



CARDIOPULMONARY RADIOLOGY

Tampa General Hospital

Rotation Director: Todd Hazelton, M.D.

General Goals: On this rotation, the resident will learn to interpret radiographic, computed tomography and magnetic resonance imaging examinations of the chest and to formulate appropriate differential diagnoses and recommendations for various thoracic pathologies, with emphasis on the heart (including the coronary arteries), lungs, mediastinum, pleura, and chest wall. Essential elements of adult cardiac disease will also be reviewed on this service. Participation in interventional procedures such as transthoracic needle biopsy and percutaneous catheter drainage of intrathoracic fluid collections occurs during the Ultrasound and Body CT rotations.

Resident participation in interdepartmental conferences is expected. These conferences enhance the resident's knowledge of the various clinical problems faced by clinicians, and form a basis for helping to guide radiologic workup of such problems.

Daily Work: The radiology resident assigned to "Cardiopulmonary Radiology" should begin review of cases immediately after arrival from morning conference. When upper and lower level residents are assigned to "Cardiopulmonary Radiology" during the same time period, the upper level resident shall be primarily responsible for reviewing all chest and cardiac CT and MR examinations and should also review chest radiographs as time permits. The lower level resident shall be primarily responsible for review of chest radiographs, but may also review CT examinations if there is no upper level resident on the rotation. All pertinent previous radiographs and CT scans shall be reviewed and available. The staff radiologist assigned to the section will subsequently review cases as they are presented by the resident. A complete understanding of normal anatomy and its variations as represented on the chest radiograph and on CT imaging will be required of each resident. That knowledge will form the basis for recognizing abnormal findings and patterns on chest radiographs and CT studies. Differential diagnoses will be stressed. When MR studies are associated with a case, they will be reviewed in conjunction with plain radiographic and CT findings.

Frequent requests for consultation will be made by the clinical staff. Those consultations should be made by the resident working with the staff radiologist. During their second, third and fourth months on rotation, residents should take increasing responsibility in those consultations. The staff radiologist shall be available at all times. Resident presence in the reading area, except for conference periods, is maintained until at least 5:00 p.m. All dictations should be completed prior to leaving the area.

Dr. Todd Hazelton, who has formal fellowship training in thoracic radiology, will be primarily responsible for supervising this curriculum and evaluating resident performance.

Suggested Reading:

Resident Level 1

- Hansell D *et al.* Fleischner society: glossary of terms for thoracic imaging. ***Radiology*** 2008;246; 697-722.
- Goodman LR. Felson's principles of chest roentgenology: a programmed text. 3rd Ed. Philadelphia: W.B. Saunders, 2006.
- Webb WR. The Thorax. In: Webb WR, Brant WE, Major NM. Fundamentals of Body CT. 3rd Ed. Philadelphia: Saunders Elsevier, 2006: 3-162.
- Klein JS, Ed. Section III. Pulmonary. In: Brant WE, Helms CA. Fundamentals of Diagnostic Radiology. Philadelphia: Lippincott, Williams & Wilkins, 2007: 527-562.

Resident Levels 2-4

- Hansell D *et al.* Fleischner society: glossary of terms for thoracic imaging. ***Radiology*** 2008;246; 697-722.
- Shelton DK, Ed. Section V. Cardiac Radiology. In: Brant WE, Helms CA. Fundamentals of Diagnostic Radiology. Philadelphia: Lippincott, Williams & Wilkins, 2007: 603-668.
- Webb WR, Higgins CB. Thoracic Imaging: Pulmonary and Cardiovascular Radiology. Lippincott Williams & Wilkins, 2005.

Educational Goals and Objectives:

First Year

Patient Care:

- Recognize normal thoracic anatomy and its most common variations
- Differentiate airspace from interstitial disease on chest radiographs and provide an appropriate differential diagnosis.
- Distinguish malignant and benign pulmonary nodules / masses on chest radiography.
- Critique the technical quality of a chest radiograph.
- Understand the indications for Computed Tomography based upon chest radiographic findings.

Medical Knowledge:

- Proper patient positioning chest radiographic views
- Basic technique in chest radiography, CT and PET
- Common radiographic manifestations of lung cancer
- Common radiographic manifestations of infectious disease, atelectasis, pneumothorax, congestive heart failure, aortic dissection and rupture
- Radiographic appearance and proper positioning of common monitoring devices

Interpersonal and Communication Skills:

- Call the referring physician for positive results and document the communication in the report.
- Learn the recommended terminology for reporting chest radiographic and CT findings.
- Communicate effectively with all members of the health care team

Practice-Based Learning and Improvement:

- Identify, rectify and learn from personal errors
- Incorporate feedback into improved performance
- Efficiently use electronic and print resources to access information

Professionalism:

- Demonstrate respect for patients and all members of the health care team
- Respect patient confidentiality
- Present oneself as a professional in appearance and communication
- Demonstrate a responsible work ethic with regard to work assignments

Systems-Based Practice:

- Attend Pulmonary Medicine Conference and demonstrate understanding of how chest radiographic, CT and PET imaging are integrated with the clinical care of the patient
- Demonstrate knowledge of ACR standards for chest radiography and CT
- Be familiar with ACR appropriateness criteria for evaluation of pulmonary signs and symptoms

Second and Third Year

Patient Care:

- Be able to discuss differential features of airspace and interstitial diseases on chest radiographs and CT/HRCT.
- Be able to construct a differential diagnosis for solitary and multiple pulmonary nodules and pulmonary masses detected on chest radiography and by CT.
- Be able to critique the technical quality of a CT/HRCT studies
- Know the indications for Computed Tomography based upon chest radiographic findings

Medical Knowledge:

- Staging and surgical management of lung cancer
- Uncommon manifestations of lung cancer
- Manifestations and clinical management of less common thoracic diseases (idiopathic interstitial pneumonias, Langerhan's cell histiocytosis, vasculitis, hypersensitivity pneumonitis, mediastinal tumors, pleural tumors, pneumoconiosis, sarcoidosis, airway diseases)
- Familiarity with cardiac anatomy and pathology on CT and MR as well as radiographic manifestations of valvular heart disease

Interpersonal and Communication Skills:

- Call the referring physician for positive results and document the communication in the report.
- Use the recommended terminology for reporting chest radiographic and CT findings, including HRCT
- Communicate effectively with all members of the health care team
- Teach medical students and medical residents basic cardiothoracic imaging

Practice-Based Learning and Improvement:

- Identify, rectify and learn from personal errors
- Incorporate feedback into improved performance
- Efficiently use electronic and print resources to access information

Professionalism:

- Demonstrate respect for patients and all members of the health care team
- Respect patient confidentiality
- Present oneself as a professional in appearance and communication
- Demonstrate a responsible work ethic with regard to work assignments

Systems-Based Practice:

- Attend Pulmonary Case Management Conference and demonstrate understanding of how chest radiographic, CT and PET imaging are integrated with the clinical care of the patient
- Demonstrate knowledge of ACR standards for chest radiography and CT
- Be familiar with ACR appropriateness criteria for evaluation of pulmonary signs and symptoms

Fourth Year

Patient Care:

- Apply the proper management algorithm for common and less common thoracic diseases
- Advise clinicians regarding case management algorithms by integrating clinical history, physical and laboratory findings, and imaging results

Medical Knowledge:

- Imaging findings of the post-surgical chest
- Atypical manifestations of common thoracic diseases
- Adult manifestations of congenital diseases

Interpersonal and Communication Skills:

- Appropriately communicate results to patients and clinicians and document communication in the report
- Produce radiologic reports with proper terminology, concise structure, and clear conclusions and recommendations
- Communicate effectively with all members of the health care team
- Mentor junior residents in the skills outlined in the goals for rotations 1-3

Practice-Based Learning and Improvement:

- Identify, rectify and learn from personal errors
- Incorporate feedback into improved performance
- Efficiently use electronic and print resources to access information

Professionalism:

- Demonstrate respect for patients and all members of the health care team
- Respect patient confidentiality
- Present oneself as a professional in appearance and communication
- Demonstrate a responsible work ethic with regard to work assignments

Systems-Based Practice:

- Attend Pulmonary Case Management Conference and demonstrate understanding of how thoracic imaging modalities are integrated with the clinical care of the patient
- Apply knowledge of ACR Standards for chest radiography and CT
- Be familiar with ACR appropriateness criteria for evaluation of pulmonary signs and symptoms

Mechanism of Evaluation: Each resident will be evaluated on the basis of their daily work, their behavior (including interactions with clerical and technical personnel, consultants, and other radiologists), their completion of appropriate reading materials, and the development of their interpretive and reporting skills. At the end of each rotation, the appropriate faculty will complete a global evaluation form. Medical knowledge in cardiac and pulmonary radiology will be assessed by the ACR in-service examination.