



INFECTIOUS PULMONARY DISEASES



Nursing 142
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Common Terminology

- Normal Physiology
 - If you're feeling stuck, go back and review the normal physiology of whatever body system is involved.
- The Five "I"s
 - For each disease identify which of the following processes are involved (Ischemia, Infarction, Inflammation, Infection, Immune System)
- Hyper: too much, up arrow

Common Terminology

- Hypo not enough, down arrow
 - For each disease identify what, if anything, there is too much of, or too little of.
- Obstruction- The body is a dynamic system.
 - For each disease identify if anything is being obstructed.
 - What is the site of obstruction, why is it obstructed, and what are the consequences of the obstruction?

Common Terminology

- Compensation- For each disease identify what the body is doing to fix the problem (homeostasis).
 - Keep in mind that efforts to compensate may end up creating new problems.
- Genetics- when causes cannot be explained, consider the role of genetics
 - Consider genetics both as a possible source of the problem, and as explaining variations in individual responses to illness.

Mechanics of Ventilation

□ Ventilation

■ Inspiration

- Occurs when changes decrease inter-pleural pressures
- Air enters the lungs through the primary bronchus
- Oxygen and carbon dioxide are exchanged at the alveolar respiratory membrane

■ Expiration

- Occurs when changes increase inter-pleural pressures
- Primarily passive
- Carbon dioxide is expelled through expiration

Factors that Affect Respiration

- Changes in Volume and Capacity
 - Affected by gender, age, weight, and health status
 - Measured by pulmonary function tests
- Air Pressure
 - Pressure changes in the thoracic cavity drive inspiration/expiration
- Oxygen, Carbon Dioxide, Hydrogen Ion Concentrations
 - Affect respiratory centers in medulla oblongata, pons, medulla, carotid and aortic bodies
- Airway Resistance, Lung Compliance, and Elasticity
 - Increase airway resistance, decreased lung compliance or decreased elasticity decrease gas flow

Health History

- Current Illness
- Observe for Respiratory Compromise
- Present Health Status, Medical History, Family History, Risk Factors
- Lifestyle Questions
 - Smoking history
 - Exposure to environmental substances
 - Exercise
 - Use of recreational drugs
- Medications
- Surgical History
- Activity-Exercise Capacity
- Cough, SOB, Dyspnea, Sputum, Wheezing, Vocal Changes, C. Pain
- Nose, Mouth, Pharynx, Eyes, Thorax, Lungs
- Oximetry, Peak Flows, Sputum studies, ABGs, CXR, Bronchoscopy, V-Q Scan, PFTs, Thoracentesis

Age-related Changes

- Decrease in elastic recoil of the lung
- Loss of skeletal muscle strength in thorax and diaphragm
- Fibrosis in the alveoli
- Fewer functional capillaries
- Less effective cough
- Decrease in PO₂
- Vital capacity decreases
- Stimulating effects of carbon dioxide decreases
- More risks of respiratory tract infection

Respiratory Capacities

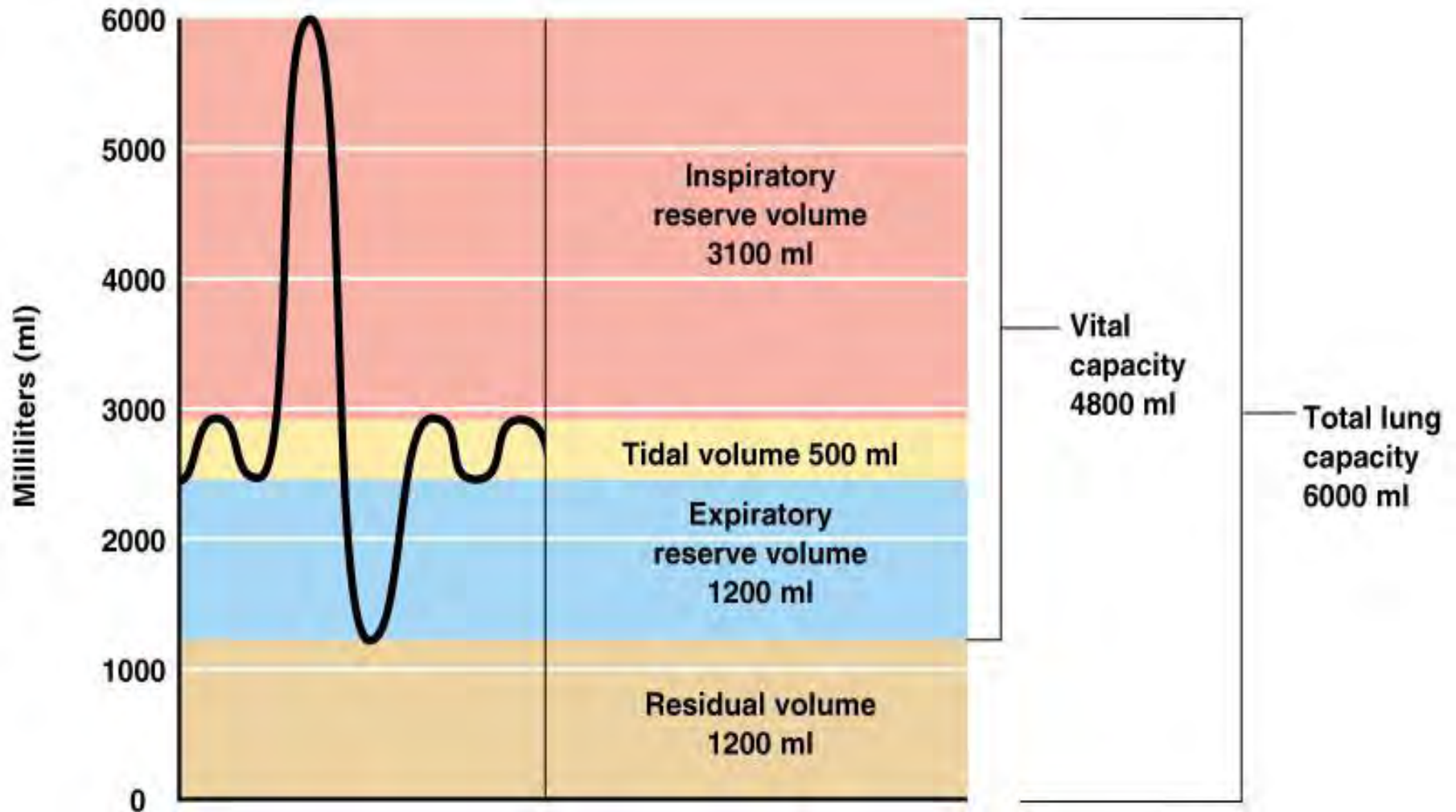


Figure 13.9

Manifestations of Possible Respiratory Disorder

- Nasal Assessment
 - Asymmetry, redness, swelling, septum abnormalities, purulent drainage, changes in ability to smell
- Frontal or Maxillary Sinus Assessment: Tenderness
- Thoracic Assessment
 - Markedly increased or decreased respiratory rate, abnormal AP diameter, intercostal retraction or bulging, asymmetric chest expansion, malposition of the trachea, changes in tactile fremitus, dullness or hyperresonance on percussion or asymmetric diaphragmatic excursion
- Breath Sound Assessment: Adventitious sounds and absence of breath sounds

Upper Respiratory Infections

- Cause by easily spread viruses
- When the virus of an allergen enters the airway it may cause acute inflammation of the upper airway including the sinuses, pharynx and or larynx
- The airway mucosa swells and secretes clear, yellow or greenish exudate
- A bacterial infection may develop following the viral infection
- URI 's occur more frequently during the fall and winter

Upper Respiratory Tract Disorders

- Influenza
 - Highly contagious viral respiratory disease
 - Usually occurs in epidemics or pandemics
 - Avian influenza: possible pandemic
- Sinusitis
 - Sterile air-filled cavities in the facial bones
- Pharyngitis
 - Acute inflammation of pharynx
 - Generally viral
 - May be bacterial
- Tonsillitis
 - Acute inflammation of palatine tonsils
 - Generally due to streptococcal infection
 - May be viral

Upper Respiratory Tract Disorders

□ Epiglottitis

- Rapidly progressive cellulitis
- Begins between base of tongue and epiglottis
- Medical emergency, as airway may be threatened

□ Laryngitis

- Inflammation of the larynx
- Occurs alone or with other URI
- May be acute or chronic

□ Diphtheria

- Acute, contagious disease
- Caused by *Corynebacterium diphtheriae*
- Uncommon in US

□ Pertussis

- Whooping cough
- Highly contagious

Viral Upper Respiratory Infection

□ Pathophysiology

- Local inflammatory response
- Swelling of mucous membranes of nasal passages
- Hyperactivity of mucus-secreting glands
- Immunity produced only to individual virus

□ Manifestations

- Nasal congestion
- Profuse nasal discharge (coryza)
- Sneezing
- Coughing
- Sore throat
- Low-grade fever
- Headache
- Malaise
- Muscle aches

Croup Syndrome

- Age 5 and under
- RSV, Para influenza, H. Influenza, Diphtheria
- Mucosal edema, increased secretions, laryngeal spasms, inspiratory stridor (bark), wheezing
- Treatments- Humidified O₂, Aerosolized, Hydration, Antibiotics
- Tends to reoccur in same individual

ACUTE LARYNGOTRACHEOBRONCHITIS

LTB (Croup)

- Slow Onset
- Barking Cough
- “Crowing Sounds”



- Inspiratory Stridor
- Occurs at Night in Fall and Winter
- May Progress to Hypoxic State
- May Have Slight Temperature ($<102^{\circ}$)

- Commonly Occurs Age 3 Months to 3 Years
- U.R.I.'s Frequently Precede LTB
- Restlessness
- Supra-sternal Retractions
- ↑ Respiratory Rate

Rhinitis

- ▣ Inflammation of the nasal mucous membrane
- ▣ May be acute or chronic
- ▣ May be caused by viruses, bacteria, or allergens
- ▣ Acute rhinitis known as the common cold
- ▣ Viral and bacterial rhinitis may be contagious - spread by droplets and direct contact
- ▣ Acute
 - ▣ Caused by reactions to allergens such as pollens
 - ▣ May be seasonal or perennial

Factors That May Precipitate Rhinitis

- Excessive nasal dryness
 - Exposure to damp and cool environmental temperatures
 - Inhalation of large amounts of dust, stress, or fatigue
 - Compromised immune system
 - Nasal injury
- Clinical Manifestations
 - Nasal congestion and drainage may affect breathing and alter the sense of smell
 - Congestion - may cause coughing, sinus headaches, and snoring
 - Fever, muscle aches, fatigue, sneezing, and watery, itchy eyes

Pharyngitis

- May be
 - Viral: rhinovirus, influenza or Epstein-Barr virus
 - Bacterial: group A beta-hemolytic streptococci, or strep throat)
 - Fungal: e.g., candidiasis
- Environmental irritants such as smoking, dust, or smog may cause chronic pharyngitis
- Spread by airborne droplets: may be transmitted for several days during the disease process

Pharyngitis: Symptoms

- Sudden onset of sore throat, possibly scratchy or with trouble swallowing, fatigue, fever, and muscle aches
- Anterior lymph nodes may be tender and enlarged, and pus may be seen on pharynx.
- Acute pharyngitis may be complicated by scarlet fever, rheumatic fever, toxic shock syndrome, and acute glomerulonephritis.
- Viral pharyngitis has a more gradual onset with sore throat, low-grade fever, headache, and rhinorrhea.
- Fungal infections may produce white patches on the pharynx

Viral Upper Respiratory Infection

Sinusitis

- Pathophysiology
 - Sinus opening obstruction, impaired drainage
- Manifestations
 - Pain and tenderness
 - Headache, fever, and malaise
 - Nasal congestion
 - Purulent nasal discharge
 - Bad breaths

Epiglottitis

- Pathophysiology
 - Inflammation/swelling pushes the epiglottis posteriorly
 - Possible airway obstruction
- Manifestations in Adults
 - 1-2 day history of sore throat
 - Painful swallowing
 - Dyspnea
 - Drooling
 - Stridor

EPIGLOTTITIS



A • Airway Inflammation → Obstruction
I • Increased Pulse
R • Restlessness

R • Retractions
A • Anxiety Increased
I • Inspiratory Stridor
D • Drooling

TREATMENT:

- ↓ Anxiety
- Don't Examine Throat
- ~~Tongue Blade~~
- Position For Comfort
- Trach Tray or Endotracheal Tube Available
- Cool Mist Humidification
- Oxygen
- No Oral Fluids
- IV Fluids

Sinusitis: Inflammation of One or More Sinus Cavities)

- Complication of an upper respiratory tract infection, tooth infections or abscess, allergies, pneumonia, or measles.
- May be related to air pollution, diving, swimming, nasal structural defects, or prolonged nasotracheal intubation
- Chronic sinusitis may result from repeated bouts of acute sinusitis; smoking or nasal spray use increases susceptibility.

- Clinical Manifestations:
 - Headache, sinus tenderness, and nasal drainage or congestion, fever (not typical), malaise, nausea, dizziness
 - Erythema and inflammation of the nasal mucosa and enlarged turbinates

Tonsillitis

- Inflammation of palatine tonsils called *tonsillitis*

- The adenoids may be inflamed as a result of tonsillitis.
- Tonsillitis may occur as a viral infection but is most commonly related to a streptococcal infection

□ Clinical Manifestations:

- Extremely sore throat, difficulty swallowing, high fever, tachycardia, otalgia, malaise, and tender, enlarged cervical lymph nodes
- Bright red, edematous tonsils with white exudate; uvula may be enlarged
- May be complicated by otitis media, spontaneous rupture of the eardrum, or quinsy
- Peritonsillar abscess resulting in increased swelling of the tonsil, deviation of the uvula, difficulty speaking, drooling, and tonic contractions of the jaw muscles

Viral Upper Respiratory Infection

Laryngitis

- Pathophysiology
 - Mucous membrane lining of larynx becomes inflamed
 - Vocal cords edema
- Manifestations
 - Change in voice quality
 - Sore, scratchy throat
 - Dry, harsh cough

Pertussis

- Pathophysiology
 - Damage/effects caused by bacterial toxins
- Manifestations
 - Follow predictable pattern
 - Begin with typical URI symptoms
 - 1-2 weeks cough becomes more frequent
 - Paroxysms of coughing occur frequently
 - Vomiting commonly follows coughing episode

Laryngitis

- May be acute or chronic
- Acute laryngitis - may be viral or bacterial
- Can be caused by overuse of voice, exposure to allergens such as dust or smoke, or injury to larynx due to hot or corrosive liquids
- Chronic laryngitis follows episodes of acute laryngitis
- Clinical Manifestations:
 - Hoarseness, inability to speak, sore or scratchy throat, decreased appetite, dry cough, and impaired breathing if inflammation is severe
 - Chronic laryngitis leads to granulation of the larynx
 - Possible permanent change in voice quality or chronic hypertrophic laryngitis

Intervention

□ Possible Medications:

- Antibiotics
- Antipyretics
- Bronchodilators
- Cough suppressants
- Mucolytic agents
- Expectorants

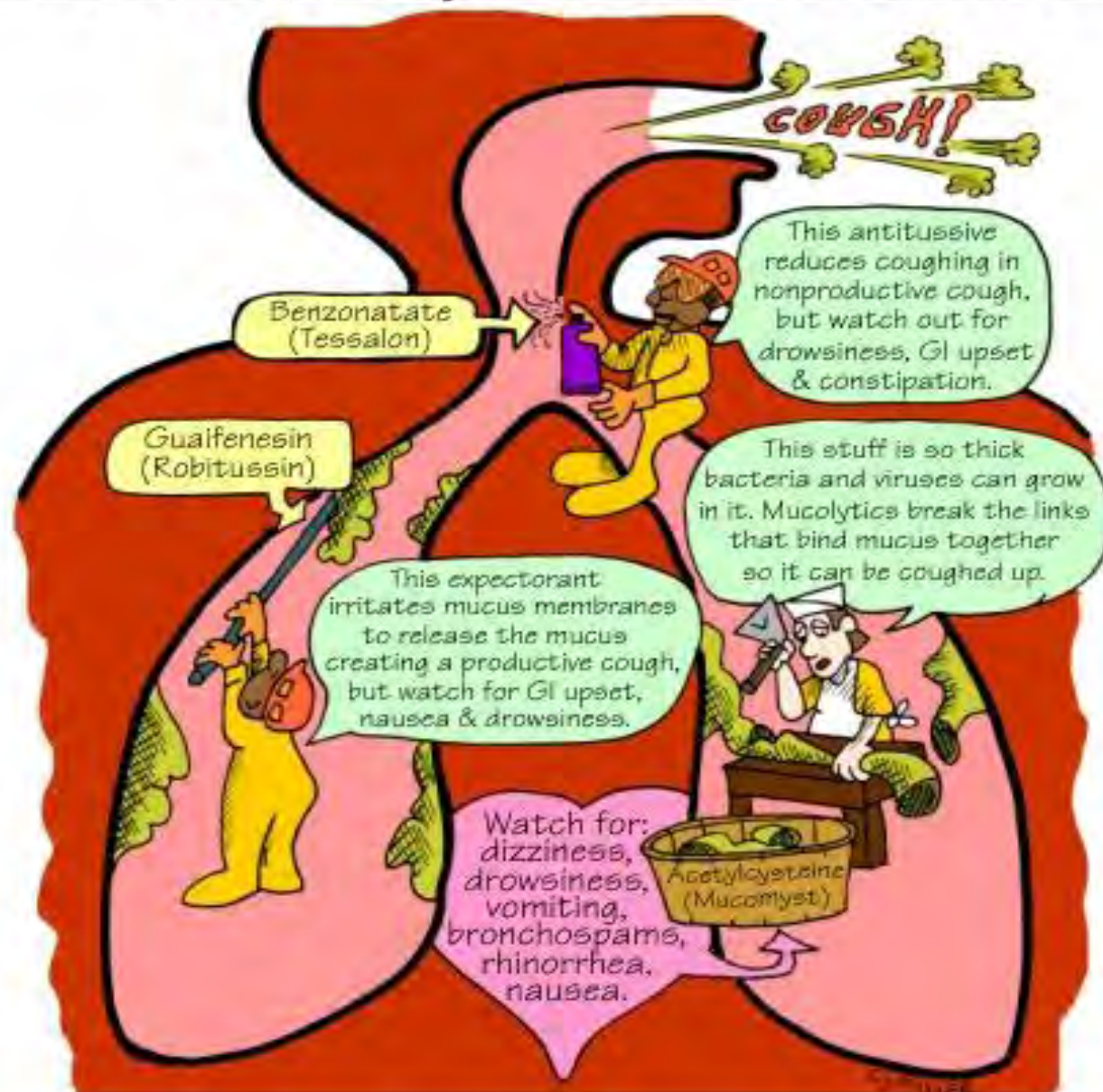
URIs - Treatment

□ Medications

- Vaccines
- Antibiotics
- Decongestants
- Antihistamines
- Topical nasal steroids
- Inhaled steroids

- Treatment for bacterial infections
- Use for up to 10 days
- Client no longer contagious after 24 hours of antibiotic therapy

Antitussives, Expectorants, & Mucolytics



Antihistamines



TABLE 23-1**Manifestations and Course of Rhinitis and Influenza**

	ACUTE VIRAL RHINITIS	ALLERGIC RHINITIS	INFLUENZA
<i>Local Manifestations</i>	Nasal mucosa red, swollen, and congested Clear, watery secretions with coryza (runny nose) Sneezing and coughing	Nasal mucosa pale, swollen, and congested Thin, watery nasal discharge Itchy, watery eyes Sneezing	Coryza Sore throat Dry, nonproductive cough; may become productive Substernal burning
<i>Systemic Manifestations</i>	Low-grade fever Headache Malaise Muscle ache	Headache	Chills and fever Headache Malaise Muscle ache Fatigue and weakness
<i>Course and Possible Complications</i>	Lasts few days to 2 weeks Mild and self-limited Secondary infections (e.g., sinusitis, otitis media) may follow	Occurs with exposure to allergens (pollen, mold, animal dander) Chronic congestion may cause snoring, postnasal drip	Abrupt onset 1- to 2-week duration Cough and fatigue may last several weeks Secondary infections (sinusitis, otitis media, pneumonia, bronchitis) may follow

Influenza

- Acute respiratory tract infection caused by:
 - A, B, or C virus
- Easily transmitted by airborne droplets or direct contact
- Incubation period following contact as short as 18 to 72 hours
- Elderly clients, especially those with cardiac or lung disorders, most susceptible to disorder and complications
- Clinical Manifestations:
 - Rapid onset due to rapid replication of virus within respiratory epithelium
 - Rhinorrhea or profuse nasal drainage, cough and sore throat

Influenza

- Medications
 - ▣ Prophylaxis
 - ▣ Treatment to reduce severity
 - Amantadine
 - Rimantadine
 - Zanamivir
 - Oseltamivir
 - Ribavirin
- ▣ Symptom relief also include
 - ASA
 - Acetaminophen
 - NSAIDs
 - Antitussives
 - Antibiotics are not indicated

Health Promotion Activities

Viral Upper Respiratory Infection

- Maintaining good general health
- Stress-reducing activities
- Limiting exposure to crowds
- Good handwashing

Influenza

- Immunization education
- Risk reduction activities
 - Avoiding crowds
 - Avoiding those who are ill

Sinusitis

- Promote nasal drainage
- Encouraging liberal fluid intake
- Judicious use of nasal decongestants
- Treating any obstructive process

Pharyngitis or Tonsillitis

- Education regarding need to seek treatment

Diphtheria and Pertussis

- Immunizations

Acute Bacterial Pneumonia

- ❑ Inflammatory response results in alveolar edema.
- ❑ Serous exudate, blood cells, fibrin, and bacteria fill the alveoli and respiratory bronchioles.
- ❑ Lobar pneumonia is consolidation of a large portion of an entire lung lobe.
- ❑ Bronchopneumonia is a patchy consolidation that involves several lobules.

Pneumonia

□ Pathophysiology

- An inflammation of the pulmonary tissue including the interstitial spaces, the alveoli, and the bronchioles.
- The edema associated with inflammation stiffens the lung, decreases compliance in vital capacity, and causes hypoxemia.

Clinical Manifestations

- Dyspnea
- Chills
- Elevated temperature
- Pleuritic pain
- Diminished breath sounds
- Rales, rhonchi, and wheezes
- Use of accessory muscles
- Cyanosis
- Mental status changes
- Sputum production(thick)
 - Pneumococcal: rust-colored, green, or bloody
 - Bronchopneumonia: Yellow-green

Diagnostic Tests

- ☐ Sputum Gram stain
- ☐ CBC
- ☐ ABG
- ☐ Pulse oximetry
- ☐ Chest x-ray
- ☐ Fiberoptic bronchoscopy

Pneumonia

- Interdisciplinary care

- Prevention

- Pneumococcal vaccine

- Influenza vaccine

- Medications

- Antibiotics

- Bronchodilators

- Agents to liquefy mucus

- Treatments

- Oxygen therapy

- Chest physiotherapy

- Nursing diagnoses

- Ineffective airway clearance

- Ineffective breathing pattern

- Activity intolerance

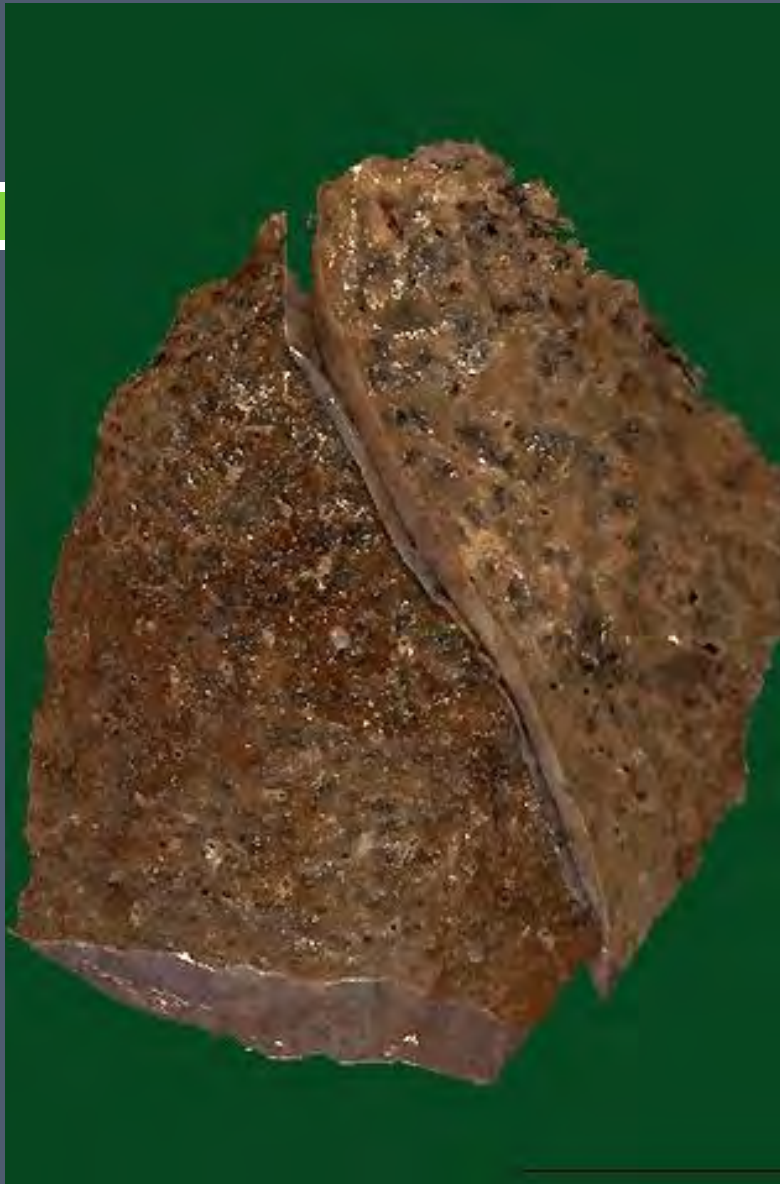
**Normal
air spaces**



**Inflamed air
spaces filled
with fluid
(pneumonia)**

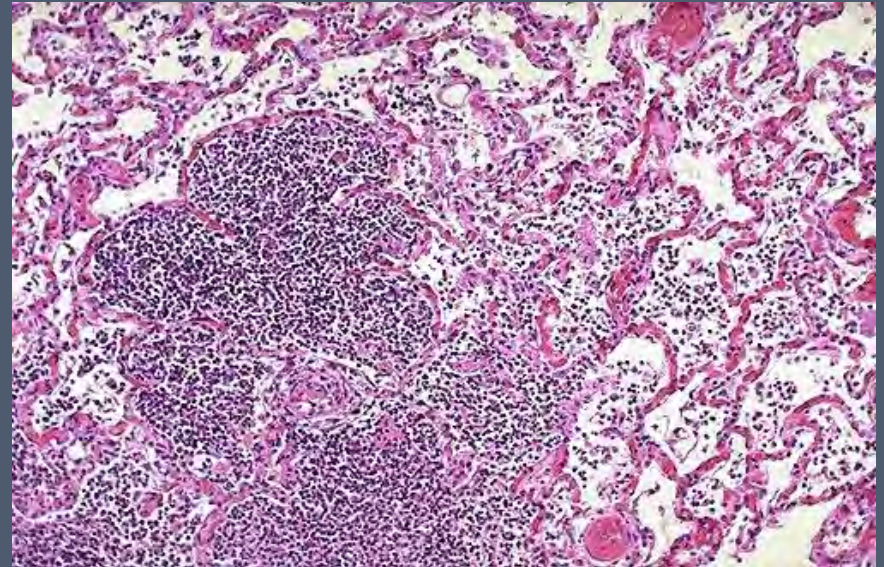
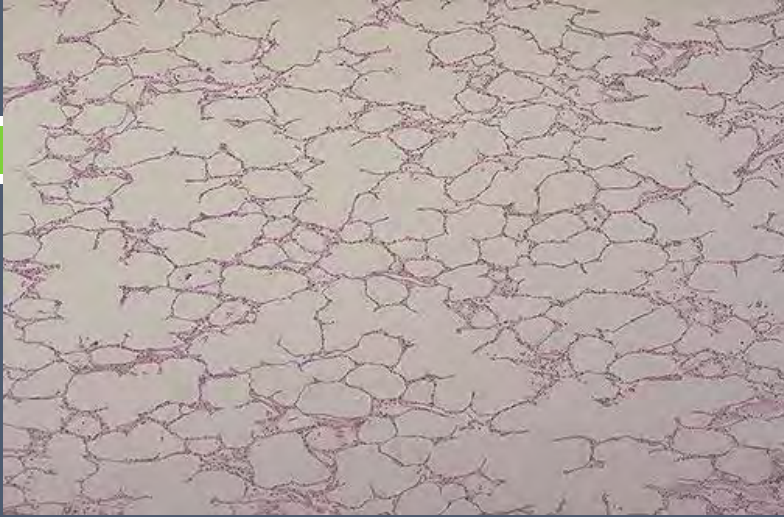


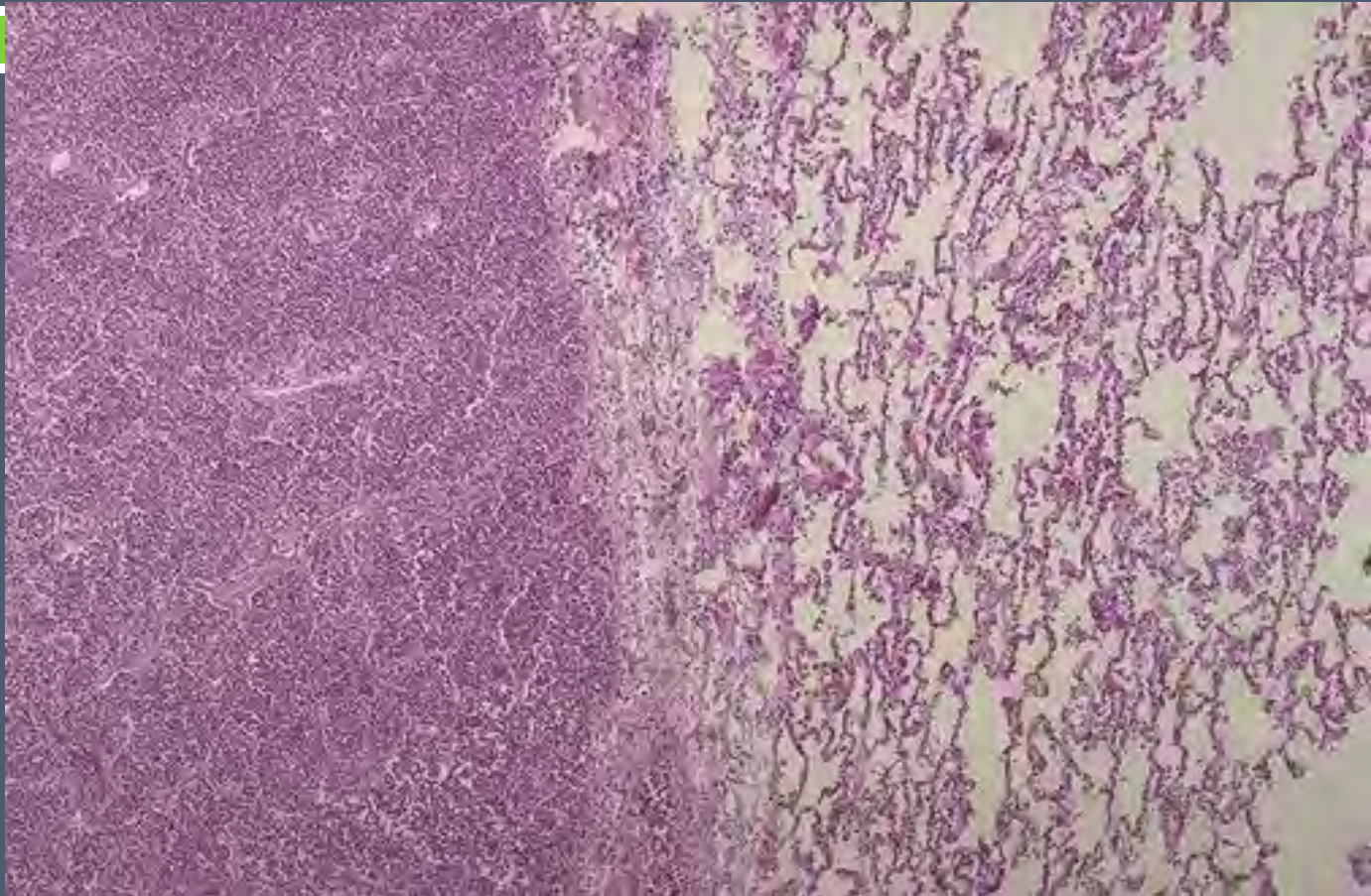
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Intervention

- ❑ Administer oxygen
- ❑ Monitor respiratory status:
 - ❑ Labored respirations, cyanosis, and cold and clammy skin.
 - ❑ Encourage coughing and deep breathing and use of incentive spirometer
- ❑ Position in semi-Fowler's to facilitate breathing and lung expansion
- ❑ Change positions frequently and ambulate as tolerated to mobilize secretions
- ❑ Nasotracheal suctioning if the client is unable to clear secretions.
- ❑ Monitor pulse oximetry.
- ❑ Monitor and record color, consistency, and amount of sputum.

Medication Treatment

- Broad-spectrum antibiotic
 - Penicillin
 - Second or third generation cephalosporin
 - Fluoroquinolone
- Bronchodilators
 - Sympathomimetic drugs
 - Methylxanthines
- An agent to “break up” mucus

Nasal and Systemic Decongestants

- Produces vasoconstriction of the capillaries within the nasal mucosa, shrinks nasal mucosal membranes, and reduces fluid secretion.
- Used for allergic rhinitis, hay fever, and acute coryza
 - (profuse nasal discharge).
- Contraindicated or used with extreme caution in clients with hypertension, cardiac disease, hyperthyroidism, and diabetes mellitus.
- Adverse Effects:
 - Usually mild
 - Nasal burning, stinging and dryness
 - Oral drugs may cause: tachycardia, arrhythmias, nervousness, restlessness, insomnia, blurred vision, nausea, vomiting

Bronchodilators

- Contraindicated in individuals with hypersensitivity, peptic ulcer disease, severe cardiac disease, and cardiac dysrhythmias, hyperthyroidism, and uncontrolled seizure disorders.
 - Used cautiously with clients with hypertension and diabetes mellitus
 - Used with caution in clients with narrow-angle glaucoma.
- Theophylline increases the risk of digitalis toxicity, decreases the effects of lithium, and decreases theophylline levels when administered with phenytoin (Dilantin).
 - Dilate the airways of the respiratory tree, thereby making air exchange and respiration easier for the client.
 - Relax the smooth muscle of the bronchi.
- Stimulate the central nervous system (CNS) and respiration, dilate coronary and pulmonary vessels, and cause diuresis.

Bronchodilators

Bronchobusting The β_2 Adrenergic Agonist RODEO



Instructing the Client to Use an Inhaler

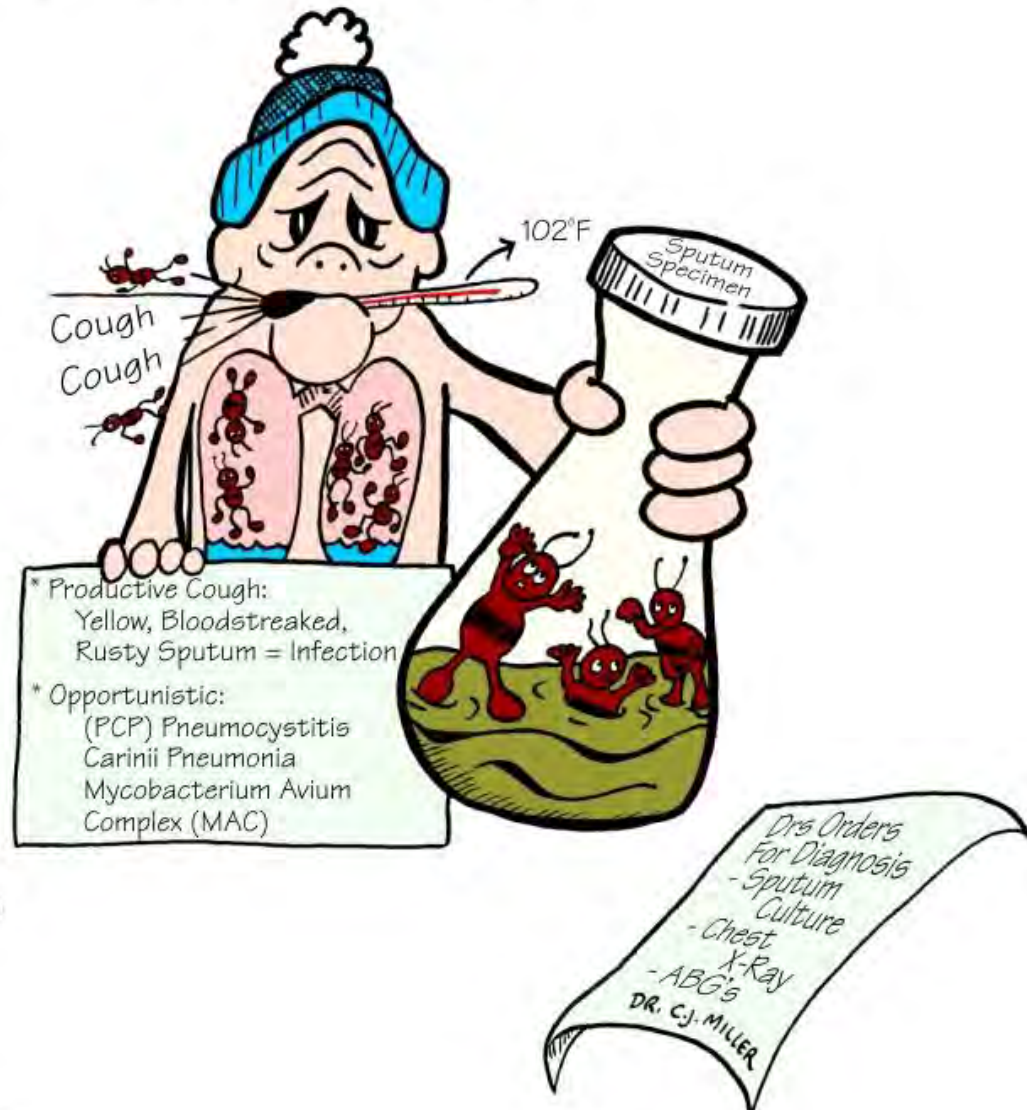
- ❑ Shake inhaler well before using.
- ❑ Remove cap from inhaler.
- ❑ Breathe deeply in and out through the mouth.
- ❑ Insert the mouthpiece into the mouth or in front of the open mouth, holding the inhaler upright.
- ❑ If a spacer is used, attach the spacer to the inhaler and place the end of the spacer in the mouth, passing the teeth and above the tongue.
- ❑ With the index finger on the top of the canister, depress the top while inhaling slowly.

PNEUMONIA

- * Obstruction of Bronchioles
- * ↓ Gas Exchange
- * ↑ Exudate

Symptoms...

- Cough
- Fever
- Chills
- Tachycardia
- Tachypnea
- Dyspnea
- Pleural Pain
- Malaise
- Respiratory Distress
- ↓ Breath Sounds



Evaluation

- Encourage rest
- Adequate hydration
- Hand washing after coughing
- Avoid exposure to crowds
- Avoid physical or psychological stress
- Prevention for influenza—vaccine for high-risk groups
- Discuss OTC medications for relief of symptoms
- Assist client to identify possible allergens for allergic rhinitis
- Stress importance of completing entire course if on antibiotics
- Teach complications of influenza and URIs

Client Education

- The importance of rest, proper nutrition, and adequate fluid intake.
- Avoid chilling and exposure to individuals with respiratory infections or viruses.
- Instruct regarding medications and the use of inhalants as prescribed.
- Instruct to notify the physician if chills, fever, dyspnea, hemoptysis, or increased fatigue occurs.
- Instruct in the importance of receiving the influenza/pneumococcal vaccine as recommended.