Lincoln Memorial University
Caylor School of Nursing
NURS 241
Spring 2010

LESSON PLAN: **Nursing Strategies: Alterations in Respiratory Function**
DATES: See syllabus
TIMES: See syllabus
OBJECTIVES: Upon completion of this unit, the student will be able to demonstrate in the clinical and campus laboratory settings, in individual and group conferences, and on written materials, the ability to:

1. Define and use the key terms as listed in the assigned readings
2. Using the four adaptive modes of Roy's Adaptation Model (RAM), recognize human adaptive responses to behavior or stimuli that affect respiratory function.
3. Identify differences, which affect the respiratory system in young, middle, and older adults.
4. Identify signs and symptoms of acute respiratory distress from impaired gas exchange.
5. Incorporate assessment of respiratory risk factors into the nursing history and physical assessment.
6. Identify components of a physical examination for a client with compromised respiratory function.
7. Identify the clinical significance and related nursing implications of laboratory and diagnostic tests and procedures used for assessment and evaluation of respiratory function.
8. Specify nursing care of patients undergoing diagnostic procedures of the respiratory system.
9. Explain the indications, principles, procedures and nursing management of adults with compromised respiratory status requiring mechanical ventilation and thoracic surgery.
10. Describe stimuli and behaviors, pathophysiology, diagnosis, medical management, complications, and nursing care for clients experiencing respiratory disorders (including: respiratory infections, chronic obstructive disorders, environmental lung diseases, respiratory emergencies, pulmonary vascular disorders, pleural disorders, and neoplastic disorders).
11. Identify properly the medications on the drug list by generic name, classification, mechanism of action, clinically significant side effects, normal dosage, and nursing implications. Be able to correctly calculate IV, IM and PO dosages.
12. Compare and contrast nursing assessment findings, care and evaluation of patients with bacterial, viral, and fungal respiratory illnesses.
13. Develop a teaching/learning plan for adults experiencing compromised respiratory function.
14. Utilize the RAM nursing process to develop a plan of care for clients experiencing compromised respiratory function.

TOPICAL OUTLINE –
Review Chapter 21 and notes from NURS 125 Oxygenation Unit!

I. Nursing Care of Adults with common respiratory disorders.
  A. Respiratory Infections
    1. Upper Respiratory Infections – (see handout attached to syllabus)
      a. Common Cold
      b. Sinusitis
      c. Pharyngitis
    2. Influenza
    3. Bronchitis
    4. Pneumonias - Stimuli, Behaviors, Diagnostics, Planning, Nursing Interventions and Evaluation of adults experiencing:
      a. Community Acquired Pneumonias
        i. Streptococcal
        ii. H. influenza
        iii. Legionnaires'
        iv. Mycoplasma
      b. Hospital Acquired Pneumonias
        i. Pseudomonas
        ii. Staphylococcal
        iii. Klebsiella
      c. Ventilator Acquired Pneumonia
        i. Head of bed elevated 30 - 45°
        ii. "Sedation Vacation" – daily assessment without sedation
        iii. Peptic Ulcer Disease prophylaxis
        iv. Deep Vein Thrombosis prophylaxis
      d. Pneumonia in Immunocompromised Host
        i. Pneumocystis Pneumonia (PCP)
        ii. Fungal
    5. Tuberculosis
  B. Chronic Obstructive Pulmonary Diseases - Stimuli, Behaviors, Diagnostics, Goals, Planning, Nursing Interventions and Evaluation of adults experiencing:
    1. Emphysema/Chronic Bronchitis
    2. Sleep Apnea/Obstructive Sleep Apnea
  C. Environmental Lung Diseases - Stimuli, Behaviors, Diagnostics, Goals, Planning, Nursing Interventions and Evaluation of adults experiencing:
    1. Pneumoconiosis

II. Pulmonary Vascular Disorders - Stimuli, Behaviors, Diagnostics, Goals, Planning, Nursing Interventions and Evaluation of adults experiencing:
  A. Pulmonary Embolism

III. Neoplastic Disorders - Stimuli, Behaviors, Diagnostics, Goals, Planning, Nursing Interventions and Evaluation of adults experiencing:
  A. Cancer of the Larynx
  B. Lung Cancer

IV. Nursing Care of Adults Requiring Thoracic Surgery - - Stimuli, Behaviors, Diagnostics, Goals, Planning, Nursing Interventions and Evaluation of adults experiencing:
- A. Pneumonectomy
- B. Lobectomy
- C. Segmentectomy (Resection)
- D. Wedge Resection
- E. Pre-operative Care
- F. Post-operative Care
- G. Nursing Diagnoses
  1. Alteration in comfort: Pain
  2. Impaired Physical Mobility
  3. Risk for fluid volume imbalance (excess or deficit)
  4. Knowledge deficit of home care (teaching/learning)

V. Respiratory Emergencies - Stimuli, Behaviors, Diagnostics, Goals, Planning, Nursing Interventions and Evaluation of adults experiencing:
- A. Adult/Acute Respiratory Distress Syndrome (ARDS)
- B. Epistaxis
- C. Chest Trauma
  1. Blunt Chest Trauma
     - a. Rib Fracture
     - b. Flail Chest
     - c. Pulmonary Contusion
  2. Penetrating Chest Trauma
  3. Pneumothorax
     - a. Spontaneous/Closed Pneumothorax
     - b. Traumatic/Open Pneumothorax
     - c. Tension Pneumothorax
  4. Hemothorax

VI. Nursing Care of Adults requiring mechanical ventilation - Stimuli, Behaviors, Diagnostics, Goals, Planning, Nursing Interventions and Evaluation of adults experiencing:
- A. Indications for Mechanical Ventilation
- B. Nursing Diagnoses for adults requiring mechanical ventilation
  1. Impaired gas exchange
  2. Ineffective airway clearance
  3. Risk for trauma and/or infection
  4. Impaired physical mobility
  5. Impaired verbal communication
- C. Complications of Mechanical Ventilation
  1. Fighting (“bucking”) the ventilator
  2. Ventilator Acquired Pneumonia
  3. Impaired communication
- D. Weaning Adults from Mechanical Ventilation

REQUIRED READINGS:

Kee, J. L., Hayes, E.R., & McCuistion, L.E. (2009). *Pharmacology: A nursing process approach (Ed 6).* St. Louis: Mosby. Ch 28, 29, 30, 31, 32, 33, 39, 40.

Smeltzer, S.C., and Bare, B.G. (2008). *Brunner & Suddarth's textbook of medical surgical nursing. (Ed 11.).* Philadelphia: Lippincott. Ch 21-25.

Wissmann, J. (Ed.). *Adult Medical –Surgical Nursing: Content mastery series review module (Ed 7.1).* Kansas City, MO: Assessment Technologies Institute, LLC. Ch 3-10; 12-19.

CLINICAL SKILLS:

1. Distinguish between normal and abnormal breath sounds.
2. Recognize acute respiratory distress.
3. Monitor an adult client receiving oxygen therapy.
4. Provide teaching/learning of breathing techniques to an adult with COPD.
5. Provide teaching/learning for post-op ventilation exercises.
6. Provide tracheostomy care.
7. Monitor an adult client with a chest tube drainage system.
8. Safely administer medications that affect respiratory function.
9. Perform airway suctioning when needed for secretion removal.

CLINICAL OBJECTIVES:

1. Assess adults for evidence of respiratory infections, respiratory distress or respiratory compromise.
2. Assess adults for risk factors related to respiratory disorders.
3. Monitor lab values pertinent for adults with compromised respiratory function
4. Provide teaching/learning in the area of prevention of respiratory disease.
5. Conduct discharge planning regarding respiratory disease.
6. Utilize the RAM nursing process to provide care for adults with compromised respiratory function.
7. Utilize the RAM nursing process to provide care for adults requiring thoracic surgery.
8. Utilize the RAM nursing process to provide care for adults with a tracheostomy.
9. Utilize the RAM nursing process to provide care for adults with chest tubes/chest trauma.
10. Provide appropriate pre and post procedure nursing care for adults undergoing diagnostic testing for respiratory disorders.

Upper Respiratory Infections Handout (NOT all inclusive. You must still read the text).

Disorder	Cause	Patho	Incidence	Manifestations	Management	Complications
URI "Common cold"	Virus Spread by droplets and contact	Virus invades nasal and throat mucosa causing edema and increased mucous production	Most common of infections: Crowding, daycares, low SES, passive smoking All ages	Rhinorrhea Sneezing Cough Slight fever Sore throat Irritability Anorexia Enlarged lymph nodes Malaise	Symptomatic Encourage fluids Tylenol Saline gargle Saline nose drops/bulb suction Rest Decongestants Prevent infection spread Assess for complications	Secondary bacterial infections All lower respiratory tract infections Sinusitis Tonsillitis Otitis media
Sinusitis	Can be viral or bacterial. S. pneumoniae, H influenzae, Moraxella catarrhail. Someimes associated with tooth infections	Nasal congestion, inflammation and edema and increased nasal fluid leads to obstruction of sinus cavities.	Approximately 32 million cases per year in US. Highest rates in Midwest and south. Higher incidence in carpentry, leather work, dye, paint and solvent manufacturing.	Pressure and pain over sinus areas. Purulent nasal secretions.	Treat the infection, decrease nasal mucosa edema and pain relief. Antibiotic of choice is amoxicillin and amoxicillin /clavulanic acid (Augmentin). If allergy to PCN, may give Bactrim DS. 7 – 10 days of ABX. Decongestants. See text.	If left untreated can lead to life-threatening infection such as meningitis, ischemic infarction, and osteomyelitis. Other uncommon complications: orbital cellulitis, subperiosteal abscess, and cavernous sinus thrombosis.
Pharyngitis – a febrile inflammation of the throat.	Usually viral.from Group A streptococcal			Fiery-red pharyngeal membrane and tonsils. Exudate on	Viral – treat symptoms If bacterial -ABX – PCN is 1st choice for 7 – 10 days. If allergic to PCN, may	Sinusitis, otitis media, peritonsillar abscess,

	infection. Usually subside in 3 – 10 days of onset.			tonsils. Cervical lymphadenopathy. Fever, malaise, sore throat.	receive cephalosporins and macrolides Tylenol-fever or pain, Antitussive medications and codeine or hydrocodone if pain severe.	mastoiditis, rheumatic fever, and nephritis.
Influenza	Strains A/B/C influenza virus (spread by droplets and contact)	Destruction of the lining of resp. tract impairing mucociliary system Causes nasal congestion and drainage	All ages, esp. elderly Up to 40,000 deaths per year (mostly elderly) Epidemic occur in winter	Chills Fever Malaise Rhinitis Myalgia Cough Sore throat	Symptomatic Similar to URI Bedrest Antivirals may be tried Annual flu shots	The main complication of influenza is pneumonia. Assess frequently for change in lung sounds especially new onset of crackles
Bronchitis	Usually viral	Usually occurs as a secondary infection of a URI Inflammation of the trachea and bronchi with increased mucus production	Affects all ages Increased in winter months	History of recent URI Gradual onset Cough (may or may not be productive) May have low grade temp May have crackles X-ray usually normal	Managed at home Symptomatic care Increase fluids Rest Tylenol Avoid cough suppressants, antihistamines, antibiotics	Secondary bacterial infections Lower respiratory tract infection

Ventilator Handout

Positive pressure vents	Vent Settings the Nurse must Monitor	Nursing Considerations for Intubated/Ventilated Patients
Require intubation and/or tracheostomy and inflate the lungs by exerting positive pressure on the airway and force alveolar expansion. Exhalation is passive. Commonly used in hospitals. They deliver a preset volume of air with each inspiration	• VT – Tidal Volume • Rate – number of breaths per minute ventilator is delivering • Patient's rate – number of breaths per minute patient is taking on their own in addition to delivered rate • FiO2 – Fraction of Inspired Oxygen – percent of oxygen delivered through ventilator • PEEP – Positive end expiratory Pressure • PAP – Positive Airway Pressure • CPAP – Continuous Positive Airway Pressure • Pressure Support .	• **Treat the patient, not the ventilator** • **Assess lung sounds and ABGs frequently** • **Ambu patient if can't immediately identify problems with ventilator** • **ROM, repositioning, DVT prophylaxis, PUD prophylaxis** • **Collaborate with Respiratory Therapist and MD on patient care** • **High Pressure Alarm = obstruction. Assess and clear airway. Suction PRN** • **Low Pressure Alarm = disconnected from patient. Ensure all connections are secure** • **Infection – airway is kept open artificially, increased risk for infection. Always use gloves when doing patient care. Sterile technique with suctioning.** • **Impaired communication – patient unable to speak, utilize patience, support and alternate means of communication.**

PHARMACOLOGY STUDY GUIDE – ANTIMICROBIALS

Vocabulary Terms:

Superinfection – a secondary infection that occurs when the normal bacterial flora of the body are disturbed by antibiotic therapy. (Occurs most often when a broad-spectrum antibiotic is used and when it is taken for more than a week.)

Opportunistic infection – an infection caused by normally=occurring organism that is only problematic for persons with a weakened immune system.

Narrow spectrum – antibiotics that are specifically effective against one type of organism.

Broad spectrum – antibiotics which are effective against both gram-positive and gram-negative organisms. (Frequently used when organism hasn't yet been identified)

Extended spectrum – antibiotics which have been developed with special properties to be effective against organisms which have become resistant to other antibiotics of this class only.

Neurotoxicity – caused by a medication which is damaging to the nervous system.

Hepatotoxicity – caused by a medication which is damaging to the liver.

Ototoxicity – caused by a medication which is damaging to the nervous conduction of hearing.

Nephrotoxicity – caused by a medication which is damaging to the kidneys.

Photosensitivity – when eyes and/or skin are more easily affected by light.

Aquired resistance – can occur when infecting organisms are repeatedly exposed to antibiotics allowing mutant strains of the organisms to proliferate because the antibiotic is no longer effective.

Cross-sensitivity – when exposure to a drug may produce an allergic reaction in a person who was previously exposed to a different but chemically-related drug.

Bacteriostatic – decreases or inhibits growth of bacteria.

Bacteriocidal – agent that kills bacteria

Trough – the lowest plasma concentration of a drug which indicates the rate of drug elimination. (generally assessed just prior to delivery of next scheduled IV dose.)

First-line drug – drugs considered to be more effective and less toxic than second-line drugs in treating TB.

Second-line drugs – drugs that may be less effective and possibly more toxic than first-line drugs in treating TB.

Study Questions:

1. When should cultures of infectious areas be obtained in relation to antimicrobial therapy? Why?

2. When a person receives a specific antimicrobial agent (esp. penicillin), what precautions should the nurse take? Why? What problems should you anticipate? How should you be prepared for those problems?

3. Why should you teach a patient to complete the prescribed course of antimicrobial therapy?

   #1 –

   #2 –

4. Describe a common superinfection that may occur in a patient taking an antibiotic. Why do superinfections occur?

5. What is the purpose of penicillinase-resistant penicillins, like methicillin? Why has methicillin resistance occurred? What precautions should be taken with a patient whose infection is methicillin resistant?

6. In general, what should you know about administration of antibiotics?

   Oral administration –

   IM injections –

   IV infusion–

7. Explain what is meant by cross-sensitivity between cephalosporins and penicillins?

8. What are the most common side effects / adverse reactions to cephalosporins?

9. What are the main drawbacks of vancomycin? What is an important use of vancomycin today?

10. Who should not take tetracyclines and why?

11. Why is it important to draw peak and trough levels on patients taking aminoglycosides? In relation to medication administration times**, <u>when should peak and trough levels be obtained</u>**?
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12. What are signs of ototoxicity and nephrotoxicity that the nurse should watch for the patient taking aminoglycosides?
Ototoxicity –

Nephrotoxicity –

13. What are the side effects/ adverse reactions / nursing implications for Amphotericin B?

Respiratory Medications

Upper Respiratory Infections

- Antihistamines
  - Bendadryl
  - Chlorpheniramine (Chlor-trimeton)
  - Loratadine (Alavert, Claritin)
  - Fexofenadine (allegra)
  - Cetirizine (Zyrtec)
- Oral Decongestants
  - Cromolyn (nasalcrom)
- Intranasal corticosteroids
  - Ipratropium (Atrovent)

Pharyngitis

- Penicillin
- Erythromycin
- Cephalosporins (clarithromycin)
- Macrolides (azithromycin – Zithromax)
- Analgesics – Tylenol, codeine
- Antitussives
- Hydrocodone

Community Acquired Pneumonias

- Macrolides
  - Azithromycin (Zithromax)
  - Clarithromycin (Biaxin)
  - Doxycycline (Vibramycin)
- Fluroroquinolones
  - Gatifloxacin (tequin)
  - Levofloxacin (Levaquin)
- Beta-lactam agents
  - Cefpodoxime (Vantin)
  - Cefuroxime (Zinacef, Ceftin)
- Amoxicillin or amoxicillin/clavulante
  - Augmentin
  - Clavulin

Mycoplasma Pneumonia

- Doxycycline
- Macrolides

Pneumocystis Cariini Pneumonia

- Pentamidine (penacarinat, NebuPent)
- Trimethoprim-sulfamethoxazole (Bactrim, Septra)

Influenza Type A

- Amantadine (Symmetrel)
- Rimantadine (Flumadine)

Influenza Type A and B

- Zanamivir (Ralenza)
- Oseltamivir (Tamiflu)

Hospital Acquired Pneumonia

- Second-generation cephalosporins
  - Cefuroxime (Ceftin, Zinacef)
  - Cefamandole (Mandol)
- Third-generation cephalosporins
  - Ceftriaxone (Rocephin)
  - Cefotaxime (Claforan)
  - Ampicillin-sulbactam (Unasyn)
- Flurorquinolones
  - Ciprofloxacin (Cipro)
  - Levofloxacin (Levaquin)

MRSA Infections

- Vancomycin (Vancocin)
- Linezolid (Zyvox)

Tuberculosis

- Isoniazid (INH)
- Rifampin (Rifadin)
- Pyrazinamide
- Ethambutol (Myambutol)

Pulmonary Embolus

- Anticoagulation therapy
  - Heparin
  - Coumadin
- Thrombolytic therapy

COPD

- Corticosteroids
- Bronchodilators
  - Methyl.xanthines
    - Aminophylline
    - Theophylline
  - Anticholinergic agernts
  - Beta-Adrenergic Agents
- Mucolytic agents
- Antitussive agents

DRUG CLASS	ACTIONS	SIDE EFFECTS/TOXIC EFFECTS	NURSING CONSIDERATIONS
BRONCHODILATORS Adrenergic Drugs • Terbutaline (Brethine) • Isotherine (Bronkosol) • Albuterol (Proventil, Ventolin) • Isoproterenol (Isuprel) • Metaproterenol (Metaprel, Alupent) • Levalbuterol (Xopenex) • Epinephrine (short acting)	Relax smooth muscles of trachea and bronchial tree.	Nervousness, tremor, headache, increased pulse, increased blood pressure, palpitations, N/V, abdominal cramps, sweating Same as above	• Monitor VS, lung sounds and I&O • Can be given orally • Most given by inhalers or nebulizers • Teach correct use of inhalers/nebs • Clean equipment frequently • Use bronchodilators first and then steroids or cromolyn 2nd (if both ordered) • Side effects decrease as tolerance develops • Use cautiously with hyperthyroidism, DM, heart disease • Use correct concentration • Double check dosage with another nurse • Given sub Q for asthma, etc
Methylxanthine drugs • Theophylline (oral) • Aminophylline (IV)		Irritability, restlessness, insomnia, headache, dizziness, palpitations, tachycardia, hypotension, N/V, anorexia, flushing, diuresis Same as above	• Relaxes smooth muscles; CNS stimulant, acts like caffeine • Give with food to decrease GI effects • **Therapeutic range 10 - 20 mcg/ml** • **Hold med if level >20, call MD** • Don't give with other methylxanthine drugs • Multiple drug interactions, check compatibility • May be used as a respiratory stimulant for infantile apnea
ANTI-INFLAMMATORY AGENTS • Beclomethasone (Vanceril) • Metamethasone • Triamcinolone (Azmacort) • Flusinolide (Aerobid) o Above meds inhaled	Decrease inflammation of the airway allowing for better exchange of air during respiration	Euphoria, insomnia, increased blood pressure, CHF, edema, increased appetite, weight gain, GI irritation, peptic ulcer, delayed wound healing, osteoporosis, cataracts, glaucoma, increased	• Minimal side effect with inhaled steroids • Monitor K+ levels • Monitor blood glucose • Use cautiously in patients with active infections • Monitor patients for s/s of infection • Monitor daily weights; report excessive weight gain

• Solumedrol (IV)		glucose, decreased K+, moon face, decreased growth in children, muscle weakness, decreased resistance to infection.	• Reduce dosage gradually; do not abruptly discontinue (will have rebound effect) • Rinse mouth after use; clean inhaler daily/ assess for oral candidiasis • Not a treatment for acute wheezing or bronchospasm • Use bronchodilators first if both are ordered
MUCOLYTIC AGENTS (inhaled) • Acetylcystiene (Mucomyst) • Domase alfa (Pulmozyme)	Helps to liquefy and thin mucous/secretions. Aids in better removal of secretions.		• Also used to treat acetaminophen overdose • Primarily used for treatment of cystic fibrosis
EXPECTORANTS • Guiafenesin (Robitussin) • Iodide preparations	Liquefy bronchial secretions and increase amount of excretion in the respiratory tract	.	• Frequently in OTC preparations • Taste bad; take with juice, etc.
ANTI-TUSSIVE AGENTS • Narcotic (may contain codeine) • Non-narcotic – dextromethorphan o Tessalon Perles	Act on cough center in brain to suppress cough reflex. Use with irritating, noncongestive, non-productive cough. Soothe respiratory tract and reduces cough reflex at its source	Sedation, constipation, respiratory suppression.	• Monitor for respiratory depression
ANTIHISTAMINES • Benadryl • Atropine	Block the effects of histamine at peripheral H1 receptor sites and have drying effects and antipruretic (itching) effects. Used for symptomatic relief of allergic rhinitis, conjunctivitis, and urticaria. May also be used as an adjunctive therapy to anaphylactic reactions – relief of lower respiratory conditions such as bronchoconstriction and bronchospacms	Drowsiness, drying effects of mouth and mucous membranes. CNS depression if used with ETOH or other sedatives.	• Assess allergy symptoms • Monitor BP and pulse • Assess lung sounds • Maintain fluid intake • Safety precautions because it may cause drowsiness • Teach to avoid use of ETOH and other CNS depressants • Frequent oral hygiene or chew sugarless gum to combat dry mouth. • DO NOT give if client has glaucoma