

## **Pulmonary/CCMU Curriculum**

### **Goal**

Pulmonary medicine is the diagnosis and management of disorders of the lungs, upper airways, thoracic cavity, and chest wall. The pulmonary specialist has expertise in neoplastic, inflammatory, and infectious disorders of the lung parenchyma, pleura, and airways; pulmonary vascular disease and its effect on the cardiovascular system; and detection and prevention of occupational and environmental causes of lung disease. Other specialized areas include respiratory failure and sleep-disordered breathing.

Rotation on the medical ward services, general medical clinic and on pulmonary/CCMU rotation will provide training for the resident to (1) understand risk factors for the development and/or exacerbation of pulmonary disease, (2) diagnose and treat a broad spectrum of pulmonary diseases and pulmonary-related complaints commonly encountered in a general internal medicine practice, (3) manage the initial approach to patients with respiratory failure, and (4) develop critical thinking and a sense of autonomy in the care of severely ill patients.

The internist will usually be assisted by the pulmonary specialist for diagnostic procedures and complicated conditions such as advanced respiratory failure. If such expertise is not available, the internist, with additional training, may have to assume this role.

### **Objectives**

#### **Patient Care**

- I. Provide patient care that is compassionate, appropriate and effective for the prevention and treatment of pulmonary disorders as well as the management of critically-ill patients.

#### **Medical Knowledge**

- I. Develop the knowledge and skills to obtain an appropriate history on patients at risk for or with pulmonary disease including identification of risk factors (tobacco use, environmental exposures), symptoms, co-morbidities and medication use.
- II. Develop the knowledge and skills for performing and interpreting physical exam findings on patients with pulmonary disease and/or patients in the critical care setting including:
  - a. Signs of extrapulmonary lung disease
  - b. Respiratory pattern (accessory muscle use, paradoxical respirations, Kussmaul and Cheyne-Stokes breathing)
  - c. Thoracic cage abnormalities
  - d. Lung exam
  - e. Cardiac exam
  - f. Extremity exam
  - g. Glasgow Coma Scale score

- III. Develop an approach to patients presenting the following pulmonary-related symptoms or signs:
  - a. dyspnea
  - b. cough
  - a. hemoptysis
  - b. wheezing
  - c. stridor
  - d. pleuritic chest pain
  - e. hypoxemia
  - f. history of (+) PPD or tuberculosis exposure
  - g. history of occupational exposure
  - h. solitary pulmonary nodule
  
- IV. Develop an approach to evaluating critically ill patients with the following symptoms or signs:
  - a. acute abdomen
  - b. altered mental status
  - c. cardiopulmonary arrest
  - d. elevated liver function tests
  - e. fever
  - f. hematemesis or melena/hematochezia
  - g. hemoptysis
  - h. hypo- and hyperthermia
  - i. new infiltrates on chest x-ray
  - j. meningismus
  - k. photophobia
  - l. pulmonary edema
  - m. respiratory distress including accessory muscle use, paradoxical respirations, stridor and wheezing
  - n. shock
  
- V. Recognize symptoms and signs, differential diagnosis and management of the following pulmonary disease processes:
  - a. Allergic bronchopulmonary aspergillosis
  - b. Altitude sickness
  - c. Alveolar hemorrhage
  - d. Asthma
  - e. Bronchiectasis
  - f. Bronchiolitis obliterans
  - g. Chronic Obstructive Pulmonary Disease
  - h. Collagen vascular diseases affecting the lungs, including pulmonary-renal syndromes
  - i. Cystic fibrosis
  - j. Hypersensitivity disorders
  - k. Interstitial fibrosis
  - l. Lung abscess

- m. Lung cancer
  - n. Mediastinal disease
  - o. Mycotic lung disease
  - p. Pleural disease
  - q. Pulmonary hypertension
  - r. Pulmonary embolism
  - s. Pulmonary infections
  - t. Respiratory muscle disorders
  - u. Sleep apnea and obesity hypoventilation syndrome
  - v. Thoracic cage disorders
- VI. Recognize symptoms and signs, differential diagnosis and management of the following disease processes seen in the critical care setting:
- a. Acid-base disorders
  - b. Acute renal failure
  - c. Acute respiratory distress syndrome
  - d. Adrenal insufficiency
  - e. Burns
  - f. Cardiac arrhythmias
  - g. Congestive heart failure
  - h. Diabetic ketoacidosis and hyperosmolar nonketotic syndrome
  - i. Disseminated intravascular coagulation
  - j. Heat stroke and heat exhaustion
  - k. Heparin-induced thrombocytopenia
  - l. Hypertensive emergency
  - m. Meningitis and encephalitis
  - n. Multisystem organ failure
  - o. Myxedema coma
  - p. Near-drowning
  - q. Poisoning
  - r. Respiratory failure
  - s. Sepsis and systemic inflammatory response syndrome
  - t. Shock – distributive, cardiogenic, hypovolemic
  - u. Status asthmaticus
  - v. Status epilepticus
  - w. Thyroid storm
- V. Become familiar with other key issues in the care of critically-ill patients, including
- a. Acute Physiology and Chronic Health Evaluation II (APACHE II) scoring system and its implications
  - b. ACLS
  - c. evaluation of encephalopathy and coma
  - d. communication in the ICU
  - e. diagnosis of brain death
  - f. drug dosing with impaired renal function
  - g. enteral and parenteral nutrition

- h. indications for and management of
    - chest tubes
    - deep lines
    - mechanical ventilation and weaning
    - noninvasive positive pressure ventilation
    - pulmonary artery catheters
    - tracheostomy
  - i. management of pain control and sedation, including use of the Ramsay scale
  - j. management of elevated intracranial pressure
  - k. physiology and principles of use of vasopressors and inotropes
  - l. prevention of ICU-associated complications, including deep venous thrombosis, gastric ulcers, line infections and ventilator-associated pneumonia
  - m. use of blood products
  - n. use of neuromuscular blocking agents
- VI. Understand appropriate use and interpretation of diagnostic studies, including:
- a. complete blood count with differential
  - b. chemistries
  - c. coagulation studies
  - d. sputum analysis
  - b. arterial blood gas
  - c. PPD
  - d. bedside NIF measurement
  - e. bedside spirometry and formal pulmonary function studies
  - f. overnight oximetry
  - g. thoracentesis and pleural fluid analysis
  - h. lung imaging including radiograph, CT, MRI and PET scan
  - i. lung and pleural biopsy
  - k. polysomnography
  - l. echocardiogram
  - m. exercise testing
  - n. external and internal transvenous pacer
  - o. endoscopy
  - m. V/Q scan
  - n. pulmonary angiogram
  - o. sweat chloride testing
  - p. phrenic nerve studies

### **Practice-Based Learning and Improvement**

- I. Perform independent research for evidence-based practice to answer specific clinical questions arising from patient care.
- II. Review current literature for changes in standard of care applicable to general practice.
- III. Be able to access clinical practice guidelines to help improve patient care
  - a. Asthma - [www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf](http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf)

- b. COPD - [www.goldcopd.com](http://www.goldcopd.com)
- IV. Review patient care errors with attention to changes in systems to prevent recurrence.
- V. Utilize information technology to enhance patient education.

### **Interpersonal and Communication Skills**

- I. Communicate effectively with patients and families in a compassionate, culturally sensitive and patient-centered manner to improve understanding and compliance.
- II. Ensure charting is legible, thoughtful, complete and timely to facilitate communication within the health care team.
- III. When acting as a consultant, ensure effective communication to the primary team.
- IV. When on pulmonary/CCMU rotation, develop effective presentations skills by selecting and presenting a case at pulmonary conference.

### **Professionalism**

- I. Understand how to function effectively as a team leader, especially in the ICU setting, to advocate for patient care.
- II. Understand impact of gender, age, culture, religion, and socioeconomic status on choices regarding mechanical ventilation.
- III. Accurately describe the risks and benefits of cardiopulmonary resuscitation to patients to obtain code status.
- IV. Develop a respectful, compassionate approach to counseling patients on withdrawal of support.
- V. Understand how to inform patients regarding the natural history of their disease and therapeutic interventions and to obtain consent to implement a treatment plan.
- VI. Provide meaningful feedback to colleagues and students regarding performance and behavior.

### **Systems-Based Practice**

- I. Interact with the multidisciplinary team including pulmonologist, social worker, nurse, pharmacist, dietician, and billing coordinator to provide optimal care.
- II. Apply evidence-based, cost-conscious strategies to prevention, diagnosis and disease management.
- III. Develop skills in identifying opportunities for quality improvement, risk management and cost-effectiveness within a practice.

### **Teaching Methods**

- I. Attending supervision of resident activities in patient care
- II. Teaching rounds
- III. Conferences
  - Morning report

Noon conference

Pulmonary noon conference (For residents on Pulmonary/CCMU)

\*1<sup>st</sup> Friday each month except July and August

IV. Recommended reading

**Resident Evaluation**

- I. Attending feedback to residents on strengths and weaknesses throughout the rotation
- II. Attending written evaluation of residents at the end of the rotation
- III. Mini-CEX bedside evaluation tool

**Resources**

*Harrison's Principles of Internal Medicine*, 15<sup>th</sup> ed. McGraw Hill, 2001.

*Cecil Textbook of Medicine*, 21<sup>st</sup> ed, Saunders, 2000.

*MKSAP*

*Manual of Clinical Problems in Pulmonary Medicine*

*The ACCP Critical Care Board Review*

*ACCP Seek Critical Care Medicine*

On-line Resources

UpToDate

MD Consult

Practice Guidelines

Asthma - [www.nlm.nih.gov/guidelines/asthma/asthgdln.pdf](http://www.nlm.nih.gov/guidelines/asthma/asthgdln.pdf)

COPD - [www.goldcopd.com](http://www.goldcopd.com)

Residents should review *Annals of Internal Medicine* for recent Updates in Pulmonary and Updates in Critical Care sections as well as ACP journal club for pertinent articles.