

Pulmonary Disorders

GETTING BASELINE INFO

- Obtain pt's health history
 - Esp. look at **smoking history**
- Common symptoms
 - Dyspnea
 - Tachypnea
 - Hypoxemia
 - Orthopnea
 - Stridor: high-pitched whistling sound when breathing
 - Coughing
 - Wheezing
 - Chest pain
 - Clubbing
 - Cyanosis

SYMPTOMS

Dyspnea

- **Def:** shortness of breathing or distress in breathing; **subjective feeling**(most common)
 - Not always respiratory issues
 - Ask for **severity** of a scale of 1-10
 - Tachypnea
 - Hypoxemia
 - Orthopnea: SOB when lying down

Coughing

- Caused by inflammation of mucous membranes in resp. tract
- Productive or not?
- Can be a **diagnostic tool**
- Body's mechanism to get rid of stuffs in lungs
- Check for **cough-reflex**; it can be impaired by:
 - Weakness or paralysis of resp. muscles
 - Prolonged inactivity
 - NG tube
 - **Anesthesia**
 - Brain disorders
- Check for **sputum** and its characteristics for diagnostic purposes
 - Hemoptysis: blood in cough; can be indicative of TB
 - If blood is bright red and frothy, usually lung issue
 - If blood is dark and not frothy, can be **stomach** issue

Wheezing

- Can be indicative of **bronchitis** or **asthma**
 - Inhalation=**bronchitis**
 - Expiration = **asthma**

Chest pain

- Check that it's not MI
- Usually on the affected side but can radiate to **neck, back, or abdomen**
- May occur with
 - **Pneumonia**
 - **Pulmonary emboli**
 - **Pleurisy**
- May be relieved when lying on unaffected side

Clubbing

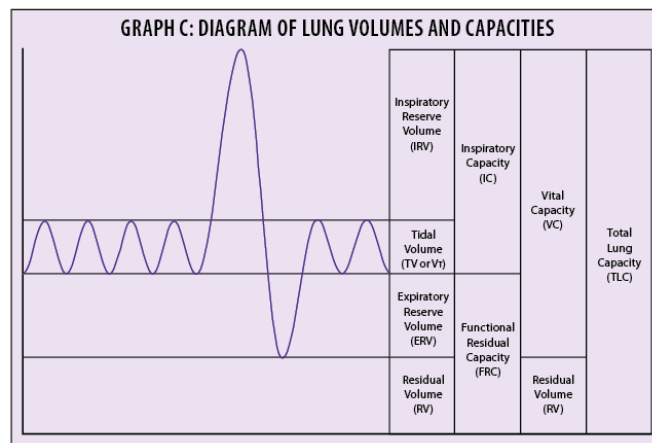
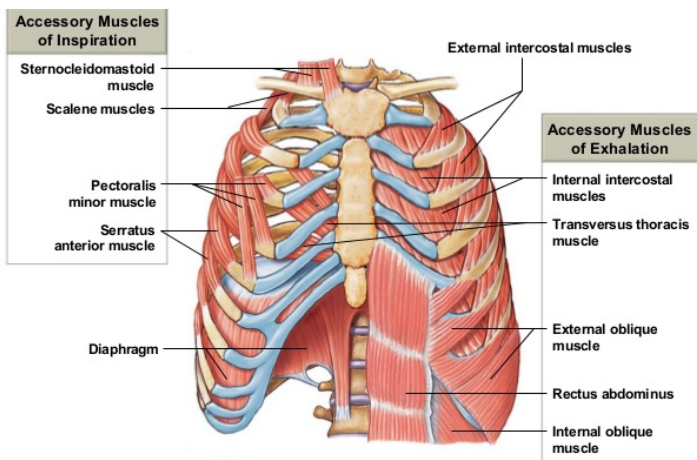
- Sign of **lung disease** in pts with:
 - COPD
 - Chronic lung infections
 - Lung cancer
- Body is not able to push O₂ to ends on fingers

Cyanosis

- Very late sign and **serious sign** of **hypoxia**
- Needs immediate interventions
 - 1) Put pt on **pulse oximeter** and get other v/s
 - 2) Call for help but **do not leave the pt alone and give rescue breaths**
- Rescue breaths:
 - Make sure you remove pillow to open airway
 - Make sure pt actually needs them to prevent **hyperventilation** (indicated by pt coughing)
- You may need to do CPR if you don't find a pulse

Use of Accessory Muscles

- Pt will start doing this when they have difficulties breathing
- Muscles allow additional support
- Inspiration vs expiration accessory muscles
 - Inspiration: **sternocleidomastoid, scalene, trapezius**
 - Exhalation: **intercostal muscles, and abdominal muscles**



Adventitious Sounds

- **Crackles:** rattling, cracking sounds during **inhalation**
 - Secondary to **fluid in the airway**
 - Can be heard in **HF, pulmonary fibrosis, obstructive pulmonary disease**
- **Wheezes:** high pitched whistling sound during breathing
 - Due to changes in **airway diameter** (airway constriction)
 - Can be due to **secretion buildup**
 - Can be heard in **asthma, bronchospasm, chronic bronchitis**

DIAGNOSTIC TESTS

- **Pulmonary Function Tests (PFT)**
- **ABG**
- **Pulse oximeter (SPO2)**
- **Cultures**
- **X-rays**
- **CT**
 - Pt should be NPO 4 hrs before
- **MRI**
- Nuclear scans
- Bronchoscopy
- Biopsy (post-procedure)

Pulmonary Function Tests (PFT)

- **Def:** comparison of FEV to FVC
- Used for pts with **chronic respiratory disorders** and to monitor **effects of treatment**
- Usually done in outpatient setting

ABG (common)

- Checks **oxygenation status, acid base balance, respiratory function, and response to therapy**
 - Very important in checking **too much CO2**
- Obtained via **arterial puncture and catheter**

Pulse oximeter (SPO2)

- Normal range: **95-100%**
- Do not use this method when pt has low perfusion like **shock, cardiac arrest, sepsis, or hypothermia**
- Nail polish can affect reading
- Double check reading if you have an abnormal one; try and warm finger up
- If saturation is lower than **90%** you need **interventions**
 - Start with **2L of nasal cannula**

Cultures

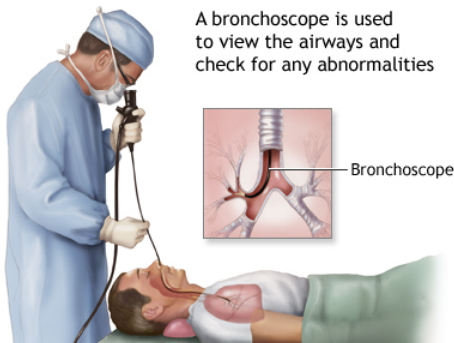
- Blood draw
- Should be done before antibiotics
- **Preliminary results** are obtained with 24 hours and **final results** can take up to 48-72 hrs

MRI

- Can distinguish between normal tissue vs abnormal (compared to CT)
- Contraindicated pts:
 - Confused
 - Agitated
 - Claustrophobic
 - Has implanted **metal**
- Nursing interventions prior
 - Remove all metal

- Assess for any implanted devices like pacemaker, defibrillator, or aneurysm clips
- Educate pt to lie flat for **30-90 mins**
- Inform about humming and thumping noises
- Administer antianxiety med for claustrophobic pts
- Others

Bronchoscopy



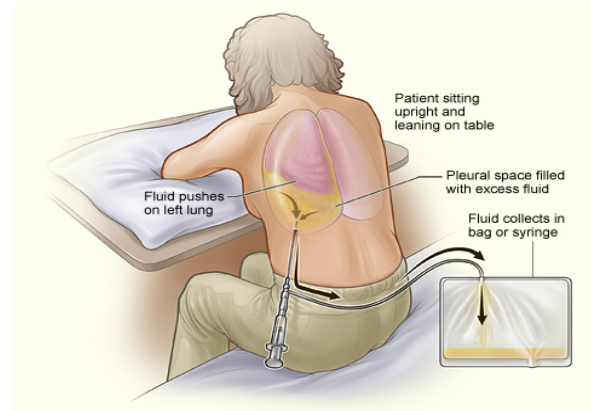
- **Complications**
 - Infection
 - Hypoxemia
 - Aspiration –things going into lungs
 - Pneumothorax
 - Others
- **Nursing interventions**
 - Informed consent
 - NPO 4-8 hrs prior
 - Make sure pt removes all **dentures**
 - Make sure **cough reflex** comes back after procedure to prevent aspiration
 - Others

Biopsy

- **Types: pleural, lung, and lymph node**
- **Post procedure management**
 - NPO until **gag-reflex returns**
 - v/s (infection)
 - Assess **breath sounds and unequal sounds**
 - Observe for **hemoptysis, dyspnea, uneven chest movement**
 - Notify HCP

THORACENTESIS

- **Def:** aspiration of fluid and air from the **pleural space**
- Can be **diagnostic** or **therapeutic**
 - **Diagnostic –always done when pt has fever + coughing**
 - **Therapeutic –instill med into pleural space**
- **Complication:** collapsed lungs due to pneumothorax
- Can be done at bedside



PNEUMONIA

- **Def:** infection of the lungs due to inflammation
- Production of **exudate that interferes with diffusion of O2 and CO2**
 - WBC fill airspace
 - **Hypoxemia** occurs
- **Most common cause of death from infectious disease with influenza in USA**
- 2 types:
 - Community acquired (CAP)
 - Healthcare associated (HCAP)

Community Acquired Pneumonia (CAP)

- Happens after **48hrs** discharge
- Patient in the community

Healthcare Acquired Pneumonia (HCAP)

- Usually due to **MDRO** pathogens and **MRSA**
 - Can also be due to immobility for pts in long-term admissions
 - Common in infection pts, home infusion pts, and hemodialysis pts
 - Can happen outside of hospital if pt has been hospitalized for past 90 days

- Can happen to hospital workers
- Happens after 48hrs from admission to hospital
- High mortality
- Hospital pays for this disease

Risk Factors

- Having an underlying disease
 - HF
 - Diabetes
 - Alcoholism
 - COPD
 - AIDS
 - Cancer
- Risk factors
 - Smoking
 - Neutropenia
 - Sedation
 - Age (older than 65)
 - Others

Clinical Manifestations

- Varies depending on causative organisms
- Fever, chills, **pleuritic chest pain (sharp)**, crackles and wheezes, **dull chest percussion over areas of consolidation**, etc.
- Older adults may show **changes in mental status, sepsis, and desaturation**

Medical Management

- Antibiotics for bacterial
- **IV antibiotics** if pt is hemodynamically unstable or unable to take PO meds
 - **Hemodynamically unstable –septic**
 - temp>100
 - HR>100
 - RR>24
 - Systolic BP<90
 - O2 sat<90%

Nursing Interventions

- O2 therapy as needed
- Administer oral antibiotics (if needed)
- Educate pt on **vaccines** (influenza and pneumococcal) esp. for COPD and sickle cell pts
- Removal of secretions

- Hydration to thin and loosen secretion
 - Also prevents loss of fluid via increased RR
- Humidification of secretions
- Turning and positioning to increase mobility of secretions
- Deep breathing and coughing

- Maintain nutrition
- **Make sure to check v/s to check for**
 - **Sepsis**
 - **Resp. failure**
- Check pt after **24-48hrs** post-treatment for effects
- Encourage use of IS
 - Pt should inhale into tube → ball rises



- Others

Sepsis Interventions

- Very serious
- **Def:** systemic response to infection
- Manifested by 2 of the following
 - Temp>38 C or 100.4F
 - HR>90
 - RR>20
 - WBC>12000
- **Septic shock**
 - Needs immediate response team ASAP
 - **Circulatory imbalances**
 - Hemodynamically unstable
 - Perfusion is not adequate to promote organ function
 - Hypotension
 - Very high mortality

Complication:

- Aspiration
 - Clinical manifestations: **tachycardia, dyspnea, hypotension**
 - Risk factors

- Seizure
- Brain injury
- Decreased LOC
- Improper NG insertion of tracheostomy
- Lying flat
- Others
- Prevention
 - Maintain head of bed at 30-45 degrees
 - Use sedatives with caution and make sure gag-reflex returns after sedating pt
 - Confirm placement for tube feeding
- Atelectasis
 - Can lead to hypoxemia
- Bacteremia (sepsis)
- Acute respiratory distress syndrome
 - **Def:** hypoxemia despite O2 therapy and hypercobia

CHRONIC PULMONARY DISORDERS: COPD

- Encompasses:
 - **Chronic bronchitis**
 - **Emphysema**
 - **Chronic bronchitis + emphysema**
- **Def:** lungs abnormal inflammatory response to noxious particles or gas; chronic inflammation occurs → narrowing of airway
 - Overtime, scar tissues are formed → more narrowing of airway
- Hypersecretion of mucous
- Obstructive disorder
- Not reversible (but treatable)

Chronic Bronchitis vs Emphysema

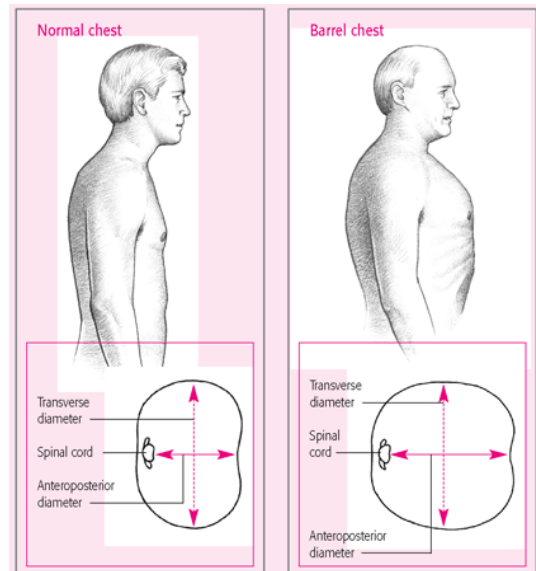
Chronic Bronchitis	Emphysema
- Presence of cough and sputum production for at least 3 months in 2 consecutive yrs	- Impaired O2 and CO2 exchange due destruction of walls of alveoli (due to overdistention)
- Lungs respond to smoke or other pollutants	- Increased dead space → hypoxemia
- Inflammation	- CO2 retention
- Bronchial lumen decreases	- Make sure you don't crank up O2 connected to pt due to risk of hyperventilating and increasing CO2 levels

Risk Factors

- Exposure to tobacco –accounts for 80-90%
 - Most important teaching is to quit smoking
- Secondhand smoke
- Increasing age
- Genetics
- Others

Clinical Manifestations

- Chronic cough
- Sputum
- Dyspnea
 - Dyspnea at rest may occur at end stage
- Worsening s/s over time
- Weight loss due to breathing requiring more energy
- Use of **accessory muscles**
- Change in posture
- Barrel chest (for emphysema)
 - Due to hyperinflation
 - Ribs are more fixed and lung is not as elastic
 - Pt tends to lean forwards



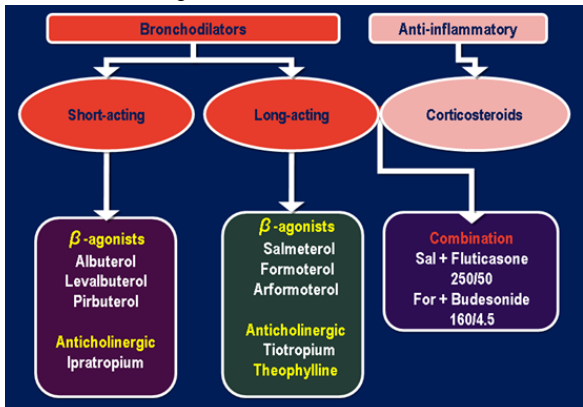
- Others

Diagnostic and Assessment Findings

- Diagnostic tests
 - Pulmonary function test
 - ABG
 - CXR (to rule out other things)
- Assessment
 - Decreased breathing sounds

- Expiratory wheeze
- Use of accessory muscles
- Clubbing
- Others

Medical Management



- Not to cure but to **stabilize disease** by reducing s/s and risk
- Can give **Zyban, Chantix, or Arventyl** to help smoking cessation
 - **Chantix** can cause pt to have suicidal thoughts
- Corticosteroids (to reduce inflammation)
 - Can cause **hyperglycemia**
 - Combined with bronchodilators for inhaled ver.; oral or IV is usually avoided
- Bronchodilators
- Metered dose inhalers (MDI)
- Dry powder inhalers
- Nebulizer
- **O2 therapy**
 - Done when O2 sat is below **90%**; we try and keep sat above 90%
 - Make sure to monitor **pulse ox** and other things

Nursing Interventions

- Most important is **stop smoking education**
 - Promote programs, nicotine replacements, certain meds, etc.
- Give meds as prescribed
- Give aids like MDIs as needed
- In emergencies, put pt on O2 therapy even if you don't have order for it
- Teach pt **breathing exercises**
 - **Diaphragmatic breathing**
 - Reduces RR
 - Increase alveolar ventilation

- Help remove as much CO2 as possible
- **Pursed lip breathing**
 - Prolongs **exhalation**
 - Prevents collapse of small bronchioles
 - Helps pt control **rate and depth** of expiration
 - Reduce panic feelings
 - Reduce amount of trapped air

- Educate pt on **tripod position**
 - Helps decrease work of breathing by increasing the **anteroposterior diameter of chest**
 - **Changes pressure in thorax**
- Educate pt on nutrition
 - Predictor of poor prognosis
 - Eating becomes difficult due to dyspnea, reduction of airflow while swallowing, and **O2 desaturation**
 - You can help by allowing pt to **rest 30 mins before meals**
 - Can use short acting bronchodilator before meals
 - May give extra protein
 - May give 6 smaller meals
- Increase pt fluid intake (at least 3L) unless contraindicated for HF pts



Pulmonary Rehab

- Interdisciplinary approach
- Does lots of things
 - Exercise training
 - Smoking cessation help
 - Education
 - Others
- Usually a **6 week program**

Complications

- Respiratory insufficiency/respiratory failure
- Chronic atelectasis
- Pneumothorax
 - Causes:
 - Changes in large bullae → rupture
 - Excessive coughing
 - **s/s:**
 - Rapid onset of SOB

- Chest pain
- Asymmetric chest movement
- Absence of breath sounds on affected side
- **Cor pulmonale (right sided heart failure)**
 - Def: abnormal enlargement of right heart
 - Blood backs up from lungs to right heart → inability of blood to reach lungs
- **Re-admission**
 - Very common for COPD pts so make sure pt goes to rehab and adhere to treatment plan
 - pt may need **home O2 evaluation**
 - Pt must be willing to modify lifestyle to prevent this

Clinical Manifestations:

- **Cough**
- **Dyspnea**
- **Wheezing**
- **Chest tightness**
- Others

Exacerbations

- Cough with or without sputum
 - Mucus may be wedged in the narrow airways → unable to cough it out
- Very bad **wheezing**
- **Expiration** requires a lot of effort and are prolonged
- **Diaphoresis**
- Tachycardia
- Hypoxemia
- **Central cyanosis** (late sign)
 - **Need emergency measures**
- Others

PALLIATIVE CARE

- Some COPD pts may need palliative care
- Depends on:
 - Prognosis of disease
 - Stage of life
 - Impact on quality of life
- Not the same as hospice, **you are still trying to treat disease**
- Main focus is to **alleviate discomfort**

Prevention

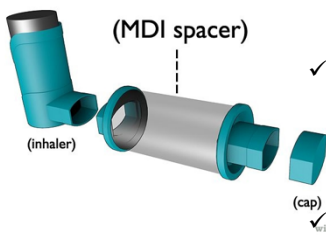
- Allergy testing
- Avoid known triggers

Medical Management

- 2 general classes
 - Quick relief meds
 - Short acting beta-2-adrenergic agonist; use with caution for pts with **cardiac issues**
 - ✓ Albuterol
 - ✓ Proventil
 - ✓ Ventolin
 - ✓ Xopenex
 - Anticholinergics (used when beta-2-adrenergic-agonist does not work or cannot be taken)
 - ✓ Atrovent
 - Long acting meds:
 - Corticosteroids (very potent)
 - ✓ Inhaled corticosteroids: **fluticasone and budesonide**
 - ✓ Anti-inflammatory med

ASTHMA

- **Def:** chronic inflammatory disease of the airways
- **Causes:**
 - Airway hyper-responsiveness (to some sort of trigger) –**most common cause**
 - Seasonal allergies
 - Perennial allergies (mold, dust, animal dander, etc.)
 - Mucosal edema
 - Mucus production
- Largely reversible
- Common triggers
 - Air pollutants
 - Heat or coldness
 - Food
 - Exercise or stress
 - Viral respiratory infections



- ✓ Can be inhaled or given via IV; always use **spacer** for inhaled meds
- ✓ **Rinse mouth out with water after use to prevent thrush**
- ✓ Used in combination with LABA
 - Long-acting beta-2-adrenergic agonist (LABA)
 - ✓ Salmeterol and Theophylline
 - ✓ Should not be used for acute exacerbations
 - Combination of LABA and steroids
 - ✓ **Combivent**
 - ✓ **Advair**
 - ✓ **Symbicort**
 - ✓ **Dulera**
- Leukotrienes (bronchoconstrictors) inhibitors
 - Singulair, Accolate, Zylflo (oral meds)
 - Interferes with leukotriene synthesis → stops bronchoconstriction

Life-Threatening Exacerbations

- Dyspneic at rest
- Speak in words and not sentences
- Audible **wheezing** (and then disappearing of it)
 - If the chest is silent → **pt is in resp. arrest**
- RR>30, HR>120, decreased O₂
- Neck vein distention
- Confusion or drowsiness
- Resp. acidosis
- Others

Management of Acute Exacerbations

- During severe asthma attack
 - 1) Quick acting beta-2-adrenergic-agnist administration via **nebulizer**
 - 2) Systemic IV corticosteroids (if needed)
 - **Prednisone**
 - 3) O₂ supplementation

4) Antibiotics if pt show **fever, purulent sputum, bacterial sinusitis or pneumonia**

- Others:
 - IV fluids; can also help with resp. **sepsis to treat hypotension**
 - IV Mg+ sulfate to induce **smooth muscle relaxation**
 - Intubation
- Post attack management
 - May need to send pt to ICU
 - Assess every shift for:
 - **Resp. status**
 - **Severity of s/s**
 - **Breath sounds**
 - **v/s + pulse ox**
 - administer meds
 - IV fluid if pt is sweating
 - ABGs
 - Others
- Pt education
 - How to use **inhalers and nebulizers**

Risk Factors for Asthma Death

- Past hx of **intubation or ICU admission**
- 2 or more admission for asthma within a year
- 3 or more emergency care visits for asthma in a year
- Using 2 or more canisters of short-acting beta-agonist per month
 - Check for s/s of heart issues since those drugs can cause serious CV side effects and **should not be used for long-term**
- Illicit drug use
- Other CV, COPD, and co-morbidities
- Others

Complications

- Resp. failure
- **Status asthmaticus** –life-threatening episode of airway obstruction that is usually unresponsive to common treatment; **can lead to resp./cardiac arrest**
- Others (pneumonia and hypoxemia)