

Course Description

RET2503 | Respiratory Care Pathophysiology 2 | 3.00 credits

This is a foundation course on cardiopulmonary disease. The student will learn the pathogenesis, diagnosis, treatment and rehabilitation of the diseases included in the course. Prerequisite: RET 1484; Prerequisite: RET1484.

Course Competencies

Competency 1: The student will describe the language and techniques associated with chest radiography and other essential radiographic techniques used in the assessment of the patient with cardiopulmonary disease by:

- 1. Describing the fundamentals of radiography
- 2. Differentiating between the following standard positions and techniques of chest radiography:
 - a. Posteroanterior radiograph
 - b. Anteroposterior radiograph
 - c. Lateral radiograph
 - d. Lateral decubitus radiograph
- 3. Defining the following radiologic terms commonly used when inspecting the chest radiograph:
 - a. Air cyst 2. Bleb 3.
 - b. Bronchogram
 - c. Bulla
 - d. Cavity
 - e. Consolidation
 - f. Homogeneous density
 - g. Honeycombing
 - h. Infiltrate
 - i. Interstitial
 - j. Density
 - k. Lesion
 - I. Opacity
 - m. Pleural
 - n. Density
 - o. Pulmonary mass
 - p. Pulmonary nodule
 - q. Radiodensity
 - r. Radiolucency
 - s. Translucent
- 4. Describing the three steps to evaluate the technical quality of the radiograph
- 5. Describing the sequence of examination and include:
 - a. Mediastinum
 - b. Trachea
 - c. Heart
 - d. Hilar region
 - e. Lung parenchyma (tissue)
 - f. Pleura
 - g. Diaphragm
 - h. Gastric air bubble
 - i. Bony thorax
 - j. Extra thoracic soft tissues
- 6. Describing the diagnostic values of the following radiologic techniques:
 - a. Computed tomography (CT)
 - b. Positron emission tomography (PET)
 - c. Positron emission tomography and computed tomography scan (PET/CT scan)
 - d. Magnetic resonance imaging (MRI)

- e. Pulmonary angiography
- f. Ventilation/ perfusion scan
- g. Fluoroscopy
- h. Bronchography

Competency 2: The student will describe a variety of general and specific tests to help identify the overall health status of the patient, with a primary emphasis on the examination of sputum samples to identify potential sources of infection and the levels of red and white blood cells and electrolytes in the blood by:

- 1. Describing the diagnostic values of the sputum examination and include common organisms associated with respiratory disorders:
 - a. Gram-negative organisms (Klebsiella, Pseudomonas aeruginosa, Haemophilus influenzae, Legionella pneumophila)
 - b. Gram-positive organisms (Streptococcus and Staphylococcus)
 - c. Viral organisms (Mycoplasma pneumoniae and respiratory syncytial virus)
- 2. Discussing the diagnostic values of the following tests and procedures:
 - a. Skin tests
 - b. Endoscopic examinations (bronchoscopy and mediastinoscopy)
 - c. Lung biopsy
 - d. Video-assisted thoracoscopy (VATS)
 - e. Thoracentesis
 - f. Pleurodesis
- 3. Describing the following components of hematology:
 - a. Complete blood count (CBC)
 - b. Red blood cell (RBC) count (red blood cell indices and types of anemias)
 - c. White blood cell count (WBC), and include granular leukocytes and nongranular leukocytes
 - d. Describing the role of platelet and include:
 - e. Causes of a platelet deficiency
 - f. Clinical significance of a platelet deficiency
- 4. Identifying the following blood chemistry tests commonly monitored in respiratory care:
 - a. Glucose
 - b. Lactic dehydrogenase (LDH)
 - c. Serum glutamic oxaloacetic transaminase (SGOT)
 - d. Blood urea nitrogen (BUN) 5. Serum creatinine
- 5. Identifying the following electrolytes commonly monitored in respiratory care:
 - a. Sodium (Na+)
 - b. Potassium (K+)
 - c. Chloride (Cl–)
 - d. Calcium (Ca++)

Competency 3: The student will describe, and list anatomic alterations associated with a prevalent form of obstructive lung disease known as asthma with emphasis placed on the assessment and treatment of patients with this disease by:

- 1. Describing the role of the following organizations in the management of asthma:
 - a. National Asthma Education and Prevention Program (NAEPP)
 - b. Global Initiative for Asthma (GINA)
 - c. Listing the anatomic alterations of the lungs associated with asthma
- 2. Describing the epidemiology and risk factors associated with asthma, including:
 - a. Extrinsic asthma
 - b. Intrinsic asthma
 - c. Describing the challenges associated with the diagnosis of asthma, and include the tests used to diagnosis and monitor asthma
 - d. Differentiating the classifications of asthma severity
 - e. Describing the cardiopulmonary clinical manifestations associated with asthma
 - f. Describing the general management of asthma
- 3. Describe the definition, assessment, and treatment for chronic obstructive pulmonary disease and focus

on chronic bronchitis and emphysema and the anatomical differences between the two forms of COPD.

- 4. Describing the American Thoracic Society (ATS) guidelines for chronic obstructive pulmonary disease (COPD), chronic bronchitis, and emphysema
- 5. Discussing the Global Initiative for Chronic Obstructive Lung Disease (GOLD) definition of COPD
- 6. Listing the epidemiology and risk factors associated with COPD
- 7. Describing the Global Initiative for Chronic Obstructive Lung Disease (GOLD) global strategy for diagnosing COPD
- 8. Describing the key indicators for considering a COPD diagnosis
 - a. Dyspnea
 - b. Chronic cough
 - c. Chronic sputum production
 - d. History of exposure to risk factors
 - e. Describing the three main pulmonary function study measurements used to confirm the clinical suspicion of COPD: 11. FVC 12. FEV1.
 - f. FEV1/FVC ratio 14. Differentiating among the following four stages of COPD as outlined by GOLD:
 - g. Stage I: Mild COPD
 - h. Stage II: Moderate COPD
 - i. Stage III: Severe COPD
 - j. Stage IV: Very severe COPD
- Discuss additional diagnostic studies for patients identified as having either Stage II, Stage III, or Stage IV COPD 20.
 - a. Bronchodilator reversibility testing
 - b. Chest x-ray 22. Arterial blood gas measurement
 - c. Alpha-1 antitrypsin deficiency screening
 - d. Listing the anatomic alterations of the lungs caused by both chronic bronchitis and emphysema
- 10. List the cardiopulmonary clinical manifestations caused by the anatomic alterations and pathophysiologic mechanisms associated with chronic bronchitis and emphysema
- 11. Identifying the key differences between chronic bronchitis and emphysema—the "pink puffer" and the "blue bloater"
- 12. Describing the Global Initiative for Chronic Obstructive Lung Disease (GOLD) global strategy for the management and prevention of chronic obstructive pulmonary diseases
- 13. Describing additional treatment considerations for emphysema, including:
 - a. Alpha1 antitrypsin replacement therapy
 - b. Lung volume reduction surgery
 - c. Lung transplantation

Competency 4: The student will describe the pathologic abnormalities associated with cystic fibrosis as well as the typical clinical findings and treatment modalities used to treat patients with CF by:

- 1. Listing the anatomic alterations of the lungs associated with cystic fibrosis
- 2. Describing the causes and classifications of cystic fibrosis
- 3. Listing the cardiopulmonary clinical manifestations associated with cystic fibrosis
- 4. Describing the general management of cystic fibrosis

Competency 5: The student will describe changes in the lung that occur with pneumonia as well as the clinical findings and treatment by:

- 1. Listing the anatomic alterations of the lungs associated with pneumonia
- 2. Describing the causes and classifications of pneumonia
- 3. Listing the cardiopulmonary clinical manifestations associated with pneumonia
- 4. Describing the general management of pneumonia

Competency 6: The student will describe the pathology, clinical findings, and treatment associated with pulmonary tuberculosis by:

- 1. Listing the anatomic alterations of the lungs associated with tuberculosis
- 2. Describing the causes of tuberculosis
- 3. Listing the cardiopulmonary clinical manifestations associated with tuberculosis
- 4. Describing the general management of tuberculosis

Competency 7: The student will describe the pathological change, clinical signs, and the treatments associated with pulmonary edema by:

- 1. Listing the anatomic alterations of the lungs associated with pulmonary edema
- 2. Describing the causes of pulmonary edema
- 3. Listing the cardiopulmonary clinical manifestations associated with pulmonary edema
- 4. Describing the general management of pulmonary edema

Competency 8: The student will describe the findings associated with general management, and respiratory care often provided to treat patients with the diagnosis of pulmonary embolism by:

- 1. Listing the anatomic alterations of the lungs associated with pulmonary embolism
- 2. Describing the causes of pulmonary embolism
- 3. Listing the cardiopulmonary clinical manifestations associated with pulmonary embolism
- 4. Describing the general management of pulmonary embolism

Competency 9: The student will describe the anatomical defects in the lung and chest wall, the assessment, and treatment associated with flail chest by:

- 1. Listing the anatomic alterations of the lungs associated with a flail chest
- 2. Describing the causes of a flail chest
- 3. Listing the cardiopulmonary clinical manifestations associated with a flail chest
- 4. Describing the general management of a flail chest

Competency 10: The student will describe the anatomical defects, causes, clinical findings, and treatment associated with a pneumothorax by:

- 1. Listing the anatomic alterations of the lungs associated with a pneumothorax
- 2. Describing the causes of a pneumothorax
- 3. Listing the cardiopulmonary clinical manifestations associated with a pneumothorax
- 4. Describing the general management of a pneumothorax

Competency 11: The student will describe pleural problems that cause unique clinical manifestations and need specific treatment by:

- 1. Listing the anatomic alterations of the lungs associated with pleural diseases
- 2. Describing the causes of pleural diseases
- 3. Listing the cardiopulmonary clinical manifestations associated with pleural diseases
- 4. Describing the general management of pleural diseases

Competency 12: The student will describe the key issues related to kyphoscoliosis to include pathology, causes, clinical findings, and treatment associated with this medical problem by:

- 1. Listing the anatomic alterations of the lungs associated with kyphoscoliosis
- 2. Describing the causes of kyphoscoliosis
- 3. Listing the cardiopulmonary clinical manifestations associated with kyphoscoliosis
- 4. Describing the general management of kyphoscoliosis

Competency 13: The student will describe the pathologic changes in the lung, causes, clinical findings, and treatment associated with chronic interstitial lung disease by:

- 1. Listing the anatomic alterations of the lungs associated with chronic interstitial lung disease
- 2. Describing the causes of chronic interstitial lung disease
- 3. Listing the cardiopulmonary clinical manifestations associated with chronic interstitial lung disease
- 4. Describing the general management of chronic interstitial lung disease

Competency 14: The student will describe the pathological changes in the lung, causes, clinical findings, and treatment for lung cancer by:

- 1. Listing the anatomic alterations of the lungs associated with cancer of the lung
- 2. Describing the causes of cancer of the lung
- 3. Listing the cardiopulmonary clinical manifestations associated with cancer of the lung

4. Describing the general management of cancer of the lung

Competency 15: The student will describe the pathological changes, causes, clinical findings, and treatment of ARDS by:

- 1. Listing the anatomic alterations of the lungs associated with acute respiratory distress syndrome
- 2. Describing the causes of acute respiratory distress syndrome
- 3. Listing the cardiopulmonary clinical manifestations associated with acute respiratory distress syndrome
- 4. Describing the general management of acute respiratory distress syndrome

Competency 16: The student will describe the pathologic changes, causes, clinical findings, and treatment for Guillain-Barré syndrome by:

- 1. Listing the anatomic alterations of the lungs associated with Guillain-Barré syndrome
- 2. Describing the causes of Guillain-Barré syndrome
- 3. Listing the cardiopulmonary clinical manifestations associated with Guillain- Barré syndrome
- 4. Describing the general management of Guillain-Barré syndrome

Competency 17: The student will describe the pathology, causes, and treatment of myasthenia gravis by:

- 1. Listing the anatomic alterations of the lungs associated with myasthenia gravis
- 2. Describing the causes of myasthenia gravis
- 3. Listing the cardiopulmonary clinical manifestations associated with myasthenia gravis
- 4. Describing the general management of myasthenia gravis

Competency 18: The student will describe clinical findings and treatment for obstructive and central sleep apnea by:

- 1. Listing the anatomic alterations of the lungs associated with sleep apnea
- 2. Describing the meaning of the apnea-hypopnea index and oxygen desaturation index
- 3. Describing the general management of sleep apnea
- 4. Describing the causes of sleep apnea
- 5. Describing how a sleep study is performing
- 6. Listing the cardiopulmonary clinical manifestations associated with sleep apnea

Competency 19: The student will describe two potential causes, clinical findings, and treatment of upper airway narrowing due to infection in croup and epiglottitis by:

- 1. Listing the anatomic alterations of the lungs associated with croup syndrome
- 2. Describing the causes of croup syndrome
- 3. Listing the cardiopulmonary clinical manifestations associated with croup syndrome
- 4. Describing the general management of croup syndrome

Competency 20: The student will describe the pathological changes in the lung, causes, clinical findings, and treatment of near drowning, smoke inhalation, and postoperative atelectasis by:

- 1. Listing the anatomic alterations of the lungs associated with near-drowning
- 2. Describing the causes of near drowning
- 3. Listing the cardiopulmonary clinical manifestations associated with near drowning
- 4. Describing the general management of near drowning
- 5. Listing the anatomic alterations of the lungs associated with smoke inhalation and thermal injuries
- 6. Describing the causes of smoke inhalation and thermal injuries
- 7. Listing the cardiopulmonary clinical manifestations associated with smoke inhalation and thermal injuries
- 8. Describing the general management of smoke inhalation and thermal injuries
- 9. Listing the anatomic alterations of the lungs associated with postoperative atelectasis
- 10. Describing the causes of postoperative atelectasis
- 11. Listing the cardiopulmonary clinical manifestations associated with postoperative atelectasis
- 12. Describing the general management of postoperative atelectasis

Learning Outcomes:

• Communicate effectively using listening, speaking, reading, and writing skills

- Use quantitative analytical skills to evaluate and process numerical data
- Solve problems using critical and creative thinking and scientific reasoning
- Formulate strategies to locate, evaluate, and apply information