Respiratory 4 lower respiratory disorders

**Atelectasis**

-Closure or collapse of the alveoli

-can be acute or chronic

- Micro atelectasis: not detectable on chest x ray
- Macro atelectasis: loss of segments, lobular, or overall lung volume.

-An airless condition caused by hypoventilation, obstruction of compression.

S/sx: cough, sputum production, and low grade fever.

**Prevention:** Turn, cough, deep breathe, early mobilization, use caution when using opioid analgesia due to increased risk of respiratory depression.

**Acute atelectasis when it manifests:**

most often occurs Post OP, during immobilization, chronic airway obstruction (lung cancer impedes the airway)

**Description:** slow onset, symptoms may not appear right away

**Nursing actions:** assess breath sounds, check x-ray, chest physiotherapy

S/sx: shallow monotonous breathing, diminished breath sounds

**Tx:** Coughing exercise, suctioning, nebulizer (aerosol therapy before physiotherapy and meals) acetylcystine, chest physiotherapy, postural drainage (gently percuss on the affected area) give o2 therapy, a bronchoscopy may be ordered to remove mucous plugs (obstruction) thoracentesis to remove the compression, its best to get a sputum sample in the AM before meals. Spirometers.

**Non obstructive atelectasis**

**Causes:** reduced ventilation, impaired cough reflex,

S/sx: cough, dyspnea, increased sputum production, central cyanosis (late manifestation), tachypnea, tachycardia, pleural pain due to drying out of secretions.

**Tx:** chest tubes
**Obstructive atelectasis**

Most common. Any blockage that can obstruct the passage of air to and from alveoli

**Causes:** bowel obstruction (causes the lungs to not be able to expand), tumor growth in an airway, altered breathing pattern (hyper/hypo ventilation), secretions, altered airway fx, laying flat on your back too long.

**Patho:** results from trapped alveolar gas saturating into the blood stream, no additional can pass into the alveoli. Thus the lung will become airless and collapse

**Nursing management:** Chest tubes, thoracentesis, raise the head of the bed, O2 if needed, spirometers, assess ABG, pulse ox, deep breathing.

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**Compressive atelectasis**

Excess pressure on the lung that restricts normal breathing (inhilation/exhilation)

**Causes:** fluid in the pleural space (effusion can be from other areas such as peritoneal cavity, ascitis or chrirosis of the liver), pneumothorax (air in the pleural space), hemothorax (blood in the pleural space) tension pneumothorax (could cause mediastinal shift, usually from blunt trauma like a car accident), tumor growth in the thorax, elevated diaphragm.

**S/sx:** adventitious breath sounds, can expose the patient to other infections, trachiobronchitis/emphyma, hypoxia, Sounds:  
- **Pneumothorax:** diminished or absent  
- **Hemothorax:** crackles  
- **Pleural effusion:** crackles

**Nursing management:** auscultation of the lungs to determine sounds, sit patient up, O2, spirometer, postural drainage, turn cough deep breathe,

**Dx:** percussion, x-ray.

**Tx:** have a chest tube kit ready if you hear diminished sounds, if a gun shot wound make sure you cover it so the lung doesn’t collapse from releasing negative pressure, if a chest tube is inserted it will be high for pneumothorax low with gravity for hemothorax (like a urinary catheter)
**Pulmonary infections**

* SARS
* spread via droplets/ sewage/ and H20. PPE and negative pressure room. 774 died.
* S/sx: flue like symptoms, cough, fever, malaise, N.V.D, dyspnea.
* Risk factors: HTN, Diabetes will increase the risk of death
* Tx: no treatment, supportive care.

**Lung abscess**

Patho: Necrosis of the lung, usually a 2cm cavity of the lung from a bacteria, usually a complication of bacterial pneumonia.

S/sx: mild productive cough, smelly sputum, bloody sputum, dullness on percussion, pleural rub, and diminished or absent breath sounds.

Dx: Chest X-Ray, sputum culture, CT, Bronchoscopy.

Tx: postural drainage, chest physiotherapy, IV antibiotic therapy 3-5 days followed by 12 weeks oral antibiotics, diet high in protein.

Risk factors: increased risk of aspiration, decreased cough reflex, dysphasia, CNS disorders, strokes, esophageal disease, NG tube, dentures.

Nursing management: increase fluid intake, patient education will be the same as pneumonia.

**Tuberculosis**

Causes: Mycobacterium tuberculosis bacillus spread via the air from droplets (talking coughing sneezing) can cause bronchiopneumonia (to specific)

Risks: high populations (Philippines and prisons)

S/sx: slow onset, low grade fever, night sweats, fatigue, weight loss, cough may be productive or non productive, purulent or bloody sputum.

Tx: usually long term latentent TB is usually 9 months, INH/ Rimpampin, airborne precautions, neg pressure room

Tb chart: inhalation of TB -> arrival at alveoli -> can go to blood and lymph -> inflammatory phagocytes, neutrophils, and macrophages, -> TB specific macrophages are released and lymphocytes are destroyed-> the accumulation of lymphocytes cause bronchiopneumonia
**Pneumonia**
Inflammatory process in the lungs that may increase the risk of bacterial infections. Pneumonia and the common cold are the most common cause of death from infectious disease in the U.S.

*Acute trachial bronchitis occurs post URI*

1. **Community acquired pneumonia**: pneumonia occurring in the community before admission to the hospital.

2. **Health care associated pneumonia**: non-hospitalized patient, may get it from a care giver or a long term care facility, would care, antibiotic, hemodialysis.

3. **Hospital Acquired pneumonia**: pneumonia occurring more than 48 hours post admission.

4. **Ventilator associated pneumonia**: develops more than 48 hours post endotracheal intubation.

**Risk factors**

*Pcn resistant pneumonia*: older than age 65, alcoholism, cephalosporin therapy (beta lactam), immuneosuppressive disorder, comorbidities, children from day care.

Enteric gram negative: long term care, cardiopulmonary disease, comorbidities, recent anti biotic therapy

*Pseudomonas Aeruginosa*: structural lung disease (bronchectasis) cortico steroid therapy, broad spectrum antibiotics more than 7 days/month, malnutrition

**Nursing assessment**: vital signs, pulse ox, ABG (most accurate), changes in mental status, color of sputum, dehydration, secretions color and thickness, auscultation of all lung lobes, changes in air exchange, chest excursion.

**Dx**: History and physical, chest x ray, blood culture, sputum sample: 1. Rinse mouth 2. Breathe deep several times 3. Cough deeply 4. Expectorate in the sterile specimen container and send off right away. 5. Offer oral care.

**Nursing d/dx**: ineffective airway clearance, activity intolerance, risk for fluid volume deficit, imbalanced nutrition, knowledge deficit.

**Nursing interventions**: o2 with humidification will thin secretions, face mask or nasal cannula, TCBD, chest physiotherapy, position changes, increase fluid intake 2L.

**Potential complications**: 1. Continuing symptoms 2. Sepsis or septic shock, respiratory failure, atelectasis, pleural effusion, confusion.

**Aspiration**

Inhalation of foreign material into the lungs, can cause pneumonia and result in tachycardia, dyspnea, central cyanosis, HTN, hypotension, death. Aspirating stomach acid can prove worse than foreign objects.

**Nursing interventions:** keep head of bed elevated, avoid stimulation of the gag reflex via suction, check tube feedings for placement before feeding, thicken fluids for swallowing problems. Make sure patient is A&O

**Pleural infections**

**Pleurisy**: inflammation of both layers of pleurae. The inflamed surfaces rub together with each respiration causes sharp pain upon inspiration. Pain can be relieved by holding your breath.

**Pleural effusion**: fluid collection in the pleural space, usually secondary to pneumonia, can cause impaired lung expansion and dyspnea.

**Empyema**: thick purulent fluid in the pleural space acutely ill patient: fibrin development impairing lung expansion. Chest tube for drainage, long time to resolve 4 to 6 weeks antibiotic therapy possible surgery.

**Pulmonary edema**

Accumulation of fluid in the lung tissue and alveoli, severe and life-threatening.

**Cardiogenic**: backflow to the pulmonary system (CHF)

**NON Cardiogenic**: direct damage, check for smoke inhalation signs, increased hydrostatic pressure causes pressure on the capillaries, monitor for hypoxemia, administer O2. Lung sepsis, pancreatitis, multiple transfusions, cardiopulmonary bypass.

**Acute respiratory failure**

Sudden and life-threatening deterioration of the gas exchange function of the lungs, indicates failure of the lung to provide adequate oxygenation or ventilation.

1. Decrease in arterial O2 less than 50mmhg (hypoxemia)
2. Increase in arterial Co2 (hypercapnia)
3. Arterial PH of less than 7.35

**Ventilatary failure mechanism that lead to acute respiratory failure:**

- impaired CNS fx (overdose, trauma, infection, hemorrhage, sleep apnea)
- neuromuscular dysfunction (myasthenia gravis, guillian-barre)
- musculoskeletal dysfunction (chest trauma, kyphoscoliosis, malnutrition)
- Pulmonary Dysfunction (COPD, Asthma, cystic fibrosis)
**Acute respiratory distress syndrome**

Severe inflammatory process that causes alveolar damage that results in sudden and progressive pulmonary edema.

**Evidenced by**: increased bilateral infiltrates on chest x-ray, hypoxia unresponsive to oxygen therapy, regardless of the amount of peep. And the absence of an elevated left arterial pressure.

* **severe form of acute lung injury**: pulmonary edema, increased bilateral infiltrates visible by x ray, and decreased lung compliance.
* **S/sx**: rapid onset of severe dyspnea, hypoxemia that doesn't respond to O2 therapy, lung crackles. Increased mortality rate , multiple organ failure, be prepared to ventilate.
* **Dx**: BNP distinguishes between ARDS and PE

**Risk Factors**
- aspiration
- drug ingestion/ OD,
- Hematologic disorders ( disseminated intravascular coagulopathy,
- massive transfusions, cardiopulmonary bypass )
- prolonged inhalation of high o2 therapy, smoke, corrosive substances
- Localized infection ( bacterial/fungal/viral pneumonia )
- Metabolic disorders ( pancreatitis , uremia)
- Shock/sepsis
- Trauma ( pulmonary contusion, multiple fractures, head injury)
- Fat or air embolism

**Patho**: inflammatory triggers initiate the release of cellular and chemical mediators, causing injury to the alveolar capillary membranes in addition, to other structural damage to the lungs. Severe ventilation/ perfusion mismatching , alveoli collapse because of the inflammatory infiltrate to blood, fluid , ad surfactant. Dysfunction. Small airways are narrowed because interstitial fluid and bronchial obstruction.

**Medical management**: intubation, mechanical ventilation w/ peep to keep alveoli open identify and treat the underlying disease . Increase lung volume / decrease regions of atelectasis. Have them breath abdominally.

Circulatory support, adequate fluid volume, nutritional support

O2 is used for the initial spiral of hypoxemia , prone position is best for oxygenation frequent repositioning to safeguard integumentary system

Nutritional support, enteral feeding to reduce anxiety.
**Pulmonary embolism**

Obstruction of the pulmonary artery by a thrombus that originates in the venous system or right side of the heart. Can be air, fat, or blood, amniotic fluid, septic thrombus

Inflammatory process obstructs an area causing diminished blood flow, the bronchioles will constrict, further increasing pulmonary vascular resistance, ventilation/perfusion imbalance, right ventricular failure, shock may occur.

**S/sx:** depend on the size of the thrombus and area occluded by the thrombus. Right ventricle can die, dyspnea is the number 1 symptom tachypnea is #1 sign. Chest pain is common and sudden, anxiety, fever, apprehension, cough diaphoresis, bloody sputum, syncope, death occurs in 1 hour after symptom onset.

**Risk factors:** immobility, venous stasis, hypercoaguability, venous endothelial disease, heart disease, trauma, post op, postpartum, diabetes, COPD, obesity, birth control, previous injury of thrombophlebitis.

**DVT:** swelling, pain, warmth, red skin, travels from leg to pulmonary artery.

**Prevention:** exercise, ambulation post surgery, sequential teds.

**Tx:** O2, IVF, Perfusion scan, anticoagulant therapy (3-6 months), thrombocytes therapy

**Contraindicated:** active bleeding, CVA, surgery less than 10 days, postpartum, trauma, HTN. Educate patients not to take vitamin K and to not eat green leafy veggies.

**Pneumoconiosis**

Non neoplastic alteration of the lung resulting from inhalation of mineral or inorganic dust (asbestos)

- occupational lung disease: number one work related illness in the United States Preventable, not treatable

**Tx:** reduce exposure, use protective gear and devices

**Nurse management:** advocate for health management, education, and preventative measures

**Most common:** late symptom onset

**Silicosis:** glass work, foundry, stone cutting,

**Asbestosis:** ship building, building demolition

**Coal worker:** black lung disease
**Lung cancer**

Leading cancer killer among women and men in the United States
90% is caused by cigarette smoke
Long term survival rate is low due to rapid movement into the lymph and other sites.
The younger you start to smoke the greater the risk

**Tx**: surgery, radiation, chemo

**Nursing care**: airway clearance, dyspnea, fatigue, pain, psychological support, palliative care and hospice

**Chest trauma**

**Blunt trauma**: MVC, use of accessory muscle, inspect airways monitor rate and depth of breathing, symmetry of chest, breath sounds, equal on both sides, JVD, stridor, tracheal shift (tension pneumo), bruising Petichea, palate for tender dress and krepitus.

**Flail chest**

**Pulmonary contusion**

**Penetrating trauma**

**Pneumothorax**: spontaneous / simple / traumatic / tension pneumothorax.