Respirology Rotation Clerkship Objectives

1) **Chest x-ray interpretation skills:**
   - Given a normal PA and lateral chest X-ray the student will be able to:
     - Identify the three lobes of the right lung and the two lobes of the left lung as well as the fissures that separate these lobes
     - Identify the normal boundaries of the lung, counting ribs anteriorly & posteriorly
     - Identify the cardiac silhouette
     - Identify the ascending aorta, arch of the aorta , and descending aorta
     - Identify the right and left pulmonary arteries
   - Given a patient with a pleural effusion the student will be able to:
     - Interpret a PA and lateral chest X-ray and identify the location of the effusion
   - Given a patient with a pneumothorax the student will be able to:
     - Interpret a PA and lateral chest X-ray and identify the extent of the air in the pleural space
     - Identify a complete lung collapse with shifting of the mediastinal structures indicating a possible tension pneumothorax
   - Given a patient with enlarged hilar structures, the student will be able to
     - name three major structures constituting the hila
   - Given a chest X-ray with a mediastinal mass the student will be able to interpret a PA and lateral and:
     - identify whether the mass is most likely to be in the anterior, middle, or posterior mediastinum
     - List 4 causes of anterior mediastinal mass
   - Given an abnormal x-ray, explain how deviation of the trachea may assist in diagnosis
   - Given a patient with diffuse parenchymal lung disease on chest X-ray, the student will be able to:
     - Differentiate between interstitial disease (lines and dots) and airspace disease (confluence, air bronchograms , silhouette sign)

2) **Pulmonary function interpretation skills:**
   Students will be able to:
   - Define TLC, VC, FRC, and RV
   - Describe (draw a figure of) the relationship between the above volumes
   - Recognize certain common disease patterns on PFT testing including:
     - Obstruction
     - Restriction
   - list at least two diseases that could cause each of the patterns listed:
     - Obstructive
     - Restrictive
     - Isolated reduced diffusion capacity
   - Recognize lung volumes consistent with COPD and that a low DLCO (gas transfer) can be caused by emphysema
   - Correctly interpret spirometry that is normal or shows variable obstruction.

- Distinguish the pulmonary function pattern of interstitial lung disease from chest wall restriction and muscle weakness.

3) Arterial blood gas interpretation skills:

Students will be able to:

- Define terms used in acid/base problems
- Know the normal values for HCO3, pCO2, pH, H+
- Explain how an elevated PCO2 causes an acidosis and how a low PCO2 causes an alkalosis
- Describe the concept of compensation and explain the expected compensation for:
    - Acute respiratory acidosis
    - Chronic respiratory acidosis
    - Acute respiratory alkalosis
    - Chronic respiratory alkalosis
- Recognize and solve simple and complex (2 or more) acid-base disturbances
- Given a patient with a simple acid-base disturbance, provide an appropriate differential diagnosis and the most likely cause

4) Evaluation and management of asthma

Given a patient with shortness of breath, cough, and/or wheeze and a normal CXR the student will be able to:

- Provide a working definition of asthma
- Take a focused history looking for historical features that suggest asthma including; age of onset, family history, triggers, severity, control, features of occupational asthma, exercise induced asthma, ASA sensitivity, symptoms of allergic rhinitis
- Perform a physical exam looking for signs of asthma, rhinitis and atopy
- Order and justify diagnostic tests
- Advise patients on use of Peak Flow meters, and peak flow monitoring
- List the medications for symptomatic relief and for control of asthma.
- Understand the Canadian Asthma Guidelines, Can Respir J 2004

5) Evaluation and management of COPD

Given a patient with COPD student will be able to:

- Provide a working definition of COPD
- List risk factors for COPD
- Perform a focused history looking for symptoms suggestive of COPD
- Perform a focused history to identify triggers and severity on a COPD exacerbation
- Assess severity of COPD (based on MRC dyspnea scale)
- Perform a physical exam looking for signs of COPD including signs of a severe exacerbation
- Order and justify diagnostic tests including EKG, ABGs, CXR
- Recognize features of hyperinflation on CXR
- List a differential diagnosis for the causes of an exacerbation
- Outline an initial management plan for an exacerbation of COPD or for chronic COPD

- Understand the role of short and long-acting bronchodilators, inhaled corticosteroids and combination therapies in COPD
- Identify clinical features that indicate patient may need ventilatory support
- Discuss requirements and benefits of domiciliary O2
- Recognize the critical role of pulmonary rehab in the management of all COPD patients
- Understand the Canadian COPD Guidelines, Can Respir J 2003.

6) Evaluation and management of Interstitial Lung Diseases.

Given a patient with diffuse parenchymal lung / interstitial lung disease (ILD) the student will be able to:

- Describe the classification of ILD
- By history, identify important environmental exposures associated with the causes of ILD.
- Name 5 medications that can cause ILD
- Justify a plan of investigation, including blood tests, CT scanning and lung biopsy of a patient with dyspnea who has a chest x-ray finding of ILD.
- Justify a plan of treatment of the common causes of ILD.
- Recognize that a multidisciplinary approach (involving clinicians, radiologists, and pathologists) is often required to diagnose diffuse parenchymal lung disease.

7) Evaluation of patients with a solitary pulmonary nodule or lung cancer

Given a patient with an X-ray with a solitary pulmonary or mass the student will be able to:

- List the two major types of primary bronchogenic neoplasms
- Categorize the non-malignant causes of lung cancer and provide three examples
- State factors that determine the probability that a solitary pulmonary nodule is malignant
- Given a patient who has a solitary nodule or mass on chest x-ray, discuss the radiological investigations, and special procedures which may be useful in the evaluation of the lesion
- List the three basic components of the TNM staging system
- Classify small cell and non-small cell lung cancer with respect to:
    - Staging system used; Treatment; and Prognosis
- List the three primary types of treatment for lung cancer
- Define paraneoplastic syndrome and list three that are caused by lung cancers
- Describe the common sites to which primary lung cancers can metastasize or spread

8) Understanding the evaluation of patients with pleural disease

Given a patient with an X-ray with a pleural effusion the student will be able to:

- Name the two different types of pleura and the structures they cover
- Describe the mechanisms leading to the formation and accumulation of pleural fluid
- List the clinical manifestations of a pleural effusion
- Describe Light's criteria and how they are used clinically
- Given a clinical scenario, use Light's criteria to determine whether the pleural fluid represents and exudate or a transudate
- Using the results derived from pleural fluid analysis (pH, cytology, WBC count and differential, glucose, TG, amylase, Hct) determine the most probable cause of the effusion

- Describe the diagnostic algorithm for parapneumonic effusion and justify your decision to consider chest tube drainage or to perform a thoracentesis

Given a patient with a pneumothorax the student will be able to:

- Describe 2 mechanisms of how a pneumothorax can develop
- Predict what happens to the lung when there is a pneumothorax and explain why
- Describe the mechanisms and cardiovascular consequences of tension pneumothorax
- Given a patient with primary, spontaneous pneumothorax, describe the presenting symptoms and typical physical signs
- Given a patient with a pneumothorax justify a management strategy
- Describe how a chest tube water seal functions; why it is important in the treatment of pneumothorax and how it indicates if a chest tube can be removed
- Describe how you would determine whether a chest drain is actually in the appropriate position within the pleural space and if it is indeed patent

9) Evaluation of patients with pulmonary embolus

Given a patient with a suspected pulmonary embolism the student will be able to:

- List four (4) common presenting symptoms of pulmonary embolism
- List four (4) risk factors for pulmonary embolism
- Given a patient with suspected pulmonary embolism, outline how you would investigate this
- Given a patient with a confirmed diagnosis of pulmonary embolism, describe the appropriate therapy based on the ACCP guidelines.

10) Pulmonary Hypertension

Given a patient with a suspected pulmonary hypertension the student will be able to:

- Describe the expected physical findings of a patient with pulmonary hypertension
- List four (4) causes of pulmonary hypertension
- Justify the investigations that should be ordered to confirm a diagnosis and the expected results from those investigations

11) Evaluation of patients with community acquired pneumonia or other pulmonary infection

Given a patient with suspected pulmonary infection the student will be able to:

- Suggest an appropriate empiric treatment regimen for community acquired pneumonia

Given a patient with pulmonary infection who is not responding to empiric treatment, the student will be able to:

- Formulate a differential diagnosis including antibiotic resistance, unusual pathogens, suppurative pulmonary complications, and extrapulmonary septic complications.
- Describe appropriate investigations for known complications of pneumonia
- Name the most common pneumonia pathogen in HIV-infected patients with depressed cell-mediated immunity and be able to formulate a diagnosis and management plan for such a patient.

12) Tuberculosis

Given a patient with suspected tuberculosis the student will be able to:

- Provide a differential diagnosis for a necrotizing lesion in the upper lobe of the lung
- List 3 tests or investigations that could be applied to the patient or tissues from a patient to establish the diagnosis
- Describe the common complications of tuberculosis
- Given a patient with pulmonary infection suspicious for tuberculosis, defend an infection control strategy for the patient and choose appropriate diagnostic tests

13) Breathing disorders during sleep

Given a patient with suspected breathing problems during sleep the student will be able to:

- Define obstructive sleep apnea
- Compare and contrast obstructive and central sleep apnea.
- Perform a focused history and physical examination; and justify a plan for further diagnostic testing (if necessary) in the setting of suspected obstructive sleep apnea
- Given a patient with known obstructive sleep apnea, determine whether treatment is necessary, and if so, make specific treatment recommendations.
- Recognize the risks of initiating CPAP or oxygen in patients with hypoventilation.