

= Chronic obstructive pulmonary disease =

Chronic obstructive pulmonary disease (COPD) is a type of obstructive lung disease characterized by long term poor airflow . The main symptoms include shortness of breath and cough with sputum production . COPD typically worsens over time . Eventually walking up stairs or carrying things will be difficult . Chronic bronchitis and emphysema are older terms used for different types of COPD . The term " chronic bronchitis " is still used to define a productive cough that is present for at least three months each year for two years .

Tobacco smoking is the most common cause of COPD , with a number of other factors such as air pollution and genetics playing a smaller role . In the developing world , one of the common sources of air pollution is poorly vented heating and cooking fires . Long @-@ term exposure to these irritants causes an inflammatory response in the lungs resulting in narrowing of the small airways and breakdown of lung tissue . The diagnosis is based on poor airflow as measured by lung function tests . In contrast to asthma , the airflow reduction does not improve much with the use of a bronchodilator .

Most cases of COPD can be prevented by reducing exposure to risk factors . This includes decreasing rates of smoking and improving indoor and outdoor air quality . While treatment can slow worsening there is no cure . COPD treatments include stopping smoking , vaccinations , respiratory rehabilitation , and often inhaled bronchodilators and steroids . Some people may benefit from long @-@ term oxygen therapy or lung transplantation . In those who have periods of acute worsening , increased use of medications and hospitalization may be needed .

As of 2013 COPD affects 329 million people or nearly 5 percent of the global population . It typically occurs in people over the age of 40 . Males and females are affected equally commonly . In 2013 it resulted in 2 @. @ 9 million deaths , up from 2 @. @ 4 million deaths in 1990 . More than 90 % of these deaths occur in the developing world . The number of deaths is projected to increase further because of higher smoking rates and an aging population in many countries . It resulted in an estimated economic cost of \$ 2 @. @ 1 trillion in 2010 .

= = Signs and symptoms = =

The most common symptoms of COPD are sputum production , shortness of breath , and a productive cough . These symptoms are present for a prolonged period of time and typically worsen over time . It is unclear if different types of COPD exist . While previously divided into emphysema and chronic bronchitis , emphysema is only a description of lung changes rather than a disease itself , and chronic bronchitis is simply a descriptor of symptoms that may or may not occur with COPD .

= = = Cough = = =

A chronic cough is often the first symptom to develop . When it persists for more than three months each year for at least two years , in combination with sputum production and without another explanation , there is by definition chronic bronchitis . This condition can occur before COPD fully develops . The amount of sputum produced can change over hours to days . In some cases , the cough may not be present or may only occur occasionally and may not be productive . Some people with COPD attribute the symptoms to a " smoker 's cough " . Sputum may be swallowed or spat out , depending often on social and cultural factors . Vigorous coughing may lead to rib fractures or a brief loss of consciousness . Those with COPD often have a history of " common colds " that last a long time .

= = = Shortness of breath = = =

Shortness of breath is often the symptom that most bothers people . It is commonly described as : " my breathing requires effort , " " I feel out of breath , " or " I can 't get enough air in " . Different terms , however , may be used in different cultures . Typically the shortness of breath is worse on exertion

of a prolonged duration and worsens over time . In the advanced stages , it occurs during rest and may be always present . It is a source of both anxiety and a poor quality of life in those with COPD . Many people with more advanced COPD breathe through pursed lips and this action can improve shortness of breath in some .

= = = Other features = = =

In COPD , it may take longer to breathe out than to breathe in . Chest tightness may occur but is not common and may be caused by another problem . Those with obstructed airflow may have wheezing or decreased sounds with air entry on examination of the chest with a stethoscope . A barrel chest is a characteristic sign of COPD , but is relatively uncommon . Tripod positioning may occur as the disease worsens .

Advanced COPD leads to high pressure on the lung arteries , which strains the right ventricle of the heart . This situation is referred to as cor pulmonale , and leads to symptoms of leg swelling and bulging neck veins . COPD is more common than any other lung disease as a cause of cor pulmonale . Cor pulmonale has become less common since the use of supplemental oxygen .

COPD often occurs along with a number of other conditions , due in part to shared risk factors . These conditions include ischemic heart disease , high blood pressure , diabetes mellitus , muscle wasting , osteoporosis , lung cancer , anxiety disorder and depression . In those with severe disease , a feeling of always being tired is common . Fingernail clubbing is not specific to COPD and should prompt investigations for an underlying lung cancer .

= = = Exacerbation = = =

An acute exacerbation of COPD is defined as increased shortness of breath , increased sputum production , a change in the color of the sputum from clear to green or yellow , or an increase in cough in someone with COPD . This may present with signs of increased work of breathing such as fast breathing , a fast heart rate , sweating , active use of muscles in the neck , a bluish tinge to the skin , and confusion or combative behavior in very severe exacerbations . Crackles may also be heard over the lungs on examination with a stethoscope .

= = Cause = =

The primary cause of COPD is tobacco smoke , with occupational exposure and pollution from indoor fires being significant causes in some countries . Typically these exposures must occur over several decades before symptoms develop . A person 's genetic makeup also affects the risk .

= = = Smoking = = =

The primary risk factor for COPD globally is tobacco smoking . Of those who smoke about 20 % will get COPD , and of those who are lifelong smokers about half will get COPD . In the United States and United Kingdom , of those with COPD , 80 ? 95 % are either current smokers or previously smoked . The likelihood of developing COPD increases with the total smoke exposure . Additionally , women are more susceptible to the harmful effects of smoke than men . In non @-@ smokers , secondhand smoke is the cause of about 20 % of cases . Other types of smoke , such as marijuana , cigar , and water pipe smoke , also confer a risk . Women who smoke during pregnancy may increase the risk of COPD in their child .

= = = Air pollution = = =

Poorly ventilated cooking fires , often fueled by coal or biomass fuels such as wood and animal dung , lead to indoor air pollution and are one of the most common causes of COPD in developing countries . These fires are a method of cooking and heating for nearly 3 billion people with their

health effects being greater among women due to more exposure . They are used as the main source of energy in 80 % of homes in India , China and sub @-@ Saharan Africa .

People who live in large cities have a higher rate of COPD compared to people who live in rural areas . While urban air pollution is a contributing factor in exacerbations , its overall role as a cause of COPD is unclear . Areas with poor outdoor air quality , including that from exhaust gas , generally have higher rates of COPD . The overall effect in relation to smoking , however , is believed to be small .

= = = Occupational exposures = = =

Intense and prolonged exposure to workplace dusts , chemicals and fumes increase the risk of COPD in both smokers and nonsmokers . Workplace exposures are believed to be the cause in 10 ? 20 % of cases . In the United States they are believed to be related to more than 30 % of cases among those who have never smoked and probably represent a greater risk in countries without sufficient regulations .

A number of industries and sources have been implicated , including high levels of dust in coal mining , gold mining , and the cotton textile industry , occupations involving cadmium and isocyanates , and fumes from welding . Working in agriculture is also a risk . In some professions the risks have been estimated as equivalent to that of one half to two packs of cigarettes a day . Silica dust exposure can also lead to COPD , with the risk unrelated to that for silicosis . The negative effects of dust exposure and cigarette smoke exposure appear to be additive or possibly more than additive .

= = = Genetics = = =

Genetics play a role in the development of COPD . It is more common among relatives of those with COPD who smoke than unrelated smokers . Currently , the only clearly inherited risk factor is alpha 1 @-@ antitrypsin deficiency (AAT) . This risk is particularly high if someone deficient in alpha 1 @-@ antitrypsin also smokes . It is responsible for about 1 ? 5 % of cases and the condition is present in about 3 ? 4 in 10 @,@ 000 people . Other genetic factors are being investigated , of which there are likely to be many .

= = = Other = = =

A number of other factors are less closely linked to COPD . The risk is greater in those who are poor , although it is not clear if this is due to poverty itself or other risk factors associated with poverty , such as air pollution and malnutrition . There is tentative evidence that those with asthma and airway hyperreactivity are at increased risk of COPD . Birth factors such as low birth weight may also play a role as do a number of infectious diseases including HIV / AIDS and tuberculosis . Respiratory infections such as pneumonia do not appear to increase the risk of COPD , at least in adults .

= = = Exacerbations = = =

An acute exacerbation (a sudden worsening of symptoms) is commonly triggered by infection or environmental pollutants , or sometimes by other factors such as improper use of medications . Infections appear to be the cause of 50 to 75 % of cases , with bacteria in 25 % , viruses in 25 % , and both in 25 % . Environmental pollutants include both poor indoor and outdoor air quality . Exposure to personal smoke and secondhand smoke increases the risk . Cold temperature may also play a role , with exacerbations occurring more commonly in winter . Those with more severe underlying disease have more frequent exacerbations : in mild disease 1 @.@ 8 per year , moderate 2 to 3 per year , and severe 3 @.@ 4 per year . Those with many exacerbations have a faster rate of deterioration of their lung function . Pulmonary emboli (blood clots in the lungs) can

worsen symptoms in those with pre @-@ existing COPD .

= = Pathophysiology = =

COPD is a type of obstructive lung disease in which chronic incompletely reversible poor airflow (airflow limitation) and inability to breathe out fully (air trapping) exist . The poor airflow is the result of breakdown of lung tissue (known as emphysema) and small airways disease (known as obstructive bronchiolitis) . The relative contributions of these two factors vary between people . Severe destruction of small airways can lead to the formation of large air pockets ? known as bullae ? that replace lung tissue . This form of disease is called bullous emphysema .

COPD develops as a significant and chronic inflammatory response to inhaled irritants . Chronic bacterial infections may also add to this inflammatory state . The inflammatory cells involved include neutrophil granulocytes and macrophages , two types of white blood cell . Those who smoke additionally have Tc1 lymphocyte involvement and some people with COPD have eosinophil involvement similar to that in asthma . Part of this cell response is brought on by inflammatory mediators such as chemotactic factors . Other processes involved with lung damage include oxidative stress produced by high concentrations of free radicals in tobacco smoke and released by inflammatory cells , and breakdown of the connective tissue of the lungs by proteases that are insufficiently inhibited by protease inhibitors . The destruction of the connective tissue of the lungs is what leads to emphysema , which then contributes to the poor airflow and , finally , poor absorption and release of respiratory gases . General muscle wasting that often occurs in COPD may be partly due to inflammatory mediators released by the lungs into the blood .

Narrowing of the airways occurs due to inflammation and scarring within them . This contributes to the inability to breathe out fully . The greatest reduction in air flow occurs when breathing out , as the pressure in the chest is compressing the airways at this time . This can result in more air from the previous breath remaining within the lungs when the next breath is started , resulting in an increase in the total volume of air in the lungs at any given time , a process called hyperinflation or air trapping . Hyperinflation from exercise is linked to shortness of breath in COPD , as it is less comfortable to breathe in when the lungs are already partly full . Hyperinflation may also worsen during an exacerbation .

Some also have a degree of airway hyperresponsiveness to irritants similar to those found in asthma .

Low oxygen levels and , eventually , high carbon dioxide levels in the blood can occur from poor gas exchange due to decreased ventilation from airway obstruction , hyperinflation and a reduced desire to breathe . During exacerbations , airway inflammation is also increased , resulting in increased hyperinflation , reduced expiratory airflow and worsening of gas transfer . This can also lead to insufficient ventilation and , eventually , low blood oxygen levels . Low oxygen levels , if present for a prolonged period , can result in narrowing of the arteries in the lungs , while emphysema leads to breakdown of capillaries in the lungs . Both these changes result in increased blood pressure in the pulmonary arteries , which may cause cor pulmonale .

= = Diagnosis = =

The diagnosis of COPD should be considered in anyone over the age of 35 to 40 who has shortness of breath , a chronic cough , sputum production , or frequent winter colds and a history of exposure to risk factors for the disease . Spirometry is then used to confirm the diagnosis . Screening those without symptoms is not recommended .

= = = Spirometry = = =

Spirometry measures the amount of airflow obstruction present and is generally carried out after the use of a bronchodilator , a medication to open up the airways . Two main components are measured to make the diagnosis : the forced expiratory volume in one second (FEV1) , which is the greatest

volume of air that can be breathed out in the first second of a breath , and the forced vital capacity (FVC) , which is the greatest volume of air that can be breathed out in a single large breath . Normally , 75 ? 80 % of the FVC comes out in the first second and a FEV1 / FVC ratio of less than 70 % in someone with symptoms of COPD defines a person as having the disease . Based on these measurements , spirometry would lead to over @-@ diagnosis of COPD in the elderly . The National Institute for Health and Care Excellence criteria additionally require a FEV1 of less than 80 % of predicted .

Evidence for using spirometry among those without symptoms in an effort to diagnose the condition earlier is of uncertain effect and is therefore currently not recommended . A peak expiratory flow (the maximum speed of expiration) , commonly used in asthma , is not sufficient for the diagnosis of COPD .

= = = Severity = = =

There are a number of methods to determine how much COPD is affecting a given individual . The modified British Medical Research Council questionnaire (mMRC) or the COPD assessment test (CAT) are simple questionnaires that may be used to determine the severity of symptoms . Scores on CAT range from 0 ? 40 with the higher the score , the more severe the disease . Spirometry may help to determine the severity of airflow limitation . This is typically based on the FEV1 expressed as a percentage of the predicted " normal " for the person 's age , gender , height and weight . Both the American and European guidelines recommended partly basing treatment recommendations on the FEV1 . The GOLD guidelines suggest dividing people into four categories based on symptoms assessment and airflow limitation . Weight loss and muscle weakness , as well as the presence of other diseases , should also be taken into account .

= = = Other tests = = =

A chest X @-@ ray and complete blood count may be useful to exclude other conditions at the time of diagnosis . Characteristic signs on X @-@ ray are overexpanded lungs , a flattened diaphragm , increased retrosternal airspace , and bullae while it can help exclude other lung diseases , such as pneumonia , pulmonary edema or a pneumothorax . A high @-@ resolution computed tomography scan of the chest may show the distribution of emphysema throughout the lungs and can also be useful to exclude other lung diseases . Unless surgery is planned , however , this rarely affects management . An analysis of arterial blood is used to determine the need for oxygen ; this is recommended in those with an FEV1 less than 35 % predicted , those with a peripheral oxygen saturation of less than 92 % and those with symptoms of congestive heart failure . In areas of the world where alpha @-@ 1 antitrypsin deficiency is common , people with COPD (particularly those below the age of 45 and with emphysema affecting the lower parts of the lungs) should be considered for testing .

= = = Differential diagnosis = = =

COPD may need to be differentiated from other causes of shortness of breath such as congestive heart failure , pulmonary embolism , pneumonia or pneumothorax . Many people with COPD mistakenly think they have asthma . The distinction between asthma and COPD is made on the basis of the symptoms , smoking history , and whether airflow limitation is reversible with bronchodilators at spirometry . Tuberculosis may also present with a chronic cough and should be considered in locations where it is common . Less common conditions that may present similarly include bronchopulmonary dysplasia and obliterative bronchiolitis . Chronic bronchitis may occur with normal airflow and in this situation it is not classified as COPD .

= = Prevention = =

Most cases of COPD are potentially preventable through decreasing exposure to smoke and improving air quality . Annual influenza vaccinations in those with COPD reduce exacerbations , hospitalizations and death . Pneumococcal vaccination may also be beneficial .

== Smoking cessation ==

Keeping people from starting smoking is a key aspect of preventing COPD . The policies of governments , public health agencies , and anti @-@ smoking organizations can reduce smoking rates by discouraging people from starting and encouraging people to stop smoking . Smoking bans in public areas and places of work are important measures to decrease exposure to secondhand smoke and while many places have instituted bans more are recommended .

In those who smoke , stopping smoking is the only measure shown to slow down the worsening of COPD . Even at a late stage of the disease , it can reduce the rate of worsening lung function and delay the onset of disability and death . Smoking cessation starts with the decision to stop smoking , leading to an attempt at quitting . Often several attempts are required before long @-@ term abstinence is achieved . Attempts over 5 years lead to success in nearly 40 % of people .

Some smokers can achieve long @-@ term smoking cessation through willpower alone . Smoking , however , is highly addictive , and many smokers need further support . The chance of quitting is improved with social support , engagement in a smoking cessation program and the use of medications such as nicotine replacement therapy , bupropion or varenicline .

== Occupational health ==

A number of measures have been taken to reduce the likelihood that workers in at @-@ risk industries ? such as coal mining , construction and stonemasonry ? will develop COPD . Examples of these measures include : the creation of public policy , education of workers and management about the risks , promoting smoking cessation , checking workers for early signs of COPD , use of respirators , and dust control . Effective dust control can be achieved by improving ventilation , using water sprays and by using mining techniques that minimize dust generation . If a worker develops COPD , further lung damage can be reduced by avoiding ongoing dust exposure , for example by changing the work role .

== Air pollution ==

Both indoor and outdoor air quality can be improved , which may prevent COPD or slow the worsening of existing disease . This may be achieved by public policy efforts , cultural changes , and personal involvement .

A number of developed countries have successfully improved outdoor air quality through regulations . This has resulted in improvements in the lung function of their populations . Those with COPD may experience fewer symptoms if they stay indoors on days when outdoor air quality is poor .

One key effort is to reduce exposure to smoke from cooking and heating fuels through improved ventilation of homes and better stoves and chimneys . Proper stoves may improve indoor air quality by 85 % . Using alternative energy sources such as solar cooking and electrical heating is also effective . Using fuels such as kerosene or coal might be less bad than traditional biomass such as wood or dung .

== Management ==

There is no known cure for COPD , but the symptoms are treatable and its progression can be delayed . The major goals of management are to reduce risk factors , manage stable COPD , prevent and treat acute exacerbations , and manage associated illnesses . The only measures that have been shown to reduce mortality are smoking cessation and supplemental oxygen . Stopping

smoking decreases the risk of death by 18 % . Other recommendations include influenza vaccination once a year , pneumococcal vaccination once every 5 years , and reduction in exposure to environmental air pollution . In those with advanced disease , palliative care may reduce symptoms , with morphine improving the feelings of shortness of breath . Noninvasive ventilation may be used to support breathing .

= = = Exercise = = =

Pulmonary rehabilitation is a program of exercise , disease management and counseling , coordinated to benefit the individual . In those who have had a recent exacerbation , pulmonary rehabilitation appears to improve the overall quality of life and the ability to exercise , and reduce mortality . It has also been shown to improve the sense of control a person has over their disease , as well as their emotions . Breathing exercises in and of themselves appear to have a limited role . Pursed lip breathing exercises may be useful .

Being either underweight or overweight can affect the symptoms , degree of disability and prognosis of COPD . People with COPD who are underweight can improve their breathing muscle strength by increasing their calorie intake . When combined with regular exercise or a pulmonary rehabilitation program , this can lead to improvements in COPD symptoms . Supplemental nutrition may be useful in those who are malnourished .

= = = Bronchodilators = = =

Inhaled bronchodilators are the primary medications used and result in a small overall benefit . There are two major types , β_2 agonists and anticholinergics ; both exist in long @-@ acting and short @-@ acting forms . They reduce shortness of breath , wheeze and exercise limitation , resulting in an improved quality of life . It is unclear if they change the progression of the underlying disease .

In those with mild disease , short @-@ acting agents are recommended on an as needed basis . In those with more severe disease , long @-@ acting agents are recommended . Long acting agents partly work by improving hyperinflation . If long @-@ acting bronchodilators are insufficient , then inhaled corticosteroids are typically added . With respect to long @-@ acting agents , it is unclear if tiotropium (a long @-@ acting anticholinergic) or long @-@ acting beta agonists (LABAs) are better , and it may be worth trying each and continuing the one that worked best . Both types of agent appear to reduce the risk of acute exacerbations by 15 ? 25 % . While both may be used at the same time , any benefit is of questionable significance .

There are several short @-@ acting β_2 agonists available including salbutamol (Ventolin) and terbutaline . They provide some relief of symptoms for four to six hours . Long @-@ acting β_2 agonists such as salmeterol and formoterol are often used as maintenance therapy . Some feel the evidence of benefits is limited while others view the evidence of benefit as established . Long @-@ term use appears safe in COPD with adverse effects include shakiness and heart palpitations . When used with inhaled steroids they increase the risk of pneumonia . While steroids and LABAs may work better together , it is unclear if this slight benefit outweighs the increased risks .

There are two main anticholinergics used in COPD , ipratropium and tiotropium . Ipratropium is a short @-@ acting agent while tiotropium is long @-@ acting . Tiotropium is associated with a decrease in exacerbations and improved quality of life , and tiotropium provides those benefits better than ipratropium . It does not appear to affect mortality or the overall hospitalization rate . Anticholinergics can cause dry mouth and urinary tract symptoms . They are also associated with increased risk of heart disease and stroke . Aclidinium , another long acting agent which came to market in 2012 , has been used as an alternative to tiotropium .

= = = Corticosteroids = = =

Corticosteroids are usually used in inhaled form but may also be used as tablets to treat and

prevent acute exacerbations . While inhaled corticosteroids (ICS) have not shown benefit for people with mild COPD , they decrease acute exacerbations in those with either moderate or severe disease . By themselves they have no effect on overall one @-@ year mortality . It is unclear if they affect the progression of the disease . When used in combination with a LABA they may decrease mortality compared to either ICS or LABA alone . Inhaled steroids are associated with increased rates of pneumonia . Long @-@ term treatment with steroid tablets is associated with significant side effects .

= = = Other medication = = =

Long @-@ term antibiotics , specifically those from the macrolide class such as erythromycin , reduce the frequency of exacerbations in those who have two or more a year . This practice may be cost effective in some areas of the world . Concerns include that of antibiotic resistance and hearing problems with azithromycin . Methylxanthines such as theophylline generally cause more harm than benefit and thus are usually not recommended , but may be used as a second @-@ line agent in those not controlled by other measures . Mucolytics may help to reduce exacerbations in some people with chronic bronchitis . Cough medicines are not recommended .

= = = Oxygen = = =

Supplemental oxygen is recommended in those with low oxygen levels at rest (a partial pressure of oxygen of less than 50 ? 55 mmHg or oxygen saturations of less than 88 %) . In this group of people it decreases the risk of heart failure and death if used 15 hours per day and may improve people 's ability to exercise . In those with normal or mildly low oxygen levels , oxygen supplementation may improve shortness of breath . There is a risk of fires and little benefit when those on oxygen continue to smoke . In this situation some recommend against its use . During acute exacerbations , many require oxygen therapy ; the use of high concentrations of oxygen without taking into account a person 's oxygen saturations may lead to increased levels of carbon dioxide and worsened outcomes . In those at high risk of high carbon dioxide levels , oxygen saturations of 88 ? 92 % are recommended , while for those without this risk recommended levels are 94 ? 98 % .

= = = Surgery = = =

For those with very severe disease , surgery is sometimes helpful and may include lung transplantation or lung volume reduction surgery . Lung volume reduction surgery involves removing the parts of the lung most damaged by emphysema allowing the remaining , relatively good lung to expand and work better . Lung transplantation is sometimes performed for very severe COPD , particularly in younger individuals .

= = = Exacerbations = = =

Acute exacerbations are typically treated by increasing the usage of short @-@ acting bronchodilators . This commonly includes a combination of a short @-@ acting inhaled beta agonist and anticholinergic . These medications can be given either via a metered @-@ dose inhaler with a spacer or via a nebulizer with both appearing to be equally effective . Nebulization may be easier for those who are more unwell .

Oral corticosteroids improve the chance of recovery and decrease the overall duration of symptoms . They work equally well as intravenous steroids but appear to have fewer side effects . Five days of steroids work as well as ten or fourteen . In those with a severe exacerbation , antibiotics improve outcomes . A number of different antibiotics may be used including amoxicillin , doxycycline and azithromycin ; it is unclear if one is better than the others . The FDA recommends against the use of fluoroquinolones when other options are available due to higher risks of serious side effects . There

is no clear evidence for those with less severe cases .

For those with type 2 respiratory failure (acutely raised CO₂ levels) non @-@ invasive positive pressure ventilation decreases the probability of death or the need of intensive care admission . Additionally , theophylline may have a role in those who do not respond to other measures . Fewer than 20 % of exacerbations require hospital admission . In those without acidosis from respiratory failure , home care (" hospital at home ") may be able to help avoid some admissions .

= = Prognosis = =

COPD usually gets gradually worse over time and can ultimately result in death . It is estimated that 3 % of all disability is related to COPD . The proportion of disability from COPD globally has decreased from 1990 to 2010 due to improved indoor air quality primarily in Asia . The overall number of years lived with disability from COPD , however , has increased .

The rate at which COPD worsens varies with the presence of factors that predict a poor outcome , including severe airflow obstruction , little ability to exercise , shortness of breath , significantly underweight or overweight , congestive heart failure , continued smoking , and frequent exacerbations . Long @-@ term outcomes in COPD can be estimated using the BODE index which gives a score of zero to ten depending on FEV₁ , body @-@ mass index , the distance walked in six minutes , and the modified MRC dyspnea scale . Significant weight loss is a bad sign . Results of spirometry are also a good predictor of the future progress of the disease but not as good as the BODE index .

= = Epidemiology = =

Globally , as of 2010 , COPD affected approximately 329 million people (4 @.@ 8 % of the population) . The disease affects men and women almost equally , as there has been increased tobacco use among women in the developed world . The increase in the developing world between 1970 and the 2000s is believed to be related to increasing rates of smoking in this region , an increasing population and an aging population due to fewer deaths from other causes such as infectious diseases . Some developed countries have seen increased rates , some have remained stable and some have seen a decrease in COPD prevalence . The global numbers are expected to continue increasing as risk factors remain common and the population continues to get older .

Between 1990 and 2010 the number of deaths from COPD decreased slightly from 3 @.@ 1 million to 2 @.@ 9 million and became the fourth leading cause of death . In 2012 it became the third leading cause as the number of deaths rose again to 3 @.@ 1 million . In some countries , mortality has decreased in men but increased in women . This is most likely due to rates of smoking in women and men becoming more similar . COPD is more common in older people ; it affects 34 ? 200 out of 1000 people older than 65 years , depending on the population under review .

In England , an estimated 0 @.@ 84 million people (of 50 million) have a diagnosis of COPD ; this translates into approximately one person in 59 receiving a diagnosis of COPD at some point in their lives . In the most socioeconomically deprived parts of the country , one in 32 people were diagnosed with COPD , compared with one in 98 in the most affluent areas . In the United States approximately 6 @.@ 3 % of the adult population , totaling approximately 15 million people , have been diagnosed with COPD . 25 million people may have COPD if currently undiagnosed cases are included . In 2011 , there were approximately 730 @, @ 000 hospitalizations in the United States for COPD . In the United State , COPD , is estimated to be the third leading cause of death in 2011 .

= = History = =

The word " emphysema " is derived from the Greek ??????? emphysan meaning " inflate " -itself composed of ?? en , meaning " in " , and ????? physan , meaning " breath , blast " . The term chronic bronchitis came into use in 1808 while the term COPD is believed to have first been used in 1965 . Previously it has been known by a number of different names , including chronic obstructive

bronchopulmonary disease , chronic obstructive respiratory disease , chronic airflow obstruction , chronic airflow limitation , chronic obstructive lung disease , nonspecific chronic pulmonary disease , and diffuse obstructive pulmonary syndrome . The terms chronic bronchitis and emphysema were formally defined in 1959 at the CIBA guest symposium and in 1962 at the American Thoracic Society Committee meeting on Diagnostic Standards .

Early descriptions of probable emphysema include : in 1679 by T. Bonet of a condition of " voluminous lungs " and in 1769 by Giovanni Morgagni of lungs which were " turgid particularly from air " . In 1721 the first drawings of emphysema were made by Ruysch . These were followed with pictures by Matthew Baillie in 1789 and descriptions of the destructive nature of the condition . In 1814 Charles Badham used " catarrh " to describe the cough and excess mucus in chronic bronchitis . René Laennec , the physician who invented the stethoscope , used the term " emphysema " in his book A Treatise on the Diseases of the Chest and of Mediate Auscultation (1837) to describe lungs that did not collapse when he opened the chest during an autopsy . He noted that they did not collapse as usual because they were full of air and the airways were filled with mucus . In 1842 , John Hutchinson invented the spirometer , which allowed the measurement of vital capacity of the lungs . However , his spirometer could only measure volume , not airflow . Tiffeneau and Pinelli in 1947 described the principles of measuring airflow .

In 1953 , Dr. George L. Waldbott , an American allergist , first described a new disease he named " smoker 's respiratory syndrome " in the 1953 Journal of the American Medical Association . This was the first association between tobacco smoking and chronic respiratory disease .

Early treatments included garlic , cinnamon and ipecac , among others . Modern treatments were developed during the second half of the 20th century . Evidence supporting the use of steroids in COPD were published in the late 1950s . Bronchodilators came into use in the 1960s following a promising trial of isoprenaline . Further bronchodilators , such as salbutamol , were developed in the 1970s , and the use of LABAs began in the mid @-@ 1990s .

= = Society and culture = =

COPD has been referred to as " smoker 's lung " . People with emphysema have been known as " pink puffers " or " type A " due to their frequent pink complexion , fast respiratory rate and pursed lips , and people with chronic bronchitis have been referred to as " blue bloaters " or " type B " due to the often bluish color of the skin and lips from low oxygen levels and their ankle swelling . This terminology is no longer accepted as useful as most people with COPD have a combination of both emphysema and chronic bronchitis .

Many health systems have difficulty ensuring appropriate identification , diagnosis and care of people with COPD ; Britain 's Department of Health has identified this as a major issue for the National Health Service and has introduced a specific strategy to tackle these problems .

= = = Economics = = =

Globally , as of 2010 , COPD is estimated to result in economic costs of \$ 2 @.@ 1 trillion , half of which occurring in the developing world . Of this total an estimated \$ 1 @.@ 9 trillion are direct costs such as medical care , while \$ 0 @.@ 2 trillion are indirect costs such as missed work . This is expected to more than double by the year 2030 . In Europe , COPD represents 3 % of healthcare spending . In the United States , costs of the disease are estimated at \$ 50 billion , most of which is due to exacerbation . COPD was among the most expensive conditions seen in U.S. hospitals in 2011 , with a total cost of about \$ 5 @.@ 7 billion .

= = Research = =

Infliximab , an immune @-@ suppressing antibody , has been tested in COPD but there was no evidence of benefit with the possibility of harm . Roflumilast shows promise in decreasing the rate of exacerbations but does not appear to change quality of life . A number of new , long @-@ acting

agents are under development .

Treatment with stem cells is under study . While there is tentative data that it is safe and with promising animal data there is little human data as of 2014 . Some of the human data that is available has found poor results .

= = Other animals = =

Chronic obstructive pulmonary disease may occur in a number of other animals and may be caused by exposure to tobacco smoke . Most cases of the disease , however , are relatively mild . In horses it is known as recurrent airway obstruction , can be quite severe , and most often is linked to an allergic reaction to a fungus contained in contaminated hay or straw . COPD is also commonly found in old dogs .