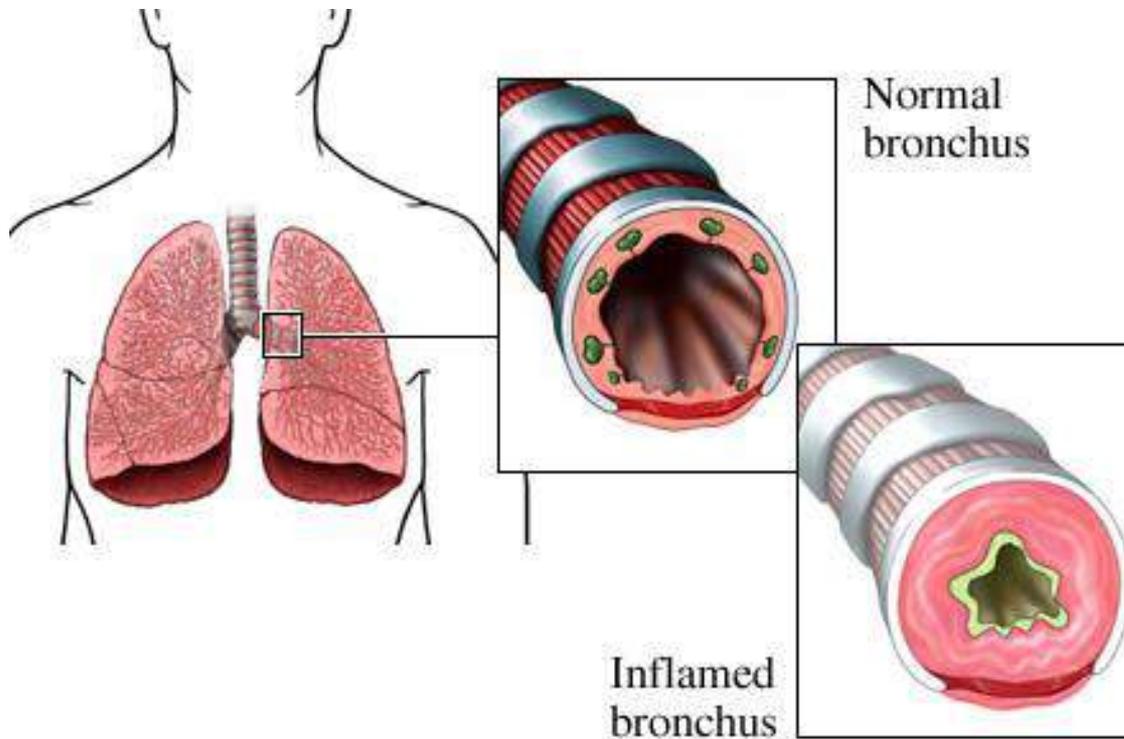


Chronic Obstructive Pulmonary Diseases

“COPD”



COPD

- ❑ Chronic obstructive pulmonary disease (COPD) is a devastating disorder that causes a huge degree of human suffering.

COPD: Is currently the fourth leading cause of death in the United States

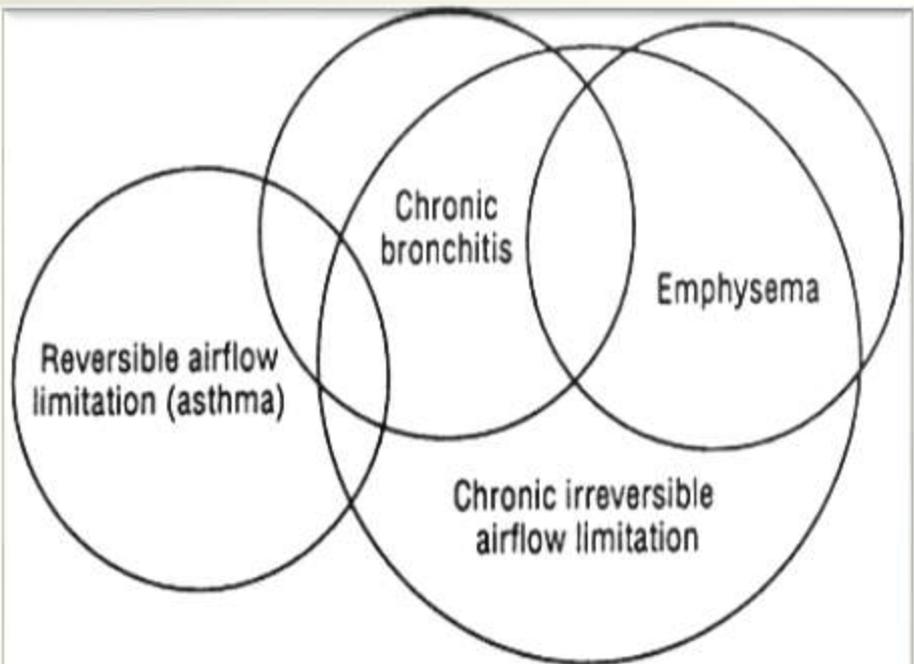
(WHO) identified COPD as the sixth leading cause of mortality in countries of middle- or low-income

Fixed

Chronic bronchitis
Emphysema

Reversible

Bronchial asthma



Venn diagram showing the interrelationship among chronic bronchitis, airflow limitation, emphysema, and asthma. An overlap is shown because with time and under treatment some of the airflow limitation associated with asthma may become fixed and in "irreversible" airflow limitation a small degree of response to bronchodilators is often shown.

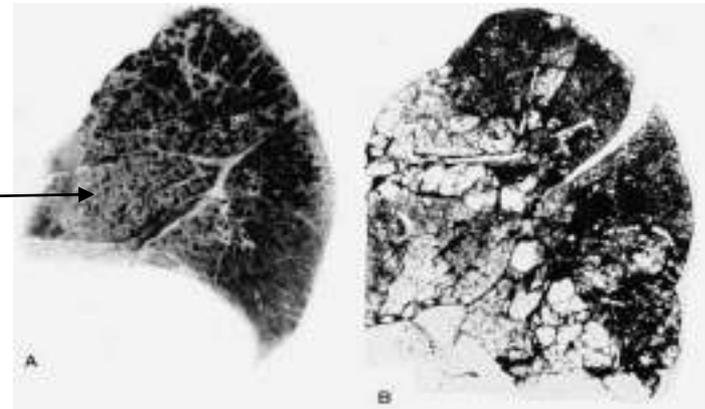
A steroid may be necessary to place an individual in the left- or right-hand side of the Venn diagram.

Definition of COPD

➤ A disease state characterized by the presence of airflow obstruction due to:

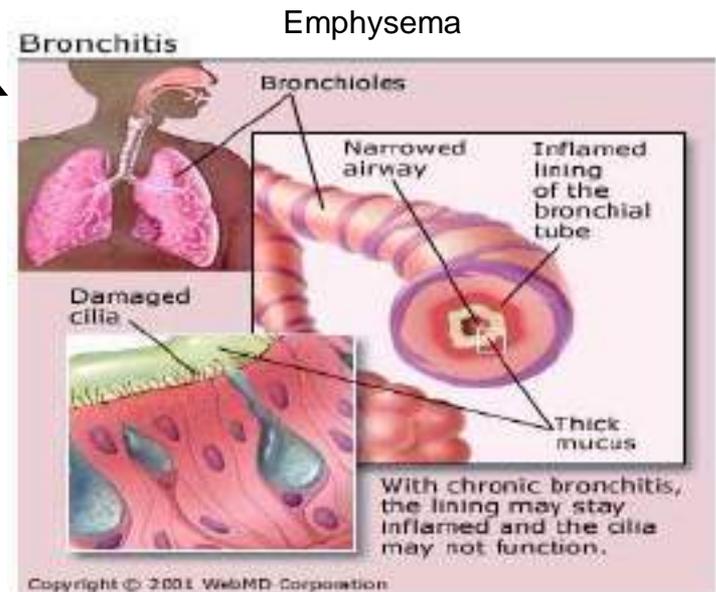
➤ *Emphysema.*

➤ *Chronic Bronchitis*



➤ The airflow obstruction generally is progressive, may be accompanied by:

- Airway hyper-reactivity,*
- Partially reversibility.*



Definition of Chronic Bronchitis (MRC 1965)

is defined clinically as the presence of:

- ***Chronic productive cough For 3 months***
- ***During each of 2 consecutive years***

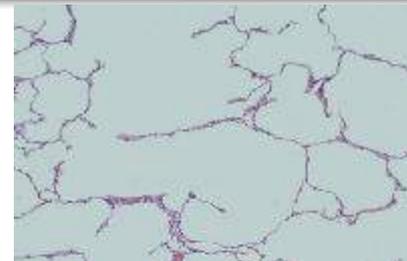
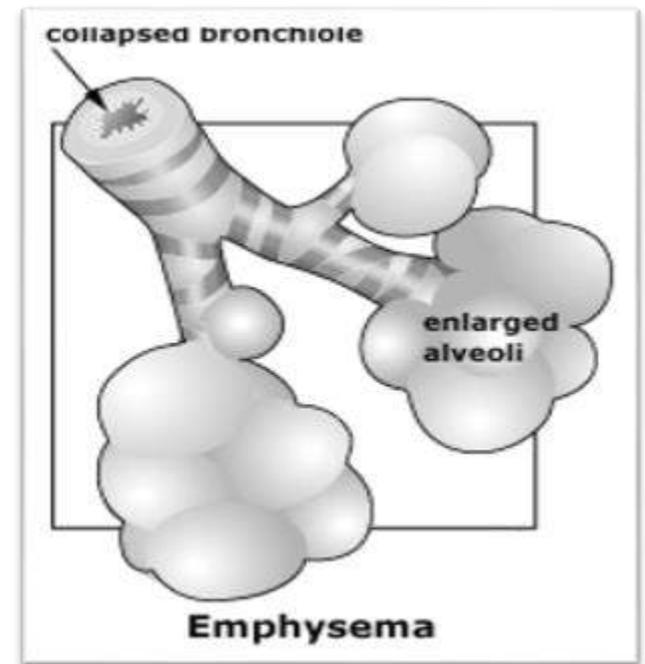
(other causes of cough being excluded)



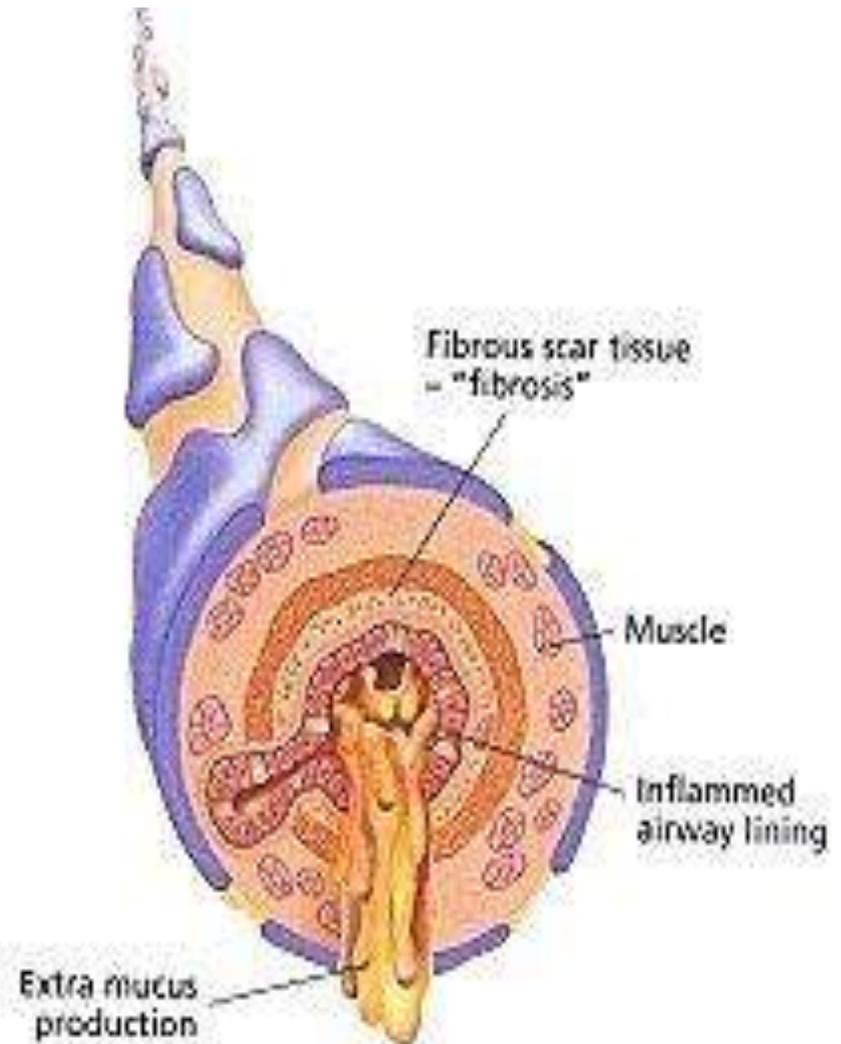
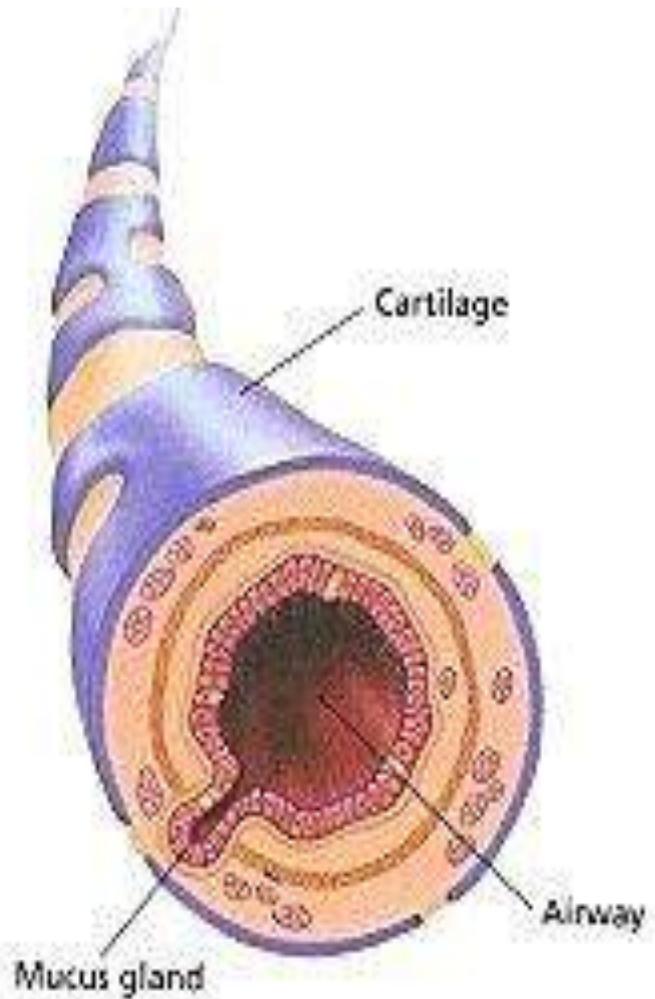
Definition of Emphysema (ATS 1962)

It is defined as:

- 1.** *An abnormal,*
- 2.** *permanent enlargement of the air spaces*
- 3.** *distal to the terminal bronchioles,*
- 4.** *accompanied by destruction of their walls*
- 5.** *and without obvious fibrosis*



Airway Obstruction in Chronic Bronchitis



Epidemiology of COPD

Occurrence

- **In the US: *Approximately***

- **14.2 million**  **COPD,**
- **12.5 million**  **Chronic Bronchitis,**
- **1.7 million**  **Emphysema.**

- **Since 1982,**

- ***The patients diagnosed with COPD increased by 41.5%.***
- ***Prevalence in the USA:***
 - men : 8 - 17%***
 - women : 10 - 19%***

Prevalence in Jordan : 12.5% (2014)

- ***The prevalence rates increased in women by 30% in the last decade.***

Epidemiology of COPD

Prevalence

- **Internationally:**

- **Worldwide data are sparse, but the rates likely are higher because more than 1.2 billion humans are exposed to the ravages of smoking.**

- **A population-based epidemiologic study:**

Spain : Prevalence of COPD in individuals aged 40- 69 years is 9.1%.

Jordan : Prevalence of COPD in individuals aged 55 – 90 years is 17% (67% were smokers).

Fig () Distribution of Al-Karak population according to prevalence of chronic bronchitis (2004)

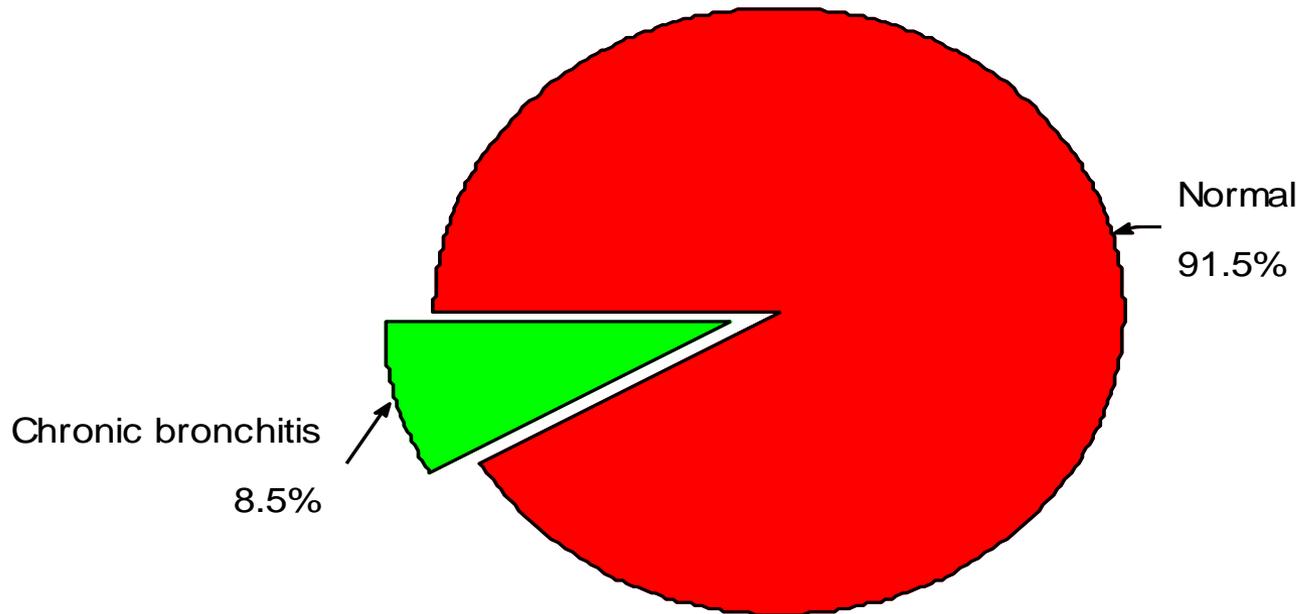


Fig () Distribution of Al-Karak population according to age and occurrence of chronic bronchitis

			Chronic bronchitis		Total
			No	Yes	
Age	12 thru 18		436	12	448
			97.3%	2.7%	100.0%
	19 thru 25		161	6	167
			96.4%	3.6%	100.0%
	26 thru 35		337	40	377
			89.4%	10.6%	100.0%
	36 thru 45		224	34	258
			86.8%	13.2%	100.0%
46 thru 55		87	11	98	
		88.8%	11.2%	100.0%	
56 thru 65		76	13	89	
		85.4%	14.6%	100.0%	
66 thru 99		52	11	63	
		82.5%	17.5%	100.0%	
Total		1373	127	1500	
		91.5%	8.5%	100.0%	

Epidemiology of COPD

Mortality/Morbidity:

- ***Absolute mortality rates for US patients aged 55-84 years (1985) were***
 - » 200 per **100,000** males and
 - » 80 per 100,000 females.
- ***Internationally, a marked variation in overall mortality rates from COPD exists. The extremes are:***
 - ***The more than 400 deaths per 100,000 males aged 65-74 years in Romania***
 - ***and the fewer than 100 deaths per 100,000 in Japan.***



Mortality Statistics

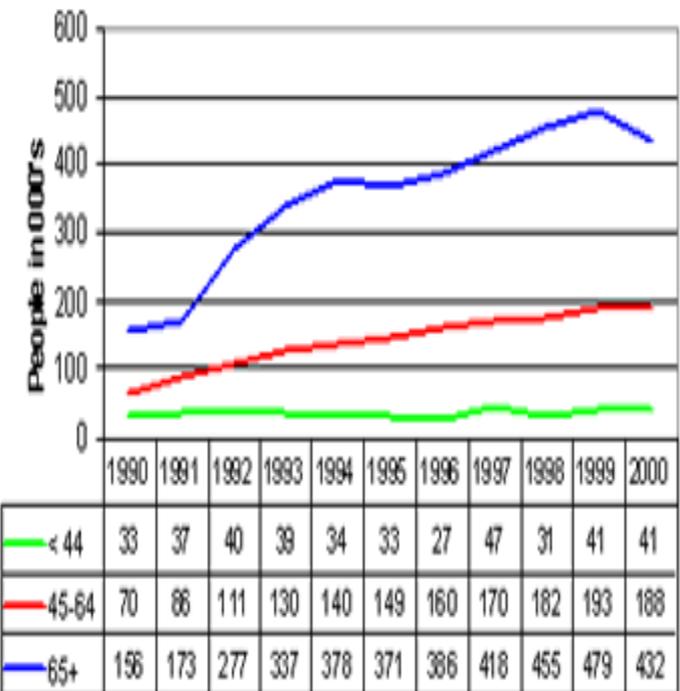
- In 1970, the **male specific death rate for ages 55-64** years in England was 154.1 .
- In USA it was 63.0 ,
- In France 19.8 ,
- In Egypt the rate was **257.2 per 100,000** deaths.

Epidemiology of COPD

Risk factors

- *Age:*
 - *Morbidity and mortality from COPD increase with age **particularly after the age of 45 years***
- *Sex:*
 - *Researchers estimate that emphysema or COPD for all ages occur in:*
 - *4-6% of white male adults*
 - *1-3% of white female adults*
 - **Men have a higher mortality rate than women, but mortality due to COPD in women is expected to increase.**

Hospital Discharge Trends for COPD

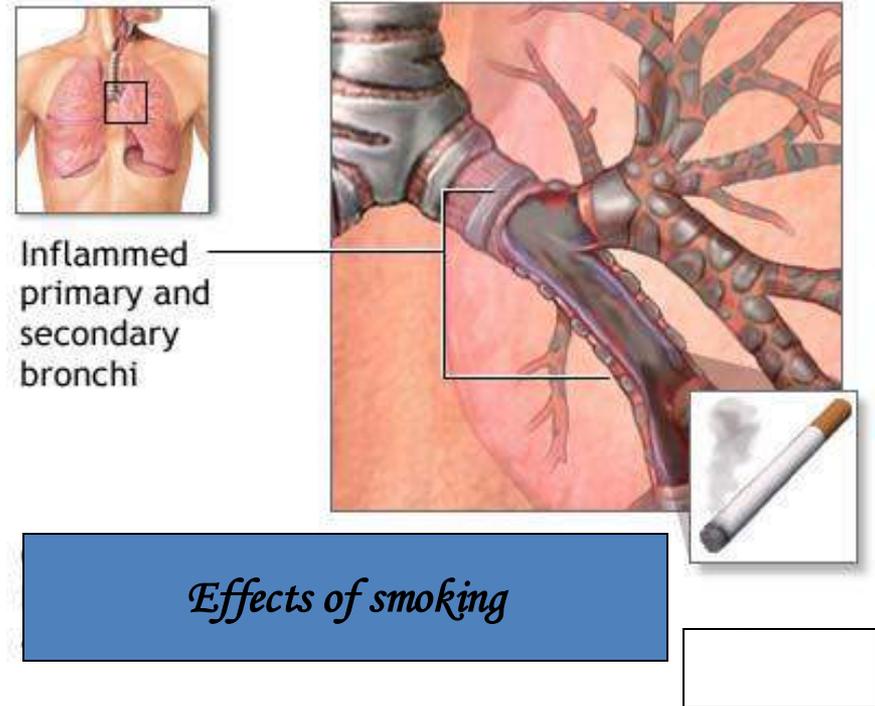


Source: National Center for Health Statistics, Discharge Survey 1979-2000

Epidemiology of COPD

Risk factors

- *Cigarette smoking*
- ***COPD prevalence has increased dramatically in the past few decades and is one of the major causes of bed-confining disability.***
- ***Smoking is the single most important risk factor in the development of COPD,***

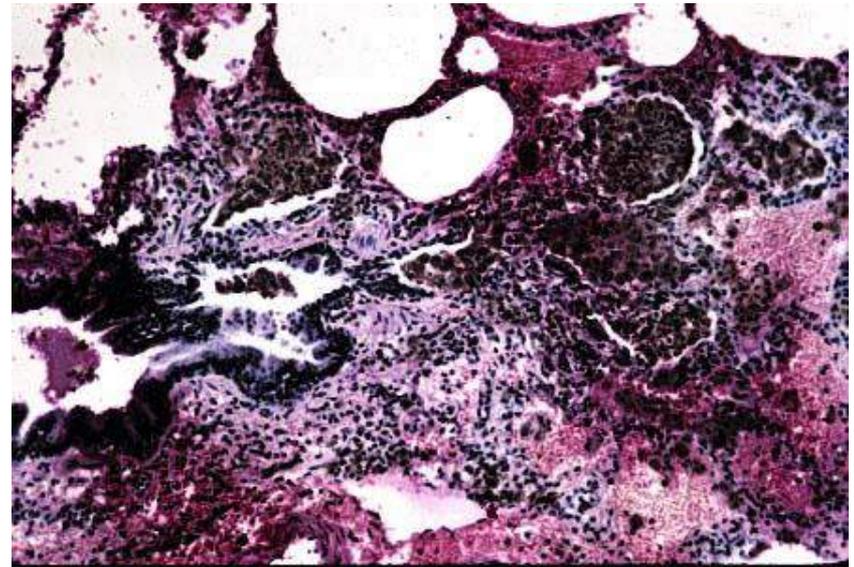


Epidemiology of COPD

Risk factors

- ***Cigarette smoking***

- Clinically significant COPD develops in 15% of cigarette smokers.***
- Smoking contributes to 81.5% of all COPD deaths.***



Smoker Bronchitis

Epidemiology of COPD

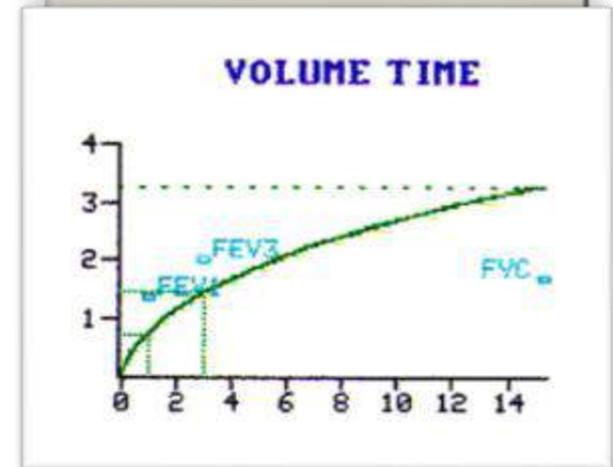
Risk factors

❑ Predictors of COPD mortality:

1. Age at initiation of smoking
2. Number of cigarette smoked
3. Current smoking status

❑ Annual decline in lung function in smokers is greater compared to non smokers

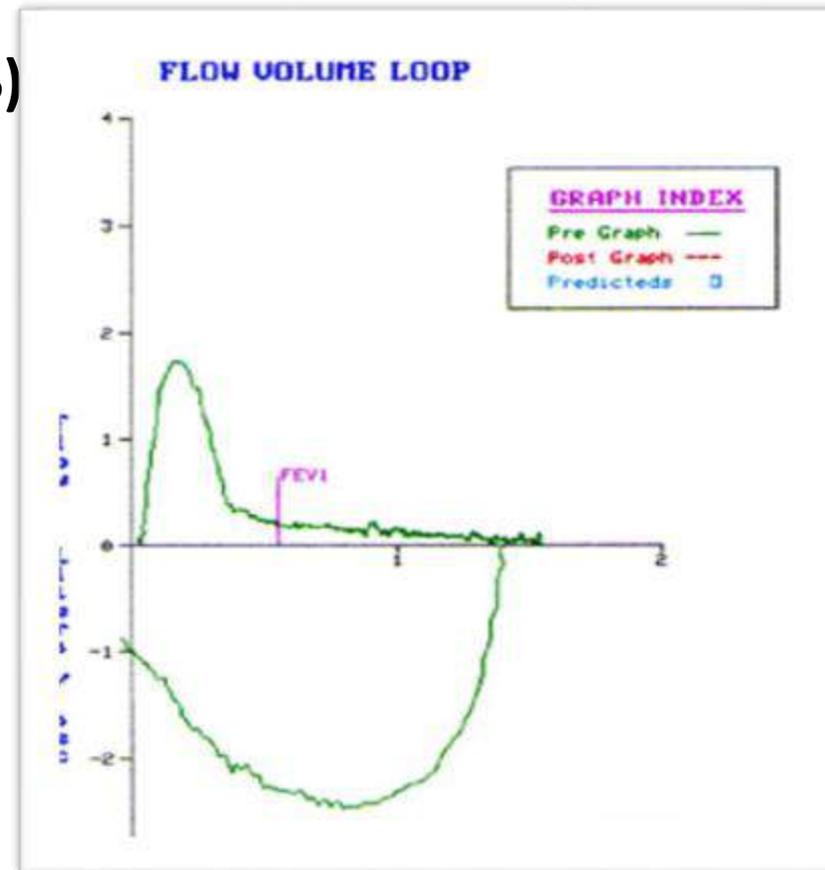
❑ Smoking is associated with premature aging of the lung



Passive Smoking & COPD



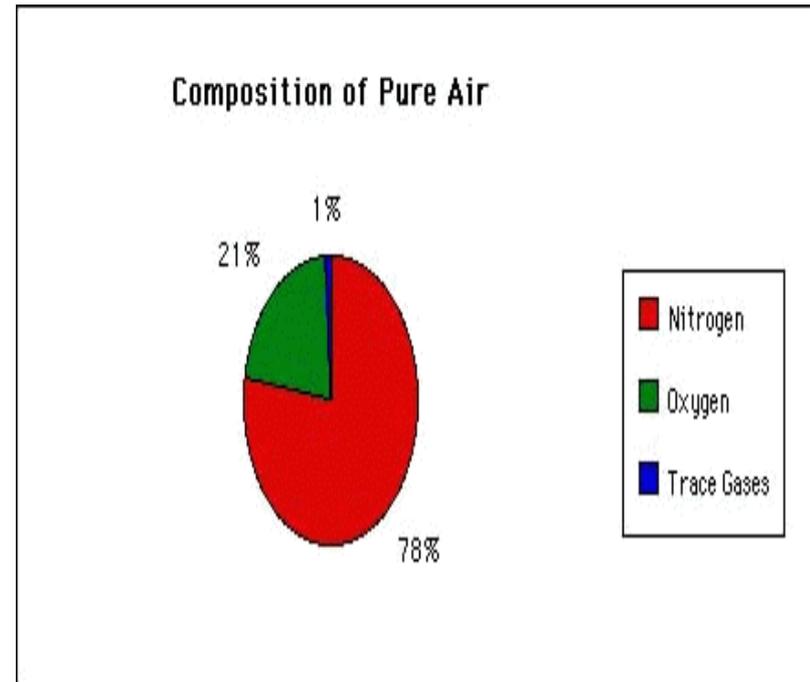
- **Secondhand smoke or**
- **environmental tobacco smoke (ETS) increases the risk of:**
 - ❑ *Respiratory infections,*
 - ❑ *Augments asthma symptoms,*
 - ❑ *Causes a measurable reduction in pulmonary function*



Epidemiology of COPD

Risk factors

- *Atmospheric pollution*
- **Normal air is composed from O₂, N₂, and trace gases**
- **Change in the percentage of these constituents or presence of any other constituent is called air pollution**



Epidemiology of COPD

Risk factors

- Sources of air pollution

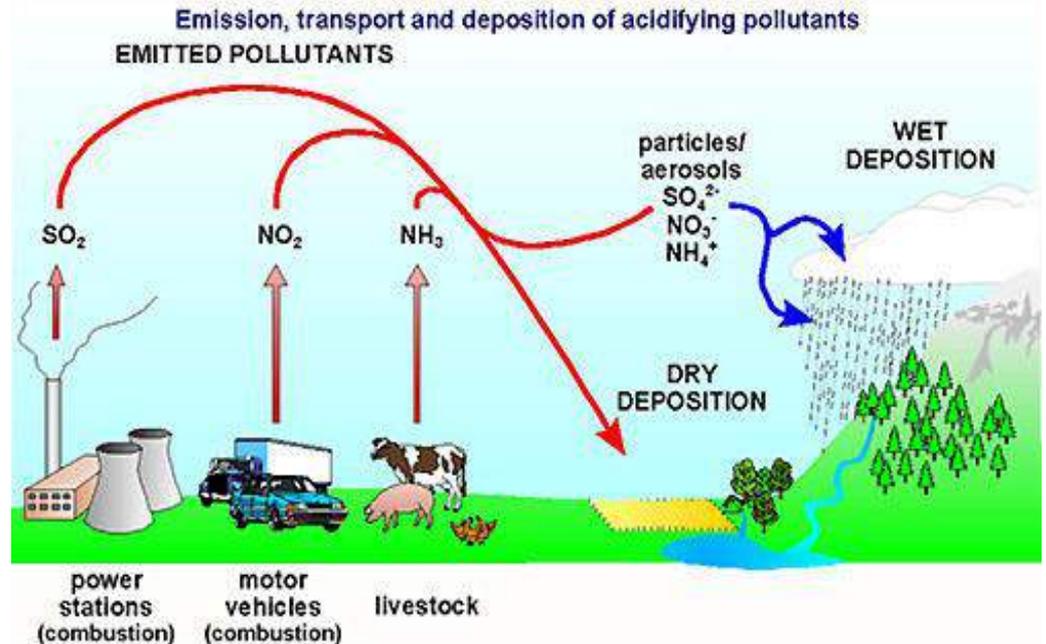
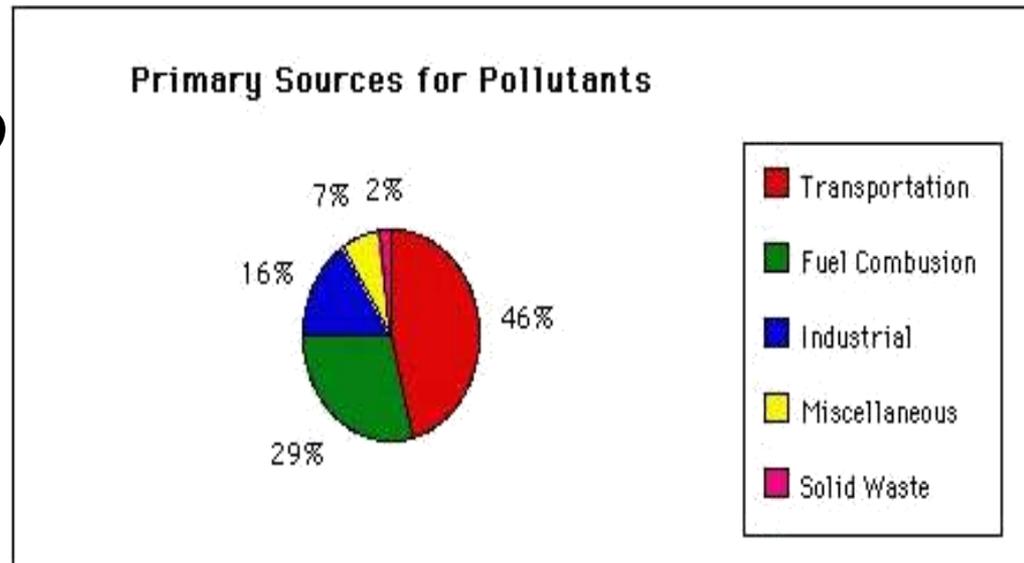
1. Transportation

2. Power plants

3. Space heating

4. Industry

5. Refuse disposal
(burning)



Epidemiology of COPD

Risk factors (air pollution)

- *Transportation*
 - *CO*
 - *NO₂*
 - *SO₂*
 - *Lead*



Epidemiology of COPD

Risk factors (air pollution)

- *Power Plants:*

- *NO₂*
- *SO₂*
- *Hydrocarbons*



Clouds of chemicals

Epidemiology of COPD

Risk factors (air pollution)

■ *Industry:*

- *Different particulates*
- *Gases (NO₂, CO, SO₂)*
- *Smoke*



Epidemiology of COPD

Risk factors (air pollution)

- *Solid Waste (e.g. Refuse)*

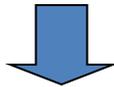
- *Gases*
- *Hydrocarbons*
- *PVC* (Polyvinyl chloride, is the third-most widely produced plastic, after polyethylene and polypropylene)



Epidemiology of COPD

Risk factors (air pollution)

- The use of solid fuels for cooking and heating*



high levels of indoor air pollution



COPD.

- Space heating*

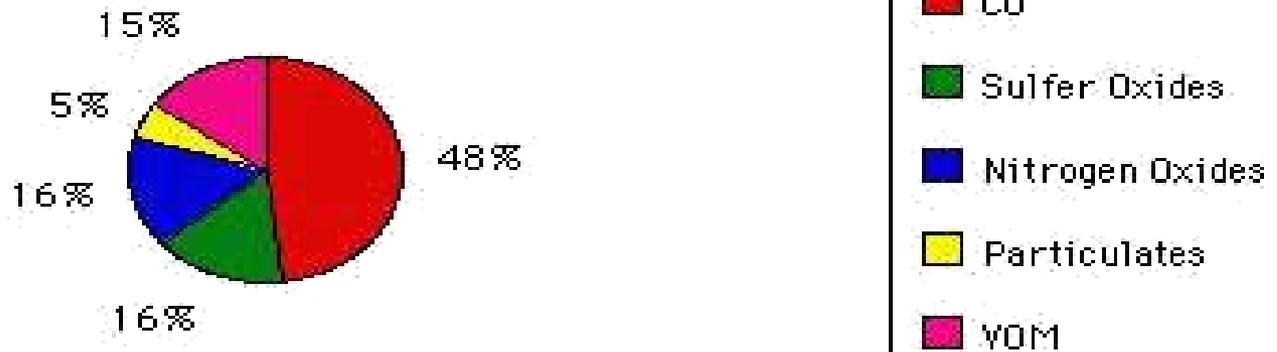
- Gases (e.g. NO₂, CO)*
- Hydrocarbons*



Epidemiology of COPD
Risk factors (air pollution)

□ *Major Air pollutants*

Emissions of Primary Air Pollutants





Epidemiology of COPD

Risk factors (air pollution)



- *Injuries to health from air pollution is a phenomena of:*
 - * *Urbanization and*
 - * *Industrialization*
- *It is not a part of county living*



Lung- Rural area



Lung- Urban area

Epidemiology of COPD

Risk factors (air pollution)

• Effects of pollution on the body

Ozone

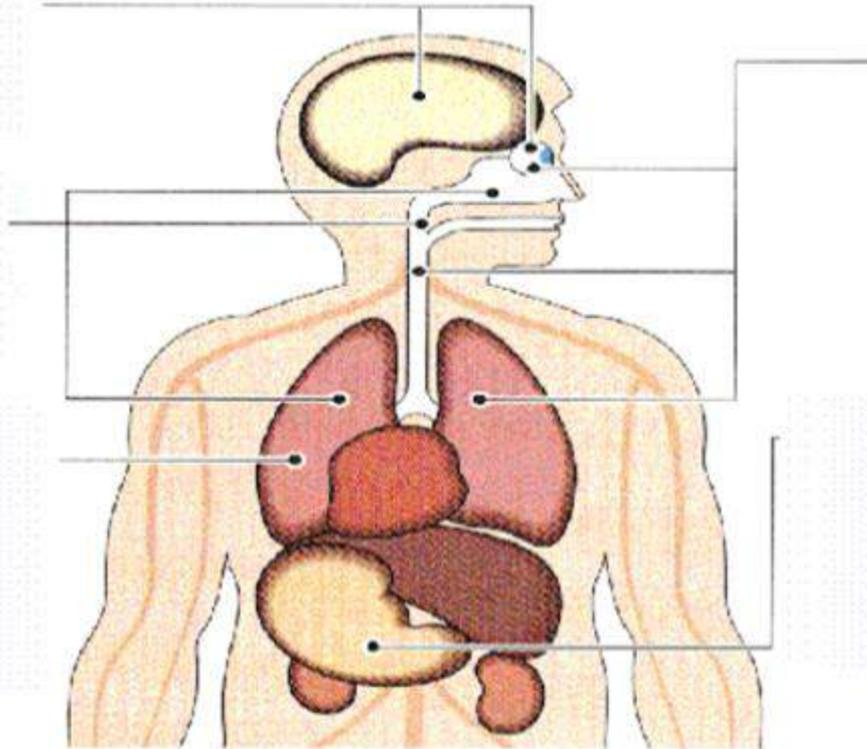
Inflammation of the eye, migraine, allergy, asthma

SO₂

Attacks nose, throat and lungs

Particles

Act as vehicles of disease for other pollutants and can penetrate the lungs



Hydrocarbons

Have a carcinogenic effect, especially on lungs. Inflammation of the eye and coughing.

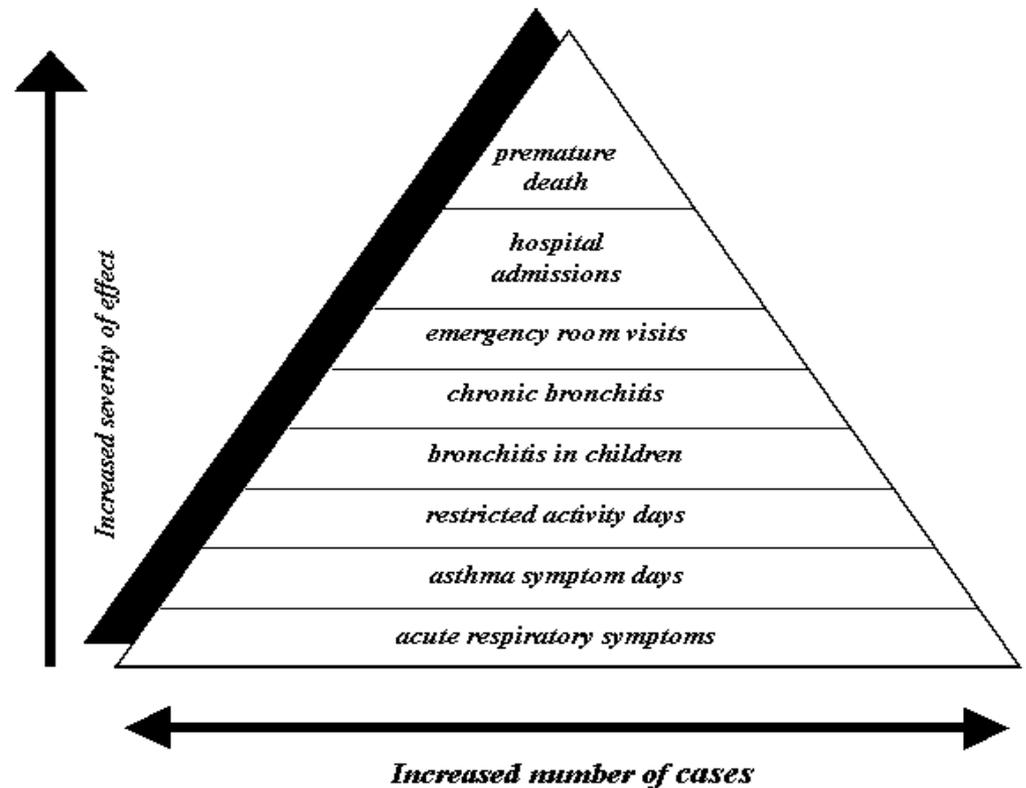
NO₂

Attacks certain immunizing cells, paving the way for bacterial and viral infections. Sleepiness, dizziness and vomiting.

Epidemiology of COPD

Risk factors (air pollution)

Effects of Air Pollution on the Respiratory System



Epidemiology of COPD
Risk factors (air pollution)

- *Increased Death from Respiratory Failure due to air pollution is usually in the extreme of age with COPD*



Very old



Very young

Epidemiology of COPD

Risk factors

- *Socio-Economic Condition (SEC)*
 - *Decreased level of SEC is associated with increased morbidity and mortality from COPD*
- *Familial Factors*
 - *There is evidence of **clustering of COPD in families***

Epidemiology of COPD

Risk factors (workplace pollution)



□ Occupation

(Industrial Bronchitis)

The term industrial bronchitis reveals the magnitude of the problem among workers



- *There is increased prevalence of COPD among workers exposed to gases, fumes, vapors and dust e.g.:*

Welding fumes, silica, PVC, carbon black, NO₂, SO₂, gases and particles from fire fighting, and other irritants....etc.

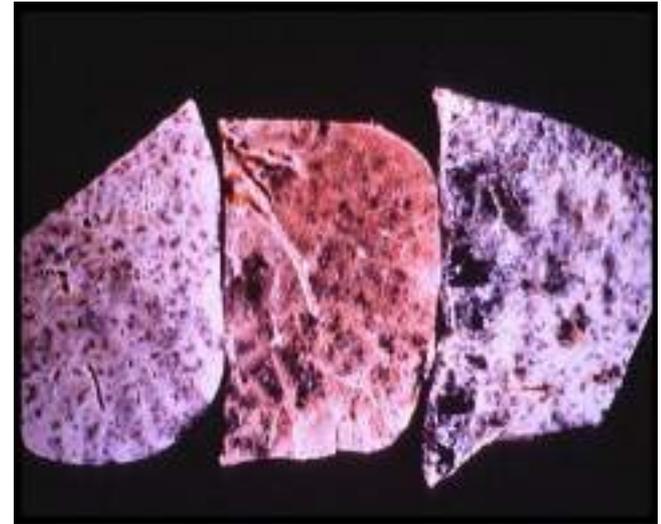


Epidemiology of COPD

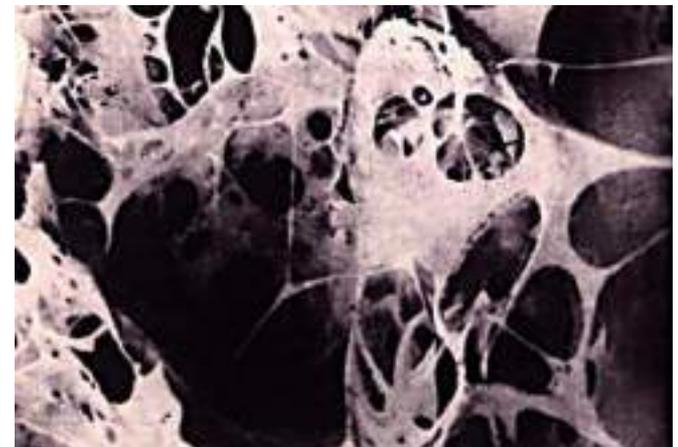
Risk factors

□ Alpha1-Antitrypsin Deficiency

- **AAT deficiency is the only known genetic risk factor for developing COPD and accounts for less than 1% of all cases in the United States.**
- *AAT is a protease inhibitor produced by the liver that acts predominantly by inhibiting neutrophil elastase in the lungs.*
- *Severe AAT deficiency leads to premature emphysema at the average age of 53 years for nonsmokers and 40 years for smokers.*
- **COPD in young nonsmoker male or in female should direct attention to AAT deficiency**



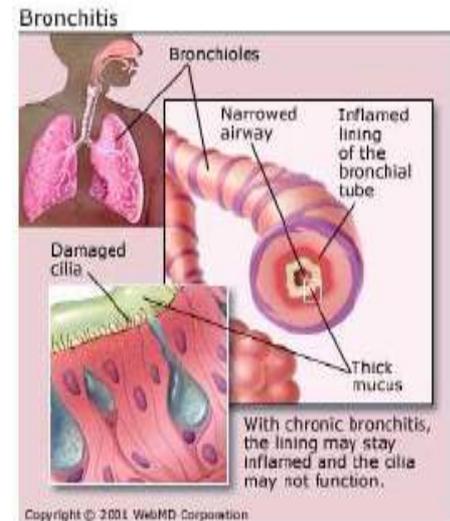
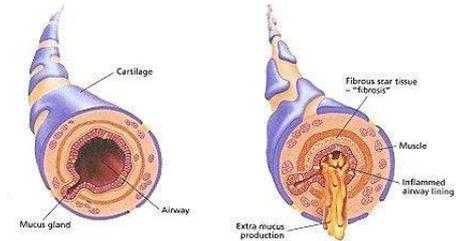
Emphysema



Clinical Manifestations

History

- **Most patients with COPD have smoked at least 20 cigarettes per day for 20 or more years before the onset of the common symptoms of :
cough, sputum, and dyspnea.**
- **Presentation commonly occurs in the fifth decade of life.**
- **A productive cough or an acute chest illness is common.**
- **The cough usually is worse in the mornings and produces a small amount of colorless sputum.**



Clinical Manifestations

History

- ***Breathlessness is the most significant symptom, but it usually does not occur until the sixth decade of life.***
- ***By the time the forced expiratory volume in 1 second FEV1 has fallen **to 30% of predicted**, the patient is breathless after minimal exertion.***
- ***Wheezing may occur in some patients, **particularly during exertion and exacerbations.*****



Clinical Manifestations

History

- ***With disease progression, intervals between acute exacerbations become shorter;***
- ***cyanosis and right heart failure may occur.***
- ***Anorexia and weight loss often develop and suggest a worse prognosis.***



Prevention of COPD

Great deal of COPD is theoretically preventable

□ *Main measures to prevent COPD are:*

- 1. Prevention of smoking**
- 2. Prevention of air pollution**
- 3. Control of hazardous occupational exposure**
- 4. Use of sensitive tests of small airway function in mass screening for early detection of COPD, particularly for high risk groups e.g. smokers and workers exposed to noxious materials**

There are many ways to prevent chronic bronchitis from getting worse, and to minimize the chances of attacks or exacerbations :

1. Avoid smoking:

We can significantly reduce the chances of developing chronic bronchitis by preventing smoking, and moreover by avoiding second hand (passive) smoking.

Non-pharmacology Therapy

- **Smoking cessation**

This is the most effective strategy to reduce the risk of developing COPD and to slow or stop disease progression.

- **Pulmonary rehabilitation**

Exercise training is beneficial in the treatment of COPD to improve exercise tolerance and to reduce symptoms of dyspnea and fatigue.

Avoid Lung Irritants

- **Irritants in the air, such as fumes, pollen, and air pollutants in general, can bring on acute exacerbations of chronic bronchitis in people that have the disease.**
- **People who are exposed to these irritants frequently and for long period of time put themselves at more risk of developing chronic bronchitis.**
- **If lung irritants present in the job environment, we should be sure to wear a face mask to reduce the irritants that are liable to breathe in.**

Avoid Respiratory Infections:

1. The common flue is normally quite harmless, but if a person subjects to it frequently. It can damage the lungs to result in chronic bronchitis.
2. If the patient is already have chronic bronchitis, the flue can kill him. For this reason, **getting the annual flue shot is highly recommended.**
3. The same goes for pneumonia, so **getting a pneumonia shot** may also be a good idea.
4. Washing hands frequently will also decrease the chances of getting an infection.

Adequate Nutrition:

- Supplementation with **vitamins A, C, and E, zinc and bioflavonoid** may also be helpful in preventing recurrence and secondary infections.
- **Dairy products, sugar foods and eggs should be avoided**, as they may increase the tendency to form mucus in the lungs.

IMMUNIZATION:

Immunizations against certain types of **pneumonia (as well as influenza)** are an important preventative measure for the very young or those children with chronic diseases.

Goals of COPD Management

1. Prevent disease progression
2. Relieve symptoms
3. Improve exercise tolerance
4. Improve overall health status
5. Prevent and treat exacerbations
6. Prevent and treat complications
7. Reduce morbidity and mortality