ROTATION 1 (Radiology Year 1)

During this rotation the residents will gain the actual experience of reading all manner of pediatric plain films including the neonatal and ICU films. This rotation is the first experience the resident has dealing with small infants, children and their parents and performing their imaging studies. This first rotation emphasizes the performance of fluoroscopic studies (voiding cystograms, barium studies including upper GI and enemas.)

MEDICAL KNOWLEDGE

Residents must demonstrate knowledge about established and evolving biomedical, clinical and cognate sciences and the application of this knowledge to patient care.

At the end of the rotation, the resident should be able to:

1. Identify normal/abnormal airways on chest x-ray of the infant or older child
2. Recognize the vast spectrum of normal on chest radiographs of children of varying ages
3. Identify the spectrum of normal skeletal structures
4. Identify fractures specific to the pediatric skeleton and other common bone pathologies
5. Identify normal and abnormal bowel gas patterns on abdominal radiographs of infants (including premature neonates) and children
6. Identify abnormalities such as free air, pneumothorax or fractures of child abuse in which a referring clinician should be notified immediately

PRACTICE-BASED LEARNING AND IMPROVEMENT

Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. Residents are expected to:

- Apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on the diagnostic effectiveness of pediatric imaging and its role in clinical care of the patient.
- Use information technology to manage information, access on-line medical information; and support their own education
- Facilitate the learning of students and other health care professionals
- Locate, appraise and assimilate evidence from scientific studies about pediatric imaging
- Recognize limitations in personal knowledge and skills, being careful to not make decisions beyond the level of personal competence.
SYSTEMS BASED PRACTICE

Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to prove all that is of optimal value.

Residents are expected to:

- Understand how their professional practice affects other health care professionals, the health care organization and the larger society, and how these elements affect their own practice
- Assist referring clinicians in providing cost effective healthcare
- Practice cost effective health care and resource allocation that does not compromise quality of care
- Recognize when the submitted study does not answer the posed clinical question

PATIENT CARE

Residents must be able to provide age appropriate patient care that is compassionate, appropriate and effective for the diagnosis and treatment of health problems. Residents are expected to:

- Communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families
- Gather essential and accurate medical and radiologic history pertinent to the procedure for which the patient is scheduled
- Make informed decisions about diagnostic and therapeutic interventions based on patient information, up-to-date scientific evidence and clinical judgment
- Work with health care professionals, including those from other disciplines to provide patient focus care.
- Demonstrate the proper fluoroscopic procedure for
  - VCUG in an infant/older child
  - Upper GI series in an infant/older child
  - Barium Enema in an infant
  - Small Bowel Follow through
- Perform fluoroscopic exams properly without undue stress to the patient or parent(s)
- Minimize unnecessary radiation without sacrificing knowledge
- Dictate examinations accurately after review by the attending radiologist.

INTERPERSONAL AND COMMUNICATION SKILLS

Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange with technologists, referring physicians and other medical personnel. Residents are expected to:

- Work professionally and effectively with the technologists
- Communicate findings effectively with the referring clinicians
• Communicate and document the communication of critical findings with the appropriate medical personnel in a timely fashion
• Preliminary review plain films and discuss findings with the radiologist, then dictate as directed
• Suggest the appropriate study to answer clinical questions after consultation with attending radiologist

PROFESSIONALISM

Residents must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient and professional population.

Residents are expected to:

• Demonstrate respect, compassion and integrity
• A commitment to excellence and on-going professional development
• Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, and business practices
• Demonstrate sensitivity and responsiveness to patients’ culture, age, gender and disabilities
• Recognize limitations in personal knowledge and skills being careful to not make decisions beyond the level of personal competence

OBJECTIVE ASSESSMENT

• Fluoroscopy skills are monitored initially through direct observation
• As the skills of the resident progress, monitoring is done via assessment of the final fluoroscopic study. By the end of the rotation, the resident should do complete fluoroscopic studies that are complete, needing no modification.
• Continual assessment, of the resident’s ability to make findings and synthesize data, is done through the Socratic method at the view box.
• Review of dictations allows for further assessment of understanding of the day’s cases
• Unknown teaching cases are shown daily allowing the monitoring of the residents knowledge base and knowledge growth.
• To test the knowledge base further, theoretical questions are asked i.e. What are the important intestinal problems in the neonate that present with biliary emesis? What studies are utilized to come to the correct diagnosis?

ROTATION 2 (Radiology Year 2)

MEDICAL KNOWLEDGE

Residents must demonstrate knowledge about established and evolving biomedical, clinical, cognate sciences and the application of this knowledge to patient care.

At the end of the rotation, the resident should be able to:
• Recognize the radiographic manifestations of congenital diseases of the heart
• Recognize the various complications in post operative and ICU patients
• Identify various causes of respiratory distress in the neonate (both full term and premature)
• Identify the additional musculoskeletal pathology
  o recognize unusual manifestation of trauma
  o be conversant in manifestation and management of suspected child abuse
  o recognize common bone tumors (benign and malignant)
• Identify normal pediatric organs on USG
• Identify common renal USG abnormalities
  o Hydronephrosis
  o Duplicated collecting systems
• Identify the USG appearance of pyloric stenosis and intussusception
• Identify intracranial bleeding on neonatal head sonography
• Detect appendicitis on abdominal CT
• Evaluate body CTs for the presence of lymphoma/cancer
• Establish bone age on the basis of radiographic findings

PRACTICE-BASED LEARNING AND IMPROVEMENT

Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. Residents are expected to:

• Apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on the diagnostic effectiveness of pediatric imaging and its role in clinical care of the patient
• Use information technology to manage information, access on-line medical information; and support their own education
• Facilitate the learning of students and other health care professionals
• Locate, appraise and assimilate evidence from scientific studies about pediatric imaging
• Recognize limitations in personal knowledge and skills, being careful to not make decisions beyond the level of personal competence

SYSTEMS BASED PRACTICE

Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide are that is of optimal value. Residents are expected to:

• Understand how their professional practice affects other health care professionals the health care organization and the larger society, and how these elements affect their own practice
• Assist referring clinicians in providing cost effective healthcare
• Practice cost effective health care and resource allocation that does not compromise quality of care
• Recognize when the submitted study does not answer the posed clinical question
PATIENT CARE

Residents must be able to provide age appropriate patient care that is compassionate, appropriate and effective for the diagnosis and treatment of health problems. Residents are expected to:

- Communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families
- Gather essential and accurate medical and radiologic history pertinent to the procedure for which the patient is scheduled
- Make informed decisions about diagnostic and therapeutic interventions based on patient information, up-to-date scientific evidence and clinical judgment
- Work with health care professionals, including those from other disciplines to provide patient focused care
- Perform fluoroscopic procedures with increasing sophistication
- Dictate films accurately with increasing speed and confidence after review by the attending radiologist.
- Perform adequate study to exclude malrotation.

INTERPERSONAL AND COMMUNICATION SKILLS

Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange with technologists, referring physicians and other medical personnel. Residents are expected to

- Work professionally and effectively with the technologists
- Communicate findings effectively with the referring clinicians
- Communicate and document the communication of critical findings with the appropriate medical personnel in a timely fashion
- Consult with referring clinicians in a professional manner, giving advice regarding which studies are appropriate to answer clinical questions.
- Review fluoroscopic, plain films and ultrasounds as they are done for completeness of study
- Suggest the appropriate study to answer clinical questions after consultation with attending radiologist

OBJECTIVE ASSESSMENT

- Fluoroscopy skills continued to be monitored via a combination of direct visualization and review of spot films.
- Continual assessment, of the resident’s ability to make findings and synthesize data, is done through the Socratic method at the view box
- Review of dictations allows for further assessment of understanding of the day’s cases
- Unknown teaching cases are shown daily allowing the monitoring of the residents knowledge base and knowledge growth
- To test the knowledge base further, theoretical questions are asked
ROTATION 3 (Radiology Year 3)

MEDICAL KNOWLEDGE
Residents must demonstrate knowledge about established and evolving biomedical, clinical and cognate sciences and the application of this knowledge to patient care.

At the end of the rotation, the resident should be able to:

- Identify normal vs abnormal findings on chest, abdominal, skeletal, skull and spine radiographs with additional sophistication
- Identify the common bone dysplasias and genetic disease with specific radiographic manifestations
- Identify abnormalities on pediatric CTs done for a variety of indications, including pain, trauma, cancer, chronic disease
- Identify complications of CP and common neuromuscular abnormalities

PRACTICE-BASED LEARNING AND IMPROVEMENT
Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. Residents are expected to:

- Apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on the diagnostic effectiveness of pediatric imaging and its role in clinical care of the patient
- Use information technology to manage information, access on-line medical information, and support their own education
- Facilitate the learning of students and other health care professionals
- Locate, appraise and assimilate evidence from scientific studies about pediatric imaging
- Recognize limitations in personal knowledge and skills, being careful to not make decisions beyond the level of personal competence

SYSTEMS BASED PRACTICE
Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value. Residents are expected to:

- Understand how their professional practice affects other health care professionals, the health care organization and the larger society, and how these elements affect their own practice
- Assist referring clinicians in providing cost effective healthcare
- Practice cost effective health care and resource allocation that does not compromise quality care
- Recognize when the submitted study does not answer the posed clinical question
PATIENT CARE

Residents must be able to provide age appropriate patient care that is compassionate, appropriate and effective for the diagnosis and treatment of health problems. Residents are expected to:

- Communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families
- Gather essential and accurate medical and radiologic history pertinent to the procedure for which the patient is scheduled
- Make informed decisions about diagnostic and therapeutic interventions based on patient information, up-to-date scientific evidence and clinical judgment
- Work with health care professionals, including those from other disciplines to provide patient focused care
- Perform fluoroscopic exams comfortably and completely except when complications are anticipated or in the unstable premature infant
- Perform fluoroscopic exams properly without undue stress to the patient or parent(s)
- Minimize unnecessary radiation without sacrificing knowledge
- Dictate examinations accurately after review by the attending radiologist.

INTERPERSONAL AND COMMUNICATION SKILLS

Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange with technologists, referring physicians and other medical personnel. Residents are expected to

- Work professional and effectively with the technologist
- Communicate findings effectively with the referring clinicians
- Communicate and document the communication of critical findings with the appropriate medical personnel in a timely fashion
- Consult with referring clinicians in a professional manner, giving advise regarding which studies are appropriate to answer clinical questions
- 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

PROFESSIONALISM

Residents must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient and professional population. Residents are expected to:

- Demonstrate respect, compassion and integrity
- A commitment to excellence and on-going professional development
- Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, and business practices
- Demonstrate sensitivity and responsiveness to patients’ culture, age, gender and disabilities
• Recognize limitations in personal knowledge and skills, being careful to not make decisions beyond the level of personal competence

OBJECTIVE ASSESSMENT

• Fluoroscopic skills continued to be monitored via a combination of direct visualization and review of spot films.
• Continual assessment of the resident’s ability to make findings and synthesize data is done through the Socratic method at the view box.
• Review of dictations allows for further assessment of understanding of the day’s cases
• Unknown teaching cases of increasing difficulty are shown daily allowing the monitoring of the residents knowledge base and knowledge growth
• To test the knowledge base further, theoretical questions are asked

By the end of the residency, the residents have moved from beginning student to the objective of a thoughtful practitioner with the ability to problem solve as well as act responsibly.

RECOMMENDED READING

During the first rotation the resident should at least read the sections on
  1. Pediatric X-ray Technique
  2. Chest
  3. GI
  4. GU
During the second rotation the resident should at least read the sections on
  1. Bone
  2. Cardiovascular
During the third rotation the resident should complete the reading of the text as well as review prior assignments.

Pediatric X-ray Diagnosis. Silverman and Caffey, 10th Edition
Best used as a reference text for examining interesting cases that come up during the day

Best used as a reference text for looking up syndromes seen at work

Additional Books

Pediatric Ultrasonography. Siegel, 2nd Edition
Pediatric Radiology Essentials. Blickman

Only to be used as a minimal guide of topics to be learned in greater depth elsewhere.
Pediatric Radiology Conference Topics

1. Normal variant.
2. Evaluation of airway.
5. Acyanotic heart disease.
6. Cyanotic heart disease.
7. GI procedures.
8. Neonatal abdominal issues and non neonatal abdominal issues.
9. GU procedures.
11. Testicular and gynecological issues.
13. Bone tumors
15. Pediatric hips and knees.
17. CNS- infection, white matter disease, stroke, tumors.
18. Newborn spine and spine in the older child.