



CanMeds Goals & Objectives-MCH

Table of Contents

1) Pediatric Rotation	5
Description	5
General Goal	5
General Responsibilities	5
2) Pediatric Chest	6
Goals Overview.....	6
Specific Objectives.....	6
Medical Expert (PGY3)	6
Medical Expert (PGY4)	6
Communicator.....	7
Collaborator.....	7
Manager	7
Health Advocate.....	7
Professional.....	8
Scholar.....	8
Responsibilities	8
Clinical	8
Teaching.....	8
Rounds.....	8
Evaluation.....	8
Quantitative Expectations.....	8
Suggested Resources	9

Additional Resources	9
3) Pediatric GI/GU	10
Goals - Overview.....	10
Specific Objectives.....	10
Medical Expert/Decision Maker	10
Communicator.....	11
Collaborator	11
Manager	11
Health Advocate.....	11
Professional.....	11
Scholar.....	12
Rotation Responsibilities	12
Clinical	12
Rounds:	12
Evaluation	12
Quantitative expectations.....	12
Suggested resources:.....	12
Recommended text books:	12
4) Pediatric Ultrasound	13
Goals Overview.....	13
Specific Objectives.....	13
Medical Expert/Decision Maker	13
Communicator:	13
Collaborator:	14
Manager:	14
Health Advocate:	14
Professional:	14
Scholar:	14
Rotations responsibilities:.....	14

Clinical	14
Teaching.....	14
Rounds.....	14
Evaluation.....	14
Quantitative expectations.....	15
Suggested resources:.....	15
5) Musculoskeletal.....	16
Goals and Overview.....	16
Specific Objectives.....	16
Medical expert/clinical decision-maker	16
Communicator.....	16
Collaborator.....	17
Manager	17
Health Advocate.....	17
Professional.....	17
Scholar.....	17
Rotation responsibilities.....	17
Clinical	17
Teaching.....	17
Rounds.....	17
Evaluation.....	17
Quantitative expectations.....	18
Suggested resources	18
6) Neuroradiology Rotation.....	19
Goals and Overview.....	19
Specific Objectives.....	19
Medical Expert.....	19
Communicator.....	19
Collaborator.....	19

Manager	19
Health advocate	19
Professional.....	20
Scholar.....	20
Rotation responsibilities.....	20
Clinical	20
Teaching.....	20
Rounds.....	20
Evaluation.....	20
Quantitative expectations.....	20
Suggested Resources	20

1) Pediatric Rotation

Description

The pediatric radiology rotation includes a period of 4 weeks as PGY 3 and a period of 12 weeks as PGY 4:

- | | |
|--------|------------------------|
| PGY 3: | 2 weeks in ultrasound, |
| | 1 week in Chest |
| | 1 week in MSK |
| PGY 4: | 2 weeks in Chest, |
| | 2 weeks in MSK, |
| | 3 weeks in neuro, |
| | 3 weeks in GU-GI, |
| | 2 weeks in ultrasound, |

General Goal

By the end of these two rotations, the resident should be competent in standard pediatric diagnosis including plain film radiography, common GI and GU contrast studies, ultrasound, CT and MRI.

Understanding that children are not 'little adults', the resident should develop an understanding for paediatric-specific pathologies and be able to review images for children ranging from extreme premature infants to adolescents.

Appreciate the imperative to reduce radiation doses to 'as low as reasonably achievable' in children.

Perform and interpret ultrasound studies and gain experience with paediatric-specific exams such as hip, brain, and pyloric stenosis US.

Interpret CT and MRI cases with specific attention to pediatric-specific protocols.

General Responsibilities

- Start at 8:00 AM until the work is completed.
- Follow the MCH policy in terms of security, confidentiality and ethics.
- Meet with MCH program coordinator at mid and end rotation for evaluations, more often if needed.
- Give case presentation (4 cases) at the end of the second rotation, to students, other residents, fellows and staff of the pediatric radiology department.

2) Pediatric Chest

- PGY 3: One week.
- PGY 4: Two weeks

Goals Overview

By the end of the residency training, the resident should be competent in interpreting radiographs, CT and MR of pediatric chest disease at the level of a general consulting radiologist. This should include:

- Radiographs of neonatal chest disease
- Radiographs and special studies of older children
- Radiographs, CT and MR of congenital heart disease (in combination with the dedicated cardiac rotation).

Specific Objectives

Medical Expert (PGY3)

- To learn the special attention given to the effects of ionizing radiation in immature proliferating and differentiating tissue in pediatrics and its importance in guiding investigation of chest diseases
- To demonstrate knowledge of common pathologies and their radiographic features:
- Neonatology:
 - Normal premature and full-term anatomy, in particular the variant thymic appearances; common ICU support devices: normal and potentially dangerous positioning
 - Umbilical arterial catheter [between T6 and T10 or at L3-4]
 - Umbilical venous catheter
 - VA, VV ECMO
 - Common neonatal pulmonary diseases
 - RDS, PIE, TTN, BPD, Meconium aspiration, pneumothorax, pneumomediastinum, diaphragmatic hernia/eventration, persistent pulmonary hypertension
 - Learning to separate medical from surgical conditions
- Infants and older children:
 - To become proficient in interpreting radiographs of upper and lower respiratory acute infections/inflammation which are the majority of examinations in pediatric radiology (pneumonia [round pneumonia < 7 years; TB], croup, and epiglottitis, bronchiolitis, reactive airways disease, Cystic Fibrosis)
 - Investigation of upper airway obstruction and suspected foreign body aspiration
 - To learn the usefulness of sonography and CT in evaluating chest infection (US for effusion, CT for parenchymal perfusion)
 - Mediastinal and chest wall masses
 - Anterior (Lymphoma, Germ cell tumors [aortic, thyroid, thymoma are rare in pediatric])
 - Middle (Adenopathy, Non-neoplastic)
 - Posterior (Neural crest tumors, Nerve sheath tumors)

Medical Expert (PGY4)

- Same as PGY 3 plus:

- Neonatology:
 - Assessment of heart size and pulmonary vascularity
 - Congenital heart disease with decreased pulmonary blood flow (right to left shunt) (Tetralogy of, Ebstein anomaly, Tricuspid atresia)
 - Cyanotic congenital heart disease with increased pulmonary blood flow (left to right shunt) (Truncus arteriosus, Transposition of the great vessels, Single ventricle, TAPVR, AV canal)
 - Acyanotic congenital heart disease with increased pulmonary blood flow (ASD, VSD, PDA, AV canal)
 - Congenital heart disease with pulmonary venous congestion or normal pulmonary blood flow (Coarctation, Aortic stenosis, Mitral Stenosis, Interrupted aortic arch, Cor triatriatum, Pulmonary venous stenosis)
 - Hypoplastic left heart
 - Situs anomalies
 - Vascular rings and slings
 - Congenital Chest (pulmonary hypoplasia, aplasia, agenesis, Bronchial atresia, Foregut duplication cyst, Sequestration, CPAM, Hybrid lesion, Scimitar Syndrome, Tracheal Bronchus, Lymphangiectasia)
- Infants and older children:
 - Major lung, mediastinal and chest wall tumors: identification, investigation and follow-up (Pleuropulmonary Blastoma, Metastasis, Chest wall [sarcomas, Askin tumor])
 - Pulmonary manifestations of diseases of other organs
 - Langerhans cell histiocytosis
 - To learn the indications for and limitations of conventional spiral and high resolution CT in children with particular emphasis on sedation, monitoring, radiation (ALARA), contrast dose and injection parameters.
 - Radiographic recognition of common lesions
 - Knowledge of current surgical procedures and their complications

Communicator

- To dictate useful concise reports which reach an opinion and, when appropriate, give recommendations for further studies.
- To organize a report into pertinent positive and negative findings, differential diagnosis and opinion.
- To learn the importance of immediate direct communication of critical, often unexpected, findings with the treating physician.

Collaborator

- To demonstrate good consulting skills when interacting with other physicians and health team members.
- To interact appropriately with other medical imaging department staff and demonstrate a team approach to patient care.

Manager

- To demonstrate awareness for the increased radiosensitivity to ionizing radiation in growing children and plan follow-up studies, repeat examinations and further investigations accordingly.
- To consider available resources when planning patient care, considering prioritizing special examinations, staffing of the department, cost-benefit ratio of the test, etc...

Health Advocate

- To recognize and consider consent issues, disclosure of test results, patient comfort, risk of examination.

Professional

- To demonstrate integrity, honesty and compassion.
- To practice with an understanding of the ethical and medical-legal requirements of radiologists.
- To demonstrate an awareness of own limitations.

Scholar

- To set personal learning goals during each rotation.
- To take a leadership role in the teaching/supervision of junior radiology residents, elective medical students and off-service residents (when appropriate).

Responsibilities

Clinical

- Interpret all chest radiographs from patients seen in the emergency department since 5 pm the previous day; review with supervisor and be certain appropriate prompt notification occurs of missed important findings or incorrect diagnoses (PGY3 & PGY 4).
- Interpret all thoracic medical imaging performed during the previous 24 hours on patients in the neonatal, medical and surgical ICU's, review with supervisor and communicate, when necessary, with the clinician (PGY 3 & PGY 4).
- Interpret, review and report chest films from emergency room, clinics, wards and consultations from referring institutions (PGY 3 & PGY 4).
- Protocol and interpret all thoracic CT scans after reviewing previous studies and, when necessary, discussing the indication and appropriate study with the supervisor and/or clinician (PGY 4)
- Observe and participate in thoracic sonography if time permits (PGY 4).
- Protocol, supervise, and interpret all non-cardiac chest MRIs after reviewing previous studies and, when necessary, discussing the indications and appropriate study with the supervisor and/or clinician (PGY 4).
- Observe cardiac MRs performed electively each week and become acquainted with, but not proficient in, the various post-processing modalities (responsibility shared with dedicated cardiac rotation) (PGY 4).
- To function as a junior consultant in the chest division (PGY 4).

Teaching

- The resident is encouraged to bring interesting cases to the attention of his fellow residents in the consultation room (PGY 3 & PGY 4).
- Supervision/teaching of elective medical students or off-service residents with guidance by staff (PGY 3 & PGY 4).

Rounds

- Attendance to weekly neonatal and monthly respirology rounds

Evaluation

- Informal assessment on a daily basis by staff assigned to chest.
- Informal evaluation at mid-point and formal evaluation at end of rotation.

Quantitative Expectations

X-Rays = 30 radiographs/day in PGY 3; 40 radiographs/day in PGY 4.

CT = 1/day

MRI = each non cardiac chest MRI as PGY 4 (typical volume is ~1/week)

Suggested Resources

- Pediatric Imaging: The Fundamentals. Donnelly 2009.
- Imaging of Newborn, Infant and Young Child. Swischuck, 2004.

Additional Resources

- Departmental teaching file library, respiratory and cardiovascular sections.
- Internet access available at terminal in resident's reading room.
- Caffey's Pediatric Diagnostic Imaging.
- Pediatric Chest Imaging. Lucaya and Strife

3) Pediatric GI/GU

PGY 4: three weeks.

Goals - Overview

- At the end of the residency training, the resident should be competent in common and emergent contrast studies of the gastrointestinal as well as genitourinary tract and computerized tomography of the abdomen.
- Gastrointestinal exams of the upper GI tract with barium, as well as the lower GI tract (enema) with barium and water-soluble contrast. The resident should be aware that the attention in a pediatric study is distinct from that in an adult study: e.g. the need to identify the anatomy with certainty.
- Computerized tomography studies of the abdomen and pelvis with oral and/or intravenous when necessary.

Specific Objectives

Medical Expert/Decision Maker

- To demonstrate basic knowledge of upper GI studies with single contrast in most emergencies, as well as contrast enemas in neonates (emergencies) and older children.
- To perform and interpret genitourinary studies such as VCUG.
- To learn the appropriate indications for a variety of gastrointestinal and genitourinary exams, including emergencies, which are most common in the gastrointestinal tract.
- To learn the normal anatomy in upper GI studies, contrast enemas and VCUG.
- To demonstrate a knowledge of common pathologies and their associated radiographic findings:
- To learn basic techniques of examinations of abdomen and pelvis in a computerized tomography including the use of oral and intravascular contrast in Helical CT. Residents should be familiar with specific pediatric protocols tailored for particular organs and pathologies.
- To learn certain basic pathologies

Biliary System (Biliary atresia, Neonatal hepatitis, Choledochal cyst)

Liver (complications of misplaced UVC/PCVC, Hemangioendothelioma, Mesenchymal hamartoma, Adenomas, Hepatoblastoma, Hepatocellular carcinoma, Metastases including neuroblastoma, Assessment with color Doppler, Cavertous transformation of the portal vein, Portal venous gas)

Spleen (Abnormal viscerotrial situs, Wandering spleen, Lymphangioma, Trauma, Infarction (sickle cell))

Pancreas (Congenital - pancreas divisum, Inflammatory - pancreatitis and pseudocyst, trauma (including non-accidental trauma), Fatty replacement or fibrosis seen in CF)

TE Fistula

Stomach (Atresia, antral webs Hypertrophic pyloric stenosis, Pylorospasm, Eosinophilic gastroenteritis, Volvulus)

Small Bowel (Midgut malrotation, Atresias, Annular pancreas, Meconium ileus, Meconium peritonitis, Mesenteric and omental cysts, duplication cysts, Meckel diverticulum, Omphalocele, gastroschisis, Diaphragmatic, umbilical, and inguinal hernias, Inflammatory (Crohn's disease), milk allergy, Necrotizing enterocolitis, Intussusception, Henoch-Schonlein purpura, Hemolytic uremic syndrome)

Colon (Imperforate anus, Hirschsprung disease, Hypoplastic left colon syndrome, Appendicitis, Anorectal malformations)

Pneumoperitoneum

Kidneys (UPJ obstruction, Duplication, Multicystic dysplastic kidney, Agenesis, Ectopia, Cross-fused ectopia, VACTRL association, ARPCK, ADPKD, Syndromes [Tuberous sclerosis, von-Hippel Lindau, Zellweger, Meckel-Gruber], Pyelonephritis, Reflux nephropathy, Wilms tumor, Nephroblastomatosis, Mesoblastic nephroma, Multilocular cystic nephroma, Leukemia/lymphoma, Renal vein thrombosis, Urolithiasis, Renal transplant US, Renovascular hypertension)

Adrenal Glands (Neuroblastoma, Adrenocortical carcinoma, Neonatal hemorrhage, Congenital adrenal hyperplasia)

Bladder, Ureters, Urethra (Posterior urethral valves. Ureterovesical junction obstruction, Primary megaureter, Bladder diverticula, Ureteral duplication, Ureterocele, Urachal abnormalities, Hypospadias, Episadias, Bladder exstrophy, Prune belly, Rhabdomyosarcoma, VU reflux, Neurogenic bladder, Dysfunctional voiding including bladder/sphincter dyssynergia)

Male Genital Tract (Testicular torsion, Torsion of testicular or epididymal appendages, Hydrocele, Epididymitis/orchitis, Germ cell tumors, Stromal tumors, Leukemia, rhabdomyosarcoma)

Female Genital Tract (Vaginal occlusion (imperforate hymen), Fusion anomalies of the Mullerian ducts (uterus didelphys, bicornuate uterus..., Cloacal anomalies, Ovarian Torsion, Ovarian cysts, Germ cell tumors, Rhabdomyosarcoma (uterus or vagina), Intersex states)

Communicator

- To dictate well-organized reports, including relevant findings, diagnosis and recommendations.
- To demonstrate effective communication skills when dealing with patients, staff and referring physicians.

Collaborator

- To demonstrate good consulting skills when interacting with other physicians and health team members.
- To interact appropriately with other radiology department staff, demonstrating a team approach to patient care.

Manager

- To demonstrate awareness of the indications for various gastrointestinal genitourinary and computerized tomography examinations.
- To consider advantages and disadvantages of fluoroscopic studies and CT vs other imaging modalities.
- To consider available imaging resources when planning and recommending patient care, using them effectively and efficiently.

Health Advocate

- To demonstrate awareness of radiation issues and radiation doses related to fluoroscopic studies (GI/GU studies) and computerized studies, particularly in the pediatric population.
- Recognize and understand issues related to exams performed in all ages, including newborn babies, infants, toddlers, children and adolescents, since interaction with the patients and parents vary according to patients' age for obvious reasons.

Professional

- To demonstrate integrity, honesty and compassion.
- To practice understanding ethical and medical-legal requirements of radiologists.
- To demonstrate awareness of own limitations and seek consult.

Scholar

- To set personal learning goals and objectives during rotation.
- To take a leadership role in the learning of others, with teaching/supervision of junior residents on rotation, elective students, off-service residents.

Rotation Responsibilities

Clinical

- The residents should focus on learning basic GI/GU techniques and skills. Residents should also review all CT cases as well.
- With graded responsibility, residents should by the end of the rotation interpret routine fluoroscopic studies under supervision, perform contrast examinations by himself under the supervision of the assigned radiologist. Attention should be paid to emergent examinations (upper GI for volvulus, intussusception reduction, and water-soluble neonatal enema).

Rounds:

- Residents should attend weekly radiology/surgery/pathology and monthly GI rounds.

Evaluation

- Evaluation is on a daily basis by staff radiologist assigned to GI/GU and computerized tomography, as well as staff at daily educational rounds.

Quantitative expectations

2 VCUGs per day

1 to 2 UGI/ SBFT per day

1 to 2 CTs per day

10-20 plain radiographs per day

Suggested resources:

Recommended text books:

1. Pediatric Imaging: The Fundamentals. Donnelly 2009.
2. Stringer DC & Babyn PS. Pediatric Gastrointestinal Imaging and Interventional. Published by Dekker
3. Caffey's Pediatric Diagnostic imaging Mosby Elsevier 12th edition
4. Slovis TL, Sly JR, Haller JO. Imaging of the Pediatric urinary Tract. WB Saunders
5. Pediatric Body CT. Marilyn Siegel Lippincott 2008

4) Pediatric Ultrasound

PGY 3: two week

PGY 4: two week

Goals Overview

At the end of the residency training, the resident should be competent in ultrasound skills required for general Pediatric Ultrasound, including sonographic studies of the Brain, Spine, Head/Neck, Chest, Abdomen, Pelvis, Small Parts, Vascular system and MSK. The resident should also be capable of advising the technologists regarding special views or parameters required for the case.

Specific Objectives

Medical Expert/Decision Maker

- To demonstrate basic technique knowledge of Ultrasound scanning for the wide range of sonographic studies done in pediatrics (PGY 3 & PGY 4).
- To learn the appropriate indications for a variety of sonographic examinations in children (PGY 3 & PGY 4).
- To learn the normal sonographic anatomy of the pediatric Brain, Spine, Head/Neck, Chest, Abdomen, Pelvis, Small Parts, Vascular system and MSK (PGY 3 & PGY 4).
- To correlate ultrasound findings with the clinical history and other imaging modalities (PGY 3 & PGY 4).
- To demonstrate a knowledge of common (PGY 3) and uncommon (PGY 4) pathologies and their associated ultrasound findings [the specific pathologies are detailed elsewhere in this document in a system-based approach]:
- Liver, Gallbladder, Biliary Tree and Splenic diseases (congenital and developmental pathologies, obstructions, tumors, portal hypertension, cirrhosis, etc.)
- Pancreatic Congenital, Inflammatory and Neoplastic diseases
- Urinary System Congenital, Infectious and Neoplastic diseases.
- Central Nervous System Congenital, Inflammatory, Infectious and Neoplastic diseases.
- Spinal Cord Congenital malformations.
- Acute scrotum: Testicular torsion, torsion of appendages, Epididymo-Orchitis and post traumatic changes.
- Acute abdomen and pelvis
- Ovaries and uterus: diagnose ovarian torsion and masses.
- Recognize and diagnose the various causes of intestinal origin such as appendicitis, intussusception, mesenteric adenitis, inflammatory bowel disease, intestinal malrotation/volvulus
- Chest US: recognize and diagnose simple and complex pleural effusion, lung consolidation and chest masses, recognize normal thymus.
- MSK: know how to perform hip ultrasound for both indications of congenital hip dysplasia and hip effusion

Communicator:

- To dictate well-organized reports, including relevant findings, diagnosis and recommendations for further imaging.
- To demonstrate effective communication skills when dealing with patients, staff and referring physicians.

Collaborator:

- To demonstrate good consulting skills when interacting with other physicians and health team members.
- To interact appropriately with other radiology department staff, demonstrating a team approach to patient care.

Manager:

- To demonstrate awareness of the indications for the variety of sonographic examinations performed in children.
- To consider advantages and disadvantages of sonographic studies versus other imaging modalities.
- To consider available imaging resources when planning and recommending patient care, using them effectively and efficiently.

Health Advocate:

- Recognize and understand issues related to exams performed in all ages, including newborn babies, infants, toddlers, children and adolescents, since interaction with the patients and parents vary according to patients' age for obvious reasons.

Professional:

- To demonstrate integrity, honesty and compassion.
- To practice understanding ethical and medical-legal requirements of radiologists.
- To demonstrate awareness of own limitations and seek consult.

Scholar:

- To set personal learning goals and objectives during rotation.
- To take a leadership role in the learning of others, with teaching/supervision of junior residents on rotation, elective students, off-service residents.

Rotations responsibilities:

Clinical

- During the first two weeks, the residents should focus on learning basic sonographic skills and techniques, with specific attention to emergency situations (head US in premature babies, acute abdominal pain to exclude ovarian torsion and appendicitis, acute scrotal pain to exclude testicular torsion), reviewing all cases with staff radiologists. On the subsequent two weeks, the resident responsibilities include: interpreting, reporting and performing routine sonographic studies, always under supervision of the staff radiologist.

Teaching

- The resident is encouraged to bring interesting cases to present at rounds. Residents are also encouraged to teach medical students, off-service residents, and technologists about the sonographic appearance of various pathologies.

Rounds

- Residents are expected and encouraged attending departmental and interdisciplinary rounds held in the Radiology Department and throughout the hospital on daily and weekly basis.

Evaluation

- The residents are evaluated on a daily basis by the staff Radiologist assigned to Ultrasound, the staff Radiologist on-call, as well as the staff at educational rounds.

Quantitative expectations

PGY 3: 4-5 US/day

PGY 4: 8-10 US/day

Suggested resources:

Recommended text books:

- Siegel - Pediatric Sonography, 4th edition 2010
- Kirks - Practical Pediatric Imaging: Diagnostic Radiology of Infants and Children
- Caffey - Pediatric Diagnostic Imaging,
- Rumack & Wilson – Diagnostic Ultrasound,

5) Musculoskeletal

PGY 3: One week

PGY 4: Two weeks

Goals and Overview

By the end of the residency training, the resident should be competent in interpreting radiographs, CT and MRI of paediatric musculoskeletal diseases. This should include radiographs of normal skeletal maturation, normal developmental variants, traumatic injuries, infections, benign and malignant tumors, non accidental injury and child abuse, musculoskeletal dysplasia and main congenital malformations. CT and MRI indications and findings might also be known.

Specific Objectives

Medical expert/clinical decision-maker

- To learn the special attention given to the effects of ionizing radiation in immature skeleton (PGY 3 & PGY 4).
- To demonstrate knowledge of common diseases and radiographic features of
 - normal skeletal development (PGY 3 & PGY 4).
 - normal anatomical variants (PGY 3 & PGY 4).
 - specific lesions in traumatic injury, infections and tumors (PGY 3 & PGY 4).
- Recognize normal anatomic structures as they appear on MRI (PGY 4).
- Recognize normal from abnormal marrow signal on MRI and provide a reasonable differential diagnosis in the setting of an abnormal pattern (PGY 4).
- Be able to diagnose common pediatric inflammatory (JIA, osteomyelitis) and traumatic osseous pathologies on MRI (PGY 4).
- Have a basic, organized approach to skeletal dysplasias (PGY 4).
- Recognize common pathologies at CT (focal bone lesions and trauma) as well as the indications for CT imaging of the MSK patient (PGY 4).

Congenital (Achondroplasia, Thanatophoric dysplasia, Chondrodysplasia, Asphyxiating thoracic dystrophy, Multiple hereditary exostoses, Osteogenesis imperfecta, Osteopetrosis, Pycnodysostosis, Proximal focal femoral deficiency, Radial ray anomalies, Amniotic band syndrome, Congenital foot anomalies [pes planus and cavus, clubfoot], Mucopolysaccharidoses, Developmental dysplasia of the hip [plain film and US evaluation], Coxa valga)

Infectious/Inflammatory (Osteomyelitis, Septic arthritis, Toxic synovitis, Juvenile idiopathic arthritis, Hemophilic arthropathy)

Neoplastic (Osteochondroma, Unicameral bone cyst, Aneurysmal bone cyst, Fibrous dysplasia, Langerhans cell histiocytosis, Osteoid osteoma, Osteoblastoma, Chondroblastoma, Chondromyxoid fibroma, Fibroxanthoma, Ewing sarcoma, Osteosarcoma, Leukemia and neuroblastoma may present as metaphyseal lucent bands)

Trauma (Physeal, incomplete fractures, Suspicious non-accidental, SCFE)

Metabolic/Endocrine Rickets, Bone age determination

Osteochondroses (including Perthes, Blount)

Communicator

- to dictate useful concise reports which reach an opinion and, when appropriate, give recommendations for further studies
- to learn the importance of immediate direct communication of critical, often unexpected findings with the treating physician

Collaborator

- To demonstrate good consulting skills when interacting with other physicians and health team members.
- To interact appropriately with other medical imaging department staff and demonstrate a team approach to patient care.

Manager

- To demonstrate awareness for the increased radiosensitivity to ionizing radiation in growing children and plan follow-up studies, repeat examinations and further investigations accordingly.
- To consider available resources when planning patient care, considering prioritizing special examinations, staffing of the department, cost-benefit ratio of the test, etc...

Health Advocate

- To recognize and consider consent issues, disclosure of test results, patient comfort, risk of examination.

Professional

- To demonstrate integrity, honesty and compassion.
- To practice with an understanding of the ethical and medical-legal requirements of radiologists.
- To demonstrate an awareness of own limitations.

Scholar

- To set personal learning goals during rotation.
- To take a leadership role in the teaching/supervision of junior radiology residents, elective medical students and off-service residents (when appropriate).

Rotation responsibilities

Clinical

- Interpret all MSK radiographs from patients seen in the emergency department, review with supervisor. Prompt notification of missed or discrepant or incorrect diagnoses must be done.
- Interpret radiographs for bone age as well as radiographs from patients seen in the rheumatology clinic and follow-up from orthopaedic clinic as well
- Interpret all CT and MRI after reviewing the previous studies and, when necessary, discussing the indication and appropriate study with the supervisor and/or clinician.

Teaching

- The resident is encouraged to bring interesting cases to the attention of his fellow as well as residents in the consultation room.
- Supervision/teaching of elective medical students or off-service residents with guidance by staff

Rounds

- Participation to rheumatology rounds every 6 weeks is highly recommended.

Evaluation

- Informal assessment on a daily basis by staff assigned to MSK
- Quality of contribution to teaching files

Quantitative expectations

- Radiographs : 40 cases/day (PGY 3 & PGY 4)
- CT, MRI : 2-4 cases/day (PGY 4)

Suggested resources

- Pediatric Imaging: The Fundamentals. Donnelly 2009.
- Tachdjian's pediatric Orthopaedics
- Keats; Atlas of normal roentgen variants that may simulate diseases
- Swischuk Imaging of the Cervical spine in children

6) Neuroradiology Rotation

PGY 4: 3 weeks

Goals and Overview

By the end of the residency training, the resident should be competent in interpreting radiographs, CT and MR of the central nervous system, neck and face, ears and eyes.

Specific Objectives

Medical Expert

- This should include knowledge of
 - Central nervous system
 - normal anatomy, myelination milestones,
 - developmental anomalies of the supra and infratentorial brain
 - traumatic injury
 - neonatal hypoxic ischemic injury
 - vascular diseases including arterial and venous infarcts and vascular malformations
 - benign and malignant tumors
 - infectious, inflammatory diseases
 - metabolic and toxic disorders
 - hydrocephalus
 - phakomatosis
 - Neck and face, eyes and ears
 - normal anatomy, age related variants
 - developmental anomalies, associated CNS anomalies
 - traumatic injury
 - tumors and pseudotumors
 - infections
 - Paediatric sedation and monitoring
 - available medications, indications and contra-indications, side and adverse effects, monitoring

Communicator

- to provide concise and diagnostic reports
- to consult with referring physicians before and after the examination
- to explain procedure to the patient's family

Collaborator

- demonstrate good consulting skills when interacting with other physicians and health team members
- interact appropriately with other radiology departmental members (technologists and nurses)

Manager

- consider indications, advantages and disadvantages of various available modalities

Health advocate

- recognize and consider consent issues, patient comfort and other patient-related issues when participating and recommending imaging procedures
- to demonstrate knowledge of radiation protection (ALARA), contrast dose and injection parameters.

Professional

- to demonstrate integrity, honesty and compassion
- to show sensitivity and care to the patient and patient's family
- to practice with an understanding of the ethical and medical-legal requirements of radiologists
- to demonstrate an awareness of own limitations

Scholar

- to set personal learning goals and objectives during rotation
- to take a leadership role in the teaching / supervision of junior radiology residents, elective medical students and off-service residents.

Rotation responsibilities

Clinical

- provide supervision/guidance to the radiologist for cases requiring consultation and/or scanning
- report all cases assigned to resident, after reviewing with the supervising neuroradiologist
- provide sedation of MRI patients when needed

Teaching

- the resident is required to bring cases to neuroradiology rounds
- supervision /teaching of elective medical students or off-service residents
- teaching of technologists

Rounds

- active participation to weekly neuro rounds
- attendance to Neuro tumor board and seizure conference
- attendance to monthly Neuro study club is suggested

Evaluation

- daily basis by the staff radiologist and fellow assigned to review cases
- quality of contribution to teaching files

Quantitative expectations

- 5 to 7 CT per day
- 4 MRI per day
- > 10 plain films

Suggested Resources

- Pediatric Imaging: The Fundamentals. Donnelly 2009.
- Barkovich AJ Pediatric Neuroimaging Raven Press
- Kirks DR Practical Pediatric Imaging Diagnostic Radiology of infants and Children
- Castillo M Imaging of the pediatric Head, Neck and Spine
- Osborn AG Diagnostic Neuroradiology Mosby Year Book Inc St Louis
- Schwartz JD Imaging of the temporal bone
- Gean AD Imaging of Head Trauma