MSU/FAME RADIOLOGY RESIDENCY CURRICULUM

Rotation Goals and Objectives

VASCULAR/INTERVENTIONAL

The resident completes three consecutive one-month rotations in Interventional Radiology. This is both an organized and comprehensive supervised educational experience. The core competency-based goals and objectives for each rotation are outlined below.

Objectives for All Three Rotations:

Patient Care: Prepare a case for Interventional Radiology M&M conference presenting the complication and analyzing case for quality improvement. (1 case presentation)

Practice Based Learning and Improvement: Demonstrate effective communication skills with patients and their families, technologists, nurses, physician assistants, and referring clinical services. Demonstrate skill in obtaining informed consent

Professionalism: Attend Interventional Radiology conferences, Interventional Radiology didactic lectures, Interventional radiology Journal Clubs, M&M conference. Demonstrate a responsible work ethic with regards to clinical responsibilities and patient care

Systems – Based Practice: Demonstrate ability to use hospital information system to obtain pertinent medial information, imaging procedures and respect patient confidentiality
Prepare a case for Interventional Radiology M&M conference presenting the complication and analyzing case for quality improvement. (1 case presentation)

Teaching Strategies:

The goals and objectives will be accomplished by resident participation in the following educational activities on their Interventional Radiology rotations:

1. Rotation teaching during procedures and read-out sessions.
2. Conferences
    a. Monthly Interventional Radiology M&M conference
    b. Periodic Interventional Radiology Journal Club
3. Review of recommended reading materials.

Evaluation Process:

The resident will be evaluated in the following manner on the Interventional Radiology rotations:

1. Competency-based written evaluation by Interventional Radiology facility at the completion of each rotation.

2. 360 degree evaluation completed by personnel including clerks, nurses, physician assistants and patients.
3. Review of procedure log.
4. Performance on Interventional Radiology Mock Oral exam.
5. Performance on ACR In-Training exam

Vascular/Interventional Radiology Lecture Topics over a three year period:

1. Fundamentals of Interventional Radiology Overview
2. GU Intervention
3. Embolotherapy
4. Dialysis Interventions
5. IVC Filters
6. UFE Update
7. Vascular Interventions
8. Peripheral Arterial Disease: Diagnosis and Management
9. Biliary Interventions
10. Mesenteric
11. Interventional Oncology of Liver
12. DVT/PE
13. Venous Access
14. Varicose Vein Therapy
15. RFA Hepatic and Renal
16. Image guided Intervention of Abdomen/Pelvis
17. Imaging and Treatment of HCC

VASCULAR/INTERVENTIONAL

Rotation 1

Goals:

By the end of this rotation, the Resident should be able to:

1. Demonstrate the learning of competency-based objectives and mastery of technical objectives for the first rotation.
2. Demonstrate a responsible work ethic.
3. Participate in quality improvement/quality assurance activities.
4. Perform a complete and accurate clinical consult.
5. Perform basic Interventional radiology procedures.

Objectives:

Patient Care:

1. Demonstrate ability to perform Interventional radiology patient consultations.
    a. Review previous imaging and appropriate lab work.
    b. Review indication for procedure.
    c. Perform targeted physical exam.
    d. Synthesize procedure plan.
    e. Order appropriate pre-procedure orders (antibiotics, pre-medication, lab work).

2. Perform/assist in the following Interventional procedures under staff supervision:
    a. Venous access
    b. Dialysis catheter placement
    c. IVC filter
    d. Diagnostic vascular procedures
    e. Dialysis vascular access intervention

Medical Knowledge:

1. Demonstrate knowledge of normal arterial anatomy.
    a. Name vessels arising from aortic arch.
    b. Name mesenteric arterial supply and branches.
    c. Name upper and lower extremity arterial supply.
    d. Name pelvic arterial supply.

2. Demonstrate knowledge of normal venous anatomy.
    a. Name upper and lower extremity venous supply.
    b. Name branches of mesenteric venous supply.
    c. Name major thoracic venous structures.

3. Describe basic techniques, indications, contraindications and potential complications/management for following procedures:
    a. Venous access (PICC, Ports)
    b. Dialysis catheter access
    c. IVC filters
    d. Dialysis vascular access interventions
    e. Diagnostic vascular procedures

VASCULAR/INTERVENTIONAL

Rotation 2

Goals:

By the end of this rotation, the Resident should be able to:

1. Demonstrate learning of knowledge-based objectives and mastery of technical objectives for the second rotation.
2. Continue to build and improve on skills/procedures developed during the first rotation.
3. Develop skills in performing more advanced Interventional Radiology procedures.

Objectives:

Medical Knowledge

1. Describe basic techniques, indications, contraindications, and potential complications/management for following procedures:
    a. Genitourinary interventional procedures (Nephrostomy, ureteral stent placement, nephrostomy exchange).
    b. Biliary interventional procedures (PTC, PTHBD, cholecystostomy, biliary catheter exchange).
    c. GI interventional procedures (gastrostomy/gastrojejunostomy tube placement/exchange).

2. Describe contrast agents used in Interventional Radiology including indications, contraindications, advantages, disadvantages.
    a. Iodinated contrast
    b. Gadolinum
    c. C02

Patient Care

1. Perform/assist in the following interventional procedures under staff supervision:
    a. Genitourinary interventional procedures
    b. Biliary procedures
    c. GI interventional procedures

VASCULAR/INTERVENTIONAL

Rotation 3

Goals:
By the end of this rotation, the Resident should be able to:

1. Demonstrate learning of competency-based objectives and mastery of technical objectives for the third rotation.
2. Continue to refine skills developed during the first two rotations.
3. Participate in education of junior residents.

Objectives:

Medical Knowledge

1. Describe basic technique, indications, contraindications and potential complications/management for following procedures:
    a. Vascular interventions (PTA, stent, lysis)
    b. Embolizations (GI, GU, Trauma, UFA, etc)
    c. Percutaneous biopsies and drainages

2. Describe agents used for embolization including indications and characteristics.

Patient Care

1. Perform/assist in the following interventional procedures under staff supervision:
    a. Vascular interventions
    b. Embolizations
    c. Interventional radiology cancer therapy

2. Perform a minimum of additional 25 Interventional radiology procedures under staff supervision.

VASCULAR/INTERVENTIONAL

Topical Study Aids & Learning Resources:

- Renan Uflacker, Atlas of Vascular Anatomy: An Angiographic Approach, 2nd. Ed., 2006.
- Saadoon Kadir, Atlas of Normal and Variant Angiographic Anatomy, 1991.
- Karim Valji, Vascular and Interventional Radiology, 2nd Ed., 2006
- Kaufman and Lee, Vascular and Interventional Radiology: The Requisites, 2003
- Kandarpa and Aruny, Handbook of Interventional Radiologic Procedures, 2001
- *Abrams Angiography and Interventional Radiology*, 3 volumes
- Editors: S. Baum and M. Pentecost
- S. Kadir: *Diagnostic Angiography*, W. B. Saunders 1986
- SIR: Syllabi on Interventional Radiology

CARDIOTHORACIC RADIOLOGY

Rotation 1

By the end of this rotation, the Resident should be able to:

A. Patient Care: Recognize congestive heart failure. Recognize common congenital cardiac lesions (cyanotic, acyanotic). Assess chamber size on chest radiograph. Recognize cardiac size, pulmonary vascularity and alterations in the intersitium.

B. Medical Knowledge: Appropriately evaluate chest radiographs, cardiac nuclear medicine procedures and coronary angiograms. Understand the coronary and cardiac chamber anatomy, and recognize common abnormalities on cardiac and coronary angiography. Recognize common acquired cardiac disorders including: ischemia and rheumatic heart disease. Identify indwelling vascular lines and items of pulmonary life support, and their appropriate locations.

C. Practice Based Learning and Improvement: Perform all "routine" angiographic and interventional procedures independently (appropriately supervised), with a high degree of skill and success.

D. Interpersonal & Communication Skills: Provide consultative services to other physicians as required in the planning and interpreting of cardiac imaging studies.

E. Professionalism: Commit to high standards of professional conduct, demonstrating altruism, compassion, honesty and integrity. Follow principles of ethics and confidentiality and consider religious, ethnic, gender, educational and other differences in interacting with patients and other members of the health care team.

F. Systems – Based Practice: Understand and integrate all available imaging data on a given case, using that information to synthesize a structured recommendation to the referring physician on the case.

CARDIOTHORACIC RADIOLOGY

Topical Study Aids & Learning Resources:

- Plain Film Interpretation in Congenital Heart Disease, Swischuck
- Radiology Vol 2. Chapters 1 – 86, 91 -132, Tavares and Ferrucci
- Clinical Cardiac Radiology, Jefferson and Rees
- Computed Body tomography with MRI, Lee and Sagel, (Lippincott-Raven)
- Coronary Arteriography – A Practical Approach, Abrams
- CT & MR Angiography - Rubin, G and Rofsky, N, 2008
- Cardiovascular Nuclear Medicine, Lyons
- CT of the Thorax, Nardick
- Congenital Cardiac Radiology, Jefferson
- MRI and CT of the Cardiovascular System, 2nd edition, 2005. Higgins, C. and deRoos, A.
- Clinical Applications of Doppler Ultrasound, 1990. Taylor.
- Applications of Non-invasive Vascular Techniques, 1988. Gerlock, A., Giyanni, V., Krebs, C.
- Diagnostic Imaging-Chest, 1st edition, 2006. Gurnsey (Amarysis)
- Brant, W.E. Fundamentals of Diagnostic Radiology. Williams and Wilkins, Baltimore, 2006.
- Goodman, L.R. Felson's Principles of Chest Roentgenology: A Programmed Text, 3rd edition, W.B. Sanders, Philadelphia, 2006.
- Collins, J., Stern, E.; Chest Radiology: The Essentials. Lippincott, Williams and Wilkins, 1999.
- Haaga, J.R. CT and MRI of the Whole Body (Chapters 22-25). Mosby, St. Louis, 2003.

COMPUTED TOMOGRAPHY

Rotation 1 & 2

By the end of this rotation, the Resident should be able to:

A. Patient Care: Identify variations from normal and distinguish these from CT pathology. Identify CT pathology and recommend the correct course of imaging evaluation / intervention. Independently provide preliminary interpretations as appropriate on emergent patients. Review history of the patient for whom procedures has been ordered and determine the appropriateness of the study requested. Identify normal anatomy. Identify normal variations in anatomy. Know basic CT protocols. Know different types of contrast media. Be familiar with contrast reactions and how to manage them. Know the effects of CT contrast with renal disease and protocol for patients with renal failure. Identify CT pathology for common disease conditions. Provide independent preliminary reads by the second rotation.

B. Medical Knowledge: Have a thorough understanding of CT anatomy, including axial, coronal and sagital planes. Read and dictate the studies performed, with the assistance of the faculty radiologist. Identify CT anatomy in all three plains: axial, coronal and sagital. Read at least 15 cases per day and review with attending physician.

C. Practice Based Learning and Improvement: Understand the physics and mechanical principles related to the performance of CT examinations. Dictate clear concise reports based on discussion with faculty radiologists regarding cases that they have reviewed.

D. Interpersonal & Communication Skills: Assist faculty in the performance of interventional CT procedures, with a clear understanding of the potential patient risks and appropriate emergency intervention. Communicate with the referring physician about any recommendations for change in the type of procedure to be performed. Communicate with the technologist about any special or additional views that should be obtained to demonstrate the pathology identified.

E. Professionalism: Commit to high standards of professional conduct, demonstrating altruism, compassion, honesty and integrity. Follow principles of ethics and confidentiality and consider religious, ethnic, gender, educational and other differences in interacting with patients and other members of the health care team.

F. Systems – Based Practice: Communicate to the referring physician on the day of the exam any significant abnormalities identifies on the examination. Understand and integrate all available imaging data on a given case, using that information to synthesize a structured recommendation to the referring physician on the case.

COMPUTED TOMOGRAPHY

Rotation 3

By the end of this rotation, the Resident should be able to:

A. Patient Care: Identify variations from normal and distinguish these from CT pathology. Identify CT pathology and recommend the correct course of imaging evaluation / intervention. Independently provide preliminary interpretations as appropriate on emergent patients. Review history of the patient for whom procedures has been ordered and determine the appropriateness of the study requested. Demonstrate knowledge of concepts of CT learned in prior rotations. Understand principles of multidetector CT physics.

B. Medical Knowledge: Have a thorough understanding of CT anatomy, including axial, coronal and sagital planes. Read and dictate the studies performed, with the assistance of the faculty radiologist. Review at least 25 cases each day with attending physician. Understand advanced CT concepts and applications such as HRCT, CT enterography, CT Colonography and Cardiac CT and review few cases.

C. Practice Based Learning and Improvement: Understand the physics and mechanical principles related to the performance of CT examinations. Dictate clear concise reports based on discussion with faculty radiologists regarding cases that they have reviewed.

D. Interpersonal & Communication Skills: Assist faculty in the performance of interventional CT procedures, with a clear understanding of the potential patient risks and appropriate emergency intervention. Communicate with the referring physician about any recommendations for change in the type of procedure to be performed. Communicate with the technologist about any special or additional views that should be obtained to demonstrate the pathology identified.

E. Professionalism: Commit to high standards of professional conduct, demonstrating altruism, compassion, honesty and integrity. Follow principles of ethics and confidentiality and consider religious, ethnic, gender, educational and other differences in interacting with patients and other members of the health care team.

F. Systems – Based Practice: Communicate to the referring physician on the day of the exam any significant abnormalities identifies on the examination. Understand and integrate all available imaging data on a given case, using that information to synthesize a structured recommendation to the referring physician on the case.

COMPUTED TOMOGRAPHY

Rotation 4

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Continue to build on the objectives as outlined in Rotation 1 & 2. Independently perform (supervised) interventional CT procedures including; biopsies, drainages, etc.

B. Medical Knowledge: Discuss the various indications for CT examinations and interventional procedures. Demonstrate techniques or direct the technologist in performance of specialized CT scans including but not limited to HRCT of the lung, bone density evaluation. Demonstrate ability to perform all skills listed in previous rotation at the competence level associated with a beginning practitioner in radiology. Read 30 cases per day with attending.

C. Practice Based Learning and Improvement: Understand the application of 3-D imaging techniques to the day to day management of patients.

D. Interpersonal & Communication Skills: Read and dictate studies with minimal assistance from the faculty radiologist. Demonstrate an ability to integrate findings from all imaging modalities in developing a concise differential diagnosis.

E. Professionalism: Commit to high standards of professional conduct, demonstrating altruism, compassion, honesty and integrity. Follow principles of ethics and confidentiality and consider religious, ethnic, gender, educational and other differences in interacting with patients and other members of the health care team.

F. Systems Based Practice: Communicate to the referring physician on the day of the exam any significant abnormalities identifies on the examination. Understand and integrate all available imaging data on a given case, using that information to synthesize a structured recommendation to the referring physician on the case.

COMPUTED TOMOGRAPHY

Topical Study Aids & Learning Resources:

- Fundamentals of Body CT — Helms, Webb, Brant — ISBN: 0721668623
- CT of the Head and Neck — Mancuso
- MRI and CT of the Musculoskeletal System — Firooznia
- Computed Body Tomography with MRI — Lee and Sagel (Lippincott-Raven)
- Diagnostic Neuroradiology — Osborn (Mosby)
- PNRI and CT of the Head and Spine — Grossman (Williams and Wilkins)

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 1

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: List the high risk factors for allergic reaction to intravenous contrast media (GI/GU). Recognize the normal radiographic appearance of structures of the GI/GU tract. Demonstrate knowledge of proper IV techniques, patient positioning, and type of after-films that should be taken for various procedures. Demonstrate initial development of fluoroscopic skills by identifying the more common abnormalities during the performance of GI/GU studies.

B. Medical Knowledge: Identify normal anatomy of the chest as it is seen on the radiograph and CT. Identify and/or describe common variants of normal (chest). State the proper assessment and treatment for allergic reactions to contrast media (GI/GU).

C. Practice Based Learning and Improvement: Demonstrate a basic knowledge of radiologic interpretation (chest). Given an appropriate neuroradiology plain film, make an accurate interpretation of information on the film (head/neck). Given an appropriate radiograph recognize cardiac enlargement (chest). Demonstrate basic knowledge of equipment to be used during fluoroscopy including proper IV techniques for the various procedures, radiation safety features of the machines, and proper radiation safety techniques. Demonstrate fluoroscopy techniques for performing: Barium Swallow, UGI, BE, ACBE, SBFT.

D. Interpersonal & Communication Skills: State the physiologic properties, proper concentrations and proper indications for the use of the following contrast material (GI/GU): barium, water soluble contrast media (oral Hypaque or Gastrografin), Ionic intravenous contrast media, non-ionic intravenous contrast media. Read and dictate the studies performed, with the assistance of the faculty radiologist. Communicate with the referring physician about any recommendations for change in the type of procedure to be performed. (GI/GU).

E. Professionalism: Discuss the proper clinical and radiologic indications for the following studies: (GI/GU): Barium swallow, Upper GI series, BE, ACBE, SBFT. Commit to high standards of professional conduct, demonstrating altruism, compassion, honesty and integrity. Follow principles of ethics and confidentiality and consider religious, ethnic, gender, educational and other differences in interacting with patients and other members of the health care team.

F. Systems – Based Practice: Recognize the following pathologic anatomy in the lungs: (chest): Air space processes; Lobular processes; Interstitial processes. Review history of the patient for whom procedures have been ordered and determine the appropriateness of the study requested. (GI/GU)

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 2

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Describe the stages different types of fractures go through in the process of healing (MSK). List and describe the basic principles of examination of musculoskeletal studies (MSK). Demonstrate knowledge of proper IV techniques, patient positioning, and type of after films that should be taken for various procedures.

B. Medical Knowledge: Discuss various common diseases that give altered patterns of lung disorders. (Chest). Describe the characteristics of common abnormal cardiac shadows (chest). Given an appropriate radiograph, demonstrate a basic knowledge of radiographic abnormalities of the GI/GU tract. (GI/GU). Discuss basic bone physiology (MSK). Identify, with a high level of accuracy, most types of bone fractures. (MSK). Identify normal musculoskeletal structure and some of the normal variants. (MSK). Recognize the commonly used radiographic projections in musculoskeletal radiology.

C. Practice Based Learning and Improvement: Demonstrate increasing development of fluoroscopic skills by identifying the more common abnormalities during the performance of the studies. (GI/GU). Discuss the proper clinical and radiologic indications for the following studies: Enteroclysis, ERCP, Fistulograms, IVU, Cystogram, Voiding cystourethrogram, HSG. Discuss the following information about Glucagon (GI/GU): proper indications and dosages used in GI radiology, Physiologic effects, Side effects, Contraindications.

D. Interpersonal & Communication Skills: Make decisions about when to alert house staff to the immediacy of a condition that is apparent on the radiograph. (chest). Determine when to request that a repeat examination is needed because of technical inadequacy. (chest). Communicate with the technologist about any special or additional views that should be obtained to demonstrate the pathology identified. (GI/GU). Communicate to the referring physician on the day of the exam any significant abnormalities identified on the examination. (All modalities).

E. Professionalism: Commit to high standards of professional conduct, demonstrating altruism, compassion, honesty and integrity. Follow principles of ethics and confidentiality and consider religious, ethnic, gender, educational and other differences in interacting with patients and other members of the health care team.

F. Systems – Based Practice: Arrange musculoskeletal radiographs in an orderly fashion for review and interpretation. (MSK). Performance and interpretation of arthrography. (MSK). Demonstrate fluoroscopy techniques for performing the following procedures: GI/GU): Enteroclysis; ERCP ; Fistulogram; IVU; Cystogram: Voiding cystourethrogram: HSG.

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 3

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Describe the stages different types of fractures go through in the process of healing (MSK). List and describe the basic principles of examination of musculoskeletal studies (MSK). Demonstrate knowledge of proper KV techniques, patient positioning, and type of after films that should be taken for various procedures.

B. Medical Knowledge: Discuss various common diseases that give altered patterns of lung disorders. (Chest). Describe the characteristics of common abnormal cardiac shadows (chest). Given an appropriate radiograph, demonstrate a basic knowledge of radiographic abnormalities of the GI/GU tract. (GI/GU). Discuss basic bone physiology (MSK). Identify, with a high level of accuracy, most types of bone fractures. (MSK). Identify normal musculoskeletal structure and some of the normal variants. (MSK). Recognize the commonly used radiographic projections in musculoskeletal radiology.

C. Practice Based Learning and Improvement: Demonstrate increasing development of fluoroscopic skills by identifying the more common abnormalities during the performance of the studies. (GI/GU). Discuss the proper clinical and radiologic indications for the following studies: Enteroclysis, ERCP, Fistulograms, IVU, Cystogram, Voiding cystourethrogram, HSG. Discuss the following information about Glucagon (GI/GU): proper indications and dosages used in GI radiology, Physiologic effects, Side effects, Contraindications.

D. Interpersonal & Communication Skills: Make decisions about when to alert house staff to the immediacy of a condition that is apparent on the radiograph. (chest). Determine when to request that a repeat examination is needed because of technical inadequacy. (chest). Communicate with the technologist about any special or additional views that should be obtained to demonstrate the pathology identified. (GI/GU). Communicate to the referring physician on the day of the exam any significant abnormalities identified on the examination. (All modalities).

E. Professionalism: Commit to high standards of professional conduct, demonstrating altruism, compassion, honesty and integrity. Follow principles of ethics and confidentiality and consider religious, ethnic, gender, educational and other differences in interacting with patients and other members of the health care team.

F. Systems – Based Practice: Arrange musculoskeletal radiographs in an orderly fashion for review and interpretation. (MSK). Performance and interpretation of arthrography. (MSK). Demonstrate fluoroscopy techniques for performing the following procedures: GI/GU): Enteroclysis; ERCP; Fistulogram; IVU; Cystogram: Voiding cystourethrogram: HSG.

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 4

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: State the indications for computed tomography, plain tomography, MRI and bone scans (MSK). Demonstrate review and/or retention of knowledge requirements set forth for the prior rotations (All modalities). Given a fluoroscopic examination, demonstrate the ability to identify the abnormality at fluoroscopy and modify the technique or change the patient's position to take more diagnostic fluoroscopic spot films. (GI/GU). Demonstrate the ability to perform efficiently through decreasing fluoroscopic time needed to perform a study without compromising diagnostic acumen. (GI/GU).

B. Medical Knowledge: Describe and/or discuss GI/GU tract pathology in specific detail (GI/GU). Demonstrate further development of technical skills of performing the GI/GU studies listed in the first rotation. (GI/GU). Demonstrate improved skill for tube placement, technical performance and interpretation of enteroclysis procedures. (GI/GU).

C. Practice Based Learning and Improvement: Evaluate and integrate data from other studies (CT, MRI, sonography and nuclear medicine) of the GI/GU tract to make recommendations to the referring physician about more appropriate or additional diagnostic studies needed for evaluation of the patient's abnormality. (GI/GU). Given radiograph of a healing bone fracture, determine the stage of bone healing. (MSK).

D. Interpersonal & Communication Skills: Read and dictate studies with less assistance from the faculty radiologist. (GI/GU). Given musculoskeletal radiographs that are not diagnostic without further study, state whether the patient should have additional exams in CT, MR, plain tomography or nuclear imaging. (MSK).

E. Professionalism: Assist with preparation and presentation of GI/GU conferences. (GI/GU). Demonstrate review and/or retention of knowledge requirements set forth for the prior rotations (All modalities). Commit to high standards of professional conduct, demonstrating altruism, compassion, honesty and integrity. Follow principles of ethics and confidentiality and consider religious, ethnic, gender, educational and other differences in interacting with patients and other members of the health care team.

F. Systems – Based Practice: Arrange musculoskeletal radiographs in an orderly fashion for review and interpretation. (MSK). Demonstrate review and/or retention of knowledge requirements set forth for the prior rotations (All modalities). Performance and interpretation of arthrography. (MSK). Demonstrate fluoroscopy techniques for performing the following procedures: GI/GU): Enteroclysis; ERCP; Fistulogram; IVU; Cystogram: Voiding cystourethrogram: HSG.

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 5

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: State the indications for computed tomography, plain tomography, MRI and bone scans (MSK). Given a fluoroscopic examination, demonstrate the ability to identify the abnormality at fluoroscopy and modify the technique or change the patient's position to take more diagnostic fluoroscopic spot films (GI/GU). Demonstrate the ability to perform efficiently through decreasing fluoroscopic time needed to perform a study without compromising diagnostic acumen (GI/GU).

B. Medical Knowledge: Describe and/or discuss GI/GU tract pathology in specific detail Demonstrate review and/or retention of knowledge requirements set forth for the prior rotation. (All Modalities). Demonstrate further development of technical skills of performing the GI/GU studies listed in the first rotation. Demonstrate improved skill for tube placement, technical performance and interpretation of enteroclysis procedures (GI/GU).

C. Practice Based Learning and Improvement: Evaluate and integrate data from other studies (CT, MRI, sonography and nuclear medicine) of the GI/GU tract to make recommendations to the referring physician about more appropriate or additional diagnostic studies needed for evaluation of the patient's abnormality. (GI/GU). Given radiograph of a healing bone fracture, determine the stage of bone healing. (MSK).

D. Interpersonal & Communication Skills: Read and dictate studies with less assistance from the faculty radiologist. (GI/GU). Given musculoskeletal radiographs that are not diagnostic without further study, state whether the patient should have additional exams in CT, MR, plain tomography or nuclear imaging. (MSK).

E. Professionalism: Assist with preparation and presentation of GI/GU conferences. (GI/GU). Demonstrate review and/or retention of knowledge requirements set forth for the prior rotations (All modalities).Commit to high standards of professional conduct, demonstrating altruism, compassion, honesty and integrity. Follow principles of ethics and confidentiality and consider religious, ethnic, gender, educational and other differences in interacting with patients and other members of the health care team.

F. Systems – Based Practice: Arrange musculoskeletal radiographs in an orderly fashion for review and interpretation. (MSK). Demonstrate review and/or retention of knowledge requirements set forth for the prior rotations (All modalities). Performance and interpretation of arthrography. (MSK). Demonstrate fluoroscopy techniques for performing the following procedures: GI/GU): Enteroclysis; ERCP; Fistulogram; IVU; Cystogram: Voiding cystourethrogram: HSG.

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 6

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Read routine chest films with a high level of accuracy and efficiency. (Chest) Given an appropriate radiograph, identify the following categories of bone pathology (MSK): Inflammatory processes; bone tumors; Congenital and acquired diseases; Metabolic diseases. Given a radiograph demonstrating bone pathology listed, and pertinent clinical/pathological information, identify common pathologies in each category. (MSK).

B. Medical Knowledge: Name and describe the various common types of bone and joint trauma, other than fractures. (MSK). Name and differentiate between various forms of arthritis, including laboratory and clinical findings of each type. (MSK). State the radiographic features that differentiate benign and malignant bone tumors. (MSK) Name and describe clinical/pathological/radiological features of metabolic bone diseases. (MSK). Name and describe clinical/pathological/radiological features of congenital and acquired bone pathologies. (MSK) Describe the radiographic features of inflammatory bone/join diseases. (MSK)

C. Practice Based Learning and Improvement: Prepare and present the radiographic components of the radiology/pathology and chest conferences. (Chest)

D. Interpersonal & Communication Skills: Demonstrate increasing skill in quality and quantity of dictation of musculoskeletal images. (MSK)

E. Professionalism: Assist with preparation and presentation of GI/GU conferences. (GI/GU). Demonstrate review and/or retention of knowledge requirements set forth for the prior rotations (All modalities).Commit to high standards of professional conduct, demonstrating altruism, compassion, honesty and integrity. Follow principles of ethics and confidentiality and consider religious, ethnic, gender, educational and other differences in interacting with patients and other members of the health care team.

F. Systems – Based Practice: Given a patient with a musculoskeletal pathology, review radiographs and clinical history, then make decision about the appropriateness of nuclear, CT, and/or MR imaging. (MSK)

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 7

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Show improvement in performance of the skills listed in the previous rotations. (GI/GU). Demonstrate improvement of decision-making skills listed in previous rotation. (All modalities) Integrate knowledge of all radiologic imaging modalities for evaluation of GI/GU pathology so that the most appropriate study will be done and studies will be done in the proper sequence. (GI/GU).

B. Medical Knowledge: Name and describe characteristics of chest pathologies that are seen infrequently in routine work but have distinctive radiographic and/or clinical pathological signs. (chest) Correlate pathological and clinical data with radiographic findings on the chest file. (Chest)

C. Practice Based Learning and Improvement: Demonstrate the technical skills and interpret the results of a defacography study. (GI/GU).

D. Interpersonal & Communication Skills: Discuss, with increased understanding, GI/GU tract pathology. (GI/GU)

E. Professionalism: Read and dictate studies with minimal assistance from the faculty radiologist. (All modalities)

F. Systems – Based Practice: Determine which cases can be interpreted and dictated independently and which cases require the assistance of a faculty radiologist. (Chest)

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 8

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Demonstrate continued increase in knowledge in the areas listed in the previous rotations. (All modalities)

B. Medical Knowledge: Demonstrate ability to perform all skills listed in previous rotations at the competence level associated with a beginning practitioner in radiology. (All modalities).

C. Practice Based Learning and Improvement: Demonstrate ability to perform all skills listed in previous rotations at the competence level associated with a beginning practitioner in radiology. (All modalities).

D. Interpersonal & Communication Skills: Discuss, with increased understanding, GI/GU tract pathology. (GI/GU)

E. Professionalism: Read and dictate studies with minimal assistance from the faculty radiologist. (All modalities)

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 9

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Consult, with confidence, with the primary care physicians and surgeons in regard to most imaging procedures. (All modalities) Serve as a consultant to attending staff, discussing their patient's cases and offering recommendations for additional imaging studies as necessary.

B. Medical Knowledge: Render preliminary readings with a high degree of skill and accuracy.

C. Practice Based Learning and Improvement: Demonstrate a high degree of accuracy in interpreting and dictating cases, identifying consistently those cases with which assistance is needed. (All modalities)

D. Interpersonal & Communication Skills: Dictate reviewed cases in an expedited fashion with quality concise reports.

E. Professionalism: Independently prepare and discuss cases with the faculty.

F. Systems – Based Practice: Be comfortable with presenting cases both in small groups as well as in conference settings.

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 10

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Consult, with confidence, with the primary care physicians and surgeons in regard to most imaging procedures. (All modalities) Serve as a consultant to attending staff, discussing their patient's cases and offering recommendations for additional imaging studies as necessary.

B. Medical Knowledge: Render preliminary readings with a high degree of skill and accuracy.

C. Practice Based Learning and Improvement: Demonstrate a high degree of accuracy in interpreting and dictating cases, identifying consistently those cases with which assistance is needed. (All modalities)

D. Interpersonal & Communication Skills: Dictate reviewed cases in an expedited fashion with quality concise reports.

E. Professionalism: Independently prepare and discuss cases with the faculty.

F. Systems – Based Practice: Be comfortable with presenting cases both in small groups as well as in conference settings.

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 11

By the end of this rotation, the Resident should be able to:

A. Medical Knowledge: Understand the pathologic basis of diseases by employing radiologic-pathologic correlation in their identification.

B. Patient Care: Apply the principals of radiologic-pathologic correlation to the interpretation of radiologic studies. Apply an understanding of the clinical and pathologic implications of the radiological appearances of image interpretation. Refine differential diagnoses in various organ systems based on specific imaging features.

C. Systems Based Practice: Experience the day to day operation of an Armed Forces Medical Post with it's variety of equipment, staff and opportunities for increasing knowledge not only in radiology but other areas.

D. Practice Based Learning & Improvement: Endeavor to achieve excellence in the technologically advancing specialty of radiology by employing radiologic pathologic correlation in the identification of disease.

E. Professionalism: Follow principles of ethics and confidentiality and consider religious, ethnic, gender, educational and other differences in interacting with patients and other members of the team.

F. Interpersonal & Communication Skills: Interact with members of other diagnostic radiology programs, including those from other countries, in an environment

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 12

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Consult, with confidence, with the primary care physicians and surgeons in regard to most imaging procedures. (All modalities) Serve as a consultant to attending staff, discussing their patient's cases and offering recommendations for additional imaging studies as necessary.

B. Medical Knowledge: Render preliminary readings with a high degree of skill and accuracy.

C. Practice Based Learning and Improvement: Demonstrate a high degree of accuracy in interpreting and dictating cases, identifying consistently those cases with which assistance is needed. (All modalities)

D. Interpersonal & Communication Skills: Dictate reviewed cases in an expedited fashion with quality concise reports.

E. Professionalism: Independently prepare and discuss cases with the faculty.

F. Systems – Based Practice: Be comfortable with presenting cases both in small groups as well as in conference settings.

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 13

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Consult, with confidence, with the primary care physicians and surgeons in regard to most imaging procedures. (All modalities) Serve as a consultant to attending staff, discussing their patient's cases and offering recommendations for additional imaging studies as necessary.

B. Medical Knowledge: Render preliminary readings with a high degree of skill and accuracy.

C. Practice Based Learning and Improvement: Demonstrate a high degree of accuracy in interpreting and dictating cases, identifying consistently those cases with which assistance is needed. (All modalities)

D. Interpersonal & Communication Skills: Dictate reviewed cases in an expedited fashion with quality concise reports.

E. Professionalism: Independently prepare and discuss cases with the faculty.

F. Systems – Based Practice: Be comfortable with presenting cases both in small groups as well as in conference settings.

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 14

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Consult, with confidence, with the primary care physicians and surgeons in regard to most imaging procedures. (All modalities) Serve as a consultant to attending staff, discussing their patient's cases and offering recommendations for additional imaging studies as necessary.

B. Medical Knowledge: Render preliminary readings with a high degree of skill and accuracy.

C. Practice Based Learning and Improvement: Demonstrate a high degree of accuracy in interpreting and dictating cases, identifying consistently those cases with which assistance is needed. (All modalities)

D. Interpersonal & Communication Skills: Dictate reviewed cases in an expedited fashion with quality concise reports.

E. Professionalism: Independently prepare and discuss cases with the faculty.

F. Systems – Based Practice: Be comfortable with presenting cases both in small groups as well as in conference settings.

GENERAL (Chest, GI, GU, Musculoskeletal)

Rotation 15

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Consult, with confidence, with the primary care physicians and surgeons in regard to most imaging procedures. (All modalities) Serve as a consultant to attending staff, discussing their patient's cases and offering recommendations for additional imaging studies as necessary.

B. Medical Knowledge: Render preliminary readings with a high degree of skill and accuracy.

C. Practice Based Learning and Improvement: Demonstrate a high degree of accuracy in interpreting and dictating cases, identifying consistently those cases with which assistance is needed. (All modalities)

D. Interpersonal & Communication Skills: Dictate reviewed cases in an expedited fashion with quality concise reports.

E. Professionalism: Independently prepare and discuss cases with the faculty.

F. Systems – Based Practice: Be comfortable with presenting cases both in small groups as well as in conference settings.

GENERAL (Chest, GI, GU, Musculoskeletal)

Topical Study Aids & Learning Resources:

Chest:

- Synopsis of Diseases of the Chest, 3rd edition (Saunders), 2005 — Fraser, Pare
- Thoracic Radiology, The Requisites (Mosby), 1999. — McLoud
- Chest Roentgenology (Saunders), 1973 — Felson, B.
- Chest Radiology, Plain Film Patterns and Differential Diagnoses — Reed

Bone:

- The Radiology of Acute Cervical Spine Trauma — Harris, Williams & Wilkins
- Bone and Joint Imaging, 3rd edition (Saunders),2005 — Resnick
- Arthritis in Black and White, 2nd edition, 1997 — Brower & Saunders
- Imaging of Orthopedic Trauma — Berquist. Raven
- Differential Diagnosis of Tumors and Tumor-Like Lesions of Bones and Joints — Adam MD. Greenspan, Wolfgang, MD Remagen
- Muscoloskeletal Radiology, The Requisites — Odeda. Debra NA
- Bone Tumor book — Edeikin

GI:

- Gastrointestinal Radiology, The Requisites, 3rd edition, 2006. Halpert (Mosby)
- Gastrointestinal Radiology, 2nd edition, 1990. Eisenberg (Lippincott)
- Dynamic Radiology of the Abdomen — Meyers. Springer-Verlag
- Textbook of Gastrointerstinal Radiology, 3rd edition, 2008. Gore, Levine, Laufer
- Double Contrast GI Radiology — Laufer

GU:

- Radiology of the Kidney — Davidson. Saunders
- The Tailored Urogram — Lalli
- Requisites in Radiology: Genitourinary Radiology, 2nd edition, 2004. Ronald J. Zagoria (Mosby)
- Textbook of Uroradiology, 4th edition, 2009. Dunnick, N.R. (Lippincott)

General:

- The Radiology of Emergency Medicine, 4th edition, 1999. — Harris, Williams & Wilkins (Lippincott)
- ACR Syllabi
- Essentials of Radiology — Paul & Juhl
- Textbook of Diagnostic Imaging — Sutton
- Fundamentals of Diagnostic Radiology, 3rd edition, 2008 — William E. Brant, Clyde A. Helms (Lippincott)
- Diagnostic Imaging Series (All textbooks). — AMIRSYS

MAMMOGRAPHY

Rotation 1

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Make a preliminary review of mammogram films and advise the technologist on the need for additional films. Select cases for appropriate ultrasound examination. Assist with and perform needle localization of breast masses and calcifications. Select lesions appropriate for stereotactic and ultrasound-guided core biopsy. Perform same with supervision. Learn the proper indication for Breast MRI, the basic principles for the basis of MRI interpretation and biopsies.

B. Medical Knowledge: Given a mammogram, identify normal vs. abnormal anatomic structures. Be able to establish a plan for follow-up protocol for probably benign lesions. Interpret breast ultrasound examinations. Know the etiology of breast cancer and assessment of risk. Know the anatomy, physiology and histology of the breast. Perform directed breast ultrasound and ultrasound biopsy procedures with technologist's assistance.

C. Practice Based Learning and Improvement: Be aware of federal and state laws regarding MQSA, certification, etc. Efficacy of screening. Breast Cancer staging. Natural history of Breast cancer including DCIS. Have acquired sufficient reviewed cases to meet MQSA and State requirements for an interpreting Physician.

D. Interpersonal & Communication Skills: Discuss technical and physical factors unique to the production of a mammogram. Knowledge of routine and additional supplementary views for Mammography. Recognize indications for, and interpretation of, ductograms.

E. Professionalism: Utilize and analyze mammographic, sonographic, and MRI imaging to detect and characterize lesions and appropriately recommend continued imaging surveillance vs. biopsy or other intervention. Recommend appropriate image guided biopsy vs. surgical biopsy for suspicious lesions.

F. Systems – Based Practice: ACR-BIRADS Lexicon for terminology and coding used in mammography reports. Conducting a mammography practice audit. Read and dictate mammograms after review by the attending radiologist.

MAMMOGRAPHY

Rotations 2 & 3

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Make a preliminary review of mammogram films and advise the technologist on the need for additional films. Select cases for appropriate ultrasound examination. Assist with and perform needle localization of breast masses and calcifications. Select lesions appropriate for stereotactic and ultrasound-guided core biopsy. Perform same with supervision.

B. Medical Knowledge: Given a mammogram, identify normal vs. abnormal anatomic structures. Able to establish a plan for follow-up protocol for probably benign lesions. Interpret breast ultrasound examinations. Etiology of Breast Cancer and assessment of risk. Anatomy, physiology and histology of the breast. Perform directed breast ultrasound and ultrasound biopsy procedures with technologist's assistance.

C. Practice Based Learning and Improvement: Be aware of federal and state laws regarding MQSA, certification, etc. Efficacy of screening. Breast Cancer staging. Natural history of Breast cancer including DCIS. Have acquired sufficient reviewed cases to meet MQSA and State requirements for an interpreting Physician.

D. Interpersonal & Communication Skills: Discuss technical and physical factors unique to the production of a mammogram. Knowledge of routine and additional supplementary views for Mammography. Recognize indications for, and interpretation of, ductograms.

E. Professionalism: Utilize and analyze mammographic and sonographic imaging to detect and characterize lesions and appropriately recommend continued imaging surveillance vs. biopsy or other intervention. Recommend appropriate image guided biopsy vs. surgical biopsy for suspicious lesions.

F. Systems – Based Practice: ACR-BIRADS Lexicon for terminology and coding used in mammography reports. Conduct a mammography practice audit. Read and dictate mammograms after review by the attending radiologist.

MAMMOGRAPHY

Topical Study Aids & Learning Resources:

- Mammography: The Requisites ISBN: 0323019692, Mosby, 2005. Ikeda, Debra NA Professor of Radiology, Stanford University, School of Medicine
- Breast Imaging Reporting and Data System, 4th edition, 2003. ACR
- Diagnosis of Diseases of the Breast, 2nd edition, 2005. Bassett, Saunders
- Screening Mammography, 1993. Potchen, et.al (Mosby)
- Breast Imaging, 3rd edition, 2006. Kopans (Lippincott)
- Mammographic Interpretation, 2nd edition, 1996. Homer (McGraw-Hill)
- Breast Imaging Atlas Laxlo Tabar
- Atlas Film-Screen Mammography DeParedes
- ACR Syllabi
- Diseases of the Breast. Harris, Lippman, Morrow, Osborne
- Breast MRI: Diagnosis and Intervention, 1st edition, April 26, 2005. Morris (Springer)
- Practical MR Mammography. Fisher
- Breast Imaging Companion. Cardenosa

MRI

Rotation 1

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Develop independently an appropriate imaging plan when presented with a patient's symptoms and preexisting clinical / laboratory information. Know MR physics. Have the ability to protocol a study based on clinical indications and patient symptoms. Know about MR safety issues. Know the biochemistry indications and contraindications of gadolinium based contrast agents. Learn contrast reactions and how to manage them. Know normal MR anatomy of brain, abdomen, and pelvis. Know normal variations. Be knowledgeable in MR pathology of common diseases.

B. Medical Knowledge: Direct MRI technologists in the appropriate sequences for most routine MRI imaging requests.

C. Practice Based Learning and Improvement: Understand the physical principles governing the performance of MRI examinations. Understand basic MRI sequences and their application to: Neuroimaging, Musculoskeletal and Body Imaging.

D. Interpersonal & Communication Skills: Dictate a concise accurate report of the imaging findings in all types of MRI examinations. Consult with attending / referral physicians regarding the cases that the resident has been involved with in a professional and collegial fashion.

E. Professionalism: Participate in and contribute to research projects and understand their impact on patient care and patient imaging. By working with the faculty during the development of various MARI applications, understand the ramifications of new technologies on existing understanding of disease and the impact of these technologies on the ultimate costs of health care.

F. Systems – Based Practice: Independently evaluate MRI exams for all body areas, being able to present those exams to the assigned faculty member for discussion.

MRI

Rotation 2

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Improve on their differential diagnosis knowledge and skills. Independently review screening mammographic exams with the ability to point out to faculty areas of concern with logical diagnostic plan to present. Demonstrate a clear understanding of the process necessary to appropriately triage fluoroscopy patients for the appropriate examination. Develop appropriate differential diagnoses for the individual patient without generation of long lists of unlikely but possible differentials. Learn MR artifacts. Understand the value and limitations of MR examination.

B. Medical Knowledge: Advise the technologist about special views or specific parameters of the study that require special attention.

C. Practice Based Learning and Improvement: Apply basic science considerations in relation to the radiologic manifestations of disease. Review at least 7-10 cases per day with attending physician.

D. Interpersonal & Communication Skills: Discuss thoroughly the ultrasound procedures and findings in the array of cases presented for daily review, including abdomen, pelvis, and obstetrical ultrasound. Consult with attending/ referral physicians regarding the cases that the resident has been involved with in a professional and collegial fashion.

E. Professionalism: Independently review general radiographic studies, knowing when to consult with faculty members regarding the findings of the examination. Provide preliminary reports where appropriate, developing confidence in their decision making skills. Understand the value of review of current literature, and its application to the day to day practice of radiology in the community.

F. Systems – Based Practice: Direct a mammography technologist in the correct positioning of diagnostic images for the diagnostic work-up of a given finding.

MRI

Rotation 3

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Develop independently an appropriate imaging plan when presented with a patient's symptoms and preexisting clinical / laboratory information.

B. Medical Knowledge: Direct MRI technologists in the appropriate sequences for most routine MRI imaging requests.

C. Practice Based Learning and Improvement: Understand the physical principles governing the performance of MRI examinations. Understand basic MRI sequences and their application to: Neuroimaging, Musculoskeletal, and Body Imaging. Review 15 cases per day with an attending physician.

D. Interpersonal & Communication Skills: Dictate a concise accurate report of the imaging findings in all types of MRI examinations. Consult with attending / referral physicians regarding the cases that the resident has been involved with in a professional and collegial fashion.

E. Professionalism: Participate in and contribute to research projects and understand their impact on patient care and patient imaging. By working with the faculty during the development of various MARI applications, understand the ramifications of new technologies on existing understanding of disease and the impact of these technologies on the ultimate costs of health care.

F. Systems – Based Practice: Independently evaluate MRI exams for all body areas, being able to present those exams to the assigned faculty member for discussion.

MRI

Rotation 4

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Develop independently an appropriate imaging plan when presented with a patient's symptoms and preexisting clinical / laboratory information.

B. Medical Knowledge: Direct MRI technologists in the appropriate sequences for most routine MRI imaging requests.

C. Practice Based Learning and Improvement: Understand the physical principles governing the performance of MRI examinations. Understand basic MRI sequences and their application to: Neuroimaging, Musculoskeletal and Body Imaging. Review 20 cases per day with an attending physician.

D. Interpersonal & Communication Skills: Dictate a concise accurate report of the imaging findings in all types of MRI examinations. Consult with attending / referral physicians regarding the cases that the resident has been involved with in a professional and collegial fashion.

E. Professionalism: Participate in and contribute to research projects and understand their impact on patient care and patient imaging. By working with the faculty during the development of various MARI applications, understand the ramifications of new technologies on existing understanding of disease and the impact of these technologies on the ultimate costs of health care.

F. Systems – Based Practice: Independently evaluate MRI exams for all body areas, being able to present those exams to the assigned faculty member for discussion.

MRI

Topical Study Aids & Learning Resources:

- Fundamentals of Diagnostic Radiology — Brant and Helms ISBN:0683300938
- Magnetic Resonance Imaging — Stark and Bradley
- Computed Body tomography with MRI — Lee & Sagel
- MRI of the Spine — Modic
- Craniospinal MRI — Pomeranz
- MRI Joints — Pomeranz
- MRI Knee — Mink
- MRI of Brain and Spine — Atlas
- Video Tape collection in MSU Learning Laboratory
- MRI and CT of the Musculoskeletal System — Firooznia
- Neuroradiology — Osborn
- Diagnostic Neuroradiology — Traverras
- Textbook of Radiology — Brant and Helms
- Diagnosis of Diseases of the Chest — Fraser and Pare
- Radiology of Bone Disease — Greenfield
- Clinical Urology — Pollak
- Radiology of the Newborn and Young Infant — Swischuk
- Esophagus — Levine
- Diagnosis of Bone and Joint Disorders — Resnick
- Radiology of Upper GI, Small Bowel and Colon — Marshak
- Double Contrast GI Radiology — Laufer
- GI Radiology — Eisenberg
- Orthopedic Radiology — Greenspan
- Textbook of Diagnostic Imaging — Sutton
- Musculoskeletal MRI, 2nd edition, Nov. 4, 2008. — Helms (Saunders)
- Breast MRI: Diagnosis and Intervention, 1st edition, April 26, 2005. Morris (Springer)
- Diagnostic Imaging Series (All textbooks) — Amirsys
- STATdx (Internet based system available through FAME Radiology website and at MR Centers)

NEURORADIOLOGY

Rotation 1

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Given an appropriate abnormal image, recognize basic neuropathology and give a differential diagnosis. Given an appropriate neuroradiology plain film make an accurate interpretation of the information on the film. Screen, prescribe, and supervise routine neuroimaging procedures.

B. Medical Knowledge: Given normal neuron images, demonstrate a proficient knowledge of the anatomy of the head and neck, spine and central nervous system. Given appropriate films, demonstrate a thorough knowledge of the vascular anatomy of the central nervous system.

C. Practice Based Learning and Improvement: Demonstrate proficiency in performance and interpretation of lumbar, dorsal and cervical myelograms. Demonstrate proficiency as an assistant angiographer for routine neuroangiography.

D. Interpersonal & Communication Skills: Interact with primary care physicians and neurologists in consultation when more common pathologies are at question.

E. Professionalism: Discuss the basic principles of CT and MRI physics. Describe, in considerable detail, CT and MR imaging protocols. Perform, in a responsible manner, pre-angiography patient consultations and post procedure patient follow-ups, identifying patient conditions that require specific action on the part of the angiography team.

F. Systems – Based Practice: Supervise and screen imaging patient sedation.

NEURORADIOLOGY

Rotation 2

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Make decisions based on patient conditions when consulting with the patient pre or post procedure. Conduct, with guidance from the attending radiologist, pre-angiographic patient consultation and post-procedure patient follow up.

B. Medical Knowledge: Make decisions to modify a neuroangiographic procedure when unexpected pathology or angiographic abnormalities occur, then follow through with the performance and supervision of the procedure. Demonstrate increased ability to recognize pathology and discuss a differential diagnosis.

C. Practice Based Learning and Improvement: Perform with increasing levels of skill in myelography and angiography.

D. Interpersonal & Communication Skills: Dictate neuroimaging studies after review with the attending neuroradiologist. Consult, with increasing confidence, with primary care physicians and neurologists in regard to most neuroimaging procedures.

E. Professionalism: Discuss criteria for modifying studies, depending on the expected pathology or angiographic abnormalities. Screen, prescribe, and supervise, with an increasing level of responsibility, most neuroimaging procedures.

F. Systems – Based Practice: Demonstrate increasing ability to accept responsibility for performance and supervision of neuroradiologic procedures.

NEURORADIOLOGY

Rotation 3

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Make decisions based on patient conditions when consulting with the patient pre or post procedure.

B. Medical Knowledge: Make decisions to modify a neuroangiographic procedure when unexpected pathology or angiographic abnormalities occur, then follow through with the performance and supervision of the procedure. Demonstrate increased ability to recognize pathology and discuss a differential diagnosis.

C. Practice Based Learning and Improvement: Perform with increasing levels of skill in myelography and angiography.

D. Interpersonal & Communication Skills: Dictate neuroimaging studies after review with the attending neuroradiologist. Consult, with increasing confidence, with primary care physicians and neurologists in regard to most neuroimaging procedures.

E. Professionalism: Discuss criteria for modifying studies, depending on the expected pathology or angiographic abnormalities. Screen, prescribe, and supervise, with an increasing level of responsibility, most neuroimaging procedures.

F. Systems – Based Practice: Demonstrate increasing ability to accept responsibility for performance and supervision of neuroradiologic procedures.

NEURORADIOLOGY

Topical Study Aids & Learning Resources

- Neuroradiology: The Requisites (Requisites in Radiology), 2nd edition, 2003 ISBN: 032300508X Robert I. Grossman, David M. Yousem (Mosby)
- Introduction to Cerebral Angiography, 2nd edition, 1998. Osborn (Lippincott)
- Head and Neck Imaging, 3rd edition, 2003. Som, Peter (Mosby)
- Neuroradiology, 1st edition, January 15, 1994. Osborn (Mosby)
- MRI of Brain and Spine, 4th edition, 2008. Atlas, S.C. (Lippincott)
- Diagnostic Imaging: Brain, 1st edition, 2004. Osborn (AMIRSYS)
- Diagnostic Imaging: Head and Neck, 1st edition, 2004. Harnsberger (AMIRSYS)
- Diagnostic Imaging: Spine, 1st edition, 2004. Ross (AMIRSYS)

NUCLEAR MEDICINE

Rotation 1

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Review histories of patients to be imaged each day to: determine the relevance of the study to clinical symptoms, evaluate for contraindications to the study, and advise technologists about special views or specific parameters of the study that require special attention. Assist technologists in the determination of the radiopharmaceutical dosage when patient conditions do not fit the criteria of the standard dose.

B. Medical Knowledge: Demonstrate a thorough knowledge of the clinical indications, general procedures, including radiopharmaceutical and dose, and scintigraphic findings in: Pulmonary (emboli) ventilation and perfusion imaging; Hepatobiliary imaging and functional studies; GI blood loss imaging; Bone imaging; Testicular torsion. Be familiar with V/Q Scans, Hepatorbilliary imaging including pharmacological interventions, GI Blood loss studies, bone imaging including three-phase bone imaging. Be familiar with nuclear myocardial perfusion studies, including anatomy, myocardial perfusion, and systolic components. Be aware of nuclear thyroid imaging and uptake protocols, indications and findings.

C. Practice Based Learning and Improvement: Identify the isotopes, including physical and chemical properties that are used routinely in the compounding of radiopharmaceuticals for nuclear radiology procedures. Master elution and quality control of the generator, gamma camera setup and quality control, radiation safety principles, NRC regulations pertaining to use of reactor-produced radiopharmaceauticals, state regulations regarding the use of non-reactor produced radiopharmaceauticals, the use of uptake probae systems, wellcounter, survey meter, GM counter and other equipment in nuclear medicine, maintain a log of all activities including type and quantity of different radiopharmaceutical uses observed and participated in, visit a commercial nuclear pharmacy, visit and observe DEXA studies, observe PET/CT studies.

D. Interpersonal & Communication Skills: Discuss the basic physical principles of nuclear medicine imaging and instrumentation. Make a preliminary review of the images and advise technologists when additional views, repeat views or correlative radiographs are needed.

E. Professionalism: Have a basic understanding of all imaging performed in the Nuclear Medicine department. Collect and maintain a log of all interesting cases observed and show them at conferences.

F. Systems – Based Practice: Observe at least one of each of the different scans routinely performed, as well as all the infrequently ordered studies.

NUCLEAR MEDICINE

Rotation 2

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Discuss criteria for allowing patients who receive > 33mCi to be sent home immediately.

B. Medical Knowledge: Demonstrate a thorough knowledge of the clinical indications, general procedures, including radiopharmaceutical and dose, and scintigraphic findings in: Renal and urinary tract studies; Liver/spleen imaging; GI tract imaging and functional studies; Brain imaging and functional studies; tumor and abscess imaging. Identify and discuss indications for isotopes used for therapeutic purposes. Demonstrate a thorough knowledge of clinical indications protocols, anatomy, nuclear myocardial perfusion, systolic function, and clinical relevance of interpretations for nuclear myocardial perfusion studies. Demonstrate a thorough knowledge of nuclear thyroid imaging and uptake studies including indications, protocols, findings and clinical relevance. Gain exposure to PET CT.

C. Practice Based Learning and Improvement: Assist with radioactive therapy treatments, making sure the consent form is completed properly and that the appropriate dose is administered, giving particular attention to radiation safety practices during the procedure.

D. Interpersonal & Communication Skills: Read and / or dictate films with the assistance and review of the faculty radiologist. Review all scans as they are performed for significant findings that require prompt attention, and make decisions in regard to notification of the referring physician if the faculty radiologist is not available for consultation.

E. Professionalism: Recognize limitations in personal skill and knowledge, always making sure dictations and consultations are checked by the faculty radiologist. Assist with preparation and presentation of cases for resident film review.

F. Systems – Based Practice: Describe the protocol for using I-131 for treatment of hyperthyroidism and thyroid malignancies, including protocol for release or hospitalization and monitoring of patients who receive over 33 mCi of activity.

NUCLEAR MEDICINE

Rotation 3

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Make preliminary decisions on all matters of film interpretation and consultation. Perform radiopharmaceutical therapy including management and evaluation of patients with hyperthyroidism, thyroid cancer, radioimmunotherapy of indolent lymphomas and use of unsealed radiopharmaceuticals for management of bone pain from metastatic disease, metastatic liver disease, brain tumors, arthritis and other emerging indications.

B. Medical Knowledge: Comment on anatomical findings, scanning technique, and reasons for doing the study to medical students in such a way that the students will be able to develop an appreciation for the value of nuclear radiology procedures in patient management. Understand clinical indications and basics of FDG metabolism.

C. Practice Based Learning and Improvement: Assist with radioactive therapy treatments, making sure the consent form is completed properly and that the appropriate dose is administered, giving particular attention to radiation safety practices during the procedure.

D. Interpersonal & Communication Skills: Review and dictate with the faculty radiologist all scans performed.

E. Professionalism: Identify normal and abnormal findings on all imaging and functional studies, other than nuclear cardiology studies.

F. Systems – Based Practice: Discuss all aspects of nuclear studies, including indications, pathologies, protocols, correlative studies, radiopharmaceuticals used for each study, and various parameters that might interfere with the results of the procedure.

NUCLEAR MEDICINE

Rotation 4

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Discuss patient conditions and patient monitoring requirements, particularly in relation to exercise and drug stress studies. Calculate patient doses, using information related to decay factors, volume concentration, and patient parameters.

B. Medical Knowledge: Demonstrate a thorough knowledge of the clinical indications, general procedures, and findings in: all requirements from previous rotations plus knowledge of multi-gated acquisition imaging and function studies, myocardial infarct imaging, and lymphoscintigraphy. Demonstrate knowledge of myocardial perfusion studies (rest and stress); Inject, monitor, and mark nodes for lymphoscrintigraphy. Discuss the following information regarding all radiopharmaceuticals used in nuclear radiology studies: production and physical properties of isotopes; Generation elution and quality control; compounding of radiopharmaceuticals; Radiochemical quality control; Biodistribution and mechanisms of localization. Demonstrate thorough knowledge of PET CT protocols, clinical indications, findings, and clinical impact.

C. Practice Based Learning and Improvement: Demonstrate an in-depth understanding of the physics of nuclear radiology. Assist with radioactive therapy treatments, making sure the consent form is completed properly and that the appropriate dose is administered, giving particular attention to radiation safety practices during the procedure.

D. Interpersonal & Communication Skills: Describe the procedures and rationale for instrument quality control in nuclear medicine. Describe the radiopharmaceuticals used in cardiac nuclear studies, including the methods of red cell labeling, patient dosages, and physical properties of the isotopes discuss the range of invasive and noninvasive tests, test characteristics, and the prognostic value of tests used to evaluate cardiac disease.

E. Professionalism: Compound radiopharmaceuticals from kits and do appropriate quality control procedures. Elute a generator and do appropriate quality control procedures. Calculate and draw up patient doses. Demonstrate appropriate use of a survey meter to monitor radioactivity spills or other sources. Perform a wipe test. Perform quality control procedures on cameras, well/uptake probes, and dose calibrators. Handle radioactive sources according to the established guidelines. Select tests for evaluation for evaluation of cardiac disease on the basis of patient condition and clinical symptoms. Correlate the results from various tests with interpretation of nuclear cardiology exams.

F. Systems – Based Practice: Process computer data obtained in each of the different cardiac studies. Discuss rules and regulations that apply to the practice of nuclear radiology as outlined in 10CFR20 and other appropriate sources. Describe the types of records that must be

maintained in order to comply with federal and state guidelines for radiation safety and radioisotope receipt, use and disposal. Carry out the practice of nuclear radiology with due regard to quality control, quality assurance and radiation safety for patient and personnel.

NUCLEAR MEDICINE

Required Reading, Topical Study Aids & Learning Resources

- Essentials of Nuclear Medicine Imaging, 5th Edition 2006.
  Milton J. Guiberteau, Fred A. Mettler ISBN: 0721651216
- Nuclear Medicine: The Requisites, 3rd edition, 2006. James H. Thrall, Harvey A. Ziessman (Mosby) ISBN: 032300537
- Braunwald's Textbook of Cardiac, Nuclear Cardiology, Chapter 14.
- Diagnostic Imaging: Nuclear Medicine, 2007. Morton (AMIRSYS).
- ACR Syllabi

PEDIATRIC RADIOLOGY

Rotation 1

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Make preliminary review of outpatient and pediatric ICU films and discuss findings with the radiologist, then dictate as directed. Assist the technologist in preparation of the patient for fluoroscopic examination (e.g., enemas, etc).

B. Medical Knowledge: Identify normal and abnormal airways on chest x-ray of the infant or older child. Identify abnormalities associated with neonatal chest, including congenital heart. Identify normal variants on skeletal radiographs. Establish bone age on the basis of radiographic findings.

C. Practice Based Learning and Improvement: Identify normal vs. abnormal skeletal structures (esp. extremities on a bone survey). Describe the proper procedure for fluoroscopy of an infant / older child.

D. Interpersonal & Communication Skills: Assist with preparation and presentation of cases for conferences.

E. Professionalism: Recognize limitations in personal knowledge and skills, being careful to not make decisions beyond the level of personal competence.

F. Systems – Based Practice: Sit in on all reading sessions with the attending radiologist, including pediatric ICU and occasionally neonatal ICU.

PEDIATRIC RADIOLOGY

Rotation 2

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Describe positioning techniques and technical factors leading to optimum chest, abdomen, GI and GU radiographs of the infant and older child. Perform fluoroscopic procedures with the assistance of the radiologist.

B. Medical Knowledge: Understand normal anatomy of infants and children on cross-sectional images including CT and ultrasound. Add to knowledge base in chest radiology and congenital diseases of the heart through continued reading of films and case reviews. Increase the knowledge base of pathological processes based on cross-sectional imaging.

C. Practice Based Learning and Improvement: Review PICU and NICU films as they are done for completeness of study and for significant findings that require prompt attention and make decision in regard to notification of the referring physician if the radiologist is not immediately available for consultation.

D. Interpersonal & Communication Skills: Determine bone ages and dictate findings. Dictate films (esp. chest, abdomen, GI, GU) with assistance of the radiologist.

E. Professionalism: Assist with preparation and present cases at weekly pediatric conferences. Recognize limitations in personal knowledge and skills, being careful to not make decisions beyond the level of personal competence.

F. Systems – Based Practice: Sit in on all reading sessions with the attending radiologist, including pediatric ICU and occasionally neonatal ICU.

PEDIATRIC RADIOLOGY

Rotation 3

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Perform fluoroscopic exams unless complications are anticipated.

B. Medical Knowledge: Become proficient in plain radiographs of the chest, musculoskeletal system, and cross-sectional imaging of chest/abdomen/pelvis. Should have thorough understanding of various manifestations of intentional trauma. Should be well-versed with various pediatric malignancies. Should be able to identify congenital neurological anomalies, as well as manifestations of acute trauma.

C. Practice Based Learning and Improvement: Add to knowledge base in all areas of pediatric radiology through continued study, review of ACR cases and film reading.

D. Interpersonal & Communication Skills: Review and dictate, either alone or with the radiologist, pediatric outpatient and inpatient films and PICU and NICU films, making sure all work is checked by the radiologist prior to final reporting.

E. Professionalism: Make preliminary decisions on all matters of film interpretation and consultation, recognizing and obtaining assistance with situations that require the expertise of the radiologist.

F. Systems – Based Practice: Sit in on all reading sessions with the attending radiologist, including pediatric ICU and occasionally neonatal ICU.

PEDIATRIC RADIOLOGY

Rotation 4

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Perform fluoroscopic exams except when complications are anticipated.

B. Medical Knowledge: Should become familiar with pediatric Neuroradiology, pediatric malignancies, traumatic sequlae, and congenital gastrointestinal and genitourinary.

C. Practice Based Learning and Improvement: Add to knowledge base in all areas of pediatric radiology and mammography through continued study, review of ACR cases and film reading.

D. Interpersonal & Communication Skills: Review and dictate, either alone or with the radiologist, pediatric outpatient and inpatient films and PICU and NICU films, making sure all work is checked by the radiologist prior to final reporting.

E. Professionalism: Make preliminary decisions on all matters of film interpretation and consultation, recognizing and obtaining assistance with situations that require the expertise of the radiologist.

F. Systems – Based Practice: Sit in on all reading sessions with the attending radiologist, including pediatric ICU and occasionally neonatal ICU.

PEDIATRIC RADIOLOGY

Topical Study Aids & Learning Resources:

• Pediatric Diagnostic Imaging, 11th edition.	Caffey
• Radiology of the Newborn and Young Infant	Swischuk
• Practical Pediatric Imaging	Kirks
• Pediatric Neuro Imaging	Barkovich

ULTRASOUND

Rotation 1

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Describe, from observation, the technique used to perform each of the routinely performed procedures.

B. Medical Knowledge: Discuss thoroughly the ultrasound procedures and findings in: Gallbladder / biliary tree ultrasound (cholelithiasis / cholecystitis); Genito-urinary ultrasound (obstruction / renal failure); Pelvic ultrasound (ectopic pregnancy); Cranial ultrasound (intracranial hemorrhage); Duplex Doppler (venous thrombosis of extremities); Right Lower Quadrant for Appendicitis; Trauma assessment for hemoperitoneum; Testicular torsion; Placental abruption; Embryonic demise; Incompetent cervix. Advise the technologist about special views or specific parameters of the study that required special attention. Develop scanning skills for each of the areas delineated above.

C. Practice Based Learning and Improvement: Record a pertinent history of the patient on the ultrasound worksheet. Discuss the basic ultrasound physics and instrumentation, especially related to equipment operation and the specifications for various probes.

D. Interpersonal & Communication Skills: Assist with the preparation and presentation of the noon ultrasound conference.

E. Professionalism: Give an ultrasound case, make a preliminary review of the images and advise the technologists when additional views or repeat views are needed.

F. Systems – Based Practice: Review histories of patients to be examined each day to determine the relevance of the study to clinical symptoms.

ULTRASOUND

Rotation 2

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Review all scans as they are performed for significant findings that require prompt attention.

B. Medical Knowledge: Demonstrate thorough knowledge of the ultrasound procedure through performing or assisting the sonographer with performance of the following studies: Liver / biliary tree (biliary obstruction / tumors); Pancreas (acute and chronic inflammatory process / tumors); Renal (transplant rejection / Doppler, tumors and inflammatory processes); Pelvis (uterine leiomyoma / ovarian neoplastic and non-neoplatic diseases); Cranial ultrasound (hydrocephalus / cerebral ischemia and infarction); Duplex and Color Flow Doppler (duplex sonography of carotids and abdominal structures).

C. Practice Based Learning and Improvement: Assist with preparation and presentation of cases for the ultrasound imaging conference. Make decisions in regard to notification for the referring physician if the faculty radiologist is not available for consultation.

D. Interpersonal & Communication Skills: Develop interpretive and reporting skills at the view box.

E. Professionalism: Given an ultrasound case, make a preliminary review of the images and advise the technologists when additional views or repeat views are needed.

F. Systems – Based Practice: Read and or dictate films with the assistance and review of the faculty radiologist.

ULTRASOUND

Rotation 3

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Make preliminary decisions on all matters of film interpretation and consultation and recognize the need to obtain assistance in situations that require the expertise of the faculty radiologist.

B. Medical Knowledge: Perform ultrasound guided procedures including : biopsy, drainage procedures, paracentesis, thoracentesis and amniocentesis.

C. Practice Based Learning and Improvement: Assist with preparation and presentation of cases for the ultrasound imaging conference. Make decisions in regard to notification for the referring physician if the faculty radiologist is not available for consultation.

D. Interpersonal & Communication Skills: Discuss all aspects of ultrasound imaging, including indications, pathology and correlative studies used for each examination.

E. Professionalism: Given an ultrasound case, make a preliminary review of the images and advise the technologists when additional views or repeat views are needed.

F. Systems-Based Practice: Review and dictate with the faculty radiologist all scans performed.

ULTRASOUND

Rotation 4

By the end of this rotation, the Resident should have improved their ability to:

A. Patient Care: Make preliminary decisions on all matters of film interpretation and consultation and recognize the need to obtain assistance in situations that require the expertise of the faculty radiologist.

B. Medical Knowledge: Perform ultrasound guided procedures including: biopsy, drainage procedures, paracentesis, thoracentesis and amniocentesis.

C. Practice Based Learning and Improvement: Assist with preparation and presentation of cases for the ultrasound imaging conference. Make decisions in regard to notification for the referring physician if the faculty radiologist is not available for consultation.

D. Interpersonal & Communication Skills: Discuss all aspects of ultrasound imaging, including indications, pathology and correlative studies used for each examination.

E. Professionalism: Given an ultrasound case, make a preliminary review of the images and advise the technologists when additional views or repeat views are needed.

F. Systems – Based Practice: Review and dictate with the faculty radiologist all scans performed.

ULTRASOUND

Topical Study Aids & Learning Resources:

- Ultrasound: Radiology Requisites Series
  William D. Middleton, Barbara S. Hertzbert, Alfred B. Kurtz.
  ISBN: 0323017029
- Diagnostic Ultrasound, 2 volume set, 3rd edition, 2005. Rumack, Carol; Wilson, S.; Charboneau, J. W.; Johnson, J. ISBN: 978-0-323-02023-7
- Ultrasonography in Obstetrics and Gynecology. Callen (Saunders)
- Clinical Applications of Doppler Ultrasound. Taylor
- Textbook of Diagnostic Ultrasonography. Hagen and Ansert
- ACR Syllabi

Recommended Reading

General

Fundamentals of Diagnostic Radiology – William E. Brant, Clyde A. Helms

Emergency Radiology / Call

(These books should be reviewed prior to or while taking night float duty)

Radiology of Emergency Medicine – William H. Harris, John H. Harris
Practical Nuclear Medicine - Palmer
Radiology of Acute Cervical Spine Trauma - Harris
Diagnostic Neuroradiology - Osborn
Radiology Review Manual - Dahnert

Core Radiology Textbooks by Subspecialty:

Neuroradiology

Neuroradiology: The Requisites – Robert Grossman, David Yousem
Diagnostic Neuroradiology - Osborn
Cranial MRI and CT - Lee and Rao

Ultrasound

Ultrasound - The Requisites – Middleton, Hertzberg, Kurtz
Ultrasonography in Obstetrics and Gynecology - Callen
Female Pelvis - TA, TV
Female Pelvis, Obstetric - TA, TV
Scrotum / Testicles
RLQ
Abdomen
Head (Pediatric)

Gastrointestinal

Gastrointestinal - The Requisites - Halpert
Gastrointestinal Radiology: A Pattern Approach - Eisenberg
Double Contrast Gastrointestinal Radiology - Laufer and Levine

Genitourinary

Requisites in Radiology:
Genitourinary Radiology: Radiology Requisites Series - Ronald J. Zagoria
Essentials of Uroradiology - Amis

Musculoskeletal

Musculoskeletal Imaging: The Requisites – David May, David Disler, David Sartoris, B.J. Manaster
Fundamentals of Skeletal Radiology - Helms
Orthopedic Radiology: A Practical Approach - Greenspan

Night float Topics by Subspecialty:

Fundamentals of Fluoroscopy – Michael Davis, Jeffrey D. Houston
UGI, BE, IVP - Adult
UGI, BE, IVP - Pediatric
Esophogram
Tube Check
Urethrogram

Computed Tomography:

Fundamentals of Body CT – Clyde A. Helms, W. Richard Webb, William E. Brant
Head
Cervical/Thorocis/Lumbar Spine
Neck
Chest, Abdomen, Pelvis

Mammography

Mammography: The Requisites – Debra Ikeda

Nuclear Medicine:

Essentials of Nuclear Medicine Imaging – Milton J. Guiberteau, Fred A. Mettler
Practical Nuclear Medicine - Palmer
Nuclear Medicine: The Requisites – James H. Thrall, Harvey A. Ziessman
Lung Scans
G.I. Bleed Scans / Meckel's Scan
HIDA Scan
Testicular Scan
Renal Transplant Scan (rare)
Brain Death Scan (rare)

Chest

Thoracic Radiology: The Requisites – Theresa McLoud
Chest Radiology: Plain Film Patterns and Differential Diagnoses – James Reed

Vascular

Vascular and Interventional Radiology: The Requisites – Lee, Michael Lee, Kaufman
Vascular and Interventional Radiology – Karim Valji

Dictations

Normal CT/MRI Finding – Torsten Moller, Emil Reif
Normal Finding In Radiology – Torsten Moller

Miscellaneous

Venograms - How to Perform and Read
Contrast Reaction Protocol
Contraindications to IV Contrast; Dosage in Pediatric Population

Plain Films:

Cervical Spine Including Conventional Tomography