

Factors Influencing Respiratory Rate and Depth

- Physical factors
 - Increased body temperature
 - Exercise
 - Talking
 - Coughing
- Volition (conscious control)
- Emotional factors

Factors Influencing Respiratory Rate and Depth

- Chemical factors
 - Carbon dioxide levels
 - Level of carbon dioxide in the blood is the main regulatory chemical for respiration
 - Increased carbon dioxide increases respiration
 - Changes in carbon dioxide act directly on the medulla oblongata

Factors Influencing Respiratory Rate and Depth

- Chemical factors (continued)
 - Oxygen levels
 - Changes in oxygen concentration in the blood are detected by chemoreceptors in the aorta and carotid artery
 - Information is sent to the medulla oblongata

Respiratory Disorders: Chronic Obstructive Pulmonary Disease (COPD)

- Exemplified by chronic bronchitis and emphysema
- Major causes of death and disability in the United States

Respiratory Disorders: Chronic Obstructive Pulmonary Disease (COPD)

- Features of these diseases
 - Patients almost always have a history of smoking
 - Labored breathing (dyspnea) becomes progressively more severe
 - Coughing and frequent pulmonary infections are common

Respiratory Disorders: Chronic Obstructive Pulmonary Disease (COPD)

- Features of these diseases (continued)
 - Most victims retain carbon dioxide, are hypoxic and have respiratory acidosis
 - Those infected will ultimately develop respiratory failure

Emphysema

- Alveoli enlarge as adjacent chambers break through
- Chronic inflammation promotes lung fibrosis
- Airways collapse during expiration
- Patients use a large amount of energy to exhale
- Overinflation of the lungs leads to a permanently expanded barrel chest
- Cyanosis appears late in the disease

Chronic Bronchitis

- Mucosa of the lower respiratory passages becomes severely inflamed
- Mucus production increases
- Pooled mucus impairs ventilation and gas exchange
- Risk of lung infection increases
- Pneumonia is common
- Hypoxia and cyanosis occur early

Chronic Obstructive Pulmonary Disease (COPD)

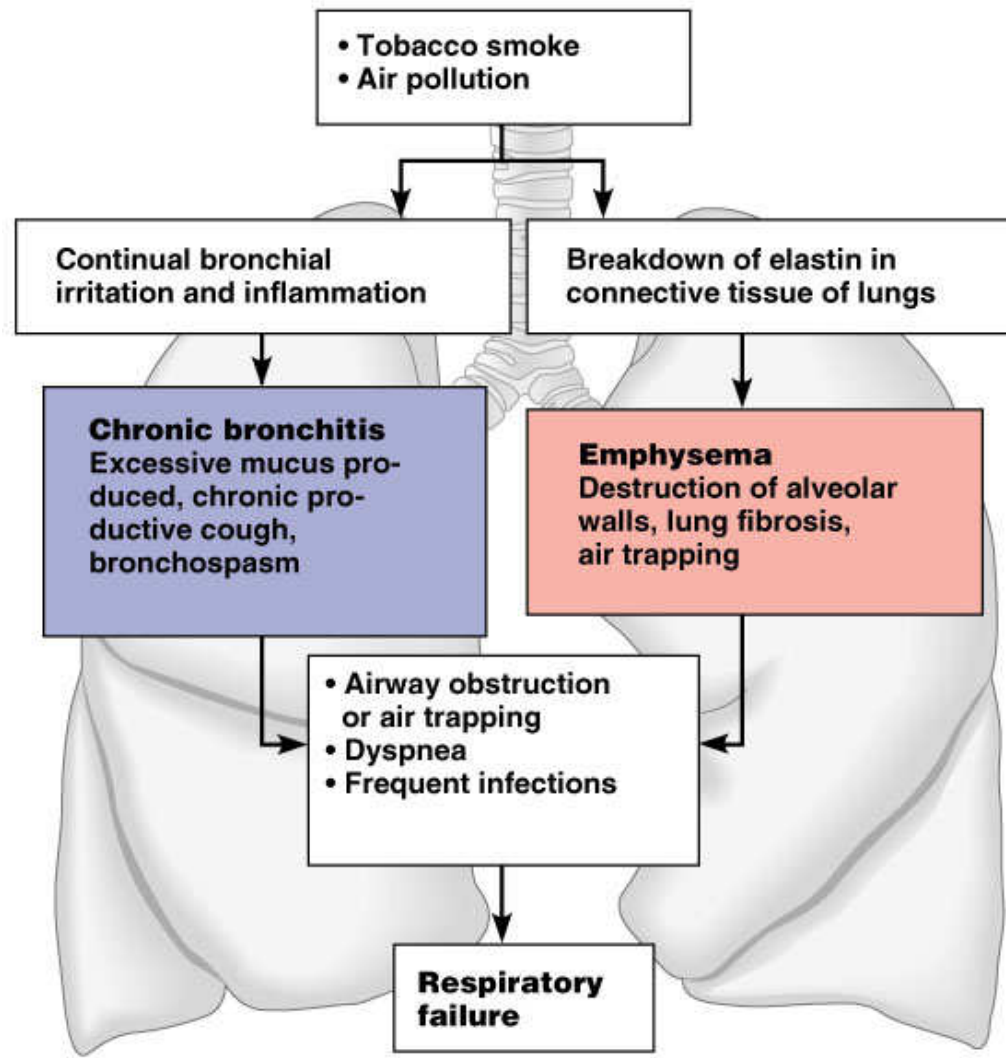


Figure 13.13

Lung Cancer

- Accounts for 1/3 of all cancer deaths in the United States
- Increased incidence associated with smoking
- Three common types
 - Squamous cell carcinoma
 - Adenocarcinoma
 - Small cell carcinoma

Sudden Infant Death syndrome (SIDS)

- Apparently healthy infant stops breathing and dies during sleep
- Some cases are thought to be a problem of the neural respiratory control center
- One third of cases appear to be due to heart rhythm abnormalities

Asthma

- Chronic inflamed hypersensitive bronchiole passages
- Response to irritants with dyspnea, coughing, and wheezing

Developmental Aspects of the Respiratory System

- Lungs are filled with fluid in the fetus
- Lungs are not fully inflated with air until two weeks after birth
- Surfactant that lowers alveolar surface tension is not present until late in fetal development and may not be present in premature babies

Developmental Aspects of the Respiratory System

- Important birth defects
 - Cystic fibrosis – oversecretion of thick mucus clogs the respiratory system
 - Cleft palate

Aging Effects

- Elasticity of lungs decreases
- Vital capacity decreases
- Blood oxygen levels decrease
- Stimulating effects of carbon dioxide decreases
- More risks of respiratory tract infection

Respiratory Rate Changes Throughout Life

- Newborns – 40 to 80 respirations per minute
- Infants – 30 respirations per minute
- Age 5 – 25 respirations per minute
- Adults – 12 to 18 respirations per minute
- Rate often increases somewhat with old age