

GOALS AND OBJECTIVES FOR RESIDENCY PROGRAM

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## UTHSCSA RADIOLOGY RESIDENCY PROGRAM

### OVERALL COMPETENCY BASED GOALS AND OBJECTIVES

These competency-based and level specific goals and objectives are included in the Narrative section 9.A.

#### OUR MISSION

The Radiology Residency Program is committed to educate, train UTHSCSA residents to achieve certification by the American Board of Radiology and inspire them to practice with excellence as leaders in their field.

#### PROGRAM OVERVIEW

The educational program for the Radiology Residency at UTHSCSA consists of clinical rotations, our academic curriculum, and scholarly activities. While each of these programs is designed to address a different set of goals, all are under the direction of the Residency Program Director and are orchestrated to accomplish our common mission effectively through an organized set of objectives.

#### COMPETENCY-BASED PROGRAM OBJECTIVES

Overall program objectives are designed within the framework of the ACGME-defined Core Competencies. In order to achieve an appropriate level of competence in each area, we have designed specific activities and methods for assessment. We have constructed an outline that illustrates our approach to addressing each of the competencies. In each case, we define the area of competency, list the skill objectives in the area and educational programs offered, and methods to assess resident progress. Residents keep the form as well as assessment checklists in their Educational Portfolio and this basic outline becomes the structure for documenting their educational experiences. Their experiences are discussed with the Program Director or an Associate Program Director during semi-annual performance review sessions. The outline is as follows:

##### **1. Patient Care**

###### ***Definition***

Provide patient care through safe, efficient, appropriately utilized, quality-controlled diagnostic and/or interventional radiology techniques and effectively communicate results to the referring physician and/or other appropriate individuals in a timely manner.

###### ***Skills***

- Gather essential and accurate information about patients.
- Develop a diagnostic plan based on the clinical questions and relevant clinical, radiologic, and pathologic information.
- Oversee diagnostic imaging to ensure adequacy of studies performed.
- Counsel patients concerning preparation for diagnostic testing.
- Demonstrate a basic understanding of electronic patient information systems.
- Demonstrate the ability to use the Internet as an educational instrument to expand medical knowledge.
- Demonstrate knowledge of the levels of ionizing radiation related to specific imaging procedures and employ measures to minimize radiation dose to the patient.
- Perform radiologic examinations appropriately and safely, assuring that the correct examination is ordered and performed.

###### ***Education (with Graduated Faculty Supervision and Feedback)***

Practical experience in developing a differential diagnosis and management plan based on clinical data, imaging findings, and other medical test results.

Instruction and experience in computer applications in radiology

Active participation in journal reviews to determine the effectiveness of diagnostic imaging for specific diagnostic questions.

Graduated responsibility in performing radiologic procedures.

Didactic instruction in radiation safety.

Preparation and presentation of radiologic cases to other members of the health care team.

###### ***Assessment***

Procedure / case logs

Monthly faculty evaluations

Direct observation by faculty of invasive procedures

360 degree evaluation

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### **2. Medical Knowledge**

#### ***Definition***

Engage in continuous learning using up-to-date evidence and apply appropriate state of the art diagnostic and/or interventional radiology techniques to meet the imaging needs of patients, referring physicians and the health care system.

#### ***Skills***

- Demonstrate sufficient knowledge of medicine and apply this knowledge to radiologic studies in a clinical context to generate meaningful differential diagnoses.
- Demonstrate progressive acquisition of radiologic knowledge.
- Demonstrate knowledge of principles of research design and implementation.
- Generate a clinically appropriate diagnostic treatment plan.
- Demonstrate the ability to use all relevant information resources to acquire evidence-based data.
- Understand how radiologic equipment can be used to generate appropriate and diagnostic images.

#### ***Education***

- Didactic lectures and self-directed learning on the science and practice of radiology, including physics, radiation biology, and radiation protection
- Participation in departmental and interdepartmental case conferences.
- Participation in the clinical activities of the radiology department.
- Departmental, online or institutional training programs on research design and implementation.

#### ***Assessment***

- ACR In-Training examination scores
- Monthly faculty evaluations
- Quarterly dictation tests
- Presentation and analysis of scientific articles at Journal Club
- Written ABR examination.
- Oral ABR examination.

### **3. PRACTICE-BASED LEARNING AND IMPROVEMENT**

#### ***Definition***

Participation in evaluation of one's own personal practice utilizing scientific evidence, "best practices" and self-assessment programs in order to optimize patient care through lifelong learning.

#### ***Skills***

- Analyze practice experience and perform practice-based improvement in cognitive knowledge, observational skills, formulating a synthesis and impression, and procedural skills.
- Demonstrate critical assessment of the scientific literature.
- Demonstrate knowledge of evidence-based medicine and apply its principles in practice.
- Use multiple sources, including information technology, to optimize lifelong learning and support patient care decisions.
- Facilitate the learning of students, peers, and other health care professionals.

#### ***Education***

- Critical assessment of scientific literature through journal clubs, clinical conference, and independent learning.
- Didactic lectures and online modules on the assessment of scientific literature, study designs, and statistical methods.
- Teaching of students, peers, and other health care professionals, with graduated supervision and feedback from supervising faculty.
- Active participation in departmental or institutional quality assurance or quality improvement activities with faculty supervision.
- Development, with mentorship, of a radiology research project, either using original research material or literature review

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### **Assessment**

- Monthly faculty evaluations
- Quarterly dictation test feedback
- Scholarly activity project
- Personal Performance Review form
- ACR in-service examination.
- Written ABR examination.
- Critique of Journal Club presentations
- Procedure log.

## **4. INTERPERSONAL AND COMMUNICATION SKILLS**

### **Definition**

Communicate effectively with patients, colleagues, referring physicians and other members of the health care team concerning imaging appropriateness, informed consent, safety issues and results of imaging tests or procedures.

### **Skills**

- Provide a clear and informative written radiologic report, including a precise diagnosis whenever possible, a differential diagnosis when appropriate, and recommended follow-up or additional studies when appropriate.
- Provide direct communication to the referring physician or appropriate clinical personnel when interpretation reveals an urgent or unexpected finding and document this communication in the radiologic report.
- Demonstrate effective skills of face-to-face listening and speaking with physicians, patients, patients' families, and support personnel.
- Demonstrate appropriate telephone communication skills.
- Demonstrate skills in obtaining informed consent, including effective communication to patients about procedures, their alternatives, and possible complications.

### **Education (with Graduated Faculty Supervisions and Feedback)**

- Participation as an active member of the radiology team by communicating face-to-face with clinicians, answering the telephone, providing consultations, problem solving, and decision making.
- Core Curriculum sessions and online modules
- Active participation (preparing and moderating) in multidisciplinary conferences.
- Practical experience in dictating radiologic reports, with critique.

### **Assessment**

- Monthly faculty evaluations
- 360° evaluations.
- Quarterly dictation test feedback
- Oral ABR examination
- Direct observation by faculty of invasive procedure patient encounters

## **5. PROFESSIONALISM**

### **Definition**

Commit to high standards of professional conduct, demonstrating altruism, compassion, honesty and integrity. Follow principles of ethics and confidentiality and consider religious, ethnic, gender, educational and other differences in interacting with patients and other members of the health care team.

### **Skills**

- Demonstrate altruism: put the interests of patients and others above self-interest.
- Demonstrate compassion: be understanding and respectful of patients, their families, and the staff and physicians caring for them.
- Demonstrate excellence: perform responsibilities at the highest level and continue active learning throughout one's career.
- Be honest with patients and all members of the health care team.

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- Demonstrate honor and integrity: avoid conflicts of interest when accepting gifts from patients or vendors.
- Interact with others without discriminating on the basis of religious, ethnic, sexual, or educational differences and without employing sexual or other types of harassment.
- Demonstrate knowledge of issues of impairment (ie, physical, mental, and alcohol and substance abuse), obligations for reporting of impaired physicians, and resources and options for care of self-impairment or impaired colleagues.
- Demonstrate positive work habits, including punctuality and professional appearance.
- Demonstrate an understanding of broad principles of biomedical ethics.
- Demonstrate principles of confidentiality with all information transmitted during a patient encounter.

### ***Education***

- Discussion of conflicts of interest and the ethics of conducting research during departmental or institutional conferences and daily clinical work.
- Training programs on the issues of harassment and discrimination.
- Didactic presentations on the recognition and management of the "impaired physician."
- Participation in hospital-sponsored core curriculum educational activities (eg. Lectures, Web-based programs).
- Didactic lecture or training program on the broad principles of medical ethics.
- U.T. Risk Management Course
- Medicare Compliance Ethics Instruction

### ***Assessment***

- Monthly faculty evaluations
- 360° evaluations.
- Conference attendance logs
- Resident self-assessment.
- Written ABR examination.
- Direct observation by faculty of invasive procedure patient encounters

## **6. SYSTEMS-BASED PRACTICE**

### ***Definition***

Understand how the components of the local and national healthcare system function interdependently and how changes to improve the system involve group and individual efforts. Optimize coordination of patient care both within one's own practice and within the healthcare system. Consult with other healthcare professionals, and educate healthcare consumers regarding the most appropriate utilization of imaging resources.

### ***Skills***

- Demonstrate the ability to design cost-effective care plans based on knowledge of best practices.
- Demonstrate knowledge of the sources of financing for health care in the United States, including Medicare, Medicaid, the Department of Veterans Affairs and Department of Defense, public health systems, employer-based private health plans, and patients' personal funds.
- Demonstrate knowledge of basic health care reimbursement methods.
- Demonstrate knowledge of the regulatory environment, including state licensing authority, state and local public health rules and regulations, and regulatory agencies such as the Centers for Medicare and Medicaid Services and the Joint commission for the Accreditation of Healthcare Organizations
- Demonstrate knowledge of basic practice management principles, such as budgeting, record keeping, medical records, and the recruitment, hiring, supervision, and management of staff.

### ***Education***

- Attendance and active participation in departmental and multidisciplinary conferences to discuss the imaging evaluation of specific diseases and the most appropriate and cost-effective methods for establishing a diagnosis.
- Interaction with department administrators and knowledgeable faculty to gain an understanding of the costs of diagnostic examinations and the influence of the type of payer system on reimbursement.
- ACR/APDR online modules on billing, standards, appropriateness criteria, business issues, financial and legal issues.

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- Membership and active participation in local and national radiologic societies.
- Participation in interdepartmental Internal Reviews
- Participation in the annual Radiology Planning Retreat
- Hospital / school / department committee service

### ***Assessment***

- Monthly faculty evaluations
- Written ABR examination.
- ACR in-training examination.
- Attendance logs for multidisciplinary conferences.
- Documented membership and participation in radiologic societies and other health care organizations.

## UTHSCSA RADIOLOGY RESIDENCY PROGRAM

### **OVERALL LEVEL-SPECIFIC PROGRAM OBJECTIVES**

While the competency-based program objectives apply to all residents, expectations are adjusted according to their level of training. Although each rotation defines its own sub-specialty specific goals and objectives which define increasing levels of responsibility and autonomy as the resident progresses, all sections within the department adhere to a common philosophy of progression.

#### **PY-1 (Beginner)**

- Study basic principles of diagnostic radiology.
- Understand principles of patient safety when using intravenous contrast media and ionizing radiation.
- Rotate in each of the major radiology sub-specialties required to achieve proficiency to work in the emergency room during the following year.
- Handle basic functions of running an individual imaging section with more senior residents or faculty members nearby for consultation.
- Begin learning basic procedural techniques on VIR rotation and by taking weekend pager call for interventions.
- Define/Describe
  - Composition of a normal exam
  - Normal and abnormal anatomy
  - Basics of quality assurance for plain film, CT and ultrasound
  - Components of an effective radiology report
- Seek a category/type of scholarly activity project and mentor for that project

#### **PY-2 (Advanced Beginner)**

- Assume a greater role in running an individual imaging section
- Begin assuming overnight duties in the emergency department
- Take increasing number of cases in core case conferences
- Correlate clinical data with radiologic findings to develop more focused differential diagnosis
- Develop procedural competency including arranging and performing invasive procedures after hours during ER rotation
- Gradually increase rate of examination interpretation while maintaining competency
- Work on scholarly activity and submit abstract to national meeting

#### **PY-3 (Competent)**

- Independently manage imaging section in most circumstances
- Mentor more junior residents on service
- Act as advisor during Quality Assurance conferences
- Attend AFIP for advanced concepts in Radiology/Pathology correlation
- Present scholarly activity project at national meeting
- Submit manuscript to peer reviewed journal

#### **PY-4 (Proficient)**

- Demonstrate independent procedural proficiency
- Counsel patients independently
- Radiology review course and Mock Oral Examination
- Mentor junior residents

## UTHSCSA RADIOLOGY RESIDENCY PROGRAM

### **OVERALL MILESTONES BASED GOALS AND OBJECTIVES**

#### **1st YEAR RESIDENT ROTATION EVALUATION (LEVEL 1)**

##### **Patient Care and Technical Skills (PCTS)**

Uses evidence-based imaging guidelines (such as ACR Appropriateness Criteria) and the Electronic Medical Record (Sunrise and CPRS) to obtain relevant clinical information when assessing cases  
Competently performs basic procedures appropriate for a 1<sup>st</sup> year resident [adult fluoro studies; lumbar puncture; image guided venous access]

Is able to handle procedure complications that arise from basic procedures

##### **Medical Knowledge**

Is able to select appropriate protocols for basic imaging exams, including those that may be encountered on independent call

Is able to make pertinent imaging observations, distinguish normal from abnormal, recognize critical findings, and give a basic differential diagnosis

Is able to recognize suboptimal imaging

##### **Professionalism**

Prioritizes patient care, maintains patient confidentiality, and behaves appropriately in patient interactions

Fulfills work responsibilities

Recognizes personal limitations, seeks assistance appropriately, and responds appropriately to constructive criticism

Demonstrates professionalism, punctuality, integrity, tolerance, and the ability to work in a team

##### **Interpersonal and Communication Skills**

Is able to obtain informed consent

Is able to communicate with patients, their families, and their caregivers about uncomplicated exam results

Is able to verbally communicate effectively with referring clinicians about imaging recommendations and exam results, including urgent/unexpected findings, and appropriately document notification in the medical record

Generates accurate reports with required documentation for billing purposes (indications, contrast dosage, appropriate format, linkage of multiple accession numbers, etc)

##### **Systems-based Practice**

Demonstrates awareness of and contributes to on-going quality improvement

##### **Practice based learning and improvement**

Is able to recognize and manage contrast reactions

Demonstrates awareness of radiation safety and MR safety



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### **2nd YEAR ROTATION EVALUATION (LEVEL 2)**

*Has achieved competence in skills for levels 1 and the following:*

#### **Patient Care and Technical Skills**

Is able to recommend appropriate imaging for common conditions independently

Competently performs procedures appropriate for 2<sup>nd</sup> year resident [adult fluoro studies; lumbar puncture; image guided arterial and venous access; hands on pediatric US]

Is able to handle procedure complications that arise

#### **Medical Knowledge**

Is able to select appropriate protocols for imaging exams for common conditions

Is able to make pertinent imaging observations (positive/negative), narrow the differential diagnosis, and describe management options

#### **Professionalism**

Prioritizes patient care, maintains patient confidentiality, and behaves appropriately in patient interactions

Fulfills work responsibilities

Recognizes personal limitations, seeks assistance appropriately, and responds appropriately to constructive criticism

Demonstrates professionalism, punctuality, integrity, tolerance, and the ability to work in a team

#### **Interpersonal and Communication Skills**

Demonstrates under direct supervision the ability to communicate effectively with patients, their families, and their caregivers in challenging situations (e.g., cognitive impairment, language barriers), including communication of difficult information (e.g., medical errors, complications)

Generates clear and concise reports that do not require substantial faculty revision on routine cases

Clearly communicates findings and recommendations to referring clinicians verbally and appropriately documents notification of urgent findings in the medical record

#### **Systems-based Practice**

Demonstrates awareness of and contributes to on-going quality improvement

#### **Practice based learning and improvement**

Is able to recognize and manage contrast reactions

Demonstrates awareness of radiation safety and MR safety

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**3rd YEAR ROTATION EVALUATION (LEVEL 3)**

*Has achieved competence in skills for levels 1 and 2 and the following:*

**Patient Care and Technical Skills**

Is able to recommend appropriate imaging for uncommon conditions independently

Competently performs advanced procedures appropriate for 3<sup>rd</sup> year resident [adult and pediatric fluoro studies; lumbar puncture; image guided arterial and venous access; hands on adult and pediatric US]

Is able to handle procedure complications that arise

**Medical Knowledge**

Is able to select appropriate protocols for advanced imaging exams, including protocols for uncommon conditions

Is able to make accurate, focused imaging observations, prioritize the differential diagnosis, and recommend management

Demonstrates knowledge of methods to optimize image quality

**Professionalism**

Prioritizes patient care, maintains patient confidentiality, and behaves appropriately in patient interactions

Fulfills work responsibilities

Recognizes personal limitations, seeks assistance appropriately, and responds appropriately to constructive criticism

Demonstrates professionalism, punctuality, integrity, tolerance, and the ability to work in and lead a team

**Interpersonal and Communication Skills**

Demonstrates without the need for direct supervision the ability to communicate effectively with patients, their families, and their caregivers in challenging situations (e.g., cognitive impairment, language barriers), including communication of difficult information (e.g., medical errors, complications)

Generates clear and concise reports that do not require substantial faculty revision on common complex cases

Clearly communicates findings and recommendations to referring clinicians verbally, even in stressful situations, and appropriately documents notification of urgent findings in the medical record

**Systems-based Practice**

Demonstrates awareness of and contributes to on-going quality improvement

**Practice based learning and improvement**

Is able to recognize and manage contrast reactions

Demonstrates awareness of radiation safety and MR safety

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### 4th YEAR ROTATION EVALUATION (LEVEL 4)

*Has achieved competence in skills for levels 1, 2 and 3 and the following:*

#### **Patient Care and Technical Skills**

Is able to recommend appropriate imaging for all cases utilizing current research and guidelines, while considering cost effectiveness and risk-benefit analysis

Competently performs procedures appropriate for 4th year resident [adult and pediatric fluoro studies; lumbar puncture; image guided arterial and venous access; hands on adult and pediatric US; drainage of effusions and abscesses; image guided biopsy; Nuclear medicine I-131 treatments (<33 and > 33 mCi)]

Is able to handle procedure complications that arise

#### **Medical Knowledge**

Is able to select appropriate protocols for all imaging exams and independently customize protocols according to clinical circumstances

Is able to make subtle observations and provide accurate and succinct interpretations, including suggesting a single diagnosis when appropriate

Integrates current research and guidelines when making management recommendations

Applies appropriate methods to optimize image quality

#### **Professionalism**

Prioritizes patient care, maintains patient confidentiality, and behaves appropriately in patient interactions

Fulfills work responsibilities

Recognizes personal limitations, seeks assistance appropriately, and responds appropriately to constructive criticism

Demonstrates professionalism, punctuality, integrity, and tolerance and acts as a role model for professional behavior

#### **Interpersonal and Communication Skills**

Is able to communicate complex and difficult information (e.g., medical errors, complications, bad news) to patients, their families, and their caregivers

Generates clear and concise reports that do not require substantial faculty revision on all cases

Effectively and professionally communicates findings and recommendations to referring clinicians and appropriately documents notification of urgent findings in the medical record in all circumstances

#### **Systems-based Practice**

Demonstrates awareness of and contributes to on-going quality improvement

#### **Practice based learning and improvement**

Is able to recognize and manage contrast reactions

Demonstrates awareness of radiation safety and MR safety

**UTHSCSA RADIOLOGY RESIDENCY PROGRAM**

**1<sup>st</sup> Rotation Goals & Objectives for  
New Diagnostic Radiology Residents, UTHSCSA**

**ABDOMEN (Dr. White/Katkar):**

- 1) Understand the normal anatomy of the abdomen and pelvis visualized on CT scan.
- 2) Demonstrate the ability to visualize common pathologies in the abdomen on CT both in emergent and non-emergent settings (Trauma, infection, neoplastic, and other common pathologies).
- 3) Begin to develop analytical skills to derive a reasonably good differential diagnosis in abdominal and pelvic pathology.

**FLUOROSCOPY (Dr. Katabathina/Sunnapwar):**

- 1) Begin to perform good quality fluoroscopic studies (single and double contrast barium swallow, UGI series, Barium enema, and IVP) with appropriate concentrations of barium/contrast media and appropriate patient positioning.
- 2) Learn the importance of safe radiology practice by adopting the ALARA principle ("As Low As Reasonably Achievable," avoid "burning" the patient).
- 3) Understand the normal radiographic anatomy of the gastrointestinal tract and recognize the common GI pathologies demonstrable on these fluoroscopic studies.

**CARDIOTHORACIC (Dr. Restrepo):**

- 1) Learn the normal radiologic thoracic anatomy, projections/positioning and imaging signs for the interpretation of conventional chest x-rays. For this purpose all residents are required to read Benjamin Felson's book "Principles of Chest Roentgenology".
- 2) Obtain pertinent patient information relative to radiological examination and accurately and concisely dictate a chest radiograph report.
- 3) Learn the appropriate terminology used for the description and interpretation of thoracic imaging exams. For this purpose all residents are required to read the Fleischner Society Glossary of Terms for Thoracic Imaging (Radiology 2008;246:697)
- 4) Review the American College of Radiology Appropriateness Criteria and ACR Practice Standards and Technical Guidelines for Thoracic radiology.

**MSK (Dr. Bean):**

- 1) Begin to learn the common x-ray views and understand the normal anatomy visualized in x-rays of the musculoskeletal system.
- 2) Demonstrate the ability to visualize common pathology (i.e., arthritis, fractures, tumors) on x-rays.
- 3) Begin to synthesize information into a reasonable differential diagnosis regarding musculoskeletal system pathology.

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### **BREAST (Dr. Otto/Kist):**

- 1) Read Gilda Cardenosa's book
- 2) Learn Penrad
- 3) Learn data entry system for conference and follow up information
- 4) Obtain basic Macros
- 5) Understand which abnormal findings must be communicated
- 6) Observe a mammogram

We teach:

#### Week One

- 1) Normal breast anatomy
- 2) Basic assessment of film quality
- 3) Basic normal and abnormal calcifications
- 4) Basic benign and suspicious masses
- 5) Indirect signs of malignancy, architectural distortion, skin thickening, nipple retraction

#### Week Two

- 1) Standard work-up of focal asymmetry and mass, calcifications with spot views and magnification views
- 2) Standard work up of calcifications
- 3) Assessment of palpable mass
- 4) Discuss ultrasound basics, cysts, complex cysts, parallel to chest wall, etc.
- 5) Accessory views of breast and purpose, rolled views, tangential spots, ML at 90 degrees

#### Week Three

- 1) Benign lesions-fibroadenoma, hamartoma, cysts, complex cysts, lipoma, sebaceous cysts
- 2) How to localize skin calcifications
- 3) Work-up of radial scars
- 4) Work-up of hypoechoic masses

#### Week Four

- 1) Surgically altered breasts, reduction mammoplasty, lumpectomy, TRAM flap, with assessment of biopsy scars by mammography and sonography.
- 2) Three-dimensional lesion localization with ML, rolled views, aligning three views with MLO in the middle.
- 3) Implants, how to perform mammography, how to use MR
- 4) Assessment of complex cysts, radial scars, indeterminate lesions
- 5) Equipment and technique-OD, contrast, sharpness, noise, technique including mA, Kvp, density, dose, effect of breast thickness

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### **VASCULAR INTERVENTIONAL (Dr. Suri/Lopera):**

- 1) Learn the normal vascular, biliary and urologic anatomy on radiography (fluoroscopy and digital subtraction angiography) and CT (CT angiography).
- 2) Begin to learn the basic armamentarium for interventional radiologic procedures – including but not limited to sheaths, catheters (Omniflush, Cobra, Reuter and angled glide catheters) and wires (Bentson, glide and Amplatz wires)
- 3) Learn the technique to perform procedures including but not limited to -
  - a. central venous access with supervision - tunneled and non-tunneled central venous catheter
  - b. arterial angiograms with supervision – femoral arterial access, catheter/wire manipulation and digital subtraction angiography
- 4) Demonstrate the ability to interact professionally with patients and perform -
  - a. dedicated history and physical examination
  - b. informed consent
  - c. appropriate pre-procedural (sedation/analgesia assessment) and post procedural work up (post-procedural orders and notes)
- 5) For this purpose all residents are required -
  - a. to read the vascular interventional section of Brant and Helms 'Fundamentals of Diagnostic Radiology'
  - b. start reading the 'Vascular Interventional Radiology: The Requisites'

### **NEURORADIOLOGY (Dr. Valencia/Altmeyer):**

- 1) Begin to learn the indications and contraindications for common neuroradiological procedures.
- 2) Learn basic neuroradiological protocols (i.e., CT, MR)
- 3) Learn basic neuroanatomy of the brain and spine.
- 4) Begin to demonstrate the ability to identify normal neuroanatomy on CT and MR.

### **NUCLEAR MEDICINE (Dr. Salman):**

- 1) Demonstrate the ability to adequately evaluate a patient for benign thyroid disease. This includes: a basic history, collection of appropriate laboratory and imaging data, performance of a limited physical exam targeted to thyroid disease, and the attainment of informed consent.
- 2) Understand the basic stress and imaging protocols for myocardial perfusion.
- 3) Understand the basic bone scan procedures and begin to differentiate normal from abnormal studies.

### **ULTRASOUND (Dr. Ojili/Katkar):**

- 1) Understand the basic anatomy relevant to sonography.
- 2) Demonstrate the ability to visualize common pathology (i.e., acute cholecystitis, hydronephrosis, DVT, etc...) on sonography.

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**PEDIATRICS (Dr. Singh):**

- 1) Residents are expected to become familiar with the presentation, imaging findings and recommended imaging work-up of common pediatric disorders. This should be accomplished by reading: PEDIATRIC RADIOLOGY: THE REQUISITES by Blickman and/or Donnelly's Fundamentals of Pediatric Radiology.
- 2) They will learn how to perform upper and lower GI contrast examinations and VCUGs, including how to tailor the examination to each individual situation and patient age.
- 3) They will learn how to operate the ultrasound machine and perform cranial ultrasound procedures.

**ORIENTATION TO BODY IMAGING/INTERVENTIONAL ROTATION  
(UH Body CT; UH Body US; UH Body IR; UH Body Fluoro; UH Body MR)**

**Faculty:** K Chintapalli, MD; H White, MD; V Katabathina MD; V Ojili MD; M Freckleton, MD; A Sunnapwar, MD; A Katkar, MD

Welcome! For the next 4 weeks, you will be doing a radiology rotation that encompasses various aspects of Abdominal Imaging (which may include any of the following rotations - UH Body CT; UH Body US; UH Body IR; UH Body Fluoro; UH/VA Body MR; VA Body; VA Fluoro). The following information is compiled in an effort to direct you and avoid confusion during, at the beginning, or at the end of the rotation. The below reading lists are recommendations meant to aid in learning abdominal imaging throughout your residency.

**First Year Resident Reading List:**

1. Brandt and Helms. Fundamentals of Diagnostic Radiology: Gastrointestinal Tract/Genitourinary Tract/Ultrasonography Chapters. 4<sup>th</sup> Edition. 2012.
2. Webb. Fundamentals of Body CT. 3<sup>rd</sup> Edition. 2005.
3. Federle. Imaging Anatomy: Chest, Abdomen, Pelvis. 1<sup>st</sup> Edition. 2006.
4. Tirkes. Peritoneal and Retroperitoneal Anatomy and Its Relevance for Cross Sectional Imaging. RadioGraphics. 2012.  
<http://dx.doi.org/10.1148/rq.322115032>

**Must-read Ultrasound Articles**

1. Levine et al. Management of Asymptomatic Ovarian and Other Adnexal Cysts Imaged at US: Society of Radiologists in Ultrasound Consensus. Radiology. 2010. <http://pubs.rsna.org/doi/pdf/10.1148/radiol.10100213>
2. Frates M et al. Management of Thyroid Nodules Detected at US: Society of Radiologists in Ultrasound Consensus Conference Statement. Radiology. 2005. <http://pubs.rsna.org/doi/pdf/10.1148/radiol.2373050220>
3. Grant et al. Carotid Artery Stenosis: Gray-Scale and Doppler US Diagnosis— Society of Radiologists in Ultrasound Consensus Conference. Radiology. 2003. <http://pubs.rsna.org/doi/pdf/10.1148/radiol.2292030516>
4. Goldstein et al. Evaluation of the Woman With Postmenopausal Bleeding Society of Radiologists in Ultrasound Consensus Conference. Journal of US in Medicine. 2001.  
[http://c.ymcdn.com/sites/www.sru.org/resource/resmgr/docs/2001\\_consensus\\_conference\\_st.pdf](http://c.ymcdn.com/sites/www.sru.org/resource/resmgr/docs/2001_consensus_conference_st.pdf)
5. McNaughton & Abu-Yousef. Doppler US of the Liver Made Simple. Radiographics. 2011. <http://pubs.rsna.org/doi/pdf/10.1148/rq.311105093>
6. Wood. Spectral Doppler Signature Waveforms in Ultrasonography. US Quarterly. 2010.
7. Akbar et al. Complications of Renal Transplantation. Radiographics. 2005. <http://pubs.rsna.org/doi/pdf/10.1148/rq.255045133>
8. Crossin et al. US of Liver Transplants: Normal and Abnormal. Radiographics. 2003. <http://pubs.rsna.org/doi/pdf/10.1148/rq.235035031>
9. Dogra et al. Sonography of the Scrotum. Radiology. 2003. <http://pubs.rsna.org/doi/pdf/10.1148/radiol.2271001744>



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### **Second Year Resident Reading List :**

1. Middleton. The Requisites: Ultrasound. 2<sup>nd</sup> Edition. 2003.
2. Boland. The Requisites: Gastrointestinal Imaging. 4<sup>th</sup> Edition. 2013.
3. Zagoria. The Requisites: Genitourinary Radiology. 2<sup>nd</sup> Edition. 2004.
4. Weissleder. Primer of Diagnostic Imaging. 5<sup>th</sup> Edition. 2011.

### **Third and Fourth Year Resident Reading List:**

1. Federle. Diagnostic Imaging: Abdomen. 2<sup>nd</sup> Edition. 2009.
2. Ahuja. Diagnostic Imaging: Ultrasound. 1<sup>st</sup> Edition. 2007.
3. Lorenz. RadCases: Gastrointestinal Imaging. 1<sup>st</sup> Edition. 2010.
4. Chopra. RadCases: Genitourinary Imaging. 1<sup>st</sup> Edition. 2011.
5. Levy. Cases in Radiology: Gastrointestinal Imaging Cases. 1<sup>st</sup> Edition. 2013.
6. Brant. Cases in Radiology: Body MRI Cases. 1<sup>st</sup> Edition. 2013.
7. Low. Case Review Series: Gastrointestinal Imaging. 3<sup>rd</sup> Edition. 2012.
8. Zagoria. Case Review Series: Genitourinary Imaging. 2<sup>nd</sup> Edition. 2006.
9. Middleton. Case Review Series: General and Vascular Ultrasound. 2<sup>nd</sup> Edition. 2007.
10. O'Brien. Top 3 Differentials in Radiology: A Case Review. 1<sup>st</sup> Edition. 2009.

### **Fluoro Specific Resident Reading List**

1. Ahmad N. Patient positioning tips for a premium UGI series. Aunt Minnie.com. 2002.  
<http://www.auntminnie.com/index.aspx?sec=ser&sub=def&pag=dis&ItemID=53089>
2. Ahmad N. Patient positioning techniques for a lower gastrointestinal series. Aunt Minnie.com. 2002.  
<http://www.auntminnie.com/index.aspx?sec=sup&sub=xra&pag=dis&ItemID=55654>
3. Ahmad N. Positioning techniques for quality esophagrams. Aunt Minnie.com. 2002.  
<http://www.auntminnie.com/index.aspx?sec=ref&sub=wht&pag=dis&ItemID=52930>
4. Johnson & Schmit. Mayo Clinic Gastrointestinal Imaging Review. 2005.

### **Body IR Specific Resident Reading List**

1. Walker. Diagnostic Imaging: Interventional Procedures. 1<sup>st</sup> Edition. 2012.

### **MRI Specific Resident Reading List**

1. Westbrook. MRI in Practice. 4<sup>th</sup> Edition. 2011.
2. Siegelman. Body MRI. 1<sup>st</sup> Edition. 2005.
3. Roth. Fundamentals of Body MRI. 1<sup>st</sup> Edition. 2011.

### **Articles for review:**

1. Feldman et al. US Artifacts. Radiographics. 2009.  
<http://pubs.rsna.org/doi/pdf/10.1148/rq.294085199>
2. Pozniak et al. Spectral and Color Doppler Artifacts. Radiographics. 1992.
3. Barrett & Keat. Artifacts in CT: Recognition and Avoidance. Radiographics. 2004.  
<http://pubs.rsna.org/doi/pdf/10.1148/rq.246045065>
4. Zhuo & Gullapalli. MR Artifacts, Safety, and Quality Control. Radiographics. 2006.  
<http://pubs.rsna.org/doi/pdf/10.1148/rq.261055134>

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Useful on-line sources/ websites include:

1. [StatDx](#)
2. RadPrimer

### **Daily AM Read-Out Session:**

**Residents and Fellows:** It would be most helpful if you would ARRIVE BEFORE 8:00AM, so that there are a decent number of films to be staffed upon arrival of staff.

### **1<sup>st</sup> – 2<sup>nd</sup> Year Residents (or Lower Level Residents on the Rotation):**

1. Review and dictate the cases in the designated list (on the PACS). All cases during the day are read in the 'draft status'
2. Review cases with staff on a timely basis
3. Understand how protocoling of studies works, start protocoling by the end of the first rotation, and communicate with referring physicians professionally. Please answer the phone in an appropriate manner such as, "Abdominal Imaging, this is Dr. \_\_\_\_."

### **3<sup>rd</sup> and 4<sup>th</sup> Year Residents (or Upper Level Resident on Service):**

1. Review and dictate the cases in the designated list (on the PACS). All cases during the day are read in the 'draft status'
2. Review cases with staff on a timely basis
3. Protocol studies at least 2 weeks out and communicate with referring physicians professionally. Please answer the phone in an appropriate manner such as, "Abdominal Imaging, this is Dr. \_\_\_\_."
4. Mentor junior residents and assist them in catching up with list and help with Ultrasounds when caught up. Mentor junior residents

**Protocol Specifics:** Protocol all Body CT cases for the upcoming 2 weeks. Cases will be added to the inpatient and outpatient schedule throughout the day, so you must protocol cases periodically throughout the day. DO NOT assume you can protocol only once a day. For complex and non-routine cases, please refer your questions to the Body CT Fellow when on rotation and when staff not immediately present.

There are many standard Body CT protocols, including:

Abdomen and Pelvis CT with IV contrast (with or without oral contrast – rarely rectal contrast)

Abdomen and Pelvis CT without IV contrast (with or without oral contrast – rarely rectal contrast)

3-Phase Liver CT (noncontrast, arterial, portal-venous)

3-Phase Pancreas CT (noncontrast, arterial, venous)

3-Phase Renal CT (noncontrast, arterial = corticomedullary, venous = nephrographic)

Renal Donor CT (noncontrast, arterial = corticomedullary, venous = nephrographic, excretory)

Adrenal Washout CT (noncontrast, venous, delayed)

Renal Stone CT (prone positioning with no IV and no oral contrast)

CT Urogram (noncontrast, venous = nephrographic, excretory)

CT Cystogram (contrast instilled via a Foley catheter, no IV contrast)

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CT Enterography (IV contrast and high volume, low density oral contrast)  
CT Colonography (rectal CO2 both prone and supine positioning, no IV contrast)

**--The afternoon read-out ends when the last film (at, or before 4:30pm Last Modified Time) is posted on our lists and staffed.**

**Mandatory Conferences:**

1. Noon Resident Conferences (12-1): Julio C. Palmaz Classroom – 6<sup>th</sup> Floor
2. Abdominal Imaging Morning Conference  
When: Every Thursday at 8 am  
Location: Resident Room  
What: Faculty shows cases to the residents.
3. Interesting Case Conference  
When: Second Tuesday of the Rotation at 4:45 pm  
Location: Resident Room  
What: One Fellow shows interesting cases seen over the previous month
4. Journal Club  
When: Third Wednesday of the Rotation at 4:45 pm  
Location: Resident Room  
What: One Resident presents assigned journal article

**Interdepartmental Conferences (Conferences presented by residents/fellows under supervision by Faculty – roster prepared by Gladys Shultz 567-6470):**

1. GU Tumor Board – 1<sup>st</sup> and 3<sup>rd</sup> Wednesday at 5:15PM
2. Pancreas Tumor Board – 2<sup>nd</sup> and 4<sup>th</sup> Tuesday at 4:00PM
3. GI Tumor Board – Every Thursday at 4:00PM

**Faculty evaluation of Resident**

1. Daily during staff out
2. Mid rotation informal verbal feedback
3. End of rotation written test
4. End of rotation verbal and online evaluation

**UTHSCSA RADIOLOGY RESIDENCY PROGRAM**

**ORIENTATION TO GENERAL RADIOLOGY ROTATION**

HOURS OF ROTATION: 8 AM to 5 PM

**LOCATION OF ROTATION:**

M,W,F -- Skytower EC. The resident should log in by 8am and begin reading EC (last 7 days), clinic # 11, and Panorex EC. They should place their reports in draft forms. We will review these cases with the resident shortly after finishing with the overnight residents. Their noon hour is protected for conference. We may give them a study hour during the course of the day depending on the work load. They can help in Clinics when needed.

T and Th -- RBG, 2nd floor. We can offer them a study hour from 8-9 depending on the work load and whether or not we have any video assisted swallowing studies (we have been asked to teach them this exam during the course of their rotation). They again have protected noon hour for conference (about 11:30 to 1:30 to include drive time). They should read cases from the same clinics as we do, clinics # 3,4 and 6,7. They may help with EC when needed.

**PERFORMANCE:**

First Year: Staff may offer for the residents to observe their reading techniques, particularly the first year residents. This is completely optional. Residents goal of 5-8 studies /hour , allowing them time to compare and research cases, followed by film review.

Second Year: 7-10 studies / hour.

Third Year: 10-12 studies / hour.

**READING ASSIGNMENTS:**

First Year: Keats, Normal Roentgen Variations. Copies in both EC and RBG. Felson, Principals of Chest Roentgenology.

Second Year: Keats, Normal Roentgen Variations. Also, Brant and Helms, Fundamentals of Diagnostic Radiology.

Third Year: Brant and Helms. Encourage topics to be assigned by staff at all levels.

**PRACTICAL GOALS:**

1. Learn how to create accurate (and proofread), pithy, and effective exam reports.
2. No cut and pasting of reports.
3. Learn how to communicate effectively with clinicians (and document when appropriate).

**EVALUATION AT END OF ROTATION:** Consensus evaluation at end of rotation by section members. This will be entered online into 'New Innovations,' (from levels 1-5) where level 1 is a 1st year level and level 5 is exceptional / fellow level.

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**ORIENTATION TO MAMMOGRAPHY ROTATION**

These guidelines are intended to facilitate a smooth transition into the UTHSCSA mammography section for Fellows and Residents. We hope that you find this rotation useful, enjoyable, and most of all, a comprehensive learning experience. Please remember that this is a list of guidelines for the mammography section, however, these duties and responsibilities may periodically change based on staffing availability and various workplace situations.

Gilda Cardenosa has a concise, inexpensive reference book on mammography, and the Requisites Series on Mammography is good also.

**GENERAL INFORMATION**

1. The UTHSCSA Mammographers have various daily responsibilities. The radiology office sends out a monthly radiology schedule, via email, which lets each staff member know which section of mammography that they will cover on each specific day. The mammography portion of the schedule looks like this: (Instead of listing actual names, this example lists capital letters for the staff members- i.e.- O= Otto, K= Kist, and so on.

**DAILY SCHEDULE- EXAMPLE FOR CTRC**

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
MAMMO	K-D/K	M-O/M	D-K/D	M-D/M	O-D/O

From left to right, the daily mammography duties are as follows:

Morning Duties: Diagnostic Mammographer - Screening/ MRI Mammographer includes (Needle localization/ Tumor Board staff member (on Wednesdays) )

Afternoon Duties- Diagnostic Mammographer - Screening, and MRI Mammographer

- **Please note that the morning and afternoon duties are separated by this symbol / on the daily radiology schedule**

So, for example, from the sample schedule given above the daily mammography duties are as follows for Monday.

Morning Duties- “K” is on Diagnostics, “D” is on Screening, Biopsies/ Needle localizations/Tumor Board staff member on Wednesdays,

Afternoon Duties- “K” is on Diagnostics, Screening/ Biopsies/ MRI  
Scheduled biopsies are performed by the Screening Mammographer. Pts who are scheduled for diagnostic exams and the decision is made to biopsy them at that appointment will be biopsied by the Diagnostic Mammographer.

**DAILY SCHEDULE-EXAMPLE FOR ROBERT B. GREEN**

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
MAMMO	McCorvey	Dornbluth	McCorvey	Kist	Kist	

2. Most UTHSCSA staff and Fellow/ Instructors rotate within various sections outside of their area of specialization, so please look at the ENTIRE daily schedule to ensure that you are not scheduled to cover another service (fellows only).

3. Breast MRI’s are performed at University Hospital imaging center or at the Robert B. Green. When you are scheduled on Screening/MRI, please check the schedule by the

## UTHSCSA RADIOLOGY RESIDENCY PROGRAM

MRI Software (Dynacad) reading station to see if a breast MRI has been scheduled for that day. If an MRI has been scheduled, check the Dynacad computer or ask the front desk if the patient information has been faxed from the downtown imaging center.

4. **DIAGNOSTIC MAMMOGRAPHY**- These mammograms, ultrasounds, and potential biopsies are performed on patients who have either (a). had an abnormal finding which was seen on a recent screening mammogram, (b). had an area of concern which was brought to our attention (i.e.- palpable lump, skin changes, nipple discharge or new inversion, etc.) so their screening mammogram was then converted to a diagnostic mammogram, (c). have a history of atypia, DCIS, or breast cancer +/- chemotherapy or radiation treatment.

-Evaluate the prior and current films and/or ultrasound images when the technologist brings you the patient information. Decide if any additional images are needed, and if so, politely ask the technologist for additional images.

-Once the appropriate images have been evaluated you may either (a). ask the technologist to let the patient go home and let them know when the patient should return. (b). go evaluate the patient and perform a physical exam and possible ultrasound in order to further evaluate the patient.

- Then, take appropriate notes on the patient's data sheet which include the BI-RADS category for the patient and any appropriate follow up.

- Next, try to dictate a report, however, if a technologist comes with a new patient then address the needs of the new patient. After the new patient has been evaluated, you may return to your dictation.

-IF A BIOPSY IS WARRANTED, TRY TO CALL THE REFERRING PHYSICIAN AND THEN DOCUMENT IN YOUR REPORT THAT YOU SPOKE TO THIS REFERRING PHYSICIAN. (Use Radiology Help Desk to help you find the provider, 358-8532).

-Please remember, the overall goal of Mammography is to provide comprehensive and efficient care that is patient based. We try to minimize patient waiting by quickly addressing each new patient.

5. **SCREENING MAMMOGRAPHY**- These mammograms are performed on healthy women who do not have a prior history of breast cancer and who do not have any breast complaints (i.e.- palpable lump, skin changes, nipple discharge or new inversion, etc.) at the time of their screening mammogram.

-UTHSCSA Screening mammograms are performed at the following locations (a). CTRC, (b). University Hospital, (c). University Hospital downtown imaging center and (d). Mobile mammography unit. The technologists that perform these screening mammograms will either notify you in person, by fax, or by phone when these mammograms have been completed.

-UTHSCSA allows patients to receive the final results of their screening mammogram on the same day that their mammogram was performed. This option allows patients to minimize the need for return trips in the event that additional mammographic images are needed. There is a separate bin for "waiting" patients. These mammograms should be evaluated a.s.a.p. so that the patient doesn't experience a lengthy wait. The technologist will wait for the mammographer to indicate that a "waiting" patient may leave, so you must notify the technologist (either in person or by phone) if the patient is free to go. If additional images are needed, the patient needs a diagnostic workup (which is typically performed by the Screening/MRI mammographer).

-Currently, all screening mammograms are dictated into RadWhere with the BI-RADS Category marked on a paper document by the mammography staff and/or fellow-

## UTHSCSA RADIOLOGY RESIDENCY PROGRAM

resident. Separate the Quick Negative sheet for the technologists to pick up so they can release the patients and track the BI-RADS Category.

If the patient has an abnormal mammogram, this information is dictated into RadWhere system by the resident, fellow, or screening mammographer.

- If a waiting patient from University Hospital has an abnormal mammogram, call the technologist who performed the mammogram and tell them that the patient will need to come to the CTRC for additional images.

- Only screening mammograms are performed at University Hospital or on the mobile mammography unit. Currently, mobile mammograms are read at the Robert B. Green facility.

- Diagnostic mammograms must be performed at the CTRC or the Robert B. Green Imaging Center where there is a radiologist on site.

6. **PROCEDURES**- Prior to any procedure being performed on a patient, an Informed Consent must be obtained. This consent is typically obtained by the fellow or resident that is performing and/or assisting with the procedure. Informed consents for needle localizations are typically obtained by the service that requested the needle localization.

- Needle localizations and sentinel lymph node injections are performed in the morning at University Hospital. These patients need to be injected 1 hour prior to their surgery, so please confer with the assigned mammography staff member in order to secure a good arrival time for the morning of the procedure. The weekly schedule for the needle localizations/ sentinel biopsy injections is emailed by one of the breast surgery residents. The mammography staff and mammography fellow permanently remain on this weekly email list, however, the fellow is responsible for forwarding this information to the appropriate mammography residents since they are not included on this list. If the surgical cases are third case or later, then the patient will be injected by a staff member from the Nuclear Medicine department. Needle localizations must be added to the Biopsy QC database and they each need a dictation. In addition, when the specimen arrives, the surgeon will call the reading room to see if the specimen contains the biopsy clip and/or appropriate tissue. The information from this call must be dictated so write down the name of the patient, surgeon, and the time of the call and then include this information in a specimen radiograph dictation. In terms of performing the needle localizations, they are divided amongst the fellow and residents- please see the fellow and resident sections of this document for more detailed information.
- Each staff member has different procedure preferences, so please ask each staff member their specific preferences regarding patient positioning, local anesthetic, biopsy devices, post procedural clips, etc. prior to performing a biopsy with them.

THE FOLLOWING FOUR ITEMS MUST BE COMPLETED FOR EACH PROCEDURE THAT IS PERFORMED.

(a). obtain an Informed Consent.

(b). put the appropriate information in the Biopsy QC database. This may be accessed as follows from any UT computer: (a) go to "My Computer", (b). click on "S" drive, (c). click on "r" and then double click on the "radiology" folder, (d). click on "m" and then double click on the "mammography" folder, (e). double click on the "Biopsy QC" folder.

(c). Fill out the pathology request in Sunrise and note the time of the biopsy when you perform the "Add specimen" step since this is important for proper processing of the specimen so that prognostic markers will be accurate- the entry process is now done electronically and the directions are in a white binder that is kept in each mammography room. Order is S, R, A, or submit, release and add specimen. Please add BI-RADS Category also to the history (This is the request of the pathologists).

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(d). Dictate a procedure report. Please note, at the end of each biopsy report there is a note which states that an addendum will be added to the report if the patient has atypical and/or malignant findings that are presented at tumor board.

### **7. TUMOR BOARD PRESENTATIONS**

- There is a weekly Interdisciplinary Breast Tumor Board meeting (TB) that is prepared by the mammography fellow and residents. This tumor board meeting starts at 7:15 am each Wednesday and is attended by the surgical oncologists, medical oncologists, radiation oncologists, plastic surgeons, and an assigned mammography staff member. The meeting is typically held in a CTRC conference room (Mabee, 4<sup>th</sup> floor), however, the tumor board coordinator will send a weekly email which states the location of the meeting.

- This presentation covers one week of atypical and/or malignant biopsies that were performed in the UTHSCSA mammography department (we typically cover the patients that were biopsied two weeks prior to that tumor board presentation). In addition, any of the physicians that attend the tumor board meeting may add on additional cases, so they will email you these cases throughout the week prior to that TB meeting.

- The deadline for outside physicians to submit new cases is on the Friday before the tumor board will be presented.

The tumor board presentation is a power point presentation which includes any relevant images for each patient. These documents are kept on the UTHSCSA hard drive, and you may look at prior tumor board presentations to get an idea of how these documents should be structured. Do NOT include needle localization patients in the tumor board presentation. (DON'T FORGET TO ANONYMIZE THE IMAGES THAT ARE PRESENTED ON THE POWER POINT PRESENTATION)

- You may access the breast tumor board database in the following manner from any UT computer: (a) go to "My Computer", (b). click on "S" drive, (c). click on "r" and then double click on the "radiology" folder, (d). click on "m" and then double click on the "mammography" folder, (e). double click on the "tumor board presentations" folder, (f). double click on the folder with the appropriate month and year.

- THE FOLLOWING SIX ITEMS MUST BE COMPLETED FOR EACH WEEKLY TUMOR BOARD MEETING

(a). Make the power point presentation which includes all of the patients to be presented that week. This should be saved to the "tumor board" folder on the UTHSCSA hard drive and also saved on a flash drive so that the images can be taken to the tumor board meeting.

(b). Present the patients at the tumor board meeting

(c). Give a copy of the radiology power point slides to the pathology resident and get a copy of the pathology power point slides from the pathology resident. When you return to clinic, put the pathology slides on the "S" drive in the tumor board folder (under the appropriate date).

(d). When you return from tumor board, call the radiology help desk at 210-358-8532 and give them the names of the referring physicians from the patients that were presented at tumor board (this should already be listed on the TB word document). Ask the help desk to facilitate each of these physicians calling you at the appropriate extension. When these clinicians return your call, tell them what was discussed at tumor board regarding their patient. The referring physician does not need to make any referrals to surgery, oncology, etc., since these referrals are automatically made when the patient is diagnosed with atypia and/or breast cancer. This call is being placed to the referring physicians as a courtesy.



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- (e). Add appropriate addendums to the biopsy reports and assign them to the mammography staff that attended the conference with you.
- (f). Call the CTTC dictation line (the directions are on a cork board in the mammography reading room) and provide a brief phone dictation for each patient that was presented. Ask the appropriate staff member what information they want included in this dictation.

### **8. MAMMOGRAPHY JOURNAL CLUB**

- There is one journal club meeting during each four week cycle of resident rotations. This meeting is led by Dr. Dornbluth, and it takes place at 7:30 am on a designated Thursday morning in the mammography patient education room (CTTC- 5<sup>th</sup> floor). After a journal article has been chosen, this article is then emailed to the residents, fellow, and mammography staff. It is the responsibility of both the residents to present the aforementioned article at the Journal Club meeting.

## **SCHEDULES**

### **FELLOW**

Schedule: Each morning, the fellow works in the Diagnostic mammography section.

- Each afternoon, the fellow works in the Screening/Biopsy/MRI section of mammography.
- The fellow performs the needle localizations on Mondays. The junior and senior residents divide the rest of the weekly needle localization responsibilities among themselves. Just be certain to let the staff know which resident will be performing the localization.
- The residents rotate on a four week cycle. The fellow is responsible for 2 tumor board presentations during this four week cycle, and the junior and senior residents then divide the remaining 2 tumor board presentations among themselves.
- Don't forget to check to see if any breast MRI's will be performed that day. If so, look at the MRI, review it with the appropriate staff member, dictate the report, then DON'T FORGET TO ADD THIS INFORMATION TO THE MRI DATABASE.
- You may access the breast MRI database in the following manner from any UT computer: (a) go to "My Computer", (b). click on "S" drive, (c). click on "r" and then double click on the "radiology" folder, (d). click on "m" and then double click on the "mammography" folder, (e). double click on the "breast MRI " folder
- If a second look ultrasound is recommended from the breast MRI, don't forget to follow up and find out the results from that second look ultrasound. This second look ultrasound information should also be included in the database.
- The fellow is often periodically assigned to ER/DAY, clinics, or ER/NIGHT which may mean traveling to the MARC, ER, or the University Hospital downtown imaging center. Carefully refer to the daily schedule so that you go to the correct location each day.
- The weekly schedule for needle localizations/sentinel biopsy injections is emailed by one of the breast surgery residents. The mammography staff and mammography fellow permanently remain on this weekly email list, however, the fellow is responsible for forwarding this information to the appropriate mammography residents

### **RESIDENT**

## UTHSCSA RADIOLOGY RESIDENCY PROGRAM

Schedule: The two residents on the mammography service split coverage at CTRC and Robert B. Green Campus (2 weeks each). In the event of a half day mammography resident, the full day mammography resident will rotate to CTRC in the afternoon, regardless of which service was covered in the morning.

At CTRC:

- Each morning, the resident goes to the Screening/Biopsy/MRI section of mammography
- Each afternoon, the resident goes to the Diagnostic mammography section

At Robert B. Green Campus:

- The resident will help with Screening mammography, Diagnostic mammography, and ultrasound guided biopsies.
- The fellow performs the needle localizations on Mondays. The residents divide the rest of the weekly needle localization responsibilities among themselves (typically the resident assigned to CTRC will perform the needle localizations).
- The residents rotate on a four week cycle. The fellow is responsible for 2 tumor board presentations during this four week cycle, and the residents then divide the remaining 2 tumor board presentations amongst themselves (typically the resident assigned to CTRC will present tumor board).
- The CTRC resident should UPDATE THE PATHOLOGY INFORMATION ON THE BIOPSY QC DATABASE EVERY 2-3 DAYS. This information may currently be found on the Sunrise computer system.
- There is one journal club meeting during each four week cycle of resident rotations. After a journal article has been chosen, this article is then emailed to the residents, fellow, and mammography staff. It is the responsibility of both the junior and senior resident to present this article at the Journal Club meeting.

**ORIENTATION TO MSK ROTATION**

From: G. Bean, MD; D. Stedman, MD; R. Loreda, MD; Jonathan Kern, MD

Welcome! For a month or so, you have been selected to complete a radiology rotation that encompasses various aspects of Musculoskeletal Imaging. The following information is compiled in an effort to direct you and avoid confusion during, at the beginning, or at the end of the rotation. The below reading lists are recommendations meant to aid in learning musculoskeletal radiology throughout your residency. The '\*' after the titles designates those available in the resident room on the 1<sup>st</sup> floor of UHS.

**First Year Resident Reading List:**

5. Brandt and Helms: Fundamentals of Diagnostic Radiology, Musculoskeletal Chapters (same as Fundamentals of Skeletal Radiology by Helms, pink paperback)\*
6. Chew: Skeletal Radiology, The Bare Bones, 3<sup>rd</sup> edition\*
7. Brower: Arthritis in Black and White\*
8. Manaster: The Requisites, Musculoskeletal Imaging\*

**Second Year Resident Reading List:**

5. Greenspan: Orthopedic Imaging, 5<sup>th</sup> ed\*
6. Resnick: Bone & Joint Imaging. Chapters on Arthritis\*
7. Resnick: Bone & Joint Imaging. Chapters on Tumors & Tumor-like diseases\*
8. Chew: Musculoskeletal Teaching File, 3<sup>rd</sup> ed\*

**Third Year Resident Reading List:**

11. Helms (Kaplan): Musculoskeletal MRI, 2<sup>nd</sup> ed\*
12. Resnick: Bone & Joint Imaging. Chapters 59-61 (Infection)\*
13. Resnick: Bone & Joint Imaging. Chapters 47-58\*
14. Morrison & Sanders: Problem Solving in Musculoskeletal Imaging

**References:**

1. Manaster: Diagnostic & Surgical Imaging Anatomy, Musculoskeletal\*
2. Stoller: MRI, Arthroscopy, and Surgical Anatomy of the Joints\*
3. Resnick & Niwayana: Diagnosis of Bone & Joint Disorders, 2<sup>nd</sup> ed (I-VI vol)\*
4. Stoller: Magnetic Resonance Imaging in Orthopaedics and Sports Medicine, 3<sup>rd</sup> ed (2 vol, red books)

As many residents now use on-line sources, the recommended websites are:

3. [www.bonepit.com](http://www.bonepit.com) (UCSD Musculoskeletal Radiology)
4. <http://www.rad.washington.edu/academics/academic-sections/msk/teaching-materials/online-musculoskeletal-radiology-book> (University of Washington On-Line Radiology Book)
5. <https://www.radiology.wisc.edu/education/fellowships/msk/faculty.php> (University of Wisconsin Musculoskeletal Radiology Faculty; click on the faculty's name and view their PowerPoint presentations)

There are also e-books available on iTunes for your computer or tablet.

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### Daily AM Read-Out Session:

**Residents and Fellows:** It would be most helpful if you would ARRIVE BEFORE 8:00AM, so that there are a decent number of films to be staffed upon arrival of staff. Some residents have taken turns coming in early to get a jump start.

**Upper Level Resident:** In the room, in concert with the fellow – check UH and VAH fluoro schedules for arthrograms or other MSK procedures (fluoro, CT, US-directed).

### 1<sup>st</sup> – 2<sup>nd</sup> Year Residents (or Lower Level Residents on the Rotation):

4. Your primary responsibility in the AM hours is to answer the phone and read the plain films. Please answer the phone in an appropriate manner such as, “Musculoskeletal Radiology, Dr. \_\_\_\_.” Although sometimes painful, answering the phone allows our upper level residents, fellow, and staff to concentrate on protocoling and interpreting cross-sectional examinations as well as teaches the lower level residents the logistics of the rotation and answers to some of the basic questions you might get on-call.
5. Review and dictate UH MSK/bone films on the PACS unit labeled “Unread UT Studies”; “Unread UH-No EC & ICU’s” and the UH DXA list.
6. One needs to pick up films as they arise, not as they accumulate (basically, one is waiting to grab the plain films and staff them immediately). The other resident may pick up CTs, if the plain film list is up-to-date, while one always stays assigned to plain film coverage. Please do not start reading a new CT, if the plain films are not completely caught up.

### 3<sup>rd</sup> and 4<sup>th</sup> Year Residents (or Upper Level Resident on Service):

5. Your primary responsibility in the AM hours is to begin to read the VAH MRI’s and CT scans and help out with the UHS and UT MRI’s CT’s and Plain Films, PRN.
6. At the VAH: check all the following folders: All Unread: Unread Studies (by modality), Unread CT’s, Unread MRI’s.
7. Check our prelim studies further back in date and make sure Doc Wetread doesn’t contain MSK exams (please do this upon arrival in the AM).
8. Once the VA is caught up, review and dictate UH MRI and CT (inpatient before outpatient, if possible); followed by the plain films lists described above.
9. Help our fellow protocol the CT and MRI exams first at the VA, then at UH, if fellow not available, and review with staff as needed.

**Protocol Specifics:** All foot CT’s and MRIS’s are protocolled to specifically scan the forefoot, midfoot, hindfoot, toe or ankle. If the history is not specific, please call to clarify or obtain more history, and review the plain films whenever possible. No foot protocols that state, “foot MRI routine” should be used. For any and all studies that elucidate a mass, palpable abnormality, or specific area of tenderness or abnormality, protocol the study such that a marker is placed demarcating the area of concern.

**--The morning read-outs end when the last film at, or before, 11:30am Last Modified Time is posted on our list and dictated.**

**UTHSCSA RADIOLOGY RESIDENCY PROGRAM**

**Daily PM Read-Out Sessions:**

**1<sup>st</sup> – 2<sup>nd</sup> Year Residents:**

1. Your primary responsibility in the early PM hours is to catch up with the plain films and CT scans that accumulated over the Noon hour. Once this is accomplished:
  - a. The younger resident or the one who has had the least rotations on MSK will stay assigned to plain film coverage, picking up films as they arise.
  - b. If there are no plain films to read, the second resident may pick up a CT and then go back to clear the plain film list.

**3<sup>rd</sup> -4<sup>th</sup> Year Residents:**

1. Repeat same read-out pattern as the AM.
2. Complete CT and MRI protocols, if fellow not available, and review with staff, as needed.

**--The afternoon read-out ends when the last film at, or before 4:30pm Last Modified Time is posted on our lists and staffed.**

**Mandatory Conferences:**

5. Noon Resident Conferences: Julio C. Palmaz Classroom – 6<sup>th</sup> Floor
6. 8AM MSK Case Conference: every Friday. The first Friday, one of the staff will show interesting cases. The following Fridays, the residents, including you, will show interesting cases so begin collecting cases as soon as you start the rotation.
7. MSK Journal Club: every third Thursday, MSK RR (fulfills ACGME requirement)

**Other Available Conferences:**

1. Noon Rheumatology Conference, UH Reading Room, 2<sup>nd</sup> Thursday of each month.
2. 7:00AM Oncology Orthopaedic: Radiology Conference, every Tuesday in MSK Reading Room.

## UTHSCSA RADIOLOGY RESIDENCY PROGRAM

### ORIENTATION TO NEUROIMAGING ROTATION

Good Morning and Welcome to your Neuro-Radiology rotation!

Cheryl will place the chart with the Academic Activities, in one of the walls at the Neuro-reading room (once entering the room, along the last station on the left), for you to sign and select the conference you will attend. Then we can keep track of the attendance.

Any of you can go to any of the conferences...But in order to make possible that at least one of you attend each, the idea is that the CT residents have priority to attend the ENT tumor Board/Neurology and the MRI residents have priority to attend the Neuropath/Neuro Tumor Board and Endocrinology conferences.

The morning case conference on Thursdays at 7:30 am in the Residents Room is mandatory for all to attend. The journal club is a 30 min presentation on the last Tuesday of the rotation at 1:00 pm in our UHS Neuro-reading room.

Additionally you will receive a Test during the last week of the rotation, according to your level of training, which you will be able to resolve at home and then review the answers with faculty.

The basic references you can use during your Neuro training are:

- Fundamentals of Radiology. Brant & Helms. (1st Year).
- RadPrimer (1st & 2nd Years).
- The Requisites (2nd & 3rd Years).
- Case Review Series (3rd & 4th Years).
- Osborn (3rd & 4th Years).

Last but not least every Monday the senior CT resident at UHS will go in the morning to the VA to help reading the MRI's performed during the weekend.

If you have any questions please let me know.

Hope you enjoy your Neuro rotation...  
Thanks!

**ORIENTATION TO PEDIATRICS ROTATION**

UTHSCSA Diagnostic Radiology residents rotate through UHS Pediatric Radiology for two 4 week blocks of Pediatric Radiology during their first through third year of training. The aim of the rotation is to have residents gain experience in plain film interpretation, fluoroscopy, ultrasound, computed tomography and MRI. The Pediatric Radiology rotation shall aim to emphasize the application of these skills to disease processes and diagnostic problems particular to the pediatric age group.

**Medical Knowledge**

- Residents are expected to become familiar with the presentation, imaging findings and recommended imaging work-up of common pediatric disorders.
- This should be accomplished by reading:
  - *PEDIATRIC RADIOLOGY: THE REQUISITES* by Blickman;
  - *Donnelly's Fundamentals of Pediatric Radiology*;
  - Kirks' *PRACTICAL PEDIATRIC IMAGING*

**Patient care**

- They will learn the appropriate examinations for particular problems and how to tailor the examination to each individual situation and patient age.
- They will learn how to perform all procedures, including GI and GU contrast examinations, ultrasound and pediatric interventional procedures.
- They will learn how to interpret pediatric imaging studies including: plain films, fluoroscopy (gastrointestinal and genitourinary), sonography, cystography, CT, MRI and Nuclear Radiology

**Professionalism and Interpersonal skills**

- Residents are expected to learn, from the example of the staff radiologists, how to operate a pediatric radiology service. This may be accomplished by acting as a primary liaison to the referring clinicians, assuring efficient progress of the day's work, and making sure that all studies are dictated.

**Supervisory Lines of Responsibility**

- All studies will be reviewed by staff prior to rendering of the final report.
- The resident will perform all procedures, including GI and GU contrast examinations, ultrasound and interventional procedures, under the direct supervision of the attending radiologist.

Residents will receive verbal feedback at the mid point of the rotation and at the end of their rotation. They will also receive a written evaluation of their performance at the end of each month. Categories of evaluation shall include image interpretation, general fund of knowledge, manual diagnostic and procedural skills, and professional behavior.

## UTHSCSA RADIOLOGY RESIDENCY PROGRAM

### ORIENTATION TO VIR ROTATION

From: J Lopera, MD; R Suri, MD; G Kroma, MD; A Garza-Berlanga, MD

Welcome! For the next 4 weeks, you will be doing a radiology rotation in the section of Vascular Interventional Radiology. The following information is compiled in an effort to direct you and avoid confusion during, at the beginning, or at the end of the rotation. The below reading lists are recommendations meant to aid in learning abdominal imaging throughout your residency.

#### **First/Second Year Resident Reading List**

1. Brandt and Helms: Fundamentals of Diagnostic Radiology – Vascular and Interventional Radiology Chapters, 3<sup>rd</sup> edition
2. Kandarpa: Handbook of Interventional Radiologic Procedures
3. Kauffman: Vascular and Interventional Radiology - Requisites

#### **Third Year Resident Reading List**

1. Vedantham: Case Review Series - Vascular and Interventional Radiology

#### **Fourth Year Resident Reading List (uncommon presentations of uncommon diseases):**

1. Vedantham: Case Review Series - Vascular and Interventional Radiology
2. Kauffman: Vascular and Interventional Radiology - Requisites

#### **Useful digital/ on-line sources/ websites include:**

1. StatDx and RadPrimer
2. SIR DVD for lectures (available with Jessica, IR Admin)
3. S drive – Interventional Folder
  - a. Presentation on devices + other presentations by faculty
  - b. IR teaching Cases

#### **Expectations for Residents from Rotation:**

1. Learn to do the following –
  - a. at least 5 venous access cases (tunneled catheters); and at least 2 arterial access cases – with minimal supervision by end of 1<sup>st</sup> year
  - b. be comfortable with PICC access
  - c. professionalism in dealing with patients/family; referring physicians; and technical/nursing/administrative staff
  - d. Know common procedures in IR suite – Access (arterial/venous/enteral/renal): oncology (ablations; embolizations); trauma (embolizations); arterial (angio/PTA/stent); IVC filters; dialysis access interventions
2. Learn the following about IR –
  - a. vascular anatomy on angiography and CTA
  - b. CTA protocols and 3 D post processing
  - c. Devices used in IR
  - d. Procedures – indications; contraindications; steps of doing procedures; possible complications and management/follow up
  - e. Disease processes – common diseases and their common/uncommon presentations

#### **Expectations of IR rotation from Residents:**

1. Arrive on time at 7AM (coordinate with fellow)
  - a. review procedures planned for the day – history, imaging, indications, labs
    - i. identify issues that could delay performance of procedures (consent issues; lab abnormalities that need correction)
    - ii. Labs – generally INR < 1.6 (except for filters and dialysis grafts); platelets > 50,000; K+ < 5; Cr < 1.5 (or GFR > 45)
  - b. Round on admitted patients from the previous day –



## UTHSCSA RADIOLOGY RESIDENCY PROGRAM

- i. Assess labs; pain issues; drains placed by IR; discharge status
    - ii. Discuss with fellow and/or faculty if any concerning issues
  - c. Consent any patients admitted from OP before 7AM
  - d. Attend conferences from 7.30-8AM (per schedule below)
2. Attend board rounds at 8AM (with faculty, fellow, tech, RNs) and participate actively –
  - a. understand why and how a procedure is being planned
  - b. work with fellow to present follow up of admitted patients
3. Help with the smooth running of the service and be involved with many procedures -
  - a. Each patient needs the following prior to a procedure
    - i. Consent – explanation of procedure in layman terms, benefits, risks, alternatives, and consent for sedation and blood products
      1. Online consent through CPRS at VAH with drop down menu
      2. Paper consents for each separate procedure – with risks mentioned at back – have patient sign the consent and initial for sedation/blood products/individual listed risks at back of form
      3. Most procedures have the same basic risks (infection, hemorrhage, vessel/renal/organ injury, contrast nephrotoxicity and risk of radiation injury) with some additional risks specific to a procedure
      4. TRY TO CONSENT IN-PATIENTS THE DAY BEFORE to avoid procedural delays
    - ii. Initial the site of procedure
    - iii. Brief focused review history and physical exam to assess for possible issues with sedation including past history of sedation/anesthesia; Mallampati scores; neck movement
    - iv. Pre-sedation note (Sunrise and CPRS)– to document above and assess ASA class i.e. stratify risk of sedation
  - b. Procedure: scrub in and understand nuances of the procedure
    - i. Initially scrub in resident level cases – ports/access
    - ii. anything is game once you feel comfortable
    - iii. ask questions as to why and how as long as it is appropriate to ask in from of a patient
  - c. Post procedure:
    - i. Brief procedure note/findings/plan in Sunrise and CPRS
    - ii. Post procedure orders – per order sets
      1. Sunrise – under Rad IR
      2. CPRS – under Interventional Radiology
    - iii. Post procedure dictation in voice recognition systems at UHS and VAH
      1. Initially your dictations may just be for simple cases but you will soon learn as we do have several templates
4. If you work with the fellow and NP (Teresa Brown) to coordinate consents, sedation notes, post procedure notes – you can get to do a lot of procedures as the last thing you want is to be pulled out of doing a case as someone was not consented
5. Attend phone calls professionally in the IR reading room i.e. “Interventional Radiology, I am Dr. \_\_\_\_, How may I help you.”
  - a. Get info about patient/MRN/procedure they are requesting, fasting status, labs, physician name and contact information
  - b. Review requested procedure with faculty/fellow till you feel comfortable in deciding the appropriateness of the procedure
  - c. Guide referring physicians to appropriate Radiology service if they are asking for non VIR procedures (see below)
6. ALL CTAs are the responsibility of the resident so please check the list regularly under the CTA folder
  - a. Review CTA with faculty and dictate in draft status
  - b. If faculty not available as busy during procedures, review yourself/with fellow and immediately inform faculty if significant emergent finding

## UTHSCSA RADIOLOGY RESIDENCY PROGRAM

7. Work as a team with the aim is to get the work done and learn in the process

### **STUDIES NOT DONE IN OUR VIR SECTION:**

1. Done by Neuroradiology – Lumbar puncture and myelograms
2. Done by MSK – arthrograms, joint aspirations and peripheral skeletal biopsies

### **PROTOCOL SPECIFICS:**

You might be asked to protocol CTA studies. Till you are comfortable, ask the fellow or faculty

1. Check GFR: > 45 no hydration; 30-45 – hydration per protocol; < 30 no CTA
2. Rule out AAA or dissection:
  - a. Noncontrast CT abdomen and pelvis
  - b. CTA AAA protocol
3. Post EVAR follow up:
  - a. Noncontrast CT abdomen and pelvis
  - b. CTA AAA protocol
  - c. Delayed CT abdomen and pelvis
4. PAD and needs arterial run-off:
  - a. CTA AAA protocol with runoff to level of ankles
  - b. Delayed CT below level of knees

### **Mandatory Intradepartmental Conferences:**

1. Noon Resident Conferences (12-1 daily): Julio C. Palmaz Classroom – 6<sup>th</sup> Floor
  - a. Encouraged to attend though residents are exempt from 80% attendance requirement during IR rotation
2. Mandatory QI QA conference and M&M conference on Tuesday (7-8AM)
3. IR Case conference by fellows (7.30-8AM Wednesdays): IR reading room
  - a. RESIDENTS ON ROTATION DOES CASE PRESENTATION ON LAST WEDNESDAY OF 4 WEEK ROTATION
4. IR Lecture by faculty (7.30-8AM Thursdays): IR reading room
5. IR Journal Club/M&M (7.30-8AM Alternate Fridays): IR reading room

### **Interdepartmental Conferences (prepared by IR fellows):**

1. UH Vascular Surgery Grand Rounds – Tuesday AM (6.45-7.45) - encouraged
2. UH Liver Transplant Tumor Board – 2<sup>nd</sup> and 4<sup>th</sup> Monday at 3.30 PM
3. UH/CTRC Liver Tumor Board – 1<sup>st</sup> and 3<sup>rd</sup> Tuesday at 4.00 PM
4. VA Liver Tumor Board – alternate Fridays at 7.30 AM - encouraged

### **Faculty evaluation of Resident**

1. Daily during staff out
2. Mid rotation informal verbal feedback
3. End of rotation test
  - a. Devices identify and which procedure used for
  - b. Vascular anatomy on angiograms and CTA
  - c. Unknown cases
4. End of rotation verbal and online evaluation

### **Phone Numbers:**

Fellow pager: 203-8101

UH IR: 358-0282 (Board Runner); 358-2748 (IR Suite); 358-8582 or 8585 (Reading room); 358-0420 (IR Clinic)

Terry Brown NP: 567-1475

UT IR: 567-5564 (Jessica Esquivel, UT IR Admin)

**ORIENTATION TO NUCLEAR MEDICINE ROTATION.**

**I. READING LIST:**

1. Essentials of Nuclear Medicine Imaging. Fred A Mettler, Milton J Guiberteau. 6<sup>th</sup> Edition, 2012
2. Fundamentals of Diagnostic Imaging. Brandt and Helms. 4<sup>th</sup>Volume. 4<sup>th</sup> Edition, 2012
3. Nuclear Medicine: The Requisites. Ziessmann, 3<sup>rd</sup> Edition. 2006

Supplemental:

1. RadCases: Nuclear Medicine: Applebaum et al. 1<sup>st</sup> Edition, 2011
2. Case Review: Nuclear medicine. Ziessman. 2<sup>nd</sup> Edition, 2010

Useful on-line sources/websites:

1. StatDx
2. RadPrimer

**II. CLINICAL DUTIES**

1. All Residents:
  - a. Read SICU plain films (from the night before until 8:00 am).
  - b. Read Clinic 2 plain films (from the evening before until 4:30 pm).
2. First rotation (1<sup>st</sup> and 2<sup>nd</sup> Year Residents)
  - a. General Nuclear medicine studies
    - i. Preview study in Synapse
    - ii. Initiate dictation.
  - b. Thyroid Patients clinic visit
    - i. Perform history & physical. Review labs and pertinent info.
    - ii. Learn to consent and observe RAI treatment
3. Second and third rotation (2-3<sup>rd</sup>Year Residents)
  - a. Preview study on NM workstation
  - b. Read cases with reports kept in "draft status".
  - c. Thyroid patient clinic visit, consent and participation in treatment
4. Advance rotation (upper level residents)
  - a. PET-CT
  - b. Help junior resident complete work.
  - c. Teach and mentor junior resident.
  - d. Thyroid patient clinic visit, consent and participation in treatment.
  - e. Complete requirements for AU.

**III. CLINICAL EXPECTATIONS:**

1. Initial rotation. General Nuclear medicine. Learn basics of:
  - a. Common Nuclear Medicine procedures/protocols(minimum):
    - i. Bone Scan, Myocardial Perfusion studies, V/Q, HIDA, Gastric emptying, GI bleed studies, renal scans
  - b. Frequently used radiopharmaceuticals (RP).
  - c. Equipment knowledge

## UTHSCSA RADIOLOGY RESIDENCY PROGRAM

- d. Operating the NM workstation
- 2. Intermediate rotations
  - a. General NM: Advanced knowledge of III,1.
  - b. Knowledge of less common procedures and RP.
  - c. Should be able to operate and review studies on NM workstations
  - d. PET-CT
    - i. Obtain all available info, including path and prior/recent treatments.
    - ii. Review studies and draft report.
- 3. Advanced rotations
  - a. General NM:
    - i. Review studies for techs. Ask for additional imaging if needed.
    - ii. Draft complete report
    - iii. Make recommendations
    - iv. Observe techs, equipment. Learn equipment QC.
    - v. Radiopharmacy
  - b. PET-CT
    - i. Obtain all available info, including path and prior/recent treatments.
    - ii. Review studies and draft report.

### **IV. CONFERENCES:**

- 1. Residents Noon Conference. Every day. 6<sup>th</sup> floor.
- 2. Endocrine -NM conference: 1<sup>st</sup> Wednesday of the month. 8:00 am. NM reading rm.
  - a. Radiology resident prepares cases
- 3. Neoplasia Board- Endo, Surgery, Path, NM: 3<sup>rd</sup> Wed of the month. 8:00 am. NM reading rm.
  - a. Cases sent by endo. Preview cases and short PP

### **V. TEACHING:**

- 1. First week: Staff presentation/discussion. (Tentative) Thurs, 10:45-11:15 a.m.
- 2. Second week: Staff, case review. (Tentative) Thurs, 10:45-11:05 a.m.
- 3. Third week: Senior resident. Short presentation. (Tentative) Thurs, 10:45-11:05 a.m.
- 4. Fourth week: Journal club/cases. Staff+junior resident. (Tentative) Thurs, 1:45-11:05 a.m.

### **VI. FACULTY EVALUATION (consensus):**

- 1. Mid rotation informal feed back
- 2. End rotation Verbal and online evaluation

## Nuclear Medicine Proficiency Checklist

### Introduction

Training in Nuclear Medicine is unique among the areas of subspecialty training in Diagnostic Radiology. Among the eleven subspecialty examinations you are required to pass at the American Board of Radiology oral examination for primary certification in radiology, only Nuclear Medicine and Breast Imaging include special requirements regarding the number of weeks that must be included in residency training. Since the practice of Nuclear Medicine involves the handling and administration of radioactive materials, the Nuclear Regulatory Commission now requires additional documentation of certain training activities in an effort to ensure public safety.

### Authorized User Status

Beginning in 2006, the American Board of Radiology began offering candidates sitting for the oral board examination the opportunity to answer additional exam questions. If answered correctly, the candidate would have the words "AU-Eligible" included on their certificate from the ABR. What does this mean?

According to the NRC, an **authorized user** is a physician, dentist or podiatrist who:

- (1) Meets the requirements in §§ 35.59 and 35.190(a), 35.290(a), 35.390(a), 35.392(a), 35.394(a), 35.490(a), 35.590(a), or 35.690(a); or
- (2) Is identified as an authorized user on--
  - (i) A Commission or Agreement State license that authorizes the medical use of byproduct material;
  - (ii) A permit issued by a Commission master material licensee that is authorized to permit the medical use of byproduct material;
  - (iii) A permit issued by a Commission or Agreement State specific licensee of broad scope that is authorized to permit the medical use of byproduct material; or
  - (iv) A permit issued by a Commission master material license broad scope permittee that is authorized to permit the medical use of byproduct material.

### *What does this really mean?*

Each facility that administers radiopharmaceuticals to perform nuclear medicine studies must have at least one authorized user to supervise the processes of receiving, handling and administering the radioactive materials. Note that this status is not required for the interpretation of nuclear medicine exams. However, some practice groups prefer to have authorized users so that they can distribute radiologists among many imaging centers without concern for having an imaging center without an authorized user available.

### *How can you achieve Authorized User status?*

The most straightforward method is to participate in and document all required activities during your residency, then take and pass the AU portion of the Nuclear Medicine section of the oral board examination. If successful, you will be "AU Eligible." If so, you can fill out an application that includes a preceptor attestation that you have had all of the appropriate training and have it signed by someone who is already an authorized user. Note that in order for the supervising Authorized User to sign your attestation, you will need to have documents that verify your completion of each of the NRC requirements. The following checklist is intended to help facilitate this process by requiring you to document your training in each of the required activities.

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**Nuclear Medicine Checklist for Authorized User Eligibility**

**Requirement:** “700 hours of training and experience, including a minimum of 80 hours of classroom and laboratory training, in basic radionuclide handling techniques and radiation safety applicable to the medical use of unsealed byproduct material for imaging and localization studies.”

This requires at least 16 full weeks of participation on the nuclear medicine service.

TIME ON SERVICE			
Rotation	Dates of Rotation	Dates Absent	Weeks Completed (weeks + days)
Nucs 1			
Nucs 2			
Nucs 3			
Nucs 4			
Mammo-Nucs			
Additional days of Nucs provided			
<b>TOTAL</b>			

DIDACTIC OR CLASSROOM AND LABORATORY TRAINING			
Description of Training	Location	Clock Hours	Dates of Training
Radiation Physics and Instrumentation			
Radiation Protection			
Mathematics Pertaining to the Use and Measurement of Radioactivity			
Radiation Biology Chemistry of Byproduct Material for Medical Use			
Other			

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WORK OR PRACTICAL EXPERIENCE WITH RADIATION			
Description of Experience	Name of Supervising Individual(s)	Location and corresponding Material License Number	Dates and/or Clock Hours of Experience
Ordering, receiving, unpacking and surveying radioactive shipments			
Performing Q/C procedures on instruments used to assay patient dose and survey meters			
Calculating, measuring and safely preparing patient dose			
Using administrative controls to prevent a medical event			
Administering radioactive drugs to patients or research subjects			
Eluting generators measuring and testing eluate and prepare labeled radioactive drugs			
Using procedures to safely contain spilled radioactive material and using proper decontamination procedures			
		TOTAL	

SUMMARY OF PARTICIPATION IN I-131 THERAPY (at least 3 are required – must attach a therapy documentation form for each)			
Date of therapy	Indication for therapy	Name of Supervising Individual	Location of Therapy

**UTHSCSA RADIOLOGY RESIDENCY PROGRAM**

**Documentation of the Radiology Resident  
Participation in I-131 therapy.**

1. Resident \_\_\_\_\_
2. I-131 case (1) \_\_\_\_ (2) \_\_\_\_ (3) \_\_\_\_
3. Date of therapy: \_\_\_\_\_
4. Content verification in the medical report:

	Yes	No
a. Pertinent history	___	___
b. Pertinent physical exam	___	___
c. Pertinent laboratory or imaging data	___	___
d. Pertinent scintigraphic findings	___	___
e. Appropriate impression or differential diagnosis	___	___
f. Informed consent	___	___
g. "Time out" prior to therapy	___	___
h. Therapeutic I-131 dose	___	___
i. Patient follow up with health care provider	___	___
j. Discussed with health care provider N/A ____	___	___

5. Did the resident demonstrate:

a. Adequate knowledge of therapy options	___	___
b. Ability to calculate a therapeutic I-131 dose	___	___
c. Adequate knowledge of post-therapy radiation safety precautions for the patient, family and the public	___	___
d. Knowledge of travel precautions	___	___
e. Understanding of a medical event and Nuclear Regulatory Commission (NRC) Reporting	___	___

6. Patient follow up

- a. Method \_\_\_\_\_
- b. Date \_\_\_\_\_

7. Authorized user verification (sign and print name)

Name \_\_\_\_\_ Date \_\_\_\_\_



**UTHSCSA RADIOLOGY RESIDENCY PROGRAM**

**BODY CT and BODY MRI ROTATIONS**

**Section Objectives:**

The primary objective of the section of abdominal imaging is to perform high quality work in the three branches of medical academia: clinical service, education, and research. The section considers each branch equally important to the creation and maintenance of a dynamic and progressive section. The objectives for each branch are:

**Clinical Service:**

- To provide **the highest quality diagnostic and interventional service for the detection and treatment of abdominal pelvic disease.**
- To practice **at the leading edge of our subspecialty.**
- To deliver **all services in a timely and efficient manner.**
- To establish **ourselves as valuable colleagues and consultants to physicians.**
- To place **the welfare of the patient above all other concerns.**

**Education:**

- To provide **an excellent, well rounded educational experience in abdominal imaging and intervention for radiology residents and fellows.**
- To educate **our colleagues about the availability and proper use of diagnostic and interventional services.**
- To contribute **to the education of the radiology community through presentation and publication of ongoing research performed at UTHSCSA.**

**Research:**

- To perform **well-designed, high quality research in abdominal imaging and intervention that will have significant impact on patient care.**
- To present **and publish scientific work that will receive national recognition and make lasting contribution to the radiological literature.**

**BODY CT and MRI ROTATIONS**

	1 <sup>ST</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year
Protocol exams with supervision	X	X	X	X
Protocol exams alone		X	X	X
Review cases at console with supervision	X	X	X	X
Review cases at console alone and dismiss patients		X	X	X
Review cases with staff supervision	X	X	X	X
Read cases and render a provisional diagnosis		X	X	X
Dictate cases	X	X	X	X

**BODY INTERVENTION ROTATION**

	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year
Schedule Cases		X	X	X
Obtain Informed Consent	X	X	X	X
Prescan Patients	X	X	X	X
Set Up Sterile Tray	X	X	X	X
Prep Patient	X	X	X	X
Perform Procedure With Staff assistance	X	X	X	X
Perform basic procedures with supervision but without direct assistance			X	X

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**BREAST IMAGING/INTERVENTIONS ROTATION**

(All screening, diagnostic and interventional procedures performed in mammography are supervised by an attending FDA/ACR certified mammographer.)

The Diagnostic Radiology Resident is expected to progress to the point of supervised independence on the mammography service with the intent that they will be able to perform independently as mammographers, if they so desire, at the completion of this residency program.

**I. Development of knowledge and skills**

**A. Initial Rotations**

1. Co-direct the mammography service with attending mammographer.
2. Review screening mammograms and form a preliminary impression.
3. Perform diagnostic mammographic work-up of breast abnormalities and form a preliminary impression which will be discussed with attending mammographer.
4. Acquire knowledge of QA/QC procedures and requirements.
5. Acquire the ability to assess the need for and perform interventional breast procedures such as biopsies, fine needle aspirations and galactography.
6. Discuss mammographic findings with patients.
7. Perform physical examinations on patients.
8. Perform ultrasound examinations on patients.
9. Coordinate, attend and present breast cases at the multidisciplinary breast conference. Be able to discuss mammographic findings with others on the team.
10. Dictate all reports in an organized, succinct manner.

**B. Senior Rotations:**

1. Direct the mammography service under the supervision of the faculty mammographer.
2. Interpret screening mammograms. Discuss findings with attending mammographer.
3. Perform diagnostic work-up of breast abnormalities and discuss findings with attending mammographer. Speak with patients about mammographic findings.
4. Supervise QA/QC activities of the division.
5. Make decisions as to what interventional breast procedures are indicated and determine what technique to utilize to perform the procedure.
6. Perform interventional procedures after discussing # 5 (above) with attending physician.
7. Direct the multidisciplinary breast conference and as a team member evaluate as to whether the biopsy was adequate and what further follow-up/intervention is required.

**II. Supervisory lines of responsibility**

**A. Initial Rotations:**

1. The residents will review all diagnostic studies with staff prior to patient discharge.
2. Staff will review and confirm ultrasound studies with residents.

**B. Intermediate Rotations:**

1. All screening and diagnostic exams will be double read with a staff member before a formal report is rendered.
2. Initially, the dictating of reports will be observed by a staff member.
3. Initially, all diagnostic work-ups will be performed with staff present and as the resident develops competence, they will gradually be allowed to direct the work-up on their own.
4. QA/QC procedures will be supervised by the Director of Mammography.
5. There will be direct supervision of interventional procedures.
6. Initially staff will be present as residents speak with patients about mammographic findings and as the residents gain competence in this there will be less direct supervision.
7. Faculty will supervise physical examinations until resident is capable of performing a complete and accurate exam.
8. Faculty will directly supervise ultrasound exams.
9. Staff will be present to oversee the multidisciplinary breast conference and make suggestions as needed.

**C. Senior Rotations:**

1. All exams will be reviewed with staff before a formal report is rendered.
2. ACR QA/QC activities will be reviewed with the Director of Mammography.
3. Interventional procedures will be reviewed with staff prior to performing them and based on residents individual competence level, supervision by staff will be provided.
4. Staff will be present at multidisciplinary breast conference as a consultant.

**UTHSCSA RADIOLOGY RESIDENCY PROGRAM**

## **FLUOROSCOPY**

### **Section Objectives:**

The primary objective of the section of abdominal imaging is to perform high quality work in the three branches of medical academia: clinical service, education, and research. The section considers each branch equally important to the creation and maintenance of a dynamic and progressive section. The objectives for each branch are:

#### **Clinical Service:**

- To provide **the highest quality diagnostic and interventional service for the detection and treatment of abdominal and pelvic disease.**
- To practice **at the leading edge of our subspecialty.**
- To deliver **all services in a timely and efficient manner.**
- To establish **ourselves as valuable colleagues and consultants to physicians.**
- To place **the welfare of the patient above all other concerns.**

#### **Education:**

- To provide **an excellent, well rounded educational experience in abdominal imaging and intervention for radiology residents and fellows.**
- To educate **our colleagues about the availability and proper use of diagnostic and interventional services.**
- To contribute **to the education of the radiology community through presentation and publication of ongoing research performed at UTHSCSA.**

#### **Research:**

- To perform **well designed, high quality research in abdominal imaging and intervention that will have significant impact on patient care.**
- To present **and publish scientific work that will receive national recognition and make a lasting contribution to the radiological literature.**

## **Fluoroscopy**

	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year
Protocol Cases with Staff Supervision	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Perform Cases Independently After Gaining Technical Proficiency	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Perform Cases Independently and Dismiss Patients		<b>X</b>	<b>X</b>	<b>X</b>
Perform Cases After Hours		<b>X</b>	<b>X</b>	<b>X</b>
Read Cases and Render A Provisional Diagnosis		<b>X</b>	<b>X</b>	<b>X</b>
Dictate Cases	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>

## **MUSCULOSKELETAL RADIOLOGY ROTATION**

The Diagnostic Radiology resident is expected to progress to the point of complete independence in monitoring, modifying, and interpreting Musculoskeletal exams, including plain films, radiography, computed tomography, and magnetic resonance imaging. He/She will also become competent in performing diagnostic and therapeutic arthrography of multiple joints.

### **I. Development of Knowledge and Skills**

#### **A. Initial Rotations:**

1. The resident is expected to begin learning the normal anatomy of the musculoskeletal system as viewed with radiography and computed tomography.
2. They will learn how to determine if the appropriate exam has been requested and how to tailor any exam to the individual situation
3. They are expected to learn the appropriate CT scan indications and protocols as they interpret the examinations.
4. They will begin to learn the principals of magnetic resonance imaging of the musculoskeletal system, and normal MR image anatomy.
5. They will learn the appropriate method for dictating musculoskeletal radiology reports and CT scan examinations.
6. They will learn the different types of plain film images.
7. They will learn arthrographic techniques.

#### **B. Intermediate Rotations**

1. They will be expected to further expand the knowledge developed in the initial rotation. They will build upon their initial learning of the normal MR image anatomy as they are learning to detect pathology on the MR images.

#### **C. Senior Rotations:**

1. They will be expected to further expand the knowledge developed in the initial and intermediate rotation(s).
2. They will become proficient in performing arthrograms and any fluoro-directed or CT-directed musculoskeletal procedures.

### **II. Supervisory Lines of Responsibility**

#### **A. Initial Rotation:**

1. The residents will clear all CT scan studies with staff prior to approval and/or modification of protocols.
2. As they demonstrate competence, they will gradually be allowed to approve and write the protocols for CT scans and MR imaging.
3. All studies will be double read by a staff member before the formal report is rendered.
4. All arthrographic cases will be presented to a staff member before the formal consent is signed by the patient and a staff member will be present during all arthrographic, fluorographic-directed, or CT-directed studies.

#### **B. Intermediate Rotations:**

1. There will be further progression of the items listed in the initial rotation.

#### **C. Senior Rotations:**

1. The residents will be responsible for writing all CT scans and MR image protocols. However, the staff will be readily available to answer any questions.
2. All studies will continue to be double-read by the staff.

**UTHSCSA RADIOLOGY RESIDENCY PROGRAM**

**NEURORADIOLOGY ROTATION**

<b>First year Resident:</b>	Knowledge of basic neuroanatomy and pathology
<b>Second year Resident:</b>	General knowledge of neuroanatomy, pathology and basic procedure protocols
<b>Third year Resident:</b> procedure protocols	Knowledge of neuroanatomy, neuropathology, and
<b>Fourth year Resident:</b>	Advanced knowledge of neuroanatomy, neuropathology, and procedure protocols

**Supervisory Lines of Responsibilities \***

<b>First year Residents:</b>	Observation and assistance in procedures; dictation of simple cases; participation in teaching conferences
<b>Second year Residents:</b>	Assistance in simple procedures; dictations of simple and complex cases; participation in teaching conferences
<b>Third year Residents:</b>	Assistance and participation in all procedures; all dictation; participation in teaching conferences
<b>Fourth year Residents:</b>	Participation in all procedures; all dictations; participation in teaching conferences

\* All neuroradiologic imaging studies will be reviewed with a staff neuroradiologist before final dictation is released. Neuroradiologic procedures will be supervised by a staff neuroradiologist.

## **NUCLEAR RADIOLOGY**

The diagnostic radiology resident is expected to progress to the point of complete independence in ordering, monitoring, modifying, and interpreting nuclear radiology exams. He/she will also become competent in treating Graves' disease and thyroid cancer.

### **I. DEVELOPMENT OF KNOWLEDGE AND SKILLS**

#### **A. INITIAL ROTATIONS:**

1. The resident is expected to understand the operation of a nuclear radiology clinic from evaluating the referring clinician's request, through monitoring the study, scan interpretation, and dictating the final report.
2. They will learn how to determine if the appropriate exam has been requested, and how to tailor the exam to each individual situation.
3. They are expected to learn what the appropriate radiopharmaceutical and dose is for the most common nuclear studies (bone scan, lung scan, thyroid studies, cardiac studies, hepatobiliary exam, renal studies, and gastric emptying). They will also learn how to determine a pediatric dose.
4. They will interview thyroid patients, take an appropriate history, perform a thyroid physical exam, and present the cases to the attending.
5. They will also learn the appropriate method for dictating nuclear radiology reports and being interpreting nuclear exams.
6. They will begin learning the principles of I-131 therapy of Graves' patients.

#### **B. INTERMEDIATE ROTATIONS**

1. They will be expected to further expand their knowledge developed in the initial rotation.
2. They will also begin to learn the principles of quality control in a nuclear radiology clinic including radiopharmaceutical and camera quality control.
3. They will learn how to admit, treat and monitor thyroid cancer patients.
4. They will participate in our quality assurance program.

#### **C. SENIOR ROTATIONS:**

1. They will learn the principles of producing radiopharmaceuticals especially as it relates to quality control.
2. They will become competent enough to independently run the nuclear radiology clinic including supervising, interpreting diagnostic studies as well as treating patients with I-131 for Graves' disease and thyroid cancer.

### **II. SUPERVISORY LINES OF RESPONSIBILITY**

#### **A. INITIAL ROTATIONS:**

1. The residents will clear all studies with the staff prior to approval and/or modification.
2. As they demonstrate competence, they will gradually be allowed to order (sign for) studies on their own.
3. After an initial period of observation, they will begin dictating studies.
4. All studies will be double read by a staff member before the formal report is rendered.
5. All thyroid cases will be presented to a staff member before a diagnostic dose of iodine is administered.

#### **B. INTERMEDIATE ROTATIONS**

1. There will be further progression of the items listed in the initial rotations.
2. All radiation therapy doses will be countersigned by a staff prior to administration.

#### **C. SENIOR ROTATIONS:**

1. The residents will be responsible for operating the clinic independently.
2. However, staff will be readily available in the event a question arises.
3. All studies will continue to be double read by the staff and therapeutic doses countersigned by the staff.

## **PEDIATRIC RADIOLOGY ROTATION**

Residents rotate through at least 2 one-month blocks of Pediatric Radiology during their training.

### **I. Development of Knowledge and Skills**

#### **A. Initial Rotation:**

1. Residents are expected to become familiar with the presentation, imaging findings and recommended imaging work-up of common pediatric disorders. This should be accomplished by reading: *PEDIATRIC RADIOLOGY: THE REQUISITES* by Blickman, and reviewing Dr. Clarke's teaching file.
2. Residents are expected to learn, from the example of the staff radiologists, how to operate a pediatric radiology service, including acting as primary liaison to the referring clinicians, assuring efficient progress of the day's work, and making sure that all studies are dictated.
3. They will learn the appropriate examinations for particular problems and how to tailor the examination to each individual situation and patient age.
4. They will learn how to perform all procedures, including GI and GU contrast examinations, ultrasound and interventional procedures.
5. They will learn how to interpret pediatric imaging studies including: fluoroscopy (gastrointestinal and genitourinary), sonography, cystography, and plain films.

#### **B. Subsequent Rotations:**

1. Residents will be expected to expand on the knowledge developed in the initial rotation. This will be accomplished by reading Kirks' *PRACTICAL PEDIATRIC IMAGING*, and reviewing the pediatric section of the ACR teaching file and CD-ROMs.
2. They will learn the principles and interpretation of specialized pediatric studies, including CT, MRI, and Nuclear Radiology.

### **II. Supervisory Lines of Responsibility**

#### **A. Initial Rotation**

1. Residents are expected to assume partial responsibility for the service, including acting as primary liaison to the referring clinicians and assuring efficient progress of the days work.
2. All studies will be cleared by staff prior to approval.
3. All studies will be reviewed by staff prior to rendering of the final report.
4. The resident will perform all procedures, including GI and GU contrast examinations, ultrasound and interventional procedures, under the direct supervision of the attending radiologist.

#### **B. Subsequent Rotations**

1. Residents are expected to assume complete responsibility for the service, including acting as primary liaison to the referring clinicians, assuring efficient progress of the days work, and making sure that all studies are dictated.
2. The resident is expected to perform procedures independently with later review by the attending radiologist.
3. All studies will continue to be reviewed by staff prior to final report.

Residents will receive a written evaluation of their performance at the end of each month. Categories of evaluation include image interpretation, general fund of knowledge, manual diagnostic and procedural skills, and professional behavior.

## UTHSCSA RADIOLOGY RESIDENCY PROGRAM

# THORACIC RADIOLOGY ROTATION

The Diagnostic Radiology resident is expected to progress to the point of complete independence in ordering, monitoring, modifying, and interpreting thoracic radiology examinations. He/She will also become a competent consultant to the healthcare providers, integrating clinical and radiological information to provide appropriate interpretations and differential diagnoses.

### I. Development of Knowledge and Skills

#### A. Initial Rotations:

1. The resident is expected to develop an understanding of thoracic anatomy displayed on plain films, CT and MR.
2. The resident will make an initial assessment of all plain film and CT examinations **performed at UHS, RBG, MARC and CTRC** before formal read-out sessions with staff. The resident will be responsible for the dictation of all reports into the appropriate system. All studies reviewed with staff will be dictated before the resident departs each evening. All dictations will be electronically signed each day.
3. The resident is encouraged to read the chapters on thoracic disease in Brant and Helms' Fundamentals of Diagnostic Radiology and Felson's Chest Roentgenology. Additionally, residents are expected to read daily about the diseases that are discussed in read-out sessions.
4. The resident will select at least 2 cases with interesting and important teaching points which will be incorporated into the chest radiology teaching file by each resident during each monthly rotation so that it will become a viable, growing resource of educational material. Each resident will present a brief teaching conference on a thoracic radiology subject to the other residents and faculty on the service.

#### B. Intermediate Rotations:

1. The resident will continue all previous responsibilities, excepting reading assignments.
2. Residents will develop differential diagnoses of fundamental thoracic disease patterns and augment their understanding of chest disease through ACR chest syllabi; ACR teaching file; Fraser and Parés' Synopsis of Diseases of the Chest; RadioGraphics; Reed's Chest Radiology Patterns and Differential Diagnoses; and Radiologic Clinics of North America.

#### C. Senior Rotations:

1. The resident will continue all previous responsibilities.
2. Residents will expand knowledge base of chest diseases and differential diagnoses through sources listed in the intermediate rotations. Additionally, they will be encouraged to review the previous five years of AJR, Radiology, and Journal of Thoracic Imaging and read the major papers on thoracic imaging.

### II. Supervisory Lines of Responsibility

#### A. Initial Rotations

1. All studies will be double read by a staff member before the formal report is rendered.
2. After an initial period of observation, residents will begin dictating studies before staff review, but residents must have staff review before the report is transcribed. All recommendations by staff will be incorporated into an addendum before the initial dictation has been transcribed.
3. The resident will develop a sense of ownership of the Thoracic Radiology Service. He/she will interact verbally with appropriate health care providers to convey clinically urgent radiologic findings and to obtain additional clinical information before rendering a radiologic interpretation. When necessary, he/she will enter the HIS/RIS and search for relevant history from prior hospitalizations and/or surgical procedures. The residents will arrange for retrieval of additional imaging examinations as needed to improve the quality of radiological interpretation (prior similar studies, other imaging examinations, and their interpretations).
4. The residents will review all requests for studies directed to the Thoracic Radiology Service with staff prior to approval and/or modification. As they demonstrate competence, they will be allowed to protocol and approve studies on their own.



## UTHSCSA RADIOLOGY RESIDENCY PROGRAM

### **B. Intermediate Rotations:**

1. There will be further progression of the items listed in the initial rotations.
2. The resident will provide immediate consultation for residents of other clinical services.

### **C. Senior Rotations:**

1. The residents will be responsible for operating the Thoracic Radiology Service independently, to include providing verbal consultations to residents and staff from other departments regarding radiologic findings and appropriate differential diagnoses. However, staff will be readily available for consultation and/or review of any study.
2. Staff will double read all studies before reports are finalized and will be available for immediate consultation.

### **III. End of Month Evaluations**

Residents in the first three years of training will complete a practical evaluation during the fourth week of the thoracic radiology rotation. The resident will be presented with not fewer than five unknown thoracic cases and will generate a full report for each case, emphasizing history, findings, pertinent negatives, synthesis of observations, differential diagnosis, final conclusion(s) and recommendations (as appropriate). A faculty member will assess the reports created by the resident and will review each case and its report with the resident. There are two purposes of this evaluation. The first purpose of this exercise is to develop and progressively augment the learned ability to 'think under pressure' and prepare each resident to take and pass the oral examination of the American Board of Radiology. The second purpose is to insure residents meet minimal milestones necessary for appropriate progression through this residency program.

### **IV. On-line Study Aids**

- A. [www.med-ed.virginia.edu/courses/rad](http://www.med-ed.virginia.edu/courses/rad)
- B. [www.learningradiology.com](http://www.learningradiology.com)
- C. [www.chestx-ray.com](http://www.chestx-ray.com)
- D. [www.thoracicrad.org](http://www.thoracicrad.org) (web site of the Society of Thoracic Radiology and has many full lectures from recent annual meetings of the society.)

**UTHSCSA RADIOLOGY RESIDENCY PROGRAM**

**ULTRASOUND**

**Section Objectives:**

The primary objective of the section of abdominal imaging is to perform high quality work in the three branches of medical academia: clinical service, education, and research. The section considers each branch equally important to the creation and maintenance of a dynamic and progressive section. The objectives for each branch are:

**Clinical Service:**

- To provide **the highest quality diagnostic and interventional service for the detection and treatment of abdominal and pelvic disease.**
- To practice **at the leading edge of our subspecialty.**
- To deliver **all services in a timely and efficient manner.**
- To establish **ourselves as valuable colleagues and consultants to physicians.**

**Education:**

- To provide **an excellent, well rounded educational experience in abdominal imaging and intervention for radiology residents and fellows.**
- To educate **our colleague about the availability and proper use of diagnostic and interventional services.**
- To contribute **to the education of the radiology community through presentation and publication of ongoing research performed at UTHSCSA.**

**Research:**

- To perform **well designed, high quality research in abdominal imaging and intervention that will have significant impact on patient care.**
- To present **and publish scientific work that will receive national recognition and make a lasting contribution to the radiological literature.**

**ULTRASOUND**

	1 <sup>ST</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year
Scan with technologist	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Scan alone with staff supervision	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Scan after hours		<b>X</b>	<b>X</b>	<b>X</b>
Review cases with supervision	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Review cases alone and dismiss patients		<b>X</b>	<b>X</b>	<b>X</b>
Sign out cases with staff	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Dictate cases			<b>X</b>	<b>X</b>

## **VASCULAR INTERVENTIONAL RADIOLOGY ROTATION**

The goals of the Vascular and Interventional Radiology program in the Radiology Residency at UTHSCSA are to provide the residents with knowledge and practical experience in vascular diagnostic and interventional radiology sufficient to support their functioning as general diagnostic radiologists upon graduation from the program. The residency graduate should be capable of performing routine vascular and non-vascular diagnostic and therapeutic procedures.

**Vascular procedures** include: Diagnostic examination of the thoracic, abdominal and lower extremity arteries as well as the fundamentals of intervention such as balloon angioplasty and stent placement, thrombolytic therapy and embolization techniques.

He or she should possess full interpretive skills for these procedures, and should be fully cognizant of the indications and contraindications of these procedures, the disease processes involved, the various invasive and non-invasive means of evaluating the patient requiring such studies, and the various surgical and radiologic interventions available. He or she should be skilled at providing the appropriate pre- and post-procedure case measures and at recognizing and appropriately dealing with complications which may occur.

The principles of vascular and non-vascular interventions should be fully understood, and experience should have been gained in these procedures during the clinical rotations. Depending on clinical cases available during the resident's rotations, it is anticipated that the graduated resident will be capable of performing basic venous access, hemodialysis graft management, IVC filters and pulmonary angiography. Residents will also perform percutaneous biliary and renal drainage.

It is extremely important that the residents realize that vascular and interventional radiology is a blending of clinical procedures and radiology. The radiologic interpretation of the images obtained is the reason for performing the invasive diagnostic examination, and analysis of the radiologic finds and pathophysiology of the patient's condition, and reporting the examination results are equally as important as performance of the examination. In addition, the peri-procedural aspects of the case, especially decision making concerning whether and how to perform a case and manage the patient are fully as important as the manipulations performed.

Vascular and Interventional Radiology is a rapidly changing field. This implies that available reference material is rapidly developing. Textbook references are listed below and represent a valuable learning resource. Specific mandatory reading assignments for the resident are given in the Cardiovascular and Interventional Radiology Training objectives.

### **Suggested Reading**

1. Abrams, H.L., *Abrams Angiography*, 3d Ed. Little Brown and Co. 1983.

This is the encyclopedic reference for classical angiographic technique, and probably the best source for disease processes. It is somewhat daunting in size, but is very complete.

2. Kadir, S., *Diagnostic Angiography*. WB Saunders Co 1986.

This is an excellent book combining technique and radiology which is manageable in size, covering principally diagnostic angiography. This entire book should be covered by the resident during the first two years.

3. Kadir, S., *Current Practice of Interventional Radiology*. B.C. Decker, 1991.

## **FIRST ROTATION ON VASCULAR INTERVENTIONAL**

### **Knowledge based Objectives:**

1. GI vascular anatomy in detail
2. Lower extremity vascular disease patterns and collateral pathways
3. Pathophysiology of carotid arterial disease and arterial manifestations
4. Basic understanding of the risks of and indications for the range of vascular interventional procedures
5. Methodology of access to the urinary tract and biliary tract by percutaneous methods with primary and alternate approaches
6. Understanding of pathophysiology of biliary obstructive disease
7. Basic understanding of pathophysiology of urinary obstructive disease and renal stone disease
8. Understanding of the principles and use of doppler ultrasound
9. Differential diagnosis of plain film signs of cardiac disease

### **Technical Skills:**

1. Catheterization of the difficult femoral artery and vein and alternative puncture sites
2. Selective catheterization of major first order vascular branches with assistance
3. Selection of injection and filming rates in angiography
4. Performing catheter and wire exchanges
5. Fluoroscopically and sonographically guided puncture technique and use of the coaxial access systems
6. Basic operation of doppler ultrasound equipment

### **Interpretive Skills:**

1. Detail interpretation of peripheral vascular arteriography
2. Detail interpretation of pulmonary arteriography and correlation with ventilation/perfusion lung scanning

### **Cumulative Experience Goals:**

1. Perform at least 25 arterial catheterizations as the primary operator
2. Insert an inferior vena cava filter as primary operator
3. Assist with at least 5 percutaneous GU interventional procedures (PCN, stent, PCNL)

### **Reading Recommendations:**

1. Kadir S, *Diagnostic Angiography*, chapters 3 (again), 11 (again), 12, 13, 14, 15, 16, 20, 22, 23
2. Cope C, *Atlas of Interventional Radiology*, chapters 3, 7, 8, 11-14 to 11-17
3. Gedgaudas E, *Cardiovascular Radiology*, chapters 10, 11, 12; optional 5-9

# UTHSCSA RADIOLOGY RESIDENCY PROGRAM

## SECOND AND SUBSEQUENT ROTATIONS ON VASCULAR INTERVENTIONAL

### Knowledge Based Objectives:

1. GI Vascular disease patterns and collateral pathways
2. Renal vascular disease patterns and differential diagnoses
3. Hepatic vascular disease patterns and differential diagnoses
4. Carotid vascular disease patterns and collateral pathways
5. Patterns of disease of vasculitis
6. Indications for and risks of GU and biliary interventions, with options for treatment and expected success rates
7. Methodology for various GU and biliary interventions
8. Basic knowledge of coronary artery anatomy
9. Knowledge of indications, risks and methodology of basic percutaneous drainage of abscesses and intra-abdominal fluid collections

### Technical Skills:

1. Central venous catheter venipuncture and catheter placement; sonographically guided puncture technique
2. Performance of routine aortography and venography procedures with assistance
3. Independent operation of the fluoroscopy equipment and table with technologist assistance
4. Directing catheter and wire exchanges with an assistant
5. Extremity venography with assistance
6. Nephrostomy access

### Interpretive Skills

1. Correlation of multi-modality vascular images for interpretation and diagnosis: CT, ultrasound, doppler ultrasound, angiography
2. In depth interpretation of GI, renal and brachiocephalic arteriography
3. Interpretation of CTA images of the abdominal aorta and renal arteries

### Cumulative Experience Goals:

1. Perform at least one antegrade femoral puncture and one brachial puncture
2. Perform at least one central venous catheter placement as primary operator
3. Perform an arterial angioplasty procedure as primary operator
4. Percutaneously puncture and catheterize a vascular graft as primary operator (includes dialysis grafts)
5. Perform at least one pulmonary arteriogram as primary operator
6. Perform at least one percutaneous nephrostomy as primary operator
7. Participate in at least one percutaneous primary biliary access procedure

### Reading Recommendations:

1. Kadir S, *Diagnostic Angiography*, chapters 17, 18, 19 (again), 21
2. Cope C, *Atlas of Interventional Radiology*, chapters 4, 5, 6, 9, 10
3. Appropriate Interventional Radiology Handbook
4. Higgins CB, *Essentials of Cardiac Radiology and Imaging*, chapters 1, 3, 6, 8, 9
5. Complete ACR TF chest and cardiovascular sections