not number of deaths, as these do not take into account differences which may exist in population size or demographics.**

An estimated 721,000 hospitalizations due to COPD were reported in 2005, a rate of 24.4 per 10,000 population.³⁷ Between 1988 and 1992, men had slightly higher rates of COPD hospitalization than women. However, since 1993, the rate in women has surpassed that for men. In 2005, the rates among men and women were 22.6 and 26.1 per 10,000, respectively.³⁸

COPD is an important cause of hospitalization in the aged population. Approximately 65 percent of all COPD hospitalizations were in people 65 years of age and older in 2005. The rate for the population 65 years of age and older (126.9 per 10,000) was significantly higher than the rate for any other age group. For instance, the hospitalization rate in the 65 years of age and older group was over four times higher than that in the 45 to 64 years of age group (31.4 per 10,000).³⁹ The number of hospitalizations by age in 2005 are displayed in Figure 3.

Figure 3: Number of COPD Hospitalizations by Age, U.S., 2005^{1,2,*}

Source: National Center for Health Statistics. National Hospital Discharge Survey, 2005.

Notes:

1. ICD-9 codes 490-492, 494-496

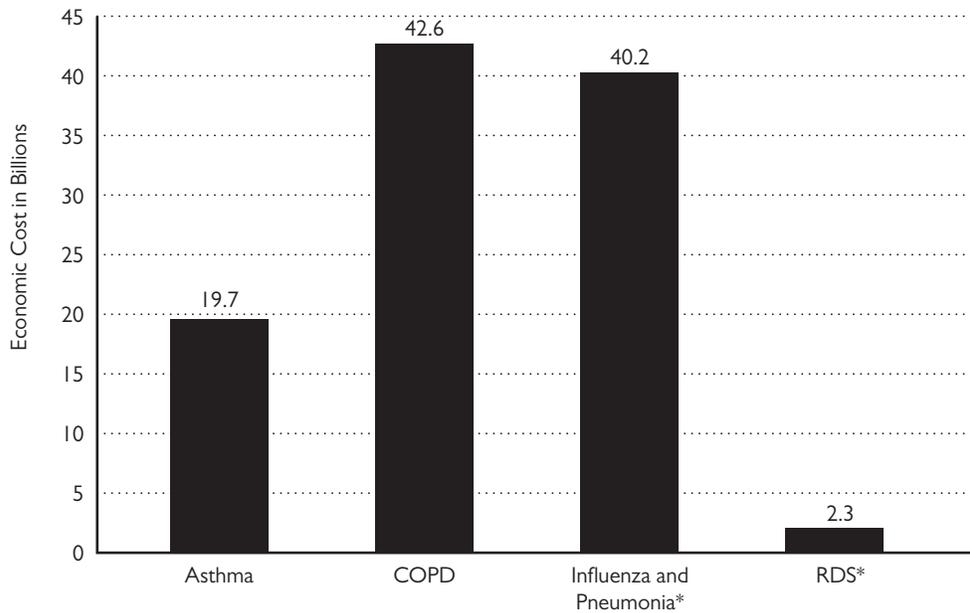
2. Hospitalizations are estimated based on the recorded primary discharge diagnosis

* **Comparisons should only be made between groups and diseases using rates, not number of hospitalizations, as these do not take into account differences which may exist in population size or demographics.**

The impact of COPD on quality of life is profound. A survey by the American Lung Association revealed that half of all COPD patients (51%) say their condition limits their ability to work. It also limits them in normal physical exertion (70%), household chores (56%), social activities (53%), sleeping (50%) and family activities (46%).⁴⁰

Patients with COPD also need psychological or other emotional support. COPD patients' inability to be as active as they once were, and their increasing dependency on others and even on machines, also can lead to profound depression and dependency, often further complicating their physical illness. One study of people with chronic breathing disorders found that 80 percent of the 1,334 people studied suffered from depression, anxiety or both. Although depression and anxiety are very treatable for people with COPD, only 31 percent of COPD patients are being treated for these conditions.⁴¹

Chronic bronchitis and emphysema take a heavy toll on the economy. According to estimates by the National Heart, Lung, and Blood Institute, in 2007 the annual cost to the nation for COPD was \$42.6 billion. This included \$26.7 billion in direct health care expenditures, \$8 billion in indirect morbidity (illness-related) costs and \$7.9 billion in indirect mortality (death-related) costs.⁴² Figure 4 displays the economic cost of COPD compared to other select lung diseases.

Figure 4: Economic Cost of Selected Lung Diseases, U.S., 2007

Source: U.S. Department of Health and Human Services. National Institutes of Health. National Heart, Lung, and Blood Institute. Morbidity and Mortality: 2007 Chartbook on Cardiovascular, Lung, and Blood Diseases.

Unpublished data provided upon special request to NHLBI.

Note:

* Unpublished data, 2005.

How is COPD diagnosed and managed?

COPD does not strike suddenly and is often neglected by individuals until it has reached an advanced state, because people mistakenly believe that the disease is not life-threatening. By the time a patient sees a health care provider, the lungs frequently have been critically injured and the patient may be in danger of developing serious respiratory problems or heart failure. For this reason, COPD is called the “silent killer.”

COPD can be easily diagnosed with a pulmonary function test known as spirometry. Spirometry measures how well the lungs exhale. In the test, a person breathes into a mouthpiece connected to an instrument called a spirometer. The spirometer records the amount and rate of air that is breathed in and out over a specified time.

Other tests that may be used to assess a patient with COPD include bronchodilator reversibility testing, chest x-ray (to exclude other diagnoses), arterial blood gas measurement (amount of oxygen and carbon dioxide in the blood) and alpha-1 antitrypsin deficiency screening. Alpha-1 screening should be performed when COPD develops in patients under 45 years of age, in patients with a strong family history of COPD, people with COPD who have never smoked, smokers with a family history of COPD and people with a family history of alpha-1 emphysema.

If AAT deficiency is discovered in a child or young person in whom emphysema has not yet developed (in children, liver disease may also occur, and the defect

can be detected by a blood test), a remedy may be liver transplantation, effectively preventing emphysema. If lung disease is already evident, lung transplantation is sometimes considered.

A second treatment alternative for alpha-1 emphysema is administration of the missing AAT protein. However, AAT replacement therapy is costly and it must be given intravenously, on a weekly basis, for life. Its long-term effects are still being studied.

While COPD lung damage is irreversible, there are treatments that can improve a patient's quality of life. Stopping smoking is the single most effective—and cost-effective—way to reduce the risk of developing COPD and slow its progression. Any current or former smoker over age 40 or never-smoker with a family history of COPD, emphysema or chronic bronchitis, those with exposure to occupational or environmental pollutants and those with a chronic cough, sputum (matter discharged from air passages) production or breathlessness, should seek testing for COPD with spirometry.⁴³ For more information about the health benefits of quitting smoking, please see the tobacco chapter of this report.

Treatment with medication can improve and prevent COPD symptoms, reduce the frequency and severity of exacerbations, improve health status and improve the ability to exercise.

Bronchodilators are used to help open the airways in the lungs and decrease shortness of breath. Inhaled or oral steroids can help decrease inflammation in the airways in some people. Antibiotics are often used to treat infections.

A study was conducted among 6,112 patients between the ages of 40 to 80 who had been diagnosed with COPD and were current or former smokers. The study was conducted to determine the effect of inhaled corticosteroids and a long-acting bronchodilator on the treatment of COPD. The study supports the use of the drugs salmeterol plus fluticasone propionate in the management of COPD. This combination treatment resulted in less worsening of symptoms and improved health status and lung function.⁴⁴

Non-drug treatment such as pulmonary rehabilitation, oxygen therapy and surgery can improve a COPD patient's quality of life. One factor that can help protect against COPD development or slow its progression is physical activity, which keeps muscles working effectively and may help slow the decline in lung function.⁴⁵

Want to learn where pulmonary rehabilitation is available near you? Please visit <http://www.lungusa.org> or call the Lung HelpLine at 1-800-LUNGUSA (586-4872).

COPD patients of all ages benefit from pulmonary rehabilitation programs that focus on supervised exercise training and education to help the patients manage their disease. These activities play an important part in helping a patient maximize their ability to perform daily activities. The minimum length of an effective rehabilitation program varies with insurance coverage but is usually two months; the longer the program continues, the more effective the results.

The long-term administration of oxygen (>15 hours per day) to patients with chronic respiratory failure increases survival and exercise capacity and improves mental state. Close to one million persons living in the United States are on long-term oxygen therapy.⁴⁶ The introduction of portable oxygen concentrators has allowed thousands of patients with chronic lung disease to travel and maintain active lifestyles.

Lung transplantation is now being done and may be a more readily available option in the future. Techniques have been improving, many more such operations are being performed each year and pulmonary specialists are optimistic about the procedure's lifesaving potential. Racial disparities in who gets transplantations are due, in part, to social determinants of health such as poverty and unequal access to health care.⁴⁷ These factors need to be addressed in order to eliminate this disparity.

There has been much interest in a procedure called lung volume reduction surgery (LVRS), in which some of the most severely damaged lung tissue is removed to ease the burden on the remaining tissue and chest muscles. Recently, a study was conducted to determine the effects of LVRS. It was found that LVRS for pulmonary emphysema improved weight (body mass index), airflow obstruction, breathing difficulties (dyspnea) and exercise capacity (BODE) index. The BODE index is a predictor of survival in COPD.⁴⁸ Another study, conducted by the National Emphysema Treatment Trial Research Group, concluded that LVRS can be recommended for patients whose emphysema is concentrated in the upper-lobe of a lung and who suffer from low-exercise capacity, and may be considered for other patients.⁴⁹

What is new in COPD research?

Scientists have identified a single gene, the SERPINA1 gene, located on human chromosome number 14, that bears the code that triggers AAT production in the liver.⁵⁰ Future therapy may correct this inherited defect by delivering DNA carrying the missing genetic coded "message" to the liver or other organs.

Recently, a study was conducted to determine the association between the use of corticosteroids in the treatment of COPD and the risk of pneumonia among the elderly. Almost 176,000 patients with COPD were followed for 15 years (1988-2003), with their use of inhaled corticosteroids and any hospitalizations due to pneumonia being tracked over this time. Use of inhaled corticosteroids was associated with a 70 percent increase in risk of hospitalization for pneumonia; those taking the largest dose (equivalent to fluticasone 1,000 micrograms per day or more) were at 2.3 times greater risk. The authors concluded that there is an excess risk of pneumonia hospitalization and an excess risk of hospitalization followed by death within 30 days for elderly COPD patients using inhaled corticosteroids. The death rate due to all causes was not different among pneumonia patients who had or had not inhaled corticosteroids in the recent past.⁵¹

As lung cancer risk may increase among patients with COPD, a study was conducted in 2006 to evaluate whether the use of inhaled corticosteroids by

COPD patients would decrease their risk of lung cancer. The study focused on patients who took their medication for COPD regularly (80% of the time) and found that corticosteroid medications show promise as a COPD medication and that these patients had a decreased risk of developing lung cancer.⁵² Other studies also support the use of corticosteroids in the treatment of COPD to reduce the risk of death and lung cancer.^{53,54}

What is the American Lung Association doing about COPD?

The American Lung Association funds researchers working in the laboratory and with patients who are looking for answers to fundamental questions about how the lungs are damaged in COPD and what can be done to treat and prevent this destruction. Several examples of the many COPD studies being funded by the American Lung Association include:

Determining the risk of COPD in HIV-positive versus HIV-negative smokers.

Examining two types of molecules involved in inflammation, interleukin-13 (IL-13) and leukotrienes, to see whether they play a role in determining who develops COPD from cigarette smoke exposure.

Investigating whether excess air trapped in the lungs may be one of the reasons why some patients with COPD remain dependent on a mechanical ventilator.

Studying a protein, elastin, responsible for the elasticity of the lungs. When elastin in the lungs is broken down, lung elasticity is lost, a hallmark of COPD. Building a comprehensive understanding of the role of elastin in COPD eventually will allow for positive identification of patients at increased risk for premature and severe forms of COPD.

The American Lung Association is currently working on a nationwide initiative to create state-of-the-art programs and services as well as to facilitate collaborative partnerships with key organizations who share the Lung Association's commitment to improve the quality of life for people living with COPD.

In advocacy, the American Lung Association is a leader in COPD-related policy change in Congress. The Lung Association advocates for increasing funding for COPD research at the National Institutes of Health, Department of Veterans Affairs and other federal programs. The Lung Association also is working to raise the profile of COPD at the Centers for Disease Control and Prevention. As a longtime leader on tobacco control, Lung Association volunteers and staff advocate for policies at the federal, state and local level that will increase access to smoking cessation programs, protect the public from secondhand smoke, and prevent children from starting to smoke. Such policies include comprehensive state and local smokefree laws, granting the U.S. Food and Drug Administration (FDA) regulatory control over the manufacturing, distribution and advertising of tobacco products, increasing funding for comprehensive tobacco control and cessation programs at the state level, and increasing cigarette excise taxes. The Lung Association actively supports legislation to provide

Medicare coverage for pulmonary rehabilitation services for COPD patients. Further, the Lung Association continues to work for regulatory changes to facilitate air travel for patients on oxygen therapy. As a member of the U.S. COPD Coalition's policy workgroup, the American Lung Association works closely with key members of the Congressional COPD Caucus, which promotes public awareness, prevention and early detection of COPD.

The Lung Association also has worked to increase state and national surveillance and collection of data on COPD. For example, due to several proposals by the Lung Association, the state of Hawaii will include a question in its 2008 Behavioral Risk Factor Surveillance Survey (BRFSS) on COPD in order to collect state-level prevalence data. The Lung Association is optimistic that other states will follow Hawaii's lead in the future so that state-level COPD surveillance can be attained nationwide. In turn, effective programs can be developed targeting states with high prevalence of COPD in order to reduce its burden.

People with COPD often say that one of the worst aspects of their illness is the feeling that they have lost control over their health. For over 40 years, the American Lung Association has helped millions of patients through its Better Breathers Clubs. These support groups are located throughout the United States and meet regularly to provide peer support and education needed to understand and better manage the disease. These clubs are for adults with all chronic lung diseases, their families and their caregivers.

By joining a support group, participants gain a sense of control over their disease and enter a positive cycle: They get out of the house, meet other people and become motivated to take action. Then they start to feel better—psychologically and physically.

Want to learn more about Better Breathers Club and find one in your area? Please view the club listings at <http://www.lungusa.org/bbc>

Often these groups are led by a respiratory therapist who can educate group members and their families about ways to live well with COPD. Groups may invite medical professionals to share their expertise on topics including nutrition, exercise, breathing techniques, new treatments, stress and depression, and medical equipment. The education patients receive in these groups may help them to avoid preventable hospitalizations and emergency room visits.

The COPD NexProfiler is an interactive decision support tool provided under the auspices of the American Lung Association and NexCura, Inc. The COPD NexProfiler helps COPD patients and their physicians make better-informed treatment decisions using information from evidence-based, peer-reviewed medical literature.

Need help with treatment decisions for COPD? Please view the COPD NexProfiler at <http://www.lungusa.org/copdtreatment>

Thousands of patients with COPD have joined with the Lung Association to

tell Congress to make life easier for people with this disease by broadening the use of portable oxygen concentrators and other approved devices on airplanes, by cleaning up outdoor pollution and by covering pulmonary rehabilitation under Medicare. Join the American Lung Association in its advocacy work by visiting <http://lungaction.org>.

In addition to its advocacy efforts, the Lung Association offers smoking cessation programs such as Freedom From Smoking[®] and Not On Tobacco, as well as self-help programs to assist smokers who want to quit. The American Lung Association Lung Help Line (1-800-LUNG-USA; 586-4872), staffed by registered nurses, respiratory therapists and quit-smoking specialists offers free counseling and support to callers, including those seeking information about COPD.

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