

GOALS, OBJECTIVES, CORE CURRICULUM AND SUGGESTED READING LIST FOR PEDIATRIC IMAGING

The foundation of the DHMC Radiology resident training in Pediatric Radiology is a 3 month rotation at Boston Children's Hospital, one of the premier Pediatric Radiology Departments in the world. This 3 month experience which occurs during the PGY3/R2 year is supplemented by Pediatric imaging cases on all subspecialty rotations at DHMC over all four years of residency and a series of Pediatric Radiology Core didactic teaching sessions that rotate on a two year basis. The Dartmouth Hitchcock Medical Center is home to CHaD, the Children's Hospital at Dartmouth, has a Pediatric residency program, is a Level 1 Pediatric Trauma Center and is home to the Norris Cotton Cancer Center, the leading cancer center in Northern New England.

The following are the Goals and Objectives for the 3 month resident rotation at Boston Children's Hospital (per BCH).

CHILDREN'S HOSPITAL PEDIATRIC RADIOLOGY ROTATION GOALS, OBJECTIVES AND EVALUATION PROGRAM BOSTON, MA

The three-month rotation for diagnostic radiology residents at Children's Hospital has the following goals and objectives:

- To familiarize residents with the diagnostic imaging of infants and children, and to emphasize that infants are not simply small children, and children are not simply small adults.
- To develop comfort with and skill in talking to children and their parents.
- The rotation is heavily weighted toward general diagnostic radiology so that the resident will learn to become familiar with the concepts behind and the imaging findings in infants and children with the most common as well as the most commonly overlooked conditions. These include but are not limited to the following, arranged by organ system and age:

Chest and Airway

Reactive airway disease; pneumonia (including "round pneumonia"); foreign bodies; cystic fibrosis; congenital cystic adenomatoid malformation; lobar emphysema; and an approach to the lucent and the opaque hemithorax; and airway emergencies.

Musculoskeletal

Growth plate injuries and the Salter classification; buckle (torus) fractures; normal variants in the growing skeleton that can mimic disease; slipped capital femoral epiphysis; Legg-Perthes disease; scoliosis; signs of inflicted trauma; common fractures (including supracondylar, ankle, and toddler's).

Gastrointestinal

Intussusception and its non-operative treatment; malrotation; meconium ileus and other causes of bowel obstruction in the very young (and meconium ileus equivalent in cystic fibrosis); pyloric stenosis; inflammatory bowel disease; gastroesophageal reflux disease; acquired small bowel obstruction in older infants and children.

Uroradiology

Urinary tract infection/vesicoureteral reflux and management guidelines thereof, including imaging (ultrasonography, voiding cystourethrography, radionuclide cystography, cortical scintigraphy); congenital anomalies presenting as prenatally diagnosed hydronephrosis, including UPJ obstruction, primary megaureter, duplex kidney with ectopic ureterocele or obstructed ectopic ureter, posterior urethral valves; ectopic ureters in girls with wetting; neurogenic dysfunction of the bladder associated with myelomeningocele, for example.

Neonatology

Hyaline membrane disease; bronchopulmonary dysplasia; meconium aspiration; pulmonary interstitial emphysema; effect of surfactant on radiographic and clinical patterns; ECMO; necrotizing enterocolitis.

Neuroradiology

Indications for and performance of emergency head CT, usually for trauma with ability to recognize epidural hematoma, subdural hematoma, contusion, etc.; recognition of hydrocephalus and its treatment with shunting, including evaluation of ventricular shunts; indications for emergency MRI, cerebral angiography, and myelography; indications for and performance of neck CT, usually for infection.

The residents will also be exposed to an approach to the various imaging modalities as they are used in infants and children, including nuclear medicine, ultrasonography, computed tomography, magnetic resonance imaging, interventional radiology and conventional fluoroscopy.

Residents assigned to Children's Hospital will be permitted to attend lectures at Children's Hospital according to their schedule Monday through Friday. The residents will participate in general diagnostic radiology activities under the supervision of the attending staff at Children's Hospital. The Resident will take part in the on-call schedule for pediatric radiology as assigned. They are evaluated by a formal evaluation process at the end of their assigned Children's Hospital rotation. These evaluations are based on the trainee's performance and technical competency and will be reported to their affiliating Program Director.

PEDIATRICS ROTATION AT BCH

Patient Care

Residents must be able to provide 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 radiographic examination performed
- work with health care professionals, including those from other disciplines, to provide patient-focused care
- recognize urgent, emergent, and critical clinical situations and provide care in a timely and appropriate fashion
- understand and respect the principles of minimizing radiation exposure to children
- understand the risks and issues involved in providing or arranging pediatric sedation

Assessment

Faculty evaluations

360 degree evaluations

ACR In-Service Exam

ABR Exam

Procedure Log

Learning Portfolio

Medical Knowledge

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

During this rotation, residents are expected to:

- learn the normal chest, abdominal, and developmental musculoskeletal plain film anatomy
- learn to interpret plain radiographs of the chest, abdomen, and musculoskeletal system
- learn the radiographic manifestations of common disease entities seen in the above studies
- learn the timing of growth plate development and fusion in order to interpret films on children

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 plain films and their role in the 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

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 with the referring clinician in order to optimize and prioritize the performance of studies on children
- communicate findings effectively with the referring clinicians
- communicate and document the communication of critical findings with the appropriate medical personnel in a timely fashion
- communicate effectively with pediatric patients, their families and their caregivers

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
- demonstrate 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

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 health care
 - practice cost-effective health care and resource allocation that does not compromise quality of care
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PEDIATRIC RADIOLOGY CORE CURRICULUM at DHMC

The Pediatric Radiology Core Curriculum at DHMC is linked to related units in the Cleveland Clinic comet on-line Pediatric Radiology educational curriculum (<https://www.cchs.net/onlinelearning/mainmenu.asp>). Appropriate units are assigned prior to the resident conference, allowing the conference to be more interactive and case based. The units to be reviewed prior to each teaching session are listed below:

SESSION 1: NEONATAL CHEST (SKS)

- Neonatal Chest unit

SESSION 2: PEDIATRIC CHEST (SKS)

- Esophageal Atresia unit
- Childhood pneumonia unit
- Bronchopulmonary foregut malformation unit

SESSION 3: PEDIATRIC GI EMERGENCIES (SKS) to be given during summer student elective

- Hypertrophic Pyloric Stenosis unit
- Malrotation and Midgut Volvulus unit
- Intussusception unit

SESSION 4: PEDIATRIC GI (SKS)

- Congenital duodenal obstruction unit
- Jejunal and ileal atresia unit
- Neonatal low bowel obstruction unit

SESSIONS 5 and 6: CONGENITAL GU DEVELOPMENTAL ANOMALIES Part 1 and 2. (SKS)

- Multicystic Dysplastic Kidney unit
- Duplicated collecting systems unit

SESSION 7: PEDIATRIC GU (TV) to be given early in academic year

- Posterior Urethral Valves unit
- Vesicoureteral Reflux unit

SESSION 8: PEDIATRIC NEOPLASMS (TV)

- Neuroblastoma, Ganglioneuroblastoma, Ganglioneuroma unit
- Wilms and Other Renal Tumors unit

SESSION 9: CHILD ABUSE (TV)

- Child Abuse: Skeletal Trauma unit

SESSION 10: PEDIATRIC ULTRASOUND (TV)

- Scrotal torsion unit
- Scrotal neoplasms unit
- Newborn cranial ultrasound unit
- Spine: The sacral dimple unit

SESSION 11: PEDIATRIC INTERESTING CASES (TV)

READING LIST

- A. Selected articles and additional texts as per SS (Dr. Sargent) and TV (Dr. Vaccaro)
 1. Pause and Pulse: Ten Steps That Help Manage Radiation Dose During Pediatric Fluoroscopy, Marta Hernanz-Schulman, Marilyn J. Goske, Ishtiaq H. Bercha, Keith Strauss. *AJR*; August 2011 197:475-481; doi:10.2214/AJR.10.6122
- B. Texts:
 1. Fundamentals of Pediatric Imaging, by Donnelly, Lane. W.B. Saunders
 2. Pediatric Radiology: The requisites, 2nd Edition by Hans Blickman, Mosby publishers
- C. Reference Texts:
 1. Imaging of the Newborn, Infant and Young Child, 4th Ed., Leonard E. Swischuck, Williams and Wilkins publishers
 2. Caffey's Pediatric Diagnostic Imaging, Elsevier, Philadelphia, PA.
 3. Practical Pediatric Imaging, 3rd Edition by Kirks, D. Lippincott-Raven
 4. Pediatric Ultrasound Imaging, Marilyn Siegel, Raven Press

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