PEDIATRIC RADIOLOGY FELLOWSHIP

PROGRAM HANDBOOK AND POLICY MANUAL

Updated MAY 2025

PEDIATRIC RADIOLOGY

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PEDIATRIC RADIOLOGY

Faculty Listing and Clinical/Research Interests

Faculty (listed alphabetically by last name)	Clinical / Research Interests
Apeksha Chaturvedi, MD	Musculoskeletal Radiology, Body Radiology, Resident/Fellow Education, Faculty Development
Mitchell Chess, MD	Maternofetal Imaging, Neuroradiology
Katherine Kaproth-Joslin	Chest and Cardiac Radiology
Nina Klionsky, MD	Fluoroscopy, Ultrasound, Body CT
Margaret Ormanoski	Body Radiology
Nadia Sultan	Neuroradiology, Body and General Radiology
Vaseem Chengazi	Nuclear Medicine
David Lee	Interventional Radiology, Body

Program Manual Statement

The Pediatric Radiology Fellowship Program complies with all policies, procedures and processes of departmental fellowships at the URMC.

Division Mission Statement

The Pediatric Radiology Division will consistently strive to deliver optimal, timely and appropriate imaging, intervention and consultative services; respecting and addressing the unique clinical and emotional needs of our pediatric patients and families.

Program Curriculum

The fellowship curriculum has been developed over the full year of the fellowship and intends to facilitate skills and attitudes related to competencies of professionalism, research, intervention and lifelong learning. The program structure seeks to enhance the knowledge and application of all imaging modalities to the unique anatomic/physiologic attributes and clinico- pathophysiologic problems of the newborn, infant, child, and adolescent (0-18 years).

The curriculum is based upon rotations through various modalities in a manner that maximizes consistent and accountable supervision. We emphasize collaborative patient-focused care; thereby facilitating the development of knowledge, skills and attitudes that characterize an exceptional pediatric radiologist. The level of responsibility increases as the fellow becomes more sophisticated and adept with imaging and as communication skills improve.

The fellow is expected to attend all curriculum conferences delivered by the pediatric radiology faculty to the radiology residents. These conferences include didactic and case material. Since interdepartmental conferences are a major component of the curriculum, the fellow is expected to participate in all of them. The fellow is also required to prepare and deliver two didactic resident lectures before the completion of their fellowship.

The fellow should facilitate the journal club and Radiology-Pathology conferences under supervision of a faculty mentor, and take initiative with a monthly interesting case teaching file conference. The program intends to expand the fellow's role in these conferences as knowledge, expertise and proficiency improve.

PEDIATRIC RADIOLOGY FELLOW CORE LECTURE SERIES

TOPIC	PRESENTER
NICU Chest patterns	Dr. Klionsky
NICU Lines and Tubes	Dr. Klionsky
DDH imaging	Dr. Chaturvedi
Fluoroscopy pearls	Dr. Klionsky
Pediatric US Pearls	Dr. Klionsky
Abdominal MRI protocol basics	Dr. Chaturvedi
Fetal Spine	Dr. Chess
Fetal MRI Intro	Dr. Sultan
Abdominal MRCP basics	Dr. Sultan
Radiation Safety I	
Radiation Safety II	
FAI Intro (angles)	Dr. Sultan
Pediatric ED brain	Dr. Chess
Pediatric Airway	Dr. Klionsky

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Fetal Ultrasound	**Dr. Chess**
Musculoskeletal MR: Applications and Unique Considerations in children	**Dr. Chaturvedi**
Pediatric Biliary	**Dr. Ormanoski**
Abdominal MRA Basics	**Dr. Chaturvedi**
Neonatal MR: Special considerations 1/2	**Dr. Chaturvedi/Chess**
MR Enterography	**Dr. Ormanoski**
Introduction to Cardiac MRI in children	**Dr. Katherine Kaproth-Joslin**

PEDIATRIC RADIOLOGY

Procedural Requirements

There will be no fewer than 7000 pediatric radiologic examinations per year per fellow. The pediatric radiology training program will provide a minimum number of procedures available per year per resident as follows:

300 fluoroscopic procedures	50 Pediatric Nuclear Radiology Studies
300 ultrasound examinations	200 Neuroimaging Studies
200 body imaging (CT/MR) examinations	25 Vascular/Interventional Studies

Fellow Rotations

Goals and Objectives: Pediatric Radiology Fellow Rotations
Updated June 2018

Specific Rotations:
Fluoroscopy (4 weeks)
Neuroradiology (8 weeks)
Body US (4 weeks)
Body CT/MR (5 weeks)
Body Fetal (6 weeks)
Chest/Cardiac (6 weeks)
Musculoskeletal (8 weeks, combined with Nuclear medicine)
Nuclear Medicine (8 weeks, combined with Musculoskeletal)
Interventional Radiology (4 weeks, second 6 months)
Elective (4 weeks)

Weekend coverage includes reading all modalities except neuroradiology and Interventional radiology (separate radiologist assigned).
All studies accessioned by 10 pm are read that day.
Educational Resources:
Textbooks in reading room library
Shared drive articles and textbooks
Internet resources available through each workstation, including journal articles through PubMed (using the institutions' comprehensive subscription portal), the SPR modules and RadPrimer (an interactive web-based teaching file).

Pediatric Radiology Fellowship Required Experiences Per Rotation

(in parentheses is the number of weeks in rotation over course of year)
Updated May 2025

Neuro (8):	MRI: cervical, thoracic & lumbar spine, brain, orbit, face/neck, petrous, TMJ
	MRA: circle of Willis, neck
	CT: brain, neck, orbit, cervical, thoracic & lumbar spine, sinus, temporal bone
	CTA: brain, neck
	US: head, spine
	Radiograph: lateral neck, spine (trauma, scoliosis), skull, shunt series
	SPECT brain: ictal and inter-ictal
	PET/CT and PET/MR brain for seizures
	Functional brain MRI
	Fetal MRI: myelomeningocele, agenesis corpus callosum, ventriculomegaly

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Body US (4) Hands on scanning**

Chest for effusion
Abdomen: screening, pylorus, appendix
DVT upper and lower Extremity for clot, mass, vascular malformation
Neonatal brain and spine
Hip for dysplasia and effusion
Scrotum for torsion, epididymitis, mass
Subcutaneous mass
Renal and liver transplant
Ovarian mass and torsion

Chest Cardiac (6) Cyanotic and acyanotic congenital heart disease including

- Tetralogy of Fallot
- Hypoplastic left heart
- Left to right shunts
- Transposition of the great arteries
- Coronary artery anomalies
- Vascular ring and pulmonary sling

High resolution chest CT: cystic fibrosis, interstitial lung disease (child)
CTA: bronchopulmonary malformation

Body CT/MR (5): MRI: chest, abdomen
CT: chest (include HRCT), abdomen, pelvis
Radiograph: abdomen, pelvis, foreign body series

Body/Fetal (6): MRI fetal, US fetal, participation in multidisciplinary family care conference

Fluoro (4): Voiding cystourethrogram, esophagram, Upper GI, Barium enema, Modified barium swallow, Air enema for intussusceptions, line injection, Pharyngogram

Fluoro/IR (4): PICC placement, G tube placement, GJ tube placement, Abscess drainage, Biopsy, cholangiogram, biliary drain, angiogram, joint aspirations, joint injections

MSK/NM (8): MRI: knee, hip, ankle, foot, hand, wrist, elbow, shoulder, pelvis
CT: ankle, pelvis, hip, knee, elbow
Radiograph: hand, foot, ankle, wrist, femur, humerus, knee, elbow, shoulder, clavicle, pelvis, hip, bone age (Gruelich and Pyle)
PET/CT and PET/MR (total body, eye-thigh), bone scan, MIBG scan, renal scan, lung Perfusion scan, gastric emptying

Elective (4)

PEDIATRIC RADIOLOGY

ROTATION GOALS AND OBJECTIVES

PG Year: 6
Rotation: PEDIATRIC RADIOLOGY AT UNIVERSITY OF ROCHESTER MEDICAL CENTER/GOLISANO CHILDREN'S HOSPITAL
Location: RADIOLOGY (General, radiographic interpretation)

Objectives for Rotation:

1. **MEDICAL KNOWLEDGE: Fellows should be knowledgeable, scholarly, and committed to lifetime learning.**
   - Introduction to Golisano Children's Hospital
     Structure, Mission, Vision, Values
     Hospital Orientation
   - Systems Orientation
     Desktop, PACS
     Nuance voice activated dictation
     EPIC
   - Department orientation
     Modalities
     Schedule
     Supervision
     Curriculum
   - Understand the pathology and characteristic imaging findings associated with:
     - Respiratory distress in the newborn.
     - Necrotizing enterocolitis
     - Congenital heart disease
     - Craniosynostosis
     - Skeletal dysplasia

   Develop a systematic approach to the interpretation of plain films of the chest and abdomen
   - Plain film interpretation:
     - View film(s)
     - Report (emphasis on structured reporting)
     - Review with staff
     - Edit report

   Focused Curriculum:
   - Newborn Chest
   - Newborn Abdomen

2. **PATIENT CARE: Fellows should provide compassionate, appropriate, and effective care for health problems and should make efforts to promote health.**
   - Gather essential and accurate patient information in leading NICU daily rounds and ED readout.
   - Attend departmental and interdepartmental teaching conferences.
   - Demonstrate knowledge of levels of ionizing radiation related to pediatric radiography to minimize patient dose.

   SELECTED READING
   - Caffey – Chapter on Neonatal Imaging, pgs 13-103

3. **PROFESSIONALISM: Fellows should be altruistic and accountable and adhere to principles of medical ethics by respecting and protecting patient's best interests.**
   - Ability to interact well with other members of the patient care team
   - Represents the patient's best interest by presenting essential and accurate patient information in reports

PEDIATRIC RADIOLOGY

4. **PRACTICE-BASED LEARNING AND IMPROVEMENT: Fellows should investigate and evaluate patient care practices and appraise and assimilate scientific evidence to improve their practices.**
    - Learn and demonstrate critical assessment of scientific literature through participation in journal club
    - Inter- and intra-departmental medical conferences and rounds to build knowledge of evidence-based medicine
    - Use multiple learning sources to expand knowledge, use of multiple learning sources, facilitation of education for students, peers and other professionals – inter-and intra-departmental conferences
    - Participate in QA and QI

5. **SYSTEMS BASED PRACTICE: Fellows should understand healthcare practice**
    - Understand the role and be competent in use of computers, radiology information systems, physics support, risk management and PACS.

6. **INTERPERSONAL/COMMUNICATION SKILLS:** Fellows should communicate and teach effectively.
    - Relate well to other personnel including peers, faculty, support staff, referring physicians.
    - Present concise, accurate, reports in a compassionate manner with the best interest of the patient to staff and referring physicians.

PEDIATRIC RADIOLOGY

PG Year: 6
Rotation: FLUOROSCOPY (I)
Location: PEDIATRIC RADIOLOGY AT UNIVERSITY OF ROCHESTER MEDICAL CENTER/GOLISANO CHILDREN'S HOSPITAL

Objectives for Rotation:

1. MEDICAL KNOWLEDGE:

- Operation of fluoroscopy equipment
- Protocols for various fluoroscopy exams
- Physics of fluoroscopy
- Dose reduction techniques
- Indications for commonly performed fluoroscopy exams
- Understand the pathophysiology and imaging related to urinary tract infections in children
- Understand imaging evaluation of prenatal hydronephrosis, urinary tract infection, bilious vomiting, bowel obstruction with emphasis on vesicoureteral and gastroesophageal reflux, Hirschsprung disease, malrotation and intussusception.
- Identify imaging patterns and differential diagnosis of neonatal and childhood bowel obstruction

Focused Curriculum

- UTI and urinary tract dilation
- Bowel obstruction
- Radiation physics and fluoroscopy

Daily Activity

- ED readout
- NICU rounds
- Attend departmental and interdepartmental teaching conferences
- Perform, interpret and report fluoroscopy exams

SELECTED READING

- Caffey Neonatal GI, pgs 104-254
  Neonatal GU
- Caffey Urinary Tract and Retroperitoneum 1701-1909

2. PATIENT CARE:

- Appropriate professional interaction with patient and family
- Gather essential and accurate patient information.
- Perform fluoroscopy efficiently and effectively, minimizing fluoroscopy dose
- Acquire adequate documentation of pertinent positive and negative
- View, report and edit interpretations of fluoroscopy exams
- Develop a pattern for concise, accurate and informative image interpretation of fluoroscopy examinations
- Knowledge of levels of ionizing radiation related to pediatric fluoroscopy to minimize radiation dose to patient.

3. PROFESSIONALISM:

- Ability to interact well with other members of the patient care team
- Represents the patient's best interest by presenting essential and accurate patient information in reports

PEDIATRIC RADIOLOGY

4. PRACTICE-BASED LEARNING AND IMPROVEMENT:

- Learn and demonstrate critical assessment of scientific literature through participation in journal club
- Attend and participate in Inter-and intra-departmental medical conferences and rounds to build knowledge of evidence-based medicine in pediatric fluoroscopy
- Use multiple learning sources to expand knowledge, use of multiple learning sources, facilitation of education for students, peers and other professionals
- Participate in QA and QI

5. SYSTEMS BASED PRACTICE

- Understand the role and be competent in use of computers, radiology information systems, physics support, risk management and PACS.

6. INTERPERSONAL/COMMUNICATION SKILLS: Fellows should communicate and teach effectively.

- Relate well to other personnel including peers, faculty, support staff, referring physicians.
- Present concise, accurate, reports in a compassionate manner with the best interest of the patient to staff and referring physicians.

PEDIATRIC RADIOLOGY

PG Year: 6
Rotation: NEURORADIOLOGY US/CT/MRI I
Location: PEDIATRIC RADIOLOGY AT UNIVERSITY OF ROCHESTER MEDICAL CENTER/GOLISANO CHILDREN'S HOSPITAL

Objectives for Rotation:

1 MEDICAL KNOWLEDGE

- Learn the protocol and the reasoning behind the established protocols for various indications
- Learn common pharmaceuticals, mechanism of action and physiology of effect, and pharmacokinetics of sedatives used in MRI and CT
- Review American Academy of Pediatrics guidelines on sedation
- Propose specific protocol changes which might improve diagnostic accuracy based upon specific indications
- Develop a differential diagnosis for seizures and identify characteristic imaging findings
- Develop a differential diagnosis for pediatric CNS tumors and define characteristic imaging appropriate
- Understand the imaging of tethered cord by US and MRI
- Review imaging findings of congenital and acquired diseases of the spine
- Learn head and spine US technique, indication and interpretation
- Learn temporal bone imaging for SNHL, conductive hearing loss, and infections/inflammatory conditions (mastoiditis)

Skills (that should be learned or performed)

- Protocol examinations based upon appropriate indications
- Assess, assist, monitor and recuperate pediatric patient requiring sedate for MRI
- View, report and edit MRI examinations with direct faculty supervision
- Develop a pattern for concise, accurate and informative image interpretation of MRI exams

Focused Curriculum

- MRI in seizures
- Pediatric CNS tumors
- Tethered cord imaging with US and MRI
- Congenital abnormalities of the spine
- Temporal bone imaging for hearing loss
- Newborn intracranial hemorrhage

Daily Activity

- ED readout
- NICU rounds
- Attend departmental and interdepartmental teaching conferences
- Protocol, interpret and report neuro MRI, CT and US exams

SELECTED READING

- Barkovich J. Pediatric Neuroimaging. Lippincott Williams & Wilkins; 6th ed, 2014

2. PATIENT CARE:

- Gather essential and accurate patient information
- Develop and oversee neuro US, CT and MRI diagnostic imaging with the best interest of the patient in mind
- Counsel patients and families
- Demonstrate knowledge of levels of ionizing radiation related to neuro CT imaging to minimize radiation dose to patient.

3. PROFESSIONALISM:

- Interact well with other members of the patient care team.
- Perform duties conscientiously and reports where and when scheduled.
- Demonstrate altruism, compassion, honor and integrity.

4. PRACTICE-BASED LEARNING AND IMPROVEMENT:

- Learn and demonstrate critical assessment of scientific literature through participation in journal club
- Attend and participate in inter-and intra-departmental medical conferences and rounds to build knowledge of evidence-based medicine in pediatric MRI
- Use multiple learning sources to expand knowledge, use of multiple learning sources, facilitation of education for students, peers and other professionals
- Participate in QA and QI

5. SYSTEMS BASED PRACTICE

- Understand the role and be competent in use of computers, radiology information systems, physics support, risk management and PACS.

6. **INTERPERSONAL/COMMUNICATION SKILLS:**

- Fellows should communicate and teach effectively.
- Relate well to other personnel including peers, faculty, support staff, referring physicians.
- Present concise, accurate, reports in a compassionate manner with the best interest of the patient to staff and referring physicians.

PEDIATRIC RADIOLOGY

PG Year: 6
Rotation: BODY US/CT/MRI I
Location: PEDIATRIC RADIOLOGY AT UNIVERSITY OF ROCHESTER MEDICAL CENTER/GOLISANO CHILDREN'S HOSPITAL

Objectives for Rotation:

1. MEDICAL KNOWLEDGE

- Learn the protocols for various routine exams
- Review the physics of CT with emphasis on modern multi-detector CT
- Review abdominal MRI protocols including MRCP, MRE
- Review physics of US including Doppler and spectral waveforms
- Understand the significance of and gain perspective of the contribution CT makes to radiation exposure in medical imaging
- Recommend specific protocol changes that could maintain or improve diagnostic accuracy with decreasing dose

Skills (that should be learned or performed)

- Protocol examination based upon appropriate indications that balance clinical accuracy and sensitivity with radiation exposure dose
- View, report and edit interpretations on CT, MRI and US body examinations performed with direct faculty supervision
- Develop a pattern for concise, accurate and informative image interpretation of CT, MRI and US and body examinations

Focused Curriculum

- Radiation physics as pertains to CT
- Dose reduction options in pediatric body CT imaging

Daily Activity

- ED readout
- NICU rounds
- Attend departmental and interdepartmental teaching conferences
- Protocol, interpret and report body CT, US and MRI exams

SELECTED READING

- Caffey Volume I and II

2. PATIENT CARE:

- Gathers essential and accurate patient information.
- Develops a diagnostic plan and oversees diagnostic imaging. Understands clinical issues and can interpret or undertake procedures with the best interest of the patient and referring physician in mind.
- Counsels patients and families.
- Demonstrates knowledge of levels of ionizing radiation related to specific procedures to minimize radiation dose to patient.

3. **PROFESSIONALISM:**

- Reliable and committed to patient care, and able to interact well with other members of the patient care team.
- Performs duties conscientiously and enthusiastically.
- Reports where and when scheduled.

PEDIATRIC RADIOLOGY

4. PRACTICE-BASED LEARNING AND IMPROVEMENT:

- Learn and demonstrate critical assessment of scientific literature through participation in journal club
- Attend and participate in inter-and intra-departmental medical conferences and rounds to build knowledge of evidence-based medicine in pediatric CT
- Use multiple learning sources to expand knowledge, use of multiple learning sources, facilitation of education for students, peers and other professionals
- Participate in QA and QI

5. SYSTEMS-BASED PRACTICE:

- Understands the role and is competent in the use of computers, radiology information systems, physics support, risk management and PACS.
- Demonstrates a knowledge of and applies appropriateness criteria and other cost-effective healthcare principles to professional practice.
- Utilizes department resources appropriately. Uses online resources to assist decisions regarding patient care.

6. **Interpersonal/Communication Skills:** Fellows should communicate and teach effectively

- Able to relate to other personnel, works well as member of a team.
- Is helpful and proficient in the consultative role

PEDIATRIC RADIOLOGY

PG Year: 6
Rotation: MSK US/CT/MRI
Location: PEDIATRIC RADIOLOGY AT UNIVERSITY OF ROCHESTER MEDICAL CENTER/GOLISANO CHILDREN'S HOSPITAL

Objectives for Rotation:

1. **MEDICAL KNOWLEDGE:**
   - Understand and differentiate between the use of sector scanning, linear area, Doppler and power Doppler
   - Perform hands-on scanning for hip, spine, pylorus US
   - Understand the ultrasound imaging characteristics of the common congenital abnormalities frequently evaluated by CT and MRI
   - Show good understanding of anatomy, pathophysiology and differential diagnosis related to pediatric MSK US/CT/MRIUS
   - Protocol US procedures MSK US/CT/MRI examinations

Skills (that should be learned or performed)

- Ability to perform and complete adequate exams for the following:
  - Knee MRI for internal derangement
  - Shoulder MRI arthrography for labral pathology
  - Hip MRI for AVN, SCFE, tumor
  - MSK tumors: staging, imaging and follow-up
  - Elbow, ankle and wrist MRI
  - Hips in DDH, effusion
  - Skeletal dysplasia
  - Vascular malformations and hemangiomas
- Develop a pattern for concise, accurate, and informative image interpretation of MSK US, CT and MRI examinations

Daily Activity

- ED readout
- NICU rounds
- Attend departmental and interdepartmental teaching conferences
- Scan as permitted under supervision of US tech
- View, interpret and report MSK CT/MRI and US exams

SELECTED READING

- Ultrasound Physics
- Congenital anomalies pediatric MSK: Caffey

2. **PATIENT CARE:**
   - Gather essential and accurate information
   - Develop, perform and oversee an US imaging plan for common pediatric problems.
   - Understands clinical issues and can interpret or undertake US procedures with the best interest of the patient and referring physician in mind.

3. **PROFESSIONALISM:**
   - Performs duties conscientiously and enthusiastically, and reports where and when scheduled.
   - Committed to patient care and works well with other members of the patient care team.

4. **PRACTICE-BASED LEARNING AND IMPROVEMENT**
   - Demonstrates critical assessment of scientific literature; participates in critical assessment through Journal Club and conferences.
   - Demonstrates knowledge of evidence-based medicine, u se of multiple learning sources
   - Participates in QA and QI

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5. Systems Based Practice:
- Understands and utilizes departmental resources appropriately.
- Understands the role and is competent in the use of computers, physics support, risk management, and PACS system.
- Demonstrates a knowledge of, and applies appropriateness criteria and other cost-effective healthcare principles to professional practice.

6. INTERPERSONAL/COMMUNICATION SKILLS:
- Is helpful and proficient in the consultative role.
- Able to relate to other personnel including peers, faculty, support staff, referring physicians and other housestaff members.

PEDIATRIC RADIOLOGY

PG Year: 6
Rotation: NUCLEAR MEDICINE
Location: PEDIATRIC RADIOLOGY AT UNIVERSITY OF ROCHESTER MEDICAL CENTER/GOLISANO CHILDREN'S HOSPITAL

Objectives for Rotation:

1. **MEDICAL KNOWLEDGE:**
   - Learn protocols and indications for commonly performed nuclear medicine procedures in pediatrics
   - Learn pharmacokinetics of various radiopharmaceuticals frequently utilized in pediatric exams (including dose, T ½ (half-life) where and how generated.
   - Understand the unique perspectives nuclear medicine lends to the imaging armamentarium, and the advantages and limitations in the work-up of pediatric pathologic processes
   - Examine the utility of nuclear medicine in inflammatory and infectious MSK
   - Learn hepatic gross and functional anatomy as it relates to nuclear medicine imaging
   - Discuss the myths and realities of urinary tract dilation and reflux
   - Understand the role of nuclear medicine in evaluation of hypertension
   - Learn pediatric PET-CT in oncology, seizure imaging, infection imaging.

Skills
   - Select appropriate work-up of pediatric patient form whom nuclear medicine exam is requested
   - Develop a pattern for concise, accurate, and informative image interpretation of nuclear medicine exams

Focused Curriculum
   - Infections and inflammation MSK
   - Hepatic anatomy, functional unit anatomy, lab values and significance, hepatic biliary imaging

Urinary tract dilation, UTI and reflux
   - Renal vascular hypertension
   - Oncology staging (lymphoma, sarcoma)

Daily Activity
   - ED readout
   - ICU and Newborn rounds
   - Attend departmental and interdepartmental teaching conferences
   - Protocol, interpret and report nuclear medicine exams

SELECTED READING:
   - Inserts from all pharmaceuticals used
   - Select sections Mettler

2. **PATIENT CARE:**
   - Gather essential and accurate patient information
   - Develop and oversee diagnostic imaging plan
   - Counsel patients and families.
   - Demonstrate knowledge of levels of ionizing radiation related to specific nuclear medicine procedures to minimize radiation dose to patient.

3. **PROFESSIONALISM:**
   - Performs duties conscientiously and enthusiastically, and reports where and when scheduled.
   - Committed to patient care and works well with other members of the patient care team.

4. **PRACTICE-BASED LEARNING AND IMPROVEMENT:**
   - Demonstrates critical assessment of scientific literature; participates in critical assessment through Journal Club and conferences.
   - Demonstrates knowledge of evidence-based medicine, use of multiple learning sources
   - Participates in QA and QI

5. **SYSTEMS BASED PRACTICE: Fellows should understand healthcare practice.**

- Understands and utilizes departmental resources appropriately.
- Understands the role and is competent in the use of computers, physics support, risk management, and PACS system.
- Demonstrates a knowledge of and applies appropriateness criteria and other cost-effective healthcare principles to professional practice.

6. INTERPERSONAL/COMMUNICATION SKILLS: Fellows should communicate and teach effectively.

- Is helpful and proficient in the consultative role.
- Able to relate to other personnel including peers, faculty, support staff, referring physicians

PEDIATRIC RADIOLOGY

PG Year: 6
Rotation: BODY US/CT/MRI II
Location: PEDIATRIC RADIOLOGY AT UNIVERSITY OF ROCHESTER MEDICAL CENTER/GOLISANO CHILDREN'S HOSPITAL

Objectives for Rotation:

1. **MEDICAL KNOWLEDGE:**
   - Identify and characterize congenital and acquired diseases of lung and mediastinum
   - Recognize common inflammatory infections and neoplasm diseases of lung
   - Establish an organized approach to abdominal and chest trauma
   - Know the CT characteristics of congenital and acquired diseases of the liver, spleen and pancreas

Skills (that should be learned or performed)
   - Develop a systematic approach to CT interpretation lung and mediastinum, neck, extremity, and abdomen/pelvis based upon indication and finding.
   - Develop a systematic approach to abdominal CT US and MRI based upon indication and finding
   - Refine a pattern for concise, accurate and informative image interpretation of CT examinations

Focused Curriculum
   - Congenital and acquired pathology of the lung
   - Congenital and acquired pathology of the mediastinum
   - Congenital and acquired pathology of the liver, spleen and pancreas
   - Trauma head, spine, chest and abdomen

Daily Activity
   - ED readout
   - NICU rounds
   - Attend departmental and interdepartmental teaching conferences
   - Protocol, interpret and report body CT, US and MRI exams

2. **PATIENT CARE:**
   - Gathers essential and accurate information; understands clinical issues and can interpret or undertake imaging procedures with the best interest of the patient and referring physician in mind.
   - Develops and oversees a diagnostic imaging plan.
   - Counsels patients and families
   - Demonstrates knowledge of levels of ionizing radiation related to CT and specific procedures to minimize radiation dose to patient.

3. **PROFESSIONALISM:**
   - Reliable and committed to patient care
   - Performs duties conscientiously and enthusiastically
   - Reports where and when scheduled

4. **PRACTICE-BASED LEARNING AND IMPROVEMENT:**
   - Learn and demonstrate critical assessment of scientific literature through participation in journal club
   - Attend and participate in inter-and intra-departmental medical conferences and rounds to build knowledge of evidence-based medicine in pediatric CT
   - Use multiple learning sources to expand knowledge, use of multiple learning sources, facilitation of education for students, peers and other professionals
   - Participate in QA and QI

PEDIATRIC RADIOLOGY

5. SYSTEMS-BASED PRACTICE:

- Understands the role and is competent in the use of computers, radiology information systems, physics support, risk management and PACS.
- Demonstrate knowledge of and applies appropriateness criteria and other cost-effective healthcare principles to professional practice.
- Utilizes department resources appropriately. Uses online resources to assist decisions regarding patient care.

6. Interpersonal/Communication Skills:

- Able to relate to other personnel, works well as member of a team.
- Is helpful and proficient in the consultative role

PEDIATRIC RADIOLOGY

PG Year: 6
Rotation: PEDIATRIC RADIOLOGY AT UNIVERSITY OF ROCHESTER MEDICAL CENTER/GOLISANO CHILDREN'S HOSPITAL
Location: NEURORADIOLOGY US/CT/MRI II

Objectives for Rotation:

1. **MEDICAL KNOWLEDGE:**
   - Recognize and describe congenital and acquired abnormalities of brain and spine
   - Recognize and describe characteristics of various CNS neoplasms, congenital abnormalities and trauma
   - Identify and describe characteristic MRI, CT and US abnormalities of congenital and acquired abscesses of brain
   - Refine a pattern for concise, accurate, and informative image interpretation of neuro MRI, CT and US exams
   - Provide complete and appropriate neuro differential diagnosis

Daily Activity
   - ED readout
   - NICU rounds
   - Attend departmental and interdepartmental teaching conferences
   - Efficiently protocol, interpret and report neuro US, CT and MRI exams

2. **PATIENT CARE:**
   - Gathers essential and accurate patient information.
   - Understands clinical issues and interpret or undertake procedures with the best interest of the patient and referring physician in mind.
   - Develop and oversee an MRI, CT and US diagnostic imaging plan for common pediatric neuro problems

3. **PROFESSIONALISM:**
   - Reliable and committed to patient care and can interact well with other members of the patient care team.
   - Performs duties conscientiously and enthusiastically
   - Reports where and when scheduled

4. **PRACTICE-BASED LEARNING AND IMPROVEMENT:**
   - Learn and demonstrate critical assessment of scientific literature through participation in journal club
   - Attend and participate in inter-and intra-departmental medical conferences and rounds to build knowledge of evidence-based medicine in pediatric MRI
   - Use multiple learning sources to expand knowledge, use of multiple learning sources, facilitation of education for students, peers and other professionals
   - Participate in QA and QI

5. **SYSTEMS BASED PRACTICE**
   - Understand the role of and be competent in use of computers, radiology information systems, physics support, risk management and PACS.

6. **INTERPERSONAL/COMMUNICATION SKILLS:** Fellows should communicate and teach effectively.
   - Relate well to other personnel including peers, faculty, support staff, referring physicians and other housestaff members.
   - Present concise, accurate, reports in a compassionate manner with the best interest of the patient to staff and referring physicians.

PEDIATRIC RADIOLOGY

PG Year: 6
Rotation: RADIOLOGY GENERAL
Location: PEDIATRIC RADIOLOGY AT UNIVERSITY OF ROCHESTER MEDICAL CENTER/GOLISANO CHILDREN'S HOSPITAL

Objectives for Rotation:

1. MEDICAL KNOWLEDGE:

- Physics of film screen, DR and CR

Skills

- Refine a pattern for concise, accurate and informative image interpretation of plain film examinations
  - Impression brief with pertinent positive and negative assessment of clinically relevant material

Focused Curriculum:

- Differential diagnosis and plain film interpretation with focus on characteristic findings related to:
  - Fractures of the growing skeleton
  - Pediatric bone tumors
  - Syndromes and skeletal dysplasia
  - Pediatric hip
  - Foot deformity
  - Congenital heart disease
  - Congenital and acquired diseases of the lungs and mediastinum

Daily Activity

- Primary interpretation to ED
- NICU rounds (faculty supervisor)
- Attend departmental and interdepartmental teaching conferences
- View, interpret and report plain films

2. PATIENT CARE:

- Gather essential and accurate patient information in leading ICU and PICU daily rounds and ED readout.
- Develop a diagnostic plan.
- Attend departmental and interdepartmental teaching conferences
- Demonstrate knowledge of levels of ionizing radiation related to pediatric radiography to minimize patient dose.

3. PROFESSIONALISM:

- Ability to interact well with other members of the patient care team
- Represents the patient's best interest by presenting essential and accurate patient information in reports

4. PRACTICE-BASED LEARNING AND IMPROVEMENT:

- Learn and demonstrate critical assessment of scientific literature through participation in journal club
- Inter- and intra-departmental medical conferences and rounds to build knowledge of evidence-based medicine in
- Use multiple learning sources to expand knowledge, use of multiple learning sources, facilitation of education for students, peers
- and other professionals – inter-and intra-departmental conferences
- Participate in QA and QI

PEDIATRIC RADIOLOGY

5. SYSTEMS BASED PRACTICE: Fellows should understand healthcare practice

- Understand the role and be competent in use of computers, radiology information systems, physics support, risk management and PACS.

6. INTERPERSONAL/COMMUNICATION SKILLS: Fellows should communicate and teach effectively.

- Relate well to other personnel including peers, faculty, support staff, referring physicians and other housestaff members.
- Present concise, accurate, reports in a compassionate manner with the best interest of the patient to staff and referring physicians.

PEDIATRIC RADIOLOGY

PG Year: 6
Rotation: FLUOROSCOPY II / INTERVENTIONAL RADIOLOGY
Location: PEDIATRIC RADIOLOGY AT UNIVERSITY OF ROCHESTER MEDICAL CENTER/GOLISANO CHILDREN'S HOSPITAL

Objectives for Rotation:

1. MEDICAL KNOWLEDGE:

- Operation of fluoro equipment
- Protocols for various fluoro/IR exams
- Physics of dose saving techniques
- Indications for commonly performed fluoro exams
- Understand the pathophysiology and imaging related to urinary tract infections in children, hydronephrosis, bowel obstruction
- Image and understand findings gastroesophageal reflux, acid peptic disease and reflux
- IR procedures: feeding tube placement, abscess drainage, biopsies, percutaneous nephrostomy, vascular access, and hepato-biliary procedures.
- Understand the significance of various imaging findings related to the clinical circumstances being evaluated.

Skills

- Appropriate professional interaction with patient and family
- Perform fluoroscopy efficiently and effectively, minimizing fluoro dose
- Acquire adequate documentation of pertinent positive and negative
- View, report and edit interpretations of fluoro/IR exams
- Develop a pattern for concise, accurate and informative image interpretation of fluoro examinations

Focused Curriculum

- UTI and urinary tract dilation
- Bowel obstruction
- Acid peptic disease and reflux
- Radiation physics and fluoroscopy

Daily Activity

- ED readout
- NICU rounds
- Attend departmental and interdepartmental teaching conferences
- Perform, interpret and report fluoroscopy exams
- Perform, interpret and report interventional radiology procedures

2. PATIENT CARE:

- Appropriate professional interaction with patient and family
- Gather essential and accurate patient information.
- Perform fluoroscopy efficiently and effectively, minimizing fluoroscopy dose
- Acquire adequate documentation of pertinent positive and negative
- View, report and edit interpretations of fluoroscopy/IR exams
- Develop a pattern for concise, accurate and informative image interpretation of fluoroscopy examinations
- Knowledge of levels of ionizing radiation related to pediatric fluoroscopy tom minimize radiation dose to patient.

3. PROFESSIONALISM:

- Ability to interact well with other members of the patient care team
- Represents the patient's best interest by presenting essential and accurate patient information in reports

4. PRACTICE-BASED LEARNING AND IMPROVEMENT:

- Learn and demonstrate critical assessment of scientific literature through participation in journal club
- Attend and participate in Inter-and intra-departmental medical conferences and rounds to build knowledge of evidence-based medicine in pediatric fluoroscopy
- Use multiple learning sources to expand knowledge, use of multiple learning sources, facilitation of education for students, peers and other professionals
- Participate in QA and QI

5. SYSTEMS BASED PRACTICE

- Understand the role and be competent in use of computers, radiology information systems, physics support, risk management and PACS.

6. **INTERPERSONAL/COMMUNICATION SKILLS:** Fellows should communicate and teach effectively.
   - Relate well to other personnel including peers, faculty, support staff, referring physicians and other housestaff members.
   - Present concise, accurate, reports in a compassionate manner with the best interest of the patient to staff and referring physicians.

PEDIATRIC RADIOLOGY

PG Year: 6
Rotation: ULTRASOUND II
Location: PEDIATRIC RADIOLOGY AT UNIVERSITY OF ROCHESTER MEDICAL CENTER/GOLISANO CHILDREN'S HOSPITAL

Objectives for Rotation:

1. **MEDICAL KNOWLEDGE:**
   - Master different transducers, Doppler imaging, with focus on renal and liver transplant evaluation, oncology imaging (renal, adrenal, hepatic tumor diagnosis and follow-up) and vascular abnormality (both congenital and acquired).
   - Master protocol, perform, interpret and report US examinations for pediatric head, spine, abdomen, pelvis and hip exams
   - Perform hands-on scanning
   - Develop a pattern for concise, accurate, and informative image interpretation of ultrasound examinations

Daily Activity

- ED readout
- NICU rounds
- Attend departmental and interdepartmental teaching conferences
- View, interpret and report US exams

2. **PATIENT CARE:**
   - Gather essential and accurate information
   - Develop, perform and oversee an US imaging plan for common pediatric problems.
   - Understands clinical issues and can interpret or undertake US procedures with the best interest of the patient and referring physician in mind.

3. **PROFESSIONALISM:**
   - Performs duties conscientiously and enthusiastically, and reports where and when scheduled.
   - Committed to patient care and works well with other members of the patient care team.

4. **PRACTICE-BASED LEARNING AND IMPROVEMENT:**
   - Analyzes and performs practice-based improvement in cognitive knowledge, observation, formulating a synthesis and impression and procedure skills.
   - Demonstrates critical assessment of scientific literature; participates in critical assessment through Journal Club and conferences.
   - Demonstrates knowledge of evidence-based medicine, u se of multiple learning sources
   - Participates in QA and QI

5. **SYSTEMS BASED PRACTICE:**
   - Understands and utilizes departmental resources appropriately.
   - Understands the role and is competent in the use of computers, physics support, risk management, and PACS system.
   - Demonstrates a knowledge of, and applies appropriateness criteria and other cost-effective healthcare principles to professional practice.
   -

6. **INTERPERSONAL/COMMUNICATION SKILLS:**
   - Is helpful and proficient in the consultative role.
   - Able to relate to other personnel including peers, faculty, support staff, referring physicians and other housestaff members.

PEDIATRIC RADIOLOGY

PG Year: 6
Rotation: PEDIATRIC RADIOLOGY AT UNIVERSITY OF ROCHESTER MEDICAL CENTER/GOLISANO CHILDREN'S HOSPITAL
Location: FETAL IMAGING

OBJECTIVES FOR ROTATION:

1. To provide the fellows with basic knowledge to independently interpret fetal imaging (MRI and US)
2. To better understand the perinatal and neonatal disease process from the imaging stand point.

EDUCATIONAL GOALS:

1. Familiarize with fetal MRI protocols
2. Understand the MRI safety guidelines for fetal imaging
3. Review the clinical indication of the requested study and tailor the MRI protocol accordingly
4. Learn the best time to image a fetus depending on the clinical concern and why
5. If possible, learn the imaging technique by sitting at the scanner while images are being obtained.
6. Review cases with staff
7. Discuss results with ordering physician
8. Present images in the multidisciplinary maternal- fetal conference if needed

KNOWLEDGE:

1. Expand their knowledge in fetal brain, spine, abdominal, pelvic and musculoskeletal pathology
2. Learn the differences in fetal anatomy by MRI when performed at different gestational ages
3. Understand the most common diseases affecting fetuses throughout the body
4. Familiarize with the most common syndromes affecting the fetal population
5. Correlate fetal disease process with post-natal pathology
6. Learn the basics of level II and III obstetric ultrasound: typical fetal measurements, biometry, Doppler valuation of ductus venosus, middle cerebral artery, umbilical artery and vein

PG Year: 6
Rotation: ELECTIVE ROTATION – CARDIAC IMAGING
Location: PEDIATRIC RADIOLOGY AT UNIVERSITY OF ROCHESTER MEDICAL CENTER/GOLISANO CHILDREN'S HOSPITAL

Objectives for Rotation:

1. **MEDICAL KNOWLEDGE:** Attendance at all cardiac conferences
   - Coverage of Cardiac MRIs
   - Understand the indications and reasoning for performing right and/or left heart catheterization and cardiac MRI
   - Develop a systematic approach to the evaluation of cardiac catheterization and cardiac MRI protocol and evaluation
   - Become familiar with interventional procedures and devices
   - Knowledge of cardiac anatomy (heart including explanation of cardiac segmental anatomy, atria, ventricles, coronary Arteries) and physiology
   - **Technique:** Radiographic Interpretation, Cardiac CT techniques, Cardiac MRI techniques
   - Corrective and palliative procedures

SELECTED READING:

- Cardiovascular MRI in congenital heart disease: an imaging atlas. Springer. S Sridharan, G Price, O Tann, M Hughes, V Muthurangu, AM Taylor. Feb 2010

2. PATIENT CARE:
- Gather essential and accurate patient information
- Develop and oversee MRI diagnostic imaging with the best interest of the patient in mind
- Counsel patients and families
- Demonstrate knowledge of levels of ionizing radiation related to cardiac catheterization to minimize radiation dose to patient.

3. PROFESSIONALISM:
- Interact well with other members of the patient care team.
- Perform duties conscientiously and reports where and when scheduled.
- Demonstrate altruism, compassion, honor and integrity.

4. PRACTICE-BASED LEARNING AND IMPROVEMENT:
- Learn and demonstrate critical assessment of scientific literature through participation in journal club
- Attend and participate in inter-and intra-departmental medical conferences and rounds to build knowledge of evidence-based medicine in pediatric MRI
- Use multiple learning sources to expand knowledge, use of multiple learning sources, facilitation of education for students, peers and other professionals
- Participate in QA and QI

5. SYSTEMS BASED PRACTICE
- Understand the role and be competent in use of computers, radiology information systems, physics support, risk management and PACS.

6. INTERPERSONAL/COMMUNICATION SKILLS: Residents should communicate and teach effectively.
- Relate well to other personnel including peers, faculty, support staff, referring physicians and other housestaff members.
- Present concise, accurate, reports in a compassionate manner with the best interest of the patient to staff and referring physicians.
-

CONFERENCES:

Work rounds present a daily opportunity to interface with faculty of various disciplines. The pediatric radiology fellow is given the opportunity to sharpen his or her skills through insights gained from various pediatric specialists daily.

Interdepartmental and didactic conferences offer a significant portion of the learning opportunity for the residents and fellows. Attendance is required at work rounds and at all inter-department and didactic conferences. Participation in conferences will evolve as the resident gains clinical and medical insight. The earliest involvement will be observation, but by the end of the fellowship it is expected that the fellow will function as the primary contributor at inter-departmental conferences with faculty attendance as support.

WORK ROUNDS

NICU Rounds 8:00 am – 9:00 am 1x/week

Didactic lectures – Core Radiology Resident – Schedule announced

Acquired Spine and Cord

Acyanotic Heart Disease

Airway

Bone Dysplasias
Brain Tumors
Congenital/Acquired Parenchymal lung disease
Congenital Brain
Congenital GU
Cyanotic Heart Disease
Head Ultrasound
Hips and Feet/Hands
Hydroneophrosis
Interventional
Liver/Biliary
Mediastinum
Newborn Bowel
Orbits/Sinuses/Face
Pelvis/GU
Renal/Adrenal Neoplasms
Respiratory Distress
Skeletal Neoplasms
Skeletal Trauma
Skull

INTERDEPARTMENTAL CONFERENCES

Attend all (80+ %) conferences
Always review cases with assigned faculty radiologist prior to conference.

REQUIRED PRESENTATIONS

Presentation to radiology residents (noon case conference)
Presentation to pediatric faculty
Rad-Path Club
Journal Club
Formal presentation of research project to pediatric radiology faculty

Quality Improvement and Patient Safety

PEDIATRIC RADIOLOGY: Program Quality Improvement and Patient Safety Guidelines

PEDIATRIC RADIOLOGY

Each fellow attend monthly Pediatric Radiology staff meeting dedicated to quality improvement during which recent imaging examinations are discussed by the group (covering protocol and ordering errors, interpretive errors, follow up errors) as well as brainstorming on ways to improve efficiency and accuracy.

Each fellow must complete a PQI (practice quality improvement) project during fellowship year. Fellows are instructed to look for opportunity in daily reading room activities such as protocol development, patient satisfaction survey, patient safety, modality utilization (past projects discussed)

The resident, along with faculty and relevant staff, helps to identify the quality improvement issue, develops a process to address the issue and then provides follow-up. The results are then presented to the department.

Research / Scholarly Activity

Scholarly Activity

Discussed with each fellow by the PD during orientation

1. Lectures fellows prepare: noon interesting case conference for radiology residents, technologist talk and presentation to the pediatric radiology faculty
2. Multidisciplinary conference preparation and presentation: tumor board (twice per month), monthly GI, monthly pediatric surgery, monthly pediatric rheumatology, weekly pulmonary, weekly PICU, weekly NICU.

Research project:

Each fellow completes one research project during the year with outline as follows: preliminary literature review, proposal, study design/outline draft, data collection, draft manuscript, present material to radiologists, complete manuscript, and submission to peer reviewed journal. Strive to present material as abstract at national meeting (SPR, RSNA, ARRS).

Time-Away Policy

Vacations:

A fellow is entitled to a total of 22 days of vacation per academic year (7/1/25- 6/31/26).

Travel and Conference Policy:

The fellow is entitled to reimbursement for allowable expenses up to $1500 incurred for presentations at major national meetings (ARRS, RSNA, ASSR). An away request must be filled out, along with a copy of the accepted abstract. Approval must be received from the Program Director. A copy of the time away approval and abstract must be given to the Program Coordinator.

Professional accounts have been established for each fellow in the department per department policy. These funds may be used to purchase books, journals, educational materials, dues/licenses, and for additional reimbursement of approved travel.

Duty Hours Policy

According to the institutional policy, Duty hours are defined as all clinical and academic activities related to the residency program, i.e., patient care (both inpatient and outpatient), administrative duties related to patient care, the provision for transfer of patient care, time spent in-house during call activities, and scheduled academic activities such as conferences. Duty hours do not include reading and preparation time spent away from the duty site. Duty hours must be limited to 80 hours per week, averaged over a four-week period, inclusive of all in-house call activities. (NYSDOH has placed an additional limit of 84 hours for any one week.)

Residents/fellows must be provided with 1 day in 7 free from all educational and clinical responsibilities, inclusive of in-house and pager call. One day is defined as one continuous 24-hour period free from all clinical, educational, and administrative activities. Adequate time for rest and personal activities must be provided. This should consist of a 10-hour time period and must consist of at least an 8-hour time period between all daily duty periods and after in-house call. The NYSDOH requires strict adherence of institutions to its duty hour standards.

On Call Policy

The objective of on-call activities is to provide residents with continuity of patient care experiences throughout a 24-hour period. In-house call is defined as those duty hours beyond the normal work day when residents are required to be immediately available in the assigned institution. In-house call must occur no more frequently than every third night, averaged over a four-week period.

Continuous on-site duty, including in-house call, must not exceed 24 consecutive hours. Call must not be so frequent as to preclude rest and reasonable personal time for each trainee. Residents/fellows taking at-home call must be provided with 1 day in 7 completely free from all educational and clinical responsibilities. When residents are called into the hospital from home, the hours residents spend in-house are counted toward the 80-hour limit. Hours devoted to moonlighting must be added to training program work hours and reported on all work hour surveys. At no time should a trainee exceed work hour regulations through a combination of training program plus moonlighting activities.

Reporting on Duty Hour Violations

As a trainee, if you are concerned about a possible duty hour violation, you are encouraged to first speak with your program director. Should you feel that you have exhausted that route or don't feel comfortable in approaching your program director, then use the Medical Director's Safety/Quality Hotline as described below. If there is a duty hour violation that a trainee would like to report, this can be done through the Medical Director's Safety/Quality Hotline. This hotline has a routing method to ensure that the call gets to a person, not phone mail, during normal business hours. After hours, it does go to phone mail. The system is confidential as the people who staff the hotline handle highly confidential safety and quality issues. The system can and will also handle anonymous calls but the institution's ability to respond to that type of call may be difficult because of the possible non-specific nature of the comment. All issues get screened and then go to the Medical Director's office for follow up. The Associate Dean for Graduate Medical Education will be notified regarding all work hour issues. The number to call is 273-2273.

Evaluation

The fellow will be evaluated semi-annually by faculty and peers and will have an opportunity to evaluate the faculty. The fellow will also be responsible for completing a self-evaluation at the 6-month and 12-month mark of their fellowship year. The program is evaluated yearly by the fellow and faculty. Discussions with the program director will occur at the semi-annual evaluations. Faculty and fellows will meet once a year to discuss the program and discuss any changes that should be instituted.

Supervision

Program Supervision Policy

The fellow will be provided direct and progressively responsible experience in Pediatric Imaging. However, a radiology faculty attending will be involved in all aspects of care. The supervising radiologist will review every case with the fellow and co-sign all interpretations. The attending radiologist will supervise every fluoroscopic examination and the attending faculty will be directly involved and physically present in all interventional cases. Although progressive responsibility is necessary so that the graduating fellow has the ability to execute sound clinical judgment, attending-level supervision will be available on all cases including emergency cases for which the fellow is first call. Any procedures performed by the fellow when on -call will be directly supervised by the on-call physician.

Guidelines for When Residents Must Communicate with the Attending

Critical Events Policy
Fellow will contact attending radiologist when any of the following critical results are identified.

Critical Results are defined as:

- Hazardous line or tube placement
- Unsuspected imaging findings suggesting child abuse
- New, unexpected or expanding pneumothorax
- New, unexpected or expanding pneumoperitoneum
- Newly observed bowel obstruction
- Newly discovered or recurrent tumors
- New, unexpected or increasing intracranial pressure
- New, unexpected or expanding intracranial hemorrhage
- New, unexpected or expanding spinal cord compression
- Unsuspected imaging findings considered clinically significant by the interpreting radiologist