

# CLASSIFICATION OF PULMONARY DISEASES

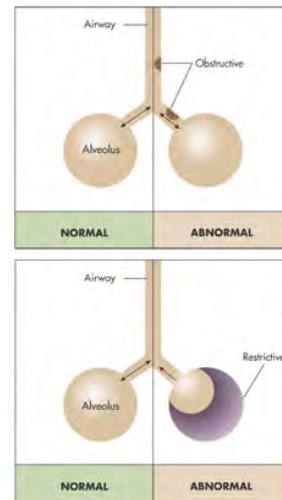
Susan Anderson, MS, RRT  
Clinical Coordinator, Respiratory Care Program

## Classification of Pulmonary Diseases

- Pulmonary function testing provides basis for classifying pulmonary diseases into two major categories
  - Obstructive
  - Restrictive
  
  - \*Combined

# Obstructive Lung Diseases

- Primary problem is increased airway resistance
  - Airway radius can be reduced by:
    - Bronchospasm
    - Excessive secretions
    - Edema
    - Tumors

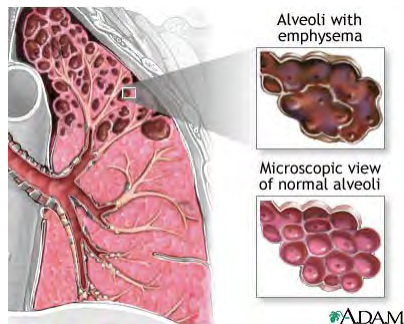


## Common Obstructive Lung Diseases

- Chronic Obstructive Pulmonary Disease
  - Emphysema
  - Chronic bronchitis
  - Bronchiectasis
- Asthma
- Cystic Fibrosis
- Acute bronchitis

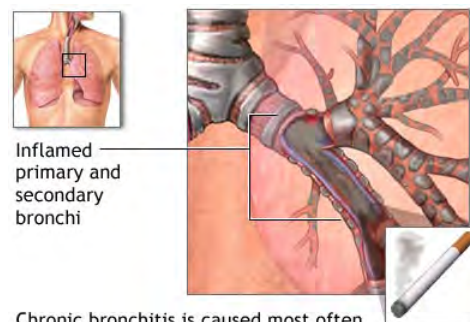
# Emphysema-“Air Trapping”

- Morphologically defined
- Air spaces distal to terminal bronchioles abnormally increase in size
  - Centrilobular- respiratory bronchioles mainly affected
  - Panlobular- alveolar involvement
- Primary cause – cigarette smoking
  - Genetic: alpha-1 antitrypsin deficiency
    - Alpha-1 inhibits proteases in blood from damaging tissue
    - Deficiency causes gradual destruction of alveolar walls



# Chronic Bronchitis

- Clinically defined
  - Productive cough on most days for at least 3 months for 2 or more years
    - Exclude other diseases
- Primary cause – cigarette smoking
- Chronic inflammation of the bronchial walls
  - Mucus gland hypertrophy
  - Increase in leukocytes and lymphocytes
  - Decreased ciliated epithelial cells



Chronic bronchitis is caused most often by exposure to airborne pollutants such as cigarette smoke

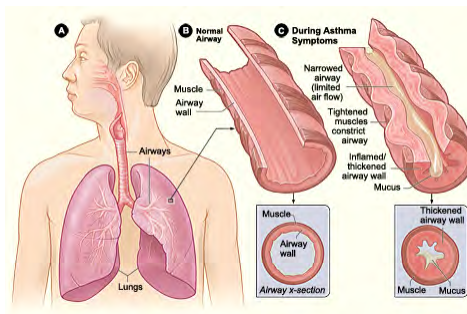
## Assessment

- Chronic airway obstruction can lead to hyperinflation of lungs
  - ▣ Increased AP diameter
- Patients have difficulty with *exhalation*
  - ▣ Prolonged expiratory phase
  - ▣ Often “purse lips”



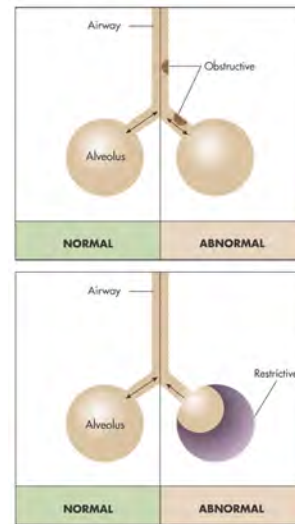
## Hyper-reactive Airways Disease Asthma

- Chronic inflammatory disorder of the airways
- Variable airflow obstruction – at least partially reversible



## Restrictive Lung Diseases

- Primary problem is reduced lung and or thoracic compliance
  - “Stiff lungs”
  - Anatomy affected: lung parenchyma and or chest wall
  - Decreased lung volumes and capacities

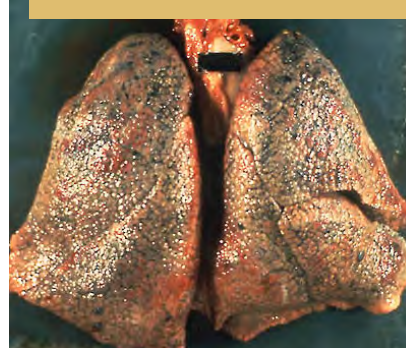


## Restrictive Pathologies

### Restrictive Lung Diseases

- Pulmonary fibrosis
- Alveolar inflammation
  - ARDS
- Pulmonary edema
- Thoracic wall abnormalities
  - Kyphoscoliosis
- Neuromuscular diseases

### Pulmonary fibrosis



## Assessment

- Patients cannot take deep breaths
  - ▣ Decreased inspiratory capacity
- Typically breathe rapid and shallow
- Other manifestations depend on cause of pulmonary restriction

## Predicted Normal Values

- Primary factors affecting predicted values
  - ▣ Age
  - ▣ Gender
  - ▣ Height
  - ▣ Race or ethnic origin



Table 18-4 Severity of pulmonary impairments based upon % of the predicted normal value or standard deviations of the mean predicted normal value

Degree of Impairment	% Predicted	Standard Deviations Below Mean
Normal	80–120%	< 1 SD
Mild	65–79%	1–2 SD
Moderate	50–64%	2–3 SD
Severe	35–49%	> 3 SD
Very Severe	< 35%	

## Standard Spirometric Values

- FVC: forced vital capacity
- FEV<sub>1</sub>: volume exhaled in 1<sup>st</sup> second of FVC
- FEV<sub>1%</sub>: ratio of FEV<sub>1</sub> / FVC
  - Normally 75-85%
- \*Spirometry cannot measure RV

# Interpretation

- Normal
- Obstructive
  - $FEV_{1\%} < 70$
- Restrictive
  - $TLC < 80\%$  of predicted

