|  |  |  |
| --- | --- | --- |
| **Rotation:** Pediatric Radiology | **Rotation Duration:** 4 weeks | **Month(s):** 4 |
| **Institution:** Lucile Packard Children's Hospital | **Call Responsibility:** weekends: see below | **Night(s):** Covered by 2nd and 3rd year residents |
| **Responsible Faculty Member(s):**Richard Barth M.D., Section chiefBeverley Newman M.D, Associate ChiefPat Barnes M.D.Frances Blankenberg M.D.Frandics Chan M.D., Ph.D.Heike Daldrup –Link M.D., Ph.D.Hedieh Eslamy M.D.Peter Kane M.D.Edward Lebowitz M.D.Ralph Lachman M.D.Peter Moskowitz M.D.William Northway M.D.Erika Rubesova M.D.Arvind Sonik M.D.Shreyas Vasanawala, M.D. Ph.D.Kristin Yeom, M.D. | **Location:** LPCH |
| **Phone Numbers:** **Reading rooms****LPCH 1st floor:** 78758**US:** 78757**CT/MR:** 42727**NEURO:** 42728**NICU/PICU:** 78764 |
| **Technologists/Technical Staff:**Lori Hart, R.T.Becki Perkins, R.T.  | **Training Level:** Years 1-3 |
| **Overall rotation goals:**The goal of the pediatric radiology rotations is to train the resident in the performance and interpretation of imaging studies of newborns, infants, children and young adults. Imaging studies covered include plain radiographs, fluoroscopy, Ultrasound, CT, and MRI. The resident will also be trained and evaluated in the ACGME non-clinical competencies relevant to providing care to children and their families, including Professionalism, Interpersonal and communication skills, Practice-Based learning and improvement, and Systems-based Practice. The goals and objectives listed below address the expectations regarding knowledge, skills level, and attitudes for each pediatric radiology rotation in each of the competencies. All pediatric radiology rotations take place at Lucile Packard Childrens’ Hospital. |

|  |
| --- |
| **Rotation One: NICU/PICU and Ultrasound**During this rotation, the resident will interpret plain radiographs of children in the intensive care units. The resident will also gain familiarity with pediatric ultrasound, and learn to perform ultrasound examinations of the neonatal brain.**Patient care objectives: NICU/PICU and Ultrasound**Goals: The resident will develop skill in diagnostic imaging of newborn and intensive care patients. Knowledge:At the conclusion of the rotation the resident will be able to:1. interpret plain radiographs obtained in the newborn and ICU settings with particular attention to:
	1. correct placement of supportive lines and tubes
	2. recognition of emergent conditions and their unique imaging appearance in children including pneumothorax, pneumomediastinum and pneumoperitoneum.
2. discuss radiation safety issues as thy relate to adequate positioning and coning
3. Performance objectives
	* + the resident will load current unread studies for the NICU, PICU, and cardiovascular patients with their comparison studies and preview cases
		+ cases will be reviewed with the attending radiologist and then dictated
		+ pertinent findings will be relayed to the appropriate team
		+ the resident will be shown the correct method for neonatal head imaging by the portable ultrasound technologist and will perform at least 10 cranial ultrasound studies under their direct supervision and record studies in the portfolio
		+ the resident will review the above studies with the attending radiologist
		+ the resident will discuss and perform a head ultrasound with a supervising radiologist in attendance
		+ enter interesting cases into file on PACS for weekly interesting case conference

Technical skills* identify incorrectly placed supportive equipment and recognize the related complications
* independently perform head ultrasound on newborn infants
* interpret head ultrasound examinations with understanding of the unique pathophysiology of disease of the mature and premature infant
* lead working conferences with NICU, PICU, and Cardiovascular clinical services
* lead imaging portion of the Friday noon Perinatal Conference

Behavior and Attitude Objectives:1. Recognize limitations of personal competency and ask for guidance when appropriate,
2. Incorporate formative feedback into daily practice, positively responding to constructive criticism, and
3. Follow-up interesting or difficult cases without prompting and share this information with appropriate faculty and fellow residents.

Assessment:Portfolio: the resident should collect the certificate of completion for assigned modules.Faculty evaluations Pediatric Radiology In-service written / oral examination**Medical Knowledge and Practice-Based Learning Objectives:**Attend the pediatric section of the weekly radiology Resident noon lecture series with attention to the following topics :  Normal Head Ultrasound Abnormal Head Ultrasound Neonatal Gastrointestinal Disease Congenital Cardiac Disease Congenital Chest Masses Infection / Inflammation of the LungComplete the following Online Modules:Access (http://pediatricradiology.clevelandclinic.org) and take web-based curriculum on:Lines and catheters Childhood pneumoniaNeonatal chestPulmonary edema Esophageal atresia Congenital duodenal obstruction Jejunal and ileal stenosis/atresiaNewborn low intestinal obstruction Omphalocele, Gastroschisis, CDHPneumoperitoneumDuplication of collecting systemsMulticystic dysplastic kidney UPJ obstruction Child abuse: skeletal trauma Childhood fractures Newborn cranial ultrasound  Read the following chapters from Pediatric Sonography by Marilyn Siegel: Physical Principals Ultrasound Artifacts BrainRead the following selections in Fundamentals of Pediatric Radiology by Lane Donnelly: Chapter 1 - IntroductionChapter 2 – Airway: pp5-8, 19-20 (foreign body)  Chapter 3 – Chest: pp 23-52 Chapter 4 – Heart Chapter 5 - Gastrointestinal Tract: pp97-98 Chapter 6 – Genitourinary System: pp141-153 Chapter 7 – Musculoskeletal System: pp171-182 Chapter 8 – Neurologic System: pp 223-226**Professionalism and Interpersonal and Comminucation skills:** Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. *Residents are expected to demonstrate:***Knowledge Objectives:**1. Understanding of the need for respect for patient and family privacy and the special needs of pediatric patients, and
2. Understanding of their responsibility for the patient and the service, including arriving in the reading room promptly each day, promptly returning to the reading room after conferences, completing the work in a timely fashion, and not leaving at the end of the day until all work is complete. If the resident will be away from a service (for time off, meeting, board review, etc.), this *must* be arranged in advance with the appropriate faculty and/or fellow.

**Skill Objectives:**1. Sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation, and
2. Treat radiologic technologists and file room personal in a kind and professional manner.
3. Practice sensitive methods for answering parent questions
4. Act as radiologist consultant for neonatal / ICU services

**Behavior and Attitude Objectives:**1. Respect, compassion, integrity, and responsiveness to patient care needs that supersede self-interest.

**Systems-Based Practice:**Residents must demonstrate an awareness of, and responsiveness to, the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. *Residents are expected to:***Knowledge Objectives:**1. Understand how their image interpretation affects patient care.

**Skill Objectives:**1. Provide accurate and timely interpretations to decrease length of hospital and emergency department stay,
2. Appropriately notify the referring clinician if there are urgent or unexpected findings and document such without being prompted; and
3. Practice using cost effective use of time and support personnel.

**Behavior and Attitude Objectives:**1. Advocate for quality patient care in a professional manner, particularly concerning imaging utilization issues.
 |

|  |
| --- |
| **Rotation 2: Pediatric Fluoroscopy, Ultrasonography and Outpatient Radiography**Goals: The resident will develop professional and technical skills necessary to provide quality ultrasonographic and fluoroscopic imaging in pediatric patients. **Patient Care Objectives**Knowledge:At the conclusion of the rotation the resident will be able to:* interpret plain radiographs obtained in the outpatient setting with particular attention to:
	+ recognition of traumatic musculoskeletal injuries including child abuse
	+ recognition of acute infectious processes including pneumonia
* understand the appropriate use and limitations for ultrasound and fluoroscopy in children
* independently perform ultrasound examinations in children (as outlined in the protocol manual) including: renal transplant, hepatic transplant, spine and hip ultrasound.
* independently perform fluoroscopic procedures in children (as outlined in the protocol manual)
* interpret ultrasound examinations with understanding of the unique pathophysiology of disease in infants and children.
* discuss ultrasound physics and safety issues

**Medical Knowledge and Practice-Based Learning Objectives:**Knowledge-Based Objectives:Attend the pediatric section of the weekly radiology lecture series with the following specifically pertaining to this service:  Imaging of appendicitis and intussusception Imaging of renal cystic disease GI emergencies GU anomalies GU infection Metabolic bone disease Childhood chest and airway disease Mediastinal masses GI bleeding Backpain Child abuse Pediatric fractures Emergency ultrasound Spine and hip ultrasound Scrotal ultrasound Complete the followingOnline Modules:Access (http://pediatricradiology.clevelandclinic.org) and take web-based curriculum on:Fluoroscopic Techniques\*Radiation Safety\*Patient Care\*Professionalism\*Esophageal foreign bodyGE reflux Appendicitis  Intussusception Malrotation and midgut volvulus Posterior urethral valves Testicular torsion Vesicoureteral reflux Developmental dysplasia of the hipSeptic arthritis SCFE\* these modules should be completed prior to or on your first morning of fluoroscopy.Complete the following Reading assignment: - read the following selections in Fundamentals of Pediatric Radiology by Lane Donnelly:  Chapter 3 – Chest: pp 53-69 Chapter 5 - Gastrointestinal Tract: pp 98-119 Chapter 6 – Genitourinary System pp 153-170Chapter 7 – Musculoskeletal System: pp 200-208 Chapter 8 – Neurologic System: pp 248 (trauma & abuse), 258-263* read the following chapters from Computed Body Tomography with MRI Correlation by Lee and Sagel:
* Chapter 24: Pediatric Applications
* Chapters pertinent to cases seen while on service

  3) Performance objectives - the resident will load current unread outpatient plain radiographs as they are obtained throughout the day. Studies should be loaded with their comparison studies and previewed before reviewing with the attending radiologist if possible.- cases will then be dictated- pertinent findings will be relayed to the appropriate team- the resident will be shown the correct method of performing an ultrasound exam by the ultrasound technologist or staff. The resident will perform as many examinations as possible under the technologist or staff direct supervision and record studies in the portfolio- the resident will review the above studies with the attending radiologist, dictate studies and relay pertinent findings- the resident will discuss and perform spine, hip, and pyloric ultrasound with a supervising radiologist in attendance - the resident will have formal introduction to the fluoroscopy service on the first morning of service including: * introduction to equipment
* completion of online modules: Fluoroscopic Techniques, Radiation Safety, Patient Care, Professionalism
* Power point presentation on catheterization

 - the resident will be shown the correct method for performing fluoroscopic studies in the pediatric patient and will be overseen on a designated number of cases- after mastery of the procedures is demonstrated, the resident will perform fluoroscopic studies independently for review with the attending radiologist.- enter interesting fluoroscopic and plain radiographic cases into file on PACS for weekly interesting case conference- mark interesting ultrasound cases in the US logbook for weekly interesting case conferenceAssessment:Portfolio: the resident should collect the certificate of completion for assigned modules.Faculty evaluationsPediatric Radiology In-service written / oral examination**Professionalism and Interpersonal and Comminucation skills:** Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. *Residents are expected to demonstrate:***Knowledge Objectives:**1. Understanding of the need for respect for patient and family privacy and the special needs of pediatric patients, and
2. Understanding of their responsibility for the patient and the service, including arriving in the reading room promptly each day, promptly returning to the reading room after conferences, completing the work in a timely fashion, and not leaving at the end of the day until all work is complete. If the resident will be away from a service (for time off, meeting, board review, etc.), this *must* be arranged in advance with the appropriate faculty and/or fellow.

**Skill Objectives:**1. Provide preliminary reading on plain films, fluoroscopic studies and ultrasound to referring clinicians
2. Discuss radiation safety issues as they relate to adequate positioning and coning
3. Discuss the imaging protocols and procedures with the patients and families
4. Management of children and parents in situation of stress due to radiological procedures
5. Conduct conferences for clinicians (surgery, urology, nephrology, gastroenterology and general pediatrics)
	* 1. -
6. Be able to explain procedures to families in a professional manner
7. Practice sensitive methods for answering parent questions and relaying results
8. Act as radiologist consultant for fluoroscopy and ultrasound services
9. Sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation, and
10. Treat radiologic technologists and file room personal in a kind and professional manner.

**Behavior and Attitude Objectives:**1. Respect, compassion, integrity, and responsiveness to patient care needs that supersede self-interest.

**Systems-Based Practice:**Residents must demonstrate an awareness of, and responsiveness to, the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. *Residents are expected to:***Knowledge Objectives:**1. Understand how their image interpretation affects patient care.

**Skill Objectives:**1. Provide accurate and timely interpretations to decrease length of hospital and emergency department stay,
2. Appropriately notify the referring clinician if there are urgent or unexpected findings and document such without being prompted; and
3. Practice using cost effective use of time and support personnel.

**Behavior and Attitude Objectives:**1. Advocate for quality patient care in a professional manner, particularly concerning imaging utilization issues.
 |

|  |
| --- |
| **Rotations Three and Four: CT/MRI**The overall goal of this rotation is to develop skill in cross-sectional imaging of pediatric patients. **Patient Care Objectives:*** Understand the appropriate indications for use of CT vs. MRI (vs. other imaging modalities) in children

- Protocol CT scans with particular understanding of the radiation risks and methods for decreasing dose* Interpret CT scans in pediatric patients with understanding of the unique disease processes in children
* Protocol MRI studies in children as outlined in the protocol manual with focus on customizing and streamlining the procedure
* Interpret MRI studies in children with understanding of the unique disease processes in children

Skills:- Check the days schedule on arrival to the department and review protocols for the days studies. Any questions will be addressed to the clinical service and to the CT/MRI attending- Protocol all studies that are awaiting scheduling - Load current unread CT and MRI studies with their comparison studies and preview cases- Check cases for completeness before patients are released- Cases will be previewed using prior studies for comparison and then reviewed with the attending radiologist - Studies will be dictated and pertinent findings will be relayed to the appropriate team- Enter interesting cases into file on PACS for weekly interesting case conference**Medical Knowledge** *Third rotation:*Complete the following online modules:Access (http://pediatricradiology.clevelandclinic.org) and take web-based curriculum on: Cardiac: all modulesBlunt abdominal traumaScrotal neoplasmsLCH Rickets Spine: sacral dimple Trisomy 21 Complete for following reading:- read chapters from Pediatric Sonography by Marilyn Siegel as pertain to cases seen on service with special attention to GI, GU, and Musculoskeletal sections. - read the following selections in Fundamentals of Pediatric Radiology by Lane Donnelly: Chapter 5 - Gastrointestinal Tract: pp 127-131(trauma and bowel injury) Chapter 7 – Musculoskeletal: pp182-200, 203-206, 208-216- read the following chapters from Computed Body Tomography with MRI Correlation by Lee and Sagel:* Heart and Pericardium
* Other chapters pertinent to cases seen while on service

 *Fourth rotation* Complete the following online Modules:Access (http://pediatricradiology.clevelandclinic.org) and take web-based curriculum on:Bronchopulmonary foregut malformationMediastinal massesSickle cell diseaseNewborn jaundiceNeuroblastoma, GanglioneuromaWilms and other renal tumors Ewing sarcomaOsteogenic sarcoma Read the following chapters from Computed Body Tomography with MRI Correlation by Lee and Sagel:* Chapters pertinent to cases seen while on service

Read the following selections in Fundamentals of Pediatric Radiology by Lane Donnelly:Chapter 2 – Airway: pp 10-19  Chapter 5 - Gastrointestinal Tract: pp 119-127, 131-139 Chapter 7 – Musculoskeletal System: pp 216-222 Chapter 8 – Neurologic System: pp 226-248, 249-258Read Musculoskeletal MRI by Kaplan and Helms with particular attention to chapters on:* Marrow
* Infection
* Tumors
* Trauma
* Knee
* Hip

**Interpersonal / Communication Objectives:*** Communication with patients and families
* Develop confident discussion with clinical colleagues on the appropriate diagnostic modalities, protocols in the setting of patient requirements and radiation risks
* Act as radiologist consultant for CT / MRI services
* Conduct conferences for clinicians (surgery, urology, nephrology, gastroenterology and general pediatrics)

**Professionalism Objectives:*** Practice sensitive methods for answering parent questions
* Consultant to referring services.
* Generation of clear oral and written reports of diagnostic findings with focus on accuracy and expediency

**Practice-based Learning Objectives:*** To learn to utilize available information technology to access patients history and management to provide the best radiological diagnosis
* To integrate the clinical information from the clinical patients history to the radiological diagnosis
* Review of recent cases at weekly “Interesting Case Conference” with focus on improving patient care and departmental processes as well as reviewing recent literature

**Systems-based Practice Objectives:*** To integrate the clinical information provided by the clinical colleagues on the requisition forms and in the clinical reports to provide the best diagnostic differentials
* Recommend appropriate studies for further evaluation of the patients
* Review of literature regarding use of competing imaging options for specific clinical scenarios at the weekly “Interesting Case Conference” and “Hot Topics” conference
 |
| **On-call services:**Goals: The resident will gain experience in triage, protocol, performance, and interpretation of on-call studies.**Weekend call service (first year)**The resident will cover an average of two weekends per month of pediatric radiology service. This call will be performed during the first year of Radiology residency. Weekend coverage requires prior discussion of meeting time with the faculty for Saturday and Sunday read-outs. The resident will read-out cases with the fellow or attending radiologist. Weekend cases to be read include:* NICU/PICU studies
* ED plain radiographs
* After hours CT, MRI, and Ultrasound (check to ensure that all the exams on the Peds ED unread list are dictated

- After hours plain radiographs from the acute care clinicNight call service (beginning in 2nd half of second residency year)The resident will be first call for all emergent pediatric cases performed from:* the emergency department of Stanford University Hospital
* inpatient and afterhours cases at LPCH

 The resident should consult the fellow or attending pediatric radiologist for: - All studies which will result in the patient receiving operative intervention* All fluoroscopic procedures (intussusception reduction, malrotation, esophageal foreign bodies, etc.)
* Any case that requires assistance in interpretation (including ultrasonographic studies, CT and MRI studies performed emergently after hours, or difficult plain radiographic cases).

Attending pediatric radiologists can be reached by pager. (See posted schedule) |
| **Pediatric Radiology Rotation Conferences**Goal: The resident will gain experience in preparing and leading clinical working conferences and didactic teaching conferences.The resident and fellow will be alternately responsible for organizing and presenting radiological studies at the following clinical conferences:1. Weekly Perinatal Conference ( Friday noon in LPCH boardroom)
2. Pediatric Radiology Interesting Case Conference
3. NICU, PICU, CVICU daily rounds
4. Body Rounds
 |
| **Method of Assessment of Performance:*** Pediatric Radiology in-service exam at the end of each rotation
* Certificates of completion of online modules
* Written evaluation of resident by responsible faculty member monthly
* Verbal feedback to resident by faculty
* ACR In-Training Service Exam annually
 |
| **Recommended Reading****Most of the titles below are on reserve at Lane library**1) Practical Pediatric Imaging, Donald Kirks, 3rd ed2)   Ultrasonography in Obstetrics and Gynecology, Peter Callen, 4th ed.3)   Imaging of the Newborn, Infant and Young Child, Leonard Swischuck, 5th ed.4)   Caffeys Pediatric Diagnostic Imaging, Tom Slovis, 11th ed.5)   Pediatric Sonography, Marilyn Siegel, 3rd ed.6)   Fundamentals of Pediatric Radiology, Lane Donnelly 7)   Pocket Radiologist, Pediatrics 100 Top Diagnoses, Lane Donnelly8) Gastrointestinal Tract Sonography in Fetuses and Children, A Couture 9) Pediatric Uroradiology R. Fotter  |

**APPENDIX:
RADPRIMER CURRICULUM FOR PEDIATRIC RADIOLOGY
(EXCLUDING PEDIATRIC NEURORADIOLOGY)**

|  |
| --- |
|  |
|  |  | **Seq** | **Name** |
| **Pre-call** |  |  |  |
|   |   | 1 | Appendicitis |
|   |   | 2 | Brainstem Glioma |
|   |   | 3 | Bronchial Obstruction |
|   |   | 4 | Child Abuse, Brain |
|   |   | 5 | Child Abuse, Metaphyseal & Rib Fractures |
|   |   | 6 | Congenital Diaphragmatic Hernia |
|   |   | 7 | Croup |
|   |   | 8 | Duodenal Atresia or Stenosis |
|   |   | 9 | Epididymoorchitis |
|   |   | 10 | Epiglottitis |
|   |   | 11 | Esophageal Atresia and Tracheoesophageal Fistula |
|   |   | 12 | Exudative Tracheitis |
|   |   | 13 | Germinal Matrix Hemorrhage |
|   |   | 14 | Hirschsprung Disease |
|   |   | 15 | Hypertrophic Pyloric Stenosis |
|   |   | 16 | Ileocolic Intussusception |
|   |   | 17 | Incomplete Fractures |
|   |   | 18 | Ingested Button Batteries |
|   |   | 19 | Ingested Multiple Magnets |
|   |   | 20 | Jejunoileal Atresia |
|   |   | 21 | Meconium Aspiration Syndrome |
|   |   | 22 | Meconium Ileus |
|   |   | 23 | Medulloblastoma |
|   |   | 24 | Midgut Volvulus |
|   |   | 25 | Necrotizing Enterocolitis |
|   |   | 26 | Neonatal Pneumonia |
|   |   | 27 | Neuroblastoma, Thoracic |
|   |   | 28 | Osteomyelitis |
|   |   | 29 | Ovarian Torsion |
|   |   | 30 | Physeal Fractures |
|   |   | 31 | Posterior Urethral Valves |
|   |   | 32 | Pulmonary Interstitial Emphysema |
|   |   | 33 | Pyelonephritis |
|   |   | 34 | Retropharyngeal Abscess |
|   |   | 35 | Round Pneumonia |
|   |   | 36 | Slipped Capital Femoral Epiphysis |
|   |   | 37 | Supracondylar Fracture |
|   |   | 38 | Surfactant Deficiency Disease |
|   |   | 39 | Testicular Torsion |
|   |   | 40 | Toddler Fracture |
|   |   | 41 | Viral Lung Infection |
|   |   | 42 | Wilms Tumor |
| **Airway** |  |  |  |
|   | **Acute Upper Airway Obstruction** |
|   | **Obstructive Sleep Apnea** |
|   |   | 43 | Enlarged Pharyngeal Tonsils, OSA |
|   | **Lower Central Airway Obstruction** |
|   |   | 44 | Double Aortic Arch |
|   |   | 45 | Pulmonary Sling |
|   |   | 46 | Pseudo-Retropharyngeal Thickening |
|   |   | 47 | Neonatal Meningitis |
|   |   | 48 | Ependymoma |
|   |   | 49 | Right Arch with Aberrant Left SCA |
|   | **Small Airway Abnormalities** |
|   |   | 50 | Orbital Cellulitis |
| **Chest** |  |  |  |
|   | **Congenital Lung Lesions** |
|   |   | 51 | Congenital Pulmonary Airway Malformation |
|   |   | 52 | Pulmonary Sequestration |
|   |   | 53 | Bronchogenic Cyst |
|   |   | 54 | Congenital Lobar Emphysema |
|   |   | 55 | Bronchial Atresia |
|   | **Neonatal Chest Issues** |
|   |   | 56 | Transient Tachypnea of the Newborn |
|   |   | 57 | Bronchopulmonary Dysplasia |
|   |   | 58 | Umbilical Catheter Complications |
|   | **Chest Infection** |
|   |   | 59 | Parapneumonic Effusion and Empyema |
|   |   | 60 | Pneumonia with Cavitary Necrosis |
|   |   | 61 | Trauma, Testicles |
|   | **Anterior Mediastinum** |
|   |   | 62 | Normal Thymus |
|   |   | 63 | Lymphoma, Thoracic |
|   |   | 64 | Germ Cell Tumors, Mediastinum |
|   | **Pulmonary Masses** |
|   |   | 65 | Pleuropulmonary Blastoma |
|   | **Trauma** |  |  |
|   |   | 66 | Lung Contusion and Laceration |
|   |   | 67 | Atlanto-Axial Injuries |
|   |   | 68 | Pneumomediastinum |
|   | **Pediatric Interstitial Lung Diseases** |
|   |   | 69 | Swyer-James (BO) |
|   | **Miscellaneous** |  |
|   |   | 70 | Cystic Fibrosis, Lung |
|   |   | 71 | Papillomatosis |
| **Cardiac** |  |  |  |
|   | **Left to Right Shunts (Non0Cyanotic, Increased Pulmonary Arterial Flow)** |
|   |   | 72 | Ventricular Septal Defect |
|   |   | 73 | Atrial Septal Defect |
|   |   | 74 | Arteriovenous Malformation |
|   |   | 75 | Patent Ductus Arteriosus |
|   |   | 76 | Atrioventricular Septal Defect |
|   | **Cyanotic, Decreased Pulmonary Arterial Flow** |
|   |   | 77 | Tetralogy of Fallot |
|   |   | 78 | Pulmonary Atresia |
|   |   | 79 | Ebstein Anomaly |
|   |   | 80 | D-Transposition of the Great Arteries |
|   | **Cyanotic, Increased Pulmonary Arterial Flow** |
|   |   | 81 | Truncus Arteriosus |
|   | **Congestive Heart Failure (Increased Venous Flow)** |
|   |   | 82 | Hypoplastic Left Heart Syndrome |
|   |   | 83 | Total Anomalous Pulmonary Venous Return |
|   |   | 84 | Myocarditis |
|   |   | 85 | Cardiomyopathy |
|   | **Abnormalities Often Associated with Complex Congenital Heart Disease** |
|   |   | 86 | L-Transposition of the Great Arteries |
|   |   | 87 | Heterotaxia Syndromes |
|   | **Obstructive Lesions of the Aorta and Pulmonary Arteries** |
|   |   | 88 | Aortic Coarctation |
|   |   | 89 | Aortic Stenosis |
|   |   | 90 | Pulmonary Artery Stenosis |
|   | **Surgical Procedures for Congenital Heart Disease** |
|   |   | 91 | Arterial Switch Procedure |
|   |   | 92 | Fontan Operation |
|   | **Cardiomyopathies** |
|   |   | 93 | Myocarditis |
|   | **Miscellaneous** |  |
|   |   | 94 | Scimitar Syndrome |
|   |   | 95 | Rhabdomyoma |
|   |   | 96 | Kawasaki Disease |
| **Gastrointestinal** |  |  |
|   | **Neonatal Upper Intestinal Obstruction** |
|   |   | 97 | Duodenal Web |
|   | **Neonatal Lower Intestinal Obstruction** |
|   |   | 98 | Meconium Plug Syndrome |
|   |   | 99 | Meconium Peritonitis |
|   | **Other Neonatal Gastrointestinal Disorders** |
|   | **Upper Gastrointestinal Abnormalities Typically Seen in Infants and Young Children** |
|   |   | 100 | Ingested Coins |
|   | **Abnormalities of the Abdominal Wall** |
|   |   | 101 | Omphalocele |
|   |   | 102 | Gastroschisis |
|   | **Abnormalities Associated with Bowel Obstruction in Various Aged Children** |
|   |   | 103 | Meckel Diverticulum |
|   | **Liver** |  |  |
|   |   | 104 | Hepatoblastoma |
|   |   | 105 | Infantile Hepatic Hemangioma |
|   |   | 106 | Mesenchymal Hamartoma |
|   |   | 107 | Biliary Atresia |
|   |   | 108 | Choledochal Cyst |
|   |   | 109 | Caroli Disease |
|   |   | 110 | Liver Transplant Complications |
|   | **Spleen** |  |  |
|   | **Pancreas** |  |  |
|   |   | 111 | Pancreatoblastoma |
|   |   | 112 | Annular Pancreas |
|   |   | 113 | Pancreatitis |
|   | **Pediatric Mesentery Abnormalities** |
|   |   | 114 | Mesenteric Lymphatic Malformations |
|   |   | 115 | Omental Infarction |
|   | **Trauma** |  |  |
|   |   | 116 | Hypoperfusion Complex |
|   |   | 117 | Bowel Injury |
|   |   | 118 | Liver Trauma |
|   |   | 119 | Spleen Trauma |
|   |   | 120 | Duodenal Hematoma |
|   |   | 121 | Trauma, Pancreas |
|   | **Abnormalities in Immunocomprromised Children** |
|   |   | 122 | Pneumatosis in Older Children |
|   |   | 123 | Post-Transplant Lymphoproliferative Disease |
|   |   | 124 | Pseudomembranous Colitis |
|   |   | 125 | Neutropenic Colitis |
|   |   | 126 | Graft-vs.-Host Disease |
|   | **Inflammatory Bowel Disease** |
|   |   | 127 | Crohn Disease |
|   | **Miscellaneous** |  |
|   |   | 128 | Gastrointestinal Duplication Cysts |
|   |   | 129 | Small Bowel Intussusception |
| **Genitourinary** |  |  |
|   | **Congenital Abnormalities** |
|   |   | 130 | Ureteropelvic Duplications |
|   |   | 131 | Renal Ectopia And Fusion |
|   |   | 132 | Primary Megaureter |
|   |   | 133 | Renal Agenesis |
|   |   | 134 | Vesicoureteral Reflux |
|   |   | 135 | Ureteropelvic Junction Obstruction |
|   |   | 136 | Urachal Abnormalities |
|   | **Multicystic Renal Disease** |
|   |   | 137 | Multicystic Dysplastic Kidney |
|   |   | 138 | Polycystic Renal Disease, Recessive |
|   |   | 139 | Calyceal Diverticulum |
|   | **Renal Masses** |  |
|   |   | 140 | Nephroblastomatosis |
|   |   | 141 | Multilocular Cystic Nephroma |
|   |   | 142 | Angiomyolipoma |
|   |   | 143 | Mesoblastic Nephroma |
|   | **Uterine Anomalies** |
|   |   | 144 | Hydrometrocolpos |
|   | **Adrenal Abnormalities** |
|   |   | 145 | Neonatal Adrenal Hemorrhage |
|   |   | 146 | Neuroblastoma |
|   | **Other Masses** |  |
|   |   | 147 | Rhabdomyosarcoma, Genitourinary |
|   | **Ovarian Abnormalities** |
|   |   | 148 | Ovarian Teratoma |
|   |   | 149 | Ovarian Malignancies of Childhood |
|   |   | 150 | Ovarian Cyst |
|   | **Testicular Abnormalities** |
|   |   | 151 | Torsion of the Testicular Appendage |
|   |   | 152 | Paratesticular Rhabdomyosarcoma |
|   |   | 153 | Testicular Tumors |
|   | **Infection and Trauma** |
|   | **Bladder Abnormalities** |
|   | **Miscellaneous** |  |
| **Musculoskeletal** |  |  |
|   | **Trauma** |  |  |
|   |   | 154 | Child Abuse, Metaphyseal Fracture |
|   |   | 155 | Medial Epicondyle Avulsion |
|   |   | 156 | Juvenile Tillaux Fracture |
|   |   | 157 | Patellar Dislocation |
|   |   | 158 | Triplane Fracture |
|   |   | 159 | Lateral Condylar Fracture |
|   |   | 160 | Apophyseal Injuries |
|   |   | 161 | Osgood-Schlatter Lesion |
|   | **Infection** |  |  |
|   | **Soft Tissue Masses** |
|   |   | 162 | Infantile Hemangioma, Musculoskeletal |
|   |   | 163 | Venous Malformation |
|   |   | 164 | Lymphatic Malformation |
|   |   | 165 | Rhabdomyosarcoma, Musculoskeletal |
|   |   | 166 | Granuloma Annulare |
|   | **Focal Bone Lesions** |
|   |   | 167 | Leukemia, Musculoskeletal |
|   |   | 168 | Langerhans Cell Histiocytosis, General |
|   |   | 169 | Fibroxanthoma |
|   |   | 170 | Aneurysmal Bone Cyst |
|   |   | 171 | Chondroblastoma |
|   |   | 172 | Osteochondroma |
|   |   | 173 | Ewing Sarcoma |
|   |   | 174 | Osteosarcoma |
|   |   | 175 | Osteoid Osteoma |
|   |   | 176 | Distal Femoral Metaphyseal Irregularity |
|   |   | 177 | Simple Bone Cysts |
|   | **Abnormalities of the Hip** |
|   |   | 178 | Developmental Dysplasia of the Hip |
|   |   | 179 | Proximal Focal Femoral Deficiency |
|   |   | 180 | Legg-Calve-Perthes Disease |
|   | **Constitutional Disorders of Bone** |
|   |   | 181 | Mucopolysaccharidoses (MPS), General |
|   |   | 182 | Osteopetrosis |
|   |   | 183 | Achondroplasia |
|   |   | 184 | Osteogenesis Imperfecta |
|   | **Autoimmune Diseases** |
|   |   | 185 | Dermatomyositis |
|   |   | 186 | Juvenile Rheumatoid Arthritis |
|   | **Other Congenital Lesions** |
|   |   | 187 | VACTERL Association |
|   |   | 188 | Tarsal Coalition |
|   |   | 189 | Campomelic Dysplasia |
|   |   | 190 | Discoid Meniscus |
|   | **Miscellaneous** |  |
|   |   | 191 | Clubfoot |
|   |   | 192 | Distal Femoral Metaphyseal Irregularity |
|   |   | 193 | Rickets |
|   |   | 194 | Sickle Cell Anemia, Bone |