

AdventHealth Diagnostic Radiology
Residency Program

2019 - 2020



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AdventHealth Orlando Diagnostic Radiology Residency Program

Radiology Resident Manual: Table of Contents

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AdventHealth Orlando **Diagnostic Radiology Residency Program**

Letter from the Program Director

On behalf of AdventHealth Medical Group and AdventHealth Orlando Graduate Medical Education, I am excited that you have chosen to enter our 4-year Diagnostic Radiology Residency Program in Orlando, Florida. AdventHealth Orlando is one of the largest healthcare systems in the country, performing over 1.5 million imaging studies per year and offering a wide breadth of pathologies. Because of our large case volumes, high faculty-to-resident ratio, subspecialty training and advanced technology, AdventHealth Orlando has the ability to offer an exceptional radiology educational experience. Along with your radiology resident colleagues, you will be trained by engaged faculty using state of the art equipment (3T MRI, PET-CT, digital mammography and bi-plane angiography equipment). By the end of your four years of training, you will have mastered the six ACGME core competencies (Patient Care, Medical Knowledge, Practice-Based Learning and Improvement, Interpersonal and Communication Skills, Professionalism and Systems-Based Practice), based on the ACGME/ABR Milestones here at AdventHealth Orlando. My door is always open to you. Congratulations and welcome!

Introduction

It is the responsibility of the faculty, residents and staff of the Department of Radiology to provide high quality patient care and demonstrate professionalism in their daily activities.

The purpose of this Resident manual is to present the Policies and Procedures of the Radiology Department, the curriculum, goals and objectives of the residency program and to describe the various activities and expectations associated with being a resident in our department. The contents are current as of this time this manual is presented to you; however, the faculty of the department retain the right to change schedules, documents, and/or activities with approval of the Program Director, as long as changes do not affect the overall outcome of the residents of this program of study.

In addition to the policies included in this manual, residents need to familiarize themselves with the AdventHealth Orlando Graduate Medical Education Policies and Procedures Manual that apply to their practice of radiology and administration of patient care services. The GME manual will be given to you at the GME orientation and can also be found on New Innovations.

Code of Professional Conduct

As a resident physician at AdventHealth Orlando, you are held the highest standards. The Code of Professional Conduct can be found in the appendices along with the confirmation of receipt of code of conduct form which must be signed and given to the Radiology Residency Coordinator to be placed in your file.

Pillars of Professional Practice

Acquire expert skills & knowledge through scholarly training & lifelong learning
Place patient's interests above one's own
Self-regulate through ethics behavior and self-discipline

Mission Statement

To Extend the Healing Ministry of Christ by preparing competent and compassionate physicians.

Residency Goals and Objectives

The mission of the Residency Program in Diagnostic Radiology at AdventHealth Orlando is the comprehensive education and preparation for service of radiology residents by offering a quality education experience of adequate scope and depth in all associated modalities.

The goal of the program is that by the time of their graduation, all residents should be fully competent to practice as General Diagnostic Radiologists utilizing all imaging modalities. All graduating residents will be fully qualified to complete their certification by the American Board of Radiology (ABR) and will be expected to obtain full privilege credentialing in general diagnostic radiology.

The objectives of the diagnostic radiology residency program are:

1. To provide clinical and didactic experiences that will enable the resident to correlate information obtained through the application of various diagnostic modalities with appropriate pathologic differential diagnoses, leading to accurate patient diagnosis.
2. To provide didactic experiences that will enable the resident to become knowledgeable in the application of physical, technical, and biomedical principles of diagnostic procedures. Laboratory sessions will provide additional technical experience when appropriate.
3. To provide an intellectual environment that encourages residents to actively learn throughout their residency and to establish a pattern of lifetime continuous medical education following completion of the training program.
4. To stimulate interest in radiology research and create an environment conducive to the performance of research projects during the period of residency training.
5. To promote in all residents, the vision of the radiologist, as a medical consultant and clinical/academic educator.



AdventHealth Orlando Diagnostic Radiology Residency Program

Section Chiefs, Faculty, Subspecialty Chiefs and Residents

| <u>Specialty</u> | <u>Department Section Chief</u> | <u>Faculty</u> |
|-----------------------------------|------------------------------------|--------------------------|
| <u>Body Imaging</u> | <u>Nicholas Feranec, MD</u> | |
| Body | | Jack L. Berger, MD |
| Body | | Christopher Brady, MD |
| Body | | Jeremy Burt, MD |
| Body | | Michael Doyle, MD |
| Body | | Miguel Fernandez, MD |
| Body | | Ashkan Ghaneie, MD |
| Body | | Antonio Gonzalez, MD |
| Body | | Manual Hernandez, MD |
| Body | | Ibrahim Koury, MD |
| Body | | Ramaswami Krishnan, MD |
| Body | | Tod Mattis, MD |
| Body | | Rahul Mehta, MD |
| Body | | Pedro L. Rodriguez, MD |
| Body | | Amir Salmanzadeh, MD |
| Body | | Ashit Shah, MD |
| Body | | Marc Siegel, MD |
| Body Imaging Evening/Night | | |
| Body | | Nathan Miller, MD |
| Body | | Donald Nies, MD |
| Body | | Michael Sacerdote, MD |
| Body | | Darren L. Transue, MD |
| <u>ED Imaging</u> | <u>Brett Gutterman, MD</u> | |
| Body | | G. Edward Byers, MD, III |
| Body | | Alan Frost, MD |
| Body | | Lee Yang, MD |
| ED Imaging/Evening/Night | | |
| Body | | B. Nicholas Hatton, MD |
| Body | | Ganapathi Kumar, MD |
| Body | | Roberto Medina, MD |
| Body | | Farhad Omoumi, MD |
| Body | | Ryan Owen, MD |
| Body | | Vivek Patel, MD |
| Body | | Thomas Richbourg, MD |

Musculoskeletal

Musculoskeletal
Musculoskeletal
Musculoskeletal
Musculoskeletal
Musculoskeletal

MSK Imaging/Evening/Night

Musculoskeletal
Musculoskeletal

Musculoskeletal
Musculoskeletal

Christopher Wasyliv, MD.

Joshua Franklin, MD
Kurt Scherer, MD
Chris Wasyliv, MD
Rohan Watson, MD
Sameet Rao, MD

David Brandel, MD
Michael Hakky, MD

Pooja Sheth, MD
Gary LiMarzi, MD

Neuroradiology

Neuroradiology
Neuroradiology
Neuroradiology
Neuroradiology
Neuroradiology
Neuroradiology
Neuroradiology

Neurology Imaging /Evening/Night

Neuroradiology
Neuroradiology
Neuroradiology
Neuroradiology
Neuroradiology
Neuroradiology
Neuroradiology
Neuroradiology

John Murray, MD

Kshitij Dalal, MD
Paul Goldberg, MD
Robert Kittyle, MD
David A. Kos, DO
John Murray, MD
Ajay Wadgaonkar, MD
Bright Wong, MD

Richard Beegle, MD
Dwight Hoarau, MD
James J. Hsiao, DO
Thomas Hughes, MD
Vivek Patel, MD
Amir Paydar, MD
Dejan Samardzic, MD
Dharmesh Tailor, MD

Nuclear Imaging/PET

Nuclear Imaging/PET
Nuclear Imaging/PET

Rola Altoos, MD

Rola Altoos, MD
Phillip Scherer, MD

Pediatrics

Pediatric Radiology
Pediatric Radiology
Pediatric Radiology
Pediatric Radiology
Pediatric Radiology

Jennifer Williams, MD

Aaron Lindsay, MD
Mathew Swerdlow, MD
Laura Varich, MD
Jennifer Williams, MD
Matthew (Cody) O'Dell, MD

Vascular Interventional

Angio-Interventional
Angio-Interventional

Francisco Contreras, MD

Josiah W. Bancroft, MD
Henry Chou, MD
Francisco Contreras, MD
Frank Fernandez, MD
Robert Hewes, MD
Derrick Jones, MD
Paul Karlinsky, MD
Alberto V. Mansilla, MD
J. David Moskovitz, MD
James D. Overmeyer, MD
Donald Perry, MD
Dindi Reddy, MD
Oscar Rosales, MD
Christopher T. Rush, MD
Thomas Seale, MD
Jonathan Simon, MD
Digvijay P. Singh, MD
Kevan Stewart, MD
Jacob Tellier, MD
Thomas James Ward, MD

IR Imaging /Weekend

Angio-Interventional

Grant Webber, MD

Women’s Imaging

Women’s Imaging
Women’s Imaging
Women’s Imaging
Women’s Imaging
Women’s Imaging
Women’s Imaging
Women’s Imaging
Women’s Imaging
Women’s Imaging
Women’s Imaging
Women’s Imaging
Women’s Imaging
Women’s Imaging
Women’s Imaging

Clark Rogers, MD

Amy Campbell, MD
Bruce Crossman, MD
Timothy Farley, MD
Patricia Geraghty, MD
Andrea Hong, MD
Leena Kamat, MD
Laura Landrieu, MD
Lisa Langmo, MD
Sergio Pineiro, MD
Cathryn Powers, MD
Brian E. Reeves, DO
Clark Rogers, MD
Anjuli Shah, MD
Fred Wittenstein, MD

**Diagnostic Radiology Residency Program –
Subspecialty Chiefs**

Program Director
Assistant Program Director

Rola Altoos, MD
Sean Dodson, MD

| | |
|-------------------------|-------------------------|
| Body Imaging | Nick Feranec, MD |
| Cardiovascular | Ashkan Ghaneie, MD |
| Clerkships | Laura Varich, MD |
| Emergency Medicine | Brett Gutterman, MD |
| Medical Students | Laura Varich, MD |
| Musculoskeletal | Christopher Wasyliv, MD |
| Neuroradiology | Richard Beegle, MD |
| Nuclear Medicine | Rola Altoos, MD |
| Pediatric Radiology | Jennifer Williams, MD |
| Physics | Charles Dodge, PhD |
| Research | Thomas Ward, MD |
| Ultrasound | Antonio Gonzalez, MD |
| Vascular Interventional | Francisco Contreras, MD |
| Women's Imaging | Andrea Hong, MD |

Section Meetings

Residents are not required to attend the quarterly section meetings. If a resident desire to attend the quarterly section meeting, they should speak the respective section chief and get permission to attend.



Residents

2015-2019

| | |
|----------------------|--|
| Joseph Limback, MD | Florida State University – Chief Resident 2018-2019 |
| Kimberly Beavers, MD | University of Oklahoma College of Medicine |
| Raul Loya, Jr., MD | Texas Tech University Health Science Center |
| David Warden, IV, MD | The University of Toledo College of Medicine |

2016-2020

| | |
|---------------------|--|
| Franklin Danger, MD | Florida International University |
| Adam Engel, MD | Florida State University College of Medicine |
| Ashley Grindol, MD | Louisiana State University School of Medicine– Chief Resident 2019-2020 |
| Ivey R. Royall, MD | Texas A&M University College of Medicine |

2017-2021

| | |
|---------------------|---|
| Andrew Cibulas, MD | University of Tennessee Memphis College of Medicine – Chief Resident 2020-2021 |
| John Dennison, MD | Medical College of Georgia |
| Alexander Leyva, MD | Johns Hopkins University School of Medicine |
| Barbara Manchec, MD | USF Health Morsani College of Medicine |

2018-2022

| | |
|----------------------|---|
| Chelsea Dennison, MD | Medical College of Georgia |
| Muhammad Noor, MD | Florida International University |
| Justin Philip, MD | University of Texas Medical School at Houston |
| Brooke Willows, MD | University of Arizona College of Medicine - Phoenix |



2019-2023

Eugene Bivins, MD

Howard University College of Medicine

Noel Delgado, MD

Columbia University College of Physicians & Surgeons

Hieu Diep, MD

USF Health Morsani College of Medicine

Kadeem Walker, MD

Florida International University

2020-2024

Jacob Bermudez, MD

University of Minnesota

Herron Gomillion, MD

Morehouse School of Medicine

Lin Lou, MD

University of Nebraska

Connor Woodward, MD

University of Kentucky



AdventHealth Orlando Diagnostic Radiology Residency Program

AdventHealth Orlando Diagnostic Radiology Residency Program is an advanced program accredited by the Accreditation Council of Graduate Medical Education (ACGME). The program provided four years of advanced diagnostic radiology training, which fulfills requirements to prepare residents for certification by the American Board of Radiology (ABR) and complies with various guidelines recommended by the ABR and ACGME.

The principal goal of the diagnostic radiology residency program is to meet or surpass the requirements of the ACGME Radiology Residency Review Committee in training competent, caring radiologists who possess the knowledge, skills and competencies necessary to:

- Pass the board examinations given by the American Board of Radiology (ABR)
- Pursue a fellowship, enter private practice, or begin an academic career
- Practice radiology, according to the standards set by the ABR, American College of Radiology (ACR), and other professional organizations
- Practice lifelong learning
- Serve their patients and community in which they practice as competent professionals

These goals are accomplished by:

- Providing supervised graduated exposure to sufficient and varied case material.
- Delivering an educational program, that consists of clinical teaching and performance, feedback that is supplemented with lectures, conferences, case discussions, textbooks, ACR syllabi, journal clubs/articles, and required readings.
- Providing clinical teaching and clinical experiences that are designed to enable the resident to master the six ACGME core competencies and gain confidence in image interpretation, consultation, performance of technical procedures, and the general competencies expected of a professional practicing in diagnostic radiology.
- Encouraging residents to participate in scholarly activity through medical student teaching; presentations at department and interdisciplinary conferences; regional and national meeting presentations; peer-reviewed publications or presentations of original research; and memberships in professional and scientific societies.

ACGME Program Requirements

AdventHealth Orlando Diagnostic Radiology Residency is fully accredited by the Accreditation Council for Graduate Medical Education (ACGME) and; therefore, is guided by the ACGME Program Requirements for each specialty. It is ultimately the responsibility of the Program Director to assure that we are in compliance with all program requirements. Compliance is monitored by accreditation site visits by the Residency Review Committee (RRC) for Diagnostic Radiology.

Program Requirements are modified over time and our policies change to maintain compliance. Residents are kept informed of new program requirements when changes are made. The ACGME program requirements for radiology may be reviewed at <http://www.acgme.org>; along with the ABR/ACGME Milestones.

Resident Required Readings

The Goals and Objectives (G&O) contain a comprehensive list of reading material (books, journals, and/or modules) that is required as part of the Resident's overall learning. The resident is to complete all reading material by the end of the rotation. If, there is difficulty completing the reading material, please meet with the Rotation Section Chief and/or the Program Director.

ACGME Resident Case Log System

<http://www.acgme.org/Data-Collection-Systems/Resident-Case-Log-System>

The ACGME requires radiology residents to maintain a case log on the ACGME website, which will be reviewed at the biannual evaluations with the Program Director. Numbers of exams in which the resident participated in the interpretation are printed in a monthly report from AdventHealth Orlando and the FRI Breast Imaging Center, based on specific ACGME CPT codes.

Other resident logs, which must be kept up-to-date will be reviewed at the biannual evaluations. Please refer to the Goals and Objectives for other required procedures to be logged.

- Invasive Procedure Logs (as per G&O)
- ACGME Case Log Minimums by graduation*
 - Chest 1900
 - CTA/MRA – 100
 - Mammography – 300
 - CT Abdominal/Pelvic – 600
 - US Abdominal/Pelvic – 350
 - Imaging-Guided Biopsy – 25
 - MRI Lower Extremity Joints – 20
 - MRI Brain – 110
 - PET – 30
 - Body MRI – 20
 - Spine MRI - 60

To keep track of the “procedure experience” received, it is **imperative** that residents maintain a record of all procedures in which they are involved. Log sheets are included in the Goals and Objectives (G&O), and this manual. This includes all mammograms, vascular ultrasound, OB ultrasound, PET scans, nuclear studies, angiographic and interventional procedures (including biopsies and drainages) performed, interpreted, and/or where the resident was primary operator or assistant. A logbook **should** be started on **Day 1** of the residency and should be updated into New Innovations. Reports will be pulled bi-annually, and upon request, by the PACS administrator for the Program Director to review for Semi-Annual Reviews, and as needed. Residents **MUST** keep a copy of this logbook for their own records. The procedures have relevance for specialty board certification, accreditation, future credentialing and licensure.

***Senior Residents** - Case logs need to be uploaded before your last day. Case logs will be reported to the ACGME, and archived, August 1st. No further changes after August 1st.

CPT Codes for procedures Categories (as of June 1, 2017)

Chest X-ray 71010, 71015, 71020, 71021, 71022, 71023, 71030, 71034, 71035

CT Abd/Pel 72192, 72193, 72194, 74150, 74160, 74170, 74176, 74177, 74178

CTA/MRA 71275, 71555, 72191, 72198, 74175, 74185, 70544, 70545, 70546, 70496, 70547, 70548, 70549, 70498, 73725, 73706

Image-guided Bx/Drainage 20604, 20606, 20611, 32555, 32557, 49083, 49405, 49406, 49407

Mammography 77065, 77066, 77067

MRI Body 71550, 71551, 71552, 72195, 72196, 72197, 74181, 74182, 74183

MRI Brain 70551, 70552, 70553

MRI Lower Extremity Joints 73721, 73722, 73723

MRI Spine 72141, 72142, 72146, 72147, 72148, 72149, 72156, 72157, 72158

PET 78491, 78492, 78608, 78609, 78811, 78812, 78813, 78814, 78815, 78816

US Abd/Pel 76700, 76705, 76706, 76770, 76775, 76830, 76856, 76857

POWERSCRIBE Instructions

- Voice Rec is a tool and is not perfect. Do not assume it got every word correctly. Please check your document to ensure ALL words were recognized correctly by PowerScribe before you approve it to the Attending. Your Attendings are focusing on your report with respect to findings and should not have to also edit incorrect voice recognition issues.
- Watch your manual edits. PowerScribe is still "learning" your voice. If you want to get rid of something you have dictated and do not want to replace it with something else, highlight the word(s) and say "Delete that" or "Scratch that". This will delete both text and voice. If you want to change what you have dictated, highlight the word(s) and dictate over them. Following these best practices will only help your recognition in the long run.
- Watch your Report Queues. If you brought a patient into PowerScribe to dictate and have **ANY** text on the screen and you log out of PACS or hit the "Close" button on the bottom of your screen, PowerScribe will think that you are going to come back to this study and it will save it in your "My Open Reports" queue. This locks the study for anyone else to read and delays the results for the patient. Watch your queue (Open Reports & Returned Reports) for any reports in there so you can keep current on them, especially before you leave at the end of the day.
- Remember to use the "Tab" buttons on your microphone to move you through the default fields. Do not click into the report default fields. You could inadvertently create a situation where chunks of your report get deleted on your approval. See the attached document for the details on this situation.

Each user will have different things that voice recognition may have trouble with such as words, numbers, etc. As you dictate more and carefully review your reports for voice recognition accuracy you will start seeing patterns that you can voice train or just remember what created the issue (letting off the dictate button to soon, etc.) to avoid in the future.

We are here to support you with the PowerScribe application. Do not hesitate to give us a call when you need us to go over something with you or just sit with you and observe to see if we can give you more pointers. Also, watch your Attendings use the system; you can pick up some great tips from them with regards to efficiency, etc.

Teresa Hutson: ext. 110-4125

Lori Cadiente: ext. 303-1732 or cell 321-662-5612

ACGME Competencies

The ACGME has implemented six core competencies to the program requirements for all accredited residencies in every specialty.

Patient Care: 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. Maintenance of BLS and ACLS is part of this competency.

Medical Knowledge: 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 healthcare system.

Practice-Based Learning and Improvement: Involves investigation and evaluation of one's own patient care, appraisal and assimilation of scientific evidence and improvements in patient care. In addition, residents must participate in evaluation of their personal practice utilizing scientific evidence, "best practices" and self-assessment programs in order to optimize patient care through lifelong learning.

Interpersonal and Communication Skills: Residents must master effective communication 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. This communication must result in effective information exchange and teaming with patients, their families and other health care professionals.

Professionalism: As manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. Moreover, residents must 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. (Completion of computer-based modules in ethics, medical-legal issues and HIPAA training are part of this competency).

Systems-Based Practice: As manifested by actions that demonstrate an awareness of, and responsiveness to, the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value. Residents should 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 resource.

Independent Learning

Independent study by residents is guided and accomplished by several means. The residency program provides access to STATdx, an extensive hospital library, residency library, and online journal access through the UCF library.

Residents who submit research proposals may request departmental support in the form of dedicated time for research. Editorial and media services are available in the department and financial support is provided through AdventHealth Orlando and hospital foundations.

Institutional Review Board IRB Certification

Compliance Requirements

Please submit the following documents to the Research Coordinator by the end of the 3rd month of R1 year of training:

- 1) Current CV**
- 2) Certification of completion of Citiprogram.org modules on:**
 - Biomedical Research
 - HIPS
 - Good Clinical Practice
 - Conflict of Interest
- 3) Investigator's Forum**
- 4) Registering for IHI Open School Courses**
 - Go to <https://www.ihl.org/layouts/ihl/userregistration/userregistration.aspx>
 - Fill out the registration form
 - Once you reach "Your Organization" choose Orlando, FL, US, AdventHealth Orlando
 - If you are prompted to select an organization, select AdventHealth Orlando
 - Complete the remainder of the form and save.
- 5) Verification of Research HIPAA Privacy Rule.**
 - go to <https://intranet.floridahospital.org>
 - click on "Departments & Campuses"
 - click on "Institutional Review Board"
 - click on "Resources and Useful Links"
 - read through "HIPAA Privacy Rule and Its Impact on Research" (PDF)
 - print, sign and date "Verification of HIPAA Privacy Rule Information"

Research or Publishable Projects

- 1) All new research projects (not including QI/QA or educational projects) involving human subjects must be submitted to the IRB for “IRB reviews prep” prior to performing any research. This can be done by submitting an email to Carol Coyne, and by indicating that you need a “IRB reviews prep.” Include the title of the project, principal investigator, co-authors, and type of project (case report, retrospective review, prospective trial, etc.) in the email. The “IRB reviews prep” typically takes one or two days to complete and receive acceptance.
- 2) After receiving an acceptance email from the IRB for your “reviews prep,” you may initiate the research project. The IRB reviews prep authorizes you to perform a Montage search, look up patient information, and determine if the project is feasible.
- 3) If the project is feasible (for example, enough patients in the database to answer the hypothesis), then you need to prepare and submit a “standard IRB application.” Templates are provided by the radiology research department. Notify Carole Coyne when you are ready to complete this paperwork. The “standard IRB application” typically takes one to a few weeks to complete, as well as a few weeks for the IRB to review.
- 4) After review from the IRB, you will receive notification of either revisions needed or acceptance. Only after receiving acceptance of the “standard IRB application” by the IRB can you initiate research: contacting patients, consent, data extraction, stats, etc.
- 5) Once research is complete and you are ready to submit the manuscript for review by a journal, the paper, figures, references, etc. needs to be submitted to Carole Coyne. This will all then be submitted to the Office of Sponsored Research (OSP), which will ensure that all of the AdventHealth Orlando research guidelines are followed, including HIPAA. This should take about 1-3 weeks to receive a response indicating that your work is ready for journal submission. Do not submit the article to a journal until after receiving acceptance by the OSP.

NOTE 1: “Reviews prep” also gives you full clearance to research and prepare a case report. You don’t need to complete the “standard IRB application” for a case report. When you are ready to submit the case report to a journal for review, send your work to Carole Coyne first. Carole Coyne will then submit to the OSP for final review. Do not submit the case report to the journal until after receiving acceptance by the OSP.

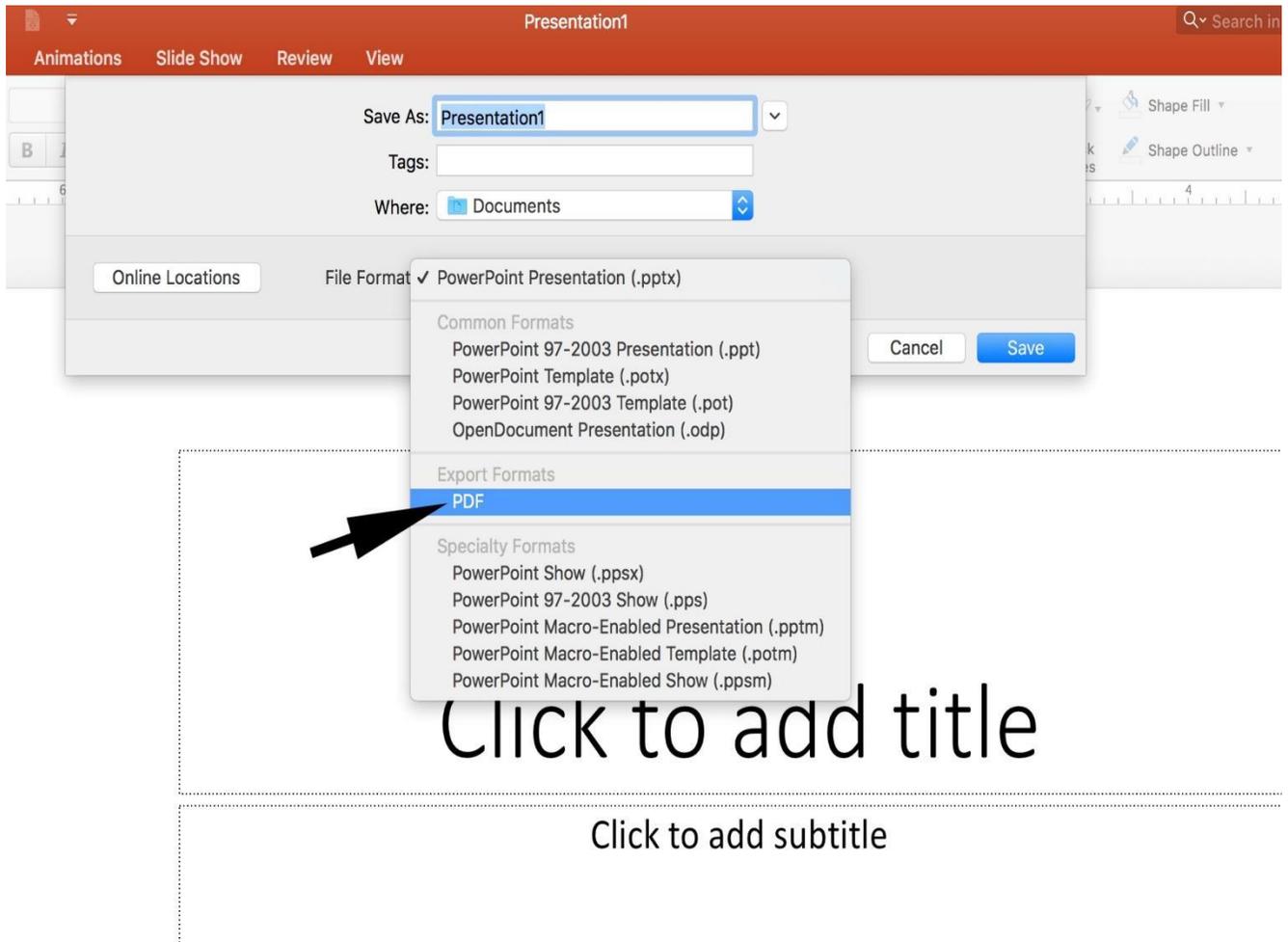
NOTE 2: A similar policy applies to submission of research to society meetings. For example, if you have a case report that you would like to submit to the next ARRS meeting, you will need to get the “IRB reviews prep” clearance prior to submitting the abstract or gathering any patient information. If your abstract is accepted by ARRS for poster or oral presentation, you will gather all of the information and images and create a poster/PowerPoint. Then you can submit the finalized poster/PowerPoint to Carole Coyne to then provide to the OSP, in order to receive OSP approval prior to taking the poster/PowerPoint to ARRS.

NOTE 3: Any changes to a research protocol and/or investigator must be submitted to and approved by IRB.

NOTE 4: You may not use your personal emails or computers for research purposes. AdventHealth Orlando requires that you use only your AdventHealth Orlando email, an encrypted USB purchased by AdventHealth Orlando that is password protected, or an encrypted AdventHealth Orlando computer for your research purposes.

NOTE 5: If your poster has received recognition at a conference, please convert poster to PDF. Conversion process is simple and should only take a couple of seconds. Please see graphic below.

File -> Save as -> Change format to PDF



Basic Requirements for Research Projects

- 1) IRB/FDA Requirements:
CITI Program certificates, Investigator's Forum, IHI registration, HIPAA Verification Form, CV, License
- 2) Protocol
- 3) IRB Applications (contact Research Coordinator to decide which forms are needed pertaining to your project).
 - All documents should be typed and submitted to Research Coordinator electronically.
 - Contact Info: (407) 303-7369 - *Josephine Gaabucayan* (GME Research & QI Liaison)
 - Contact Info: (407) 303-7510 - *Carole Coyne* (Radiology Research)
 - Contact Info: (407) 303-5600 ext 110-7730 - *Kairsten Turner* (Research Coordinator)

Research Rotation

Residents will have research rotations during their 2nd through 4th years. A research project and faculty mentor must be chosen at least two weeks prior to the assigned research rotation and submitted to the Associate Program Director at the following link:

<https://forms.office.com/Pages/ResponsePage.aspx?id=eGbDaoV3b0e-A7aLQDc0wh5scFhKH5tJkrKO8vQsqQdURFpLNvFGUkM4TEhMQUkwODQxRkhGTVZLRC4u>

. Immediately upon choosing a research project, **you must contact** the Residency Research Coordinator, *Carole Coyne*, to complete all of the required paperwork before you do any research of patient information.

Two weeks prior to starting the research rotation, the resident MUST submit to the Associate Program Director, an abstract and/or detailed written plan of the project design and how the weeks of research rotation will be used. Residents who do not meet the required deadlines stated above will be reassigned to a different Radiology rotation at the discretion of the Program Director. Residents projects may lead to an exhibit, a presentation at a Regional or National meeting and publication of their research efforts as a peer-reviewed journal article. Resident research projects may also be presented at the Department's Intradepartmental Noon Conferences. Residents are also encouraged to pursue additional research projects during their training as time and experience permits.

Goals:

1. To be familiar with IRB protocol for clinical research/chart review
2. To understand the means to obtain references
3. To be familiar with the accepted format of case reports and radiology research papers
4. To produce at least one paper worthy of publication in a peer reviewed journal at the end of the rotation

Objectives:

1. Complete IRB training within the AdventHealth Orlando system.
2. Choose a topic of interest with the intent to publish
3. Work under the guidance and mentoring of a staff radiologist during the entire rotation
4. Obtain relevant references
5. Maintain the confidentiality of patient information at all times during the research process
6. Formulate the research paper, with guidance from staff for structure, clarity and any necessary revisions

Additional Information:

1. Complete Research Week Form online and submit to Associate Program Director prior to finalizing your Research Days Request.

Training/Graduation Requirements

This program adheres to the training requirements set forth by the American Board of Radiology. These requirements can be reviewed at www.theabr.org.

Program Directors, Assistant Program Director, along with the Graduate Medical Education Committee, has the responsibility to evaluate candidates for admission to the training program, to evaluate trainees in the program, to promote those who are progressing satisfactorily and, ultimately, to make recommendations that trainees have met the criteria established by the faculty for completion of our training programs.

Graduation certificates are awarded to residents who successfully complete all of the program requirements, have shown satisfactory progress toward the competent, independent practice of Diagnostic Radiology, and demonstrate professional and personal attributes dedicated to the life-long learning process associated with the practice of medicine. Program requirements are:

- Application for and successful completion of the requirements to sit for the American Board of Radiology (ABR) examination
- Successful completion of all scheduled rotations
- Successful passage of mini-board examinations during R1 year
- All R1-3 Radiology Residents must take the American College of Radiology (ACR) in-training examination

ABR Examinations

Residents will take the American Board of Radiology Core Examination June of the R3 year and the Certifying Examination 15 months after completion of the residency program. Each individual resident is responsible to obtain the corresponding information, registration deadlines and examination fees from the American Board of Radiology website (www.theabr.org). **You must visit this site your first year.**

Registration is accepted by the ABR (7.1- 9.30). Late registrations are subject to a \$400 late registration fee (10.1 - 10.31). The current annual fee is \$640. The fee is not refundable and will not be higher if you do not register by R1 year. Annual fees will be charged every year you are in the initial registrant process. The ABR sends invitations every year, and you are responsible for responding to them.

ABR Training Requirements

The ABR requires all graduating residents to successfully complete their training:

A minimum of four months must be spent in nuclear medicine.

- A minimum of three months must be spent in mammography/breast imaging.
- No more than 16 months may be spent in any one subspecialty or in research.
- Leave of absence from residency cannot exceed 120 days in the four years of residency training; additional time out of residency must be remedied by additional training.
- All **I-131** forms must be submitted for those who wish to achieve the status of Authorized User (AU).

The ABR will send out a final verification form for your graduating residents in June. This form will attest that he/she has successfully completed training and met the above requirements. The form must be completed and signed for all residents who have finished training. Candidates will not be eligible to sit for the Certifying Exam and achieve certification without it.

To be eligible to take the Certifying Exam, candidates must meet the following minimum requirements:

- Have an active application with the ABR and be designated “board eligible.”
- Successfully complete their Diagnostic Radiology (DR) residency, as well as their clinical year of training (internship) or DR IMG plan according to their SDA.
- Pass the Core Examination in their current board eligibility period.
- Meet the minimum waiting period after training.
 - For the standard DR certification pathway, this requires a 15-month waiting period after residency before taking the exam.*
 - For IMGs or those with ABNM certification, there is no waiting period after training is successfully completed.*
- Be current with all of their ABR fees.
- Provide proof of a valid medical license.

*If a resident DID NOT take the Core Exam at his or her first opportunity and was not granted a waiver by the ABR for the requirement to examine at the first opportunity, his or her first eligibility will be for the first Certifying Exam administered at least 27 months after the date the resident first took the Core Exam.

If you have any questions regarding your graduating residents and/or the Certifying Exam, please contact us at icnotification@theabr.org.

In-Service Examinations (DXIT)

- All residents are required to take the yearly written DXIT examination during their 1st, 2nd, and 3rd years of residency training. All residents taking the DXIT Exam will be excused from service the remainder of the day.
-

Residency Financial Requirements

- Florida State License
- ABR Invitations are mailed in May/June. Applications are accepted from R2 and R3 residents July 1st to Sept 30th. You must sign up for this ONE YEAR in advance. However, the ABR encourages all residents to sign up as R1 to break up the fees
- The Core examination is given 36 months after the beginning of residency, usually during the first week in June. The exam takes 2 days and covers 18 categories.
- The Certifying Exam is given 15 months after graduation, and is comprised of Non-Interpretive Skills and Essentials of Radiology Sections.
- Once you have taken the Core Exam you must complete the “Online Modules on Ethics and Professionalism”. Click on this link to complete: <http://www.acr.org/Education/e-Learning/Online-Modules-on-Ethics-and-Professionalism>. Once all modules are completed please provide the residency coordinator a copy of your transcript.

Resident Benefits

Resident Benefits are provided, as per resident contracts, the following benefits: *Reference AdventHealth Orlando GME Manual 2017-2018*

- Photo ID/Security Access
- Radiation Badge (Dosimeter) – Radiology Residency Program Coordinator will distribute
- Stipend/Salary (yearly bonuses in February based and yearly PGY level raises in July)
- Health Coverage and Medical Reimbursement
- Professional Liability Coverage
- License and Certification
 - ACLS, BLS (as applicable to training program)
 - Medical License (renewal fees will be reimbursed proportionally based on the time remaining in Residency)
 - DEA (renewal fees will be reimbursed proportionally based on the time remaining in Residency)
- Membership Dues (ABR Qualifying Fee, ACR DXIT Exam Fee)
- Continuing Medical Education Reimbursement (**\$800** – PGY-2 / **\$1500** – PGY-3 to PGY-5)
- Moving Expenses (**\$1500** – PGY2)
- Paid Time Off (20 days/year - used for vacation, holidays, sick days, etc.) (*see PDO policy*)
- Meals & Parking
- Uniform Jackets
- Call Rooms
- Leave of Absence
 - Family and Medical Leave
 - Extended Sick leave
 - Maternity Leave
 - Paternity leave
 - Adoption Leave
 - Funeral Leave
- Expense Reporting
- Counseling Reporting
- Phone Stipend

Resident Time Off Requests

Residents should request time off at least 7 days in advance of their requested days off. To request time off, the resident should email the Chief Resident their request. The email subject line **MUST** read :

TIME OFF REQUEST - (TYPE: PDO/Conf/QI/Etc) - (Resident Name) - (Dates off).

For instance:

TIME OFF REQUEST - PDO - JOSEPH LIMBACK - 4/1/19-6/30/19.

If you are planning to work any additional shifts during weekends and take a day off during the week, this needs to be spelled out side-by-side in the body of your email. For instance:

OFF 4/1/19 - WORKING 4/6/19 (Body).

Any weekend days worked for taking days off during the week **MUST** be on the same rotation that the weekday missed was on. Also, please remember that while residents can work a weekend day while taking a weekday off, they cannot work a weekend day to bank for the future.

There are a few rotations that require special attention/procedures when requesting time off:

During Fluoro:

Please limit time off requests on this rotation. These should be limited to unavoidable things, emergencies, etc.

IF the resident needs to take time off, they will have to find coverage for the days off **BEFORE** it will be approved.

During Call/Overnight shifts:

DO NOT submit PDO request for times while on call/overnight shifts. The resident needs to work 15 of 21 days during these 3 weeks per year. So, there is room to adjust their schedule to allow for days off when needed. If it's an extreme situation that doesn't allow the resident to work the 15 days, they must contact the Chief Resident, who will workout when they can make up the call/overnight shifts.

Finally, the resident must ensure that they limit time off on NM and Mammo rotations. For Mammo, residents must read 240 mammograms **IN THEIR LAST TWO YEARS OF RESIDENCY**. Residents will not typically have a Mammo rotation in 4th year, either. For Nuclear Medicine, there is a set number of hours required on service per the ABR. If excess time off is taken during this rotation, the resident will have to coordinate elective time during the PGY5 year to makeup the missed time.

Time off Policy for End of Residency

Residents shall not be able to "bank" additional workdays for use at the end of residency. Residents are also encouraged to limit the use of PDO at the end of residency, to facilitate their presence at their final evaluation with the Program Director, while allowing appropriate time for administration to collect and compile data and input for a comprehensive evaluation. Residents should be available until at least June 15th for the completion of their final evaluation. Every effort will be made to hold all senior resident final evaluations in early June.

Annual Radiology Conferences

AUR

ARRS

ACR

FRS

SBI/ACR

SIR

SPR

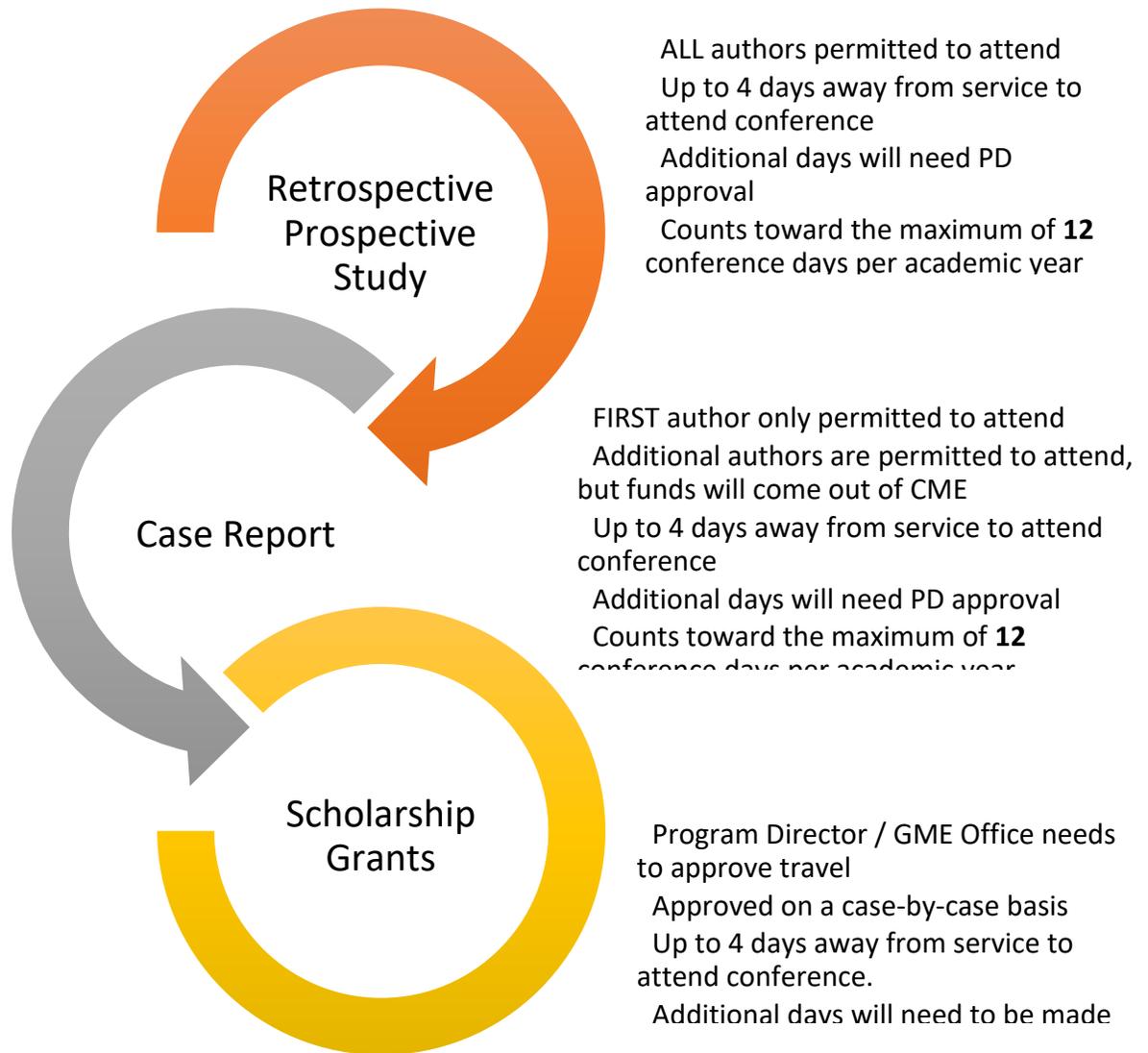
RSNA

Travel Policy for Accepted Scientific Work

Residency Travel **must be pre-approved** by the Program Director or Assistant Program Director, and the GME Office, **before** registering or making any travel arrangements. Travel requests must be submitted to the GME Office 60 days in advance of the planned travel. Residents must ensure compliance with AdventHealth Orlando Travel Policies, ACGME Duty Hour Compliance, and ABR Eligibility Requirements.

Radiology Residency Policy:

The Department of Radiology will provide each resident, during the course of the academic year (July 1 - June 30) payment for conferences, if the resident meets the following criteria:



1. **Retrospective or Prospective Study:** All authors will be reimbursed for meeting travel within the continental USA, utilizing institutional Per Diem guidelines.
2. **Case Reports:** First authors only for Case reports & posters will be reimbursed for meeting travel within the continental USA, utilizing institutional PerDiem guidelines. Other authors are permitted to attend, but must use their CME account to fund the travel.

3. **Scholarship/Grant:** Program Director will approve on a case-by-case basis.
4. **Maximum Days Allowed: 12 days** per academic year is permitted for Scientific Work travel. Any additional days, will need Program Director approval before making any arrangements.
 - When attending at a conference, you are permitted 4 days (including travel) away from service. Any additional days need to be approved by the PD, and made up.
 - If you go to conference, with no poster, your expenses come of your allotted CME amount, without going over.
 - Presentation funds come from multiple sources. Program Director and Program Coordinator will manage where amounts are pulled from.
 - CME - \$800 (PGY2) \$1500 (PGY 3-5) /year
 - GME Presentation Fund - up to \$2500/year
 - Residency Travel Fund - case-by-case basis. Dr. Shill or Dr. Joe Bancroft need to approve before making any travel arrangements.
5. **Paperwork to Submit Ahead of Time:** GME Travel Request Form, which needs to be accompanied by a detailed agenda, hotel receipt, and airline receipts. All dates must match scheduled travel.
6. **Travel Expenses:** (*flight, hotel, registration, etc.*) will be submitted at the **conclusion** of the conference. Per diem for all food, is calculated per zone. Do not turn in food receipts. Save all receipts and turn in at one time to the Program Coordinator. All receipts must be turned in within **30 days** of conference conclusion. This is different from the AdventHealth Orlando policy below, which allows time for the GME to process the expenses. (see **SOP #: 902.614**)

ACGME Duty Hour Compliance:

Documenting Conferences & Travel time

| | |
|---|--|
| <p>If some of a program's residents/fellows attend a conference that requires travel, how should the hours be counted for duty hour compliance?</p> <p>[Common Program Requirement: VI.G.1.; One-Year Common Program Requirement: VI.G.1.]</p> | <p>If attendance at the conference is required by the program, or if the resident/fellow is a representative for the program (e.g., he/she is presenting a paper or poster), the hours should be recorded just as they would be for an on-site conference hosted by the program or its Sponsoring Institution. This means that the hours during which the resident/fellow is actively attending the conference should be recorded as duty hours. Travel time and non-conference hours while away do not meet the definition of "duty hours" in the ACGME requirements.</p> |
|---|--|

Total leave and vacation time (PDO) may not exceed six calendar weeks per year (120 days averaged over 4 years). If more time is granted, the required period of training may be extended accordingly.



Department Standard Operating Procedure

GME Business Expense & Travel Reimbursement

Lead: Chief Academic Officer/Director of Graduate Medical Education

Effective Date: 7/1/2017

Scope:

This document serves as the standard operating procedure for all AdventHealth Orlando Graduate Medical Education Program Directors, Faculty and Residents.

Purpose:

The purpose of this SOP is to ensure accurate documentation and timely submission of program business and travel expense reports by Graduate Medical Education Program Directors, Faculty and Residents.

Procedure:

Approvals

1. Education Allowance: Expenses submitted to be paid through a resident's education allowance or faculty's CME allowance (referred to collectively as education allowance) will be reimbursed only for expenses that have been approved by the Program Director and supported by GME Director and/or Chief Academic Officer.

a. Each program is responsible for creating a policy/procedure outlining appropriate use of education allowance funds. The program policy must follow guidelines set in GME Reimbursable Expenses policy.

b. Residents and faculty should not incur expenses to be reimbursed through use of education allowance unless the items are explicitly defined as acceptable in their program manual, or they have received approval from their Program Director via email or other formal correspondence, prior to incurring the expense.

c. When education allowance being used, it is the purchaser's responsibility to track and know the availability of funds. Program Coordinator must keep record of submitted/reimbursed expenses for cross reference and program tracking of funds.

d. All requests for CME related travel must be submitted to Program Director, in advance of intended travel, for approval to be reimbursed using educational allowance.

i. The Program Director will review each request and discuss the educational rationale for travel with requestor as necessary.

e. All expenses submitted to be reimbursed through educational allowance must include proof of Program Director approval.

2. Program Business & Education Expenses: Expenses eligible to be paid for or reimbursed by program- will be reimbursed only for expenses that are supported by the Program Director and approved by the GME Director and/or Chief Academic Officer.

- a. Each program is responsible for creating a policy/procedure outlining program required exams, certifications, and conferences, as well as timelines for completion/attendance. The program policy must follow guidelines set in GME Reimbursable Expenses policy.
- b. All requests for program business travel must be submitted to Program Director at least 60 days in advance of intended travel, using GME travel request form, and include a Department Standard Operating Procedure estimate of all travel related costs.
 - i. The program Director will review each request and discuss the business and/or educational need for travel with requestor as necessary.
 - ii. If in support of travel, the Program Director will send signed approval form to the GME office, within seven (7) days of initial receipt, for final approval.
 - iii. Final approval will be granted at the discretion of the GME Director, and/or Chief Academic Officer, and the request form will be returned to the program. Residents, and faculty should not incur any travel expenses until they receive approval from the GME office.
 - iv. All travel related expense reports submitted for reimbursement must include a copy of the approved travel request form.
 - v. If an employee has paid for an item and approval was not granted prior to incurring the expense, they will not be reimbursed

Submission and Deadlines

1. All expense reports and receipts must be submitted to Program Coordinator no later than 30 days from date that charge is paid.
 - a. In cases where travel is required, submission of expenses must occur no later than 30 days from date of payment, regardless of travel/conference date.
2. Program Coordinators will collect expense reports, review documents for completeness and accuracy, and submit to GME Director for signature and submission to payroll, within 45 days of payment date.
3. Expense reports received by the Payroll Department after 60 days will require Senior VP approval, and must be submitted with a letter detailing why the submission deadline was not met. Reimbursement cannot be guaranteed for late submissions.
 - a. Expense report submission to Coordinators after the 30 day deadline may delay processing and submission to Payroll, resulting in missing the 60 day Payroll submission deadline

Expense Reporting and Documentation

1. Program Directors, Residents, and Faculty will use the approved AdventHealth Orlando expense reporting form when submitting business-related expenses for reimbursement.
2. Expenses submitted for reimbursement must include original, itemized receipts, clearly showing proof of payment.

3. Meal expenses must include an original itemized receipt for reimbursement, and are eligible for reimbursement of an amount less than or equal to the federal per diem rate. No expenses for alcohol will be reimbursed.
4. Expense reports without proper payment documentation will not be accepted, and may delay reimbursement.
5. Further information regarding the specific reimbursable and non-reimbursable expenses and documentation required for each type of expenditure can be found in the relevant AdventHealth Orlando and GME policies.

Payment

1. Allow 4-6 weeks, after submission to payroll, for payment.
2. Employees will receive payment on their regular AdventHealth Orlando paycheck/direct deposit. Note that reimbursements will be taxed per applicable Florida and federal laws.
3. Residents, Faculty, and Staff are responsible for tracking their own expenses and reimbursements, including review of AdventHealth Orlando employee earnings statement for payment.



GME Travel Request Form

Requestor Name:
 Requestor Program:
 Travel Location & Dates:

Estimated Expenses: Please note all estimated expenses per day in the table below and attach available quotes to form - i.e. airfare, hotel, mileage.

| Date | <input type="text"/> |
|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Reg/Fees | | | | | | | |
| Airfare (Max \$450) | | | | | | | |
| Baggage (Max \$50) | | | | | | | |
| Mileage/tolls | | | | | | | |
| Meals | | | | | | | |
| Hotel (Conf. Rate) | | | | | | | |
| Other | | | | | | | |
| TOTAL | | | | | | | |

***An approved copy of form must be submitted with related expense reports for reimbursement**

Title of Conference or Event & Name of Sponsoring Organization (Please attach conf. flyer, including session/presentation schedule.)

Educational/Business Rationale - Briefly describe educational/business rationale for travel:

Will you be presenting research? YES, I will be presenting research.
 NO, I will not be presenting research.

By signing below, I confirm that, as Program Director, I am in support of the above stated estimated expenses, educational/business rationale, location and dates for faculty/resident travel.

Program Director Signature: _____ Date: _____

Approved by GME Request Not Approved

GME Approver Signature: _____ Date: _____

- Joseph Portoghese, MD, Chief Academic Officer & DIO
- Ava Fulbright, Director, Graduate Medical Education

Related Policies

ADVENTHEALTH ORLANDO GME Policy #1022: GME Reimbursable Expenses Policy

ADVENTHEALTH ORLANDO SOP #902.613: Employee Reimbursements

ADVENTHEALTH ORLANDO SOP #902.614: Travel and Business-Related Expenses (Overnight Business Travel)

ADVENTHEALTH ORLANDO SOP #902.615: Travel and Business-Related Expenses (Non Overnight Travel)

Key Terms

Business Expense

Travel

CME

Expense Reports

Reimbursement

Revision History

GME Travel Request Form

GME REIMBURSABLE EXPENSES POLICY

Policy # 1022 Issue date: 7/1/2016

Developed by: ADVENTHEALTH ORLANDO GME

Revision dates: 6/30/2017

Approved by: Joseph Portoghese, MD, CAO/DIO

I. PURPOSE:

The purpose of this Policy is to define the Graduate Medical Education allowed reimbursable expenses for residents, and to ensure appropriate approvals, accurate documentation and timely submission of business expense reports.

II. POLICY:

The AdventHealth Orlando GME department and AdventHealth Orlando GME Programs will reimburse Residents for reasonable relocation, business travel and educational expenses in accordance with GME Department, individual program and AdventHealth Orlando policies, the most current employment agreements, and at the discretion of the Program Director, GME Director and Chief Academic Officer/Designated Institutional Official. AdventHealth Orlando and AdventHealth Orlando vGME comply with all applicable federal and state taxation laws.

Program specific benefits must be clearly defined in each Program's resident policy manual, including disbursement schedule of education allowance (formerly CME allowance), outline of program appropriate use of education allowance funds, and program required exams, certifications, and conferences.

Program specific benefits must fall within the GME reimbursement criteria described in this policy. The GME Director and/or CAO/DIO will provide final oversight and approval regarding appropriate reimbursements.

Resident Medical License & DEA

1. The Residency Program will pay for a resident's Florida Training Registration (TRN) application fee and initial fingerprinting fee.

2. The Residency Program will reimburse a resident for the following related to unrestricted licenses and DEA:

a. Unrestricted Florida medical license (ME/OS/PO) - reimbursement of unrestricted license fees, initial and renewals, will be prorated based on life of license and time remaining in program from the date in which the license is issued.

i. Prorated amounts will be calculated as:

$$\begin{aligned} &\text{License Application Fee} / \text{Life of License (in months)} = \text{Monthly Cost} \\ &\text{Monthly Cost} \times \text{Time Remaining in Program (in months)} = \text{Reimbursable amount} \\ &\text{i.e. } \$705/24 \text{ mos.} = \$29.38 \text{ per month} \\ &\$29.38 * 12 \text{ mos.} = \$352.56 \text{ reimbursed.} \end{aligned}$$

Program will only reimburse direct license fees; Program will not reimburse for associated fees, including background checks, fingerprinting, notary fees, transcripts, etc.

Additional license costs and fees, not covered by program, are eligible for reimbursement through a resident's education allowance at Program Director discretion.

b. Drug Enforcement Agency (DEA) Certificate – Reimbursement of unrestricted DEA fees, initial and renewals for residents, will be prorated based on the life of the certificate and time remaining in program from date in which certificate is issued.

i. Prorated Amounts will be calculated as:

$$\begin{aligned} &\text{DEA Application Fee} / \text{Life of Certificate (in months)} = \text{Monthly Cost} \\ &\text{Monthly Cost} \times \text{Time Remaining in Program (in months)} = \text{Reimbursable amount} \\ &\text{i.e. } \$731/36 \text{ mos.} = \$20.31 \text{ per month} \\ &\$20.31 * 12 \text{ mos.} = \$243.72 \text{ reimbursed.} \end{aligned}$$

ii. Fellow DEA Certificate fees will be reimbursed in full, by program

iii. Program will only reimburse direct DEA Certificate fees; Program will not reimburse for associated fees, including background checks, fingerprinting, notary fees, transcripts, etc.

iv. Additional certificate costs and fees, not covered by program, are eligible for reimbursement through a resident's education allowance at Program Director discretion.

Program Required Educational Expenses

1. The Residency Program will reimburse the resident for the following related to required resident educational expenses:

a. A maximum of two (2) professional memberships or certifications as required by Program and defined in Program Manual.

b. Exams and courses, including course materials, as required by Program and defined in program manual.

i. USMLE Step 3 or Complex Part 3 exam must be scheduled and paid for before completion of a resident's first year in program to be eligible for reimbursement.

1. USMLE/Comlex 3 registration and payment are eligible for reimbursement as of effective date of signed resident agreement.
 - ii. Program specific examinations, courses and certifications must be completed within the program's specified time period to be eligible for reimbursement.
 - iii. Only the first attempt for all examinations will be eligible for reimbursement. Subsequent attempts will not be reimbursed.
2. The following will not be reimbursed in relation to educational expenses:
 - a. Late fees
 - b. Deadline extensions

Education Allowance

1. AdventHealth Orlando GME programs provide an education allowance to each resident, distributed in an amount based on a PGY schedule set by program. The education allowance is intended as a benefit that assists in offsetting significant educational costs that individual residents incur. This benefit is paid out in the form of reimbursement for expenses incurred...
2. The Residency Program will reimburse the resident for the following related to the use of education allowance at the discretion of the Program Director.
 - a. Books, Subscriptions & Learning software
 - b. Mobile computing devices and other electronics to be used for learning
 - i. Multiple cell phones, laptop computers, or tablets will not be approved in the same 24-month period.
 - c. Attendance at local, regional, and/or national conferences or board review courses pertinent to their specialty, and associated travel as defined below.
 - d. Non-required educational memberships and certifications.
3. The education allowance is issued based on the duration of appointment defined the resident agreement. Unused education allowance does not roll over into the next appointment term. The education allowance for a specified appointment term must be used by the last day of that term, or it will be lost.

Business & CME Travel Expenses

1. Program Business Travel
 - a. Is defined as program paid travel, completed in order to meet required program and/or business needs, such as travel related to presenting research on behalf of the program and travel for program required conferences, examinations and certifications.
 - b. All program business travel must be supported by the Program Director, and approved by the GME Director and/or Chief Academic Officer prior to incurring any expenses, as outlined in the GME Reimbursable Expenses Standard Operating Procedure. Travel expenses submitted without proof of prior GME approval will not be reimbursed.
2. Continuing Medical Education (CME) Travel

- a. CME travel is defined as resident travel in relation to non-required conferences, examinations and certifications intended to enhance a resident's medical education.
 - b. CME travel is reimbursed through a resident's program designated education allowance.
 - c. All CME travel must be approved by the Program Director prior to incurring any expenses, as outlined in the GME Reimbursable Expenses Standard Operating Procedure. Travel expenses submitted without proof of prior Program Director approval will not be reimbursed.
3. The following are GME approved reimbursable expenses in relation to program business and CME travel:
- a. Hotel accommodations at no more than the posted standard conference rate
 - b. Air and ground transportation
 - i. Air fare (round trip)
 - ii. Limited to \$450.00 round trip for program business travel
 - iii. Bag check fees of up to \$25 each way
 - iv. Parking (self-park only), tolls, and rideshare/taxi fares
 - v. Tolls and fares limited to a single round-trip per day, to and from CME/business location.
 - vi. Mileage at the AHS standard mileage rate, round-trip from primary AdventHealth Orlando site to CME/business site.
 - c. Registrations and fees
 - d. Federal Per Diem
4. The following will not be reimbursed in relation to CME/program business travel:
- a. Fines (i.e. traffic violations & costs associated)
 - b. Airline or hotel upgrades and perks
 - c. Rental Cars, limousine service, Valet parking
 - d. Travel Insurance, Security deposits of any type
 - e. Gifts
 - f. Alcoholic beverages and smoking materials
 - g. Overnight lodging within 50 miles of AdventHealth Orlando for program business travel
 - h. Reservation cancellation/change fees (unless through no fault of employee)
 - i. Group outings or entertainment dinners that are not covered by per diem
 - j. Other non-business-related expenses
5. Resident Travel for Research: Program Directors will be expected to determine what resident research should be presented at state, regional, or national meetings. Special consideration should be given to any research accepted for podium presentation.
- a. In the case where several residents have prepared poster case reports, the program should determine which posters should be presented, up to a total of six (6) per program, per year.
 - b. In the case where several residents worked on a project, the resident who led the team should have priority on attending the meeting to present.
 - c. No faculty or resident should travel to the same conference to present the same research project.

- d. Research posters must be submitted to the GME Research Liaison for printing. Posters not printed through GME Research will not be reimbursed.
- 6. Resident travel on program recruitment trips will not be approved, unless they have been determined, by the DIO, to be the program’s primary source of resident recruitment.
- 7. No international travel will be reimbursed for any reason.

Relocation Expenses

- 1. Relocation expenses up to \$1500 will be reimbursed by the program upon initial entry into Residency Program.
 - a. Relocation expenses include travel for employee, spouse, children, and transport of personal belongings.
 - b. Expenses must be incurred no more than 3 months before and one month after training start date.
 - c. Relocation from within a 25-mile radius of AdventHealth Orlando will not be reimbursed.
 - d. Reimbursement does not include purchase of new household items or rental deposits.
 - e. Moving expenses are not available during years of any subsequent reappointments.

Definitions

Resident – The term resident refers to all AdventHealth Orlando trainees including those in residency and fellowship programs.

CME, Conference Reimbursement, Allowance, Expenses

CME EXPENSES (RECOMMENDATIONS) PER PGY LEVEL

| CME Expenses (Resident CME Funds) | Conferences Residents Attended in the Past ** |
|--|--|
| Amazon Books | NASCI Conference |
| Medical License Finger Prints | RSMA Conference (Hotel, flight, per diem, uber) |
| AAWR Membership | AMA Conference (Mileage, parking, per diem) |
| ACR Leadership Course | ACR Conference (Flight, per diem) |
| Face the Core Study Guide | FRS Conference (Hotel, per diem, mileage) |
| AIRP (Foos, Taxis, Parking) | ASSR Conference (Hotel, flight, registration, per diem, parking) |
| ACER | SAR Conference (Hotel, mileage, per diem, registration) |
| ARRS | AUR Conference |
| AUR | ARRS Conference (Registration, flight) |
| FRS | FMA (Per diem, mileage) |
| RSNA SIR | |
| Conferences - No Approval/Not Presenting/Late Submission | |

Travel Expenses (per Program Director approval)

License Fees (per contract) Department Pays

Medical License (Full/Renewal) (Prorated - good for 2 years)
DEA License (Prorated - good for 3 years)
Training License (Renewal)
Initial Fingerprinting Fee

Membership Fees (per contract) Department Pays for 2

ABR Qualifying Fees (CORE Exam) (yearly installments)
ACR DXIT Exam Fees

Educational Fees (per contract) Department Pays

ACLS (PGY2 - \$320 w/books, PGY 4-Renewal)
AIRP (Registration - paid PGY4/R3 year)
AIRP (Housing/Flight Only - PGY 4 only) Up to \$2500
BLS (PGY2 \$320 w/books, PGY4 - Renewal)

Moving Expenses (PGY2 Only) \$1,500

Rental Truck
Car Trailer
Movers/Labor
Packing Supplies
Gas Expenses

Introduction to Resident Profile (RP)

You will be oriented to your New Innovations Portfolio – during your orientation week.

The Resident Profile (RP) is purposeful collection of materials, created over time, that will demonstrate your acquisition of knowledge, skills, and attitudes by providing evidence of achievement of learning objectives or completion of specific learning activities. The RP will be both a process for formative and summative assessment, as well as, a product you can use when interviewing for a professional position.

An effective portfolio will be a visual representation of your achievement. Your RP, based on your real experiences as a resident, will (1) document your learning over time, (2) encourage self-reflection in order to connect theory with practice, and (3) focus on your personal strengths and accomplishment (rather than deficiencies).

The RP will promote collaboration between residents and faculty. Prior to each semi-annual Personal Performance Review, you will complete the self-assessment/reflection form and update your RP. During your scheduled meeting, the program director will review your PLP and discuss your progress in achieving the general competencies, as well as, your leadership development.

Guidelines for Resident Portfolio (Evidence-Based)

The RP will differ from the permanent file maintained by the program coordinator in that (1) it is your practical and intellectual property, (2) you are responsible for its creation and maintenance, and (3) you will control access to its contents.

The process of collecting and evaluating information for the RP will create opportunities for learning. To be a valuable addition to the training program, the purpose of the RP will be well defined and excessive complexity will be avoided. RP exhibits will be derived from your actual work. Some exhibits will be required by the program; others you will self-select. When an exhibit demonstrates achievement in multiple competencies, it will only “count” in one area.

Exhibits will typically be written documents, but video or audio-recordings, clinical images, photographs, published manuscripts, slide shows, and other forms of information may be included. There is growing evidence that portfolios can be reliably scored when there is agreement on criteria and standards, and guidelines for required exhibits will (1) describe the amount type, and quality of evidence required to establish proof of competence (2) and rubrics, checklists, or rating scales for scoring.

The RP of graduating resident must include a current CV and at least one exhibit of scholarly activity that is an abstract, poster, or manuscript, a systems-based practice project, and a practice-based learning project.

Because the RP belongs to you, it can be the basis for documentation of professional development in the components of MOC. Creating and maintaining the RP will model the maintenance and certification.

Resident Personal Learning Profile (PLP) Competencies

PLP items are used for Semi-Annual Reviews. Items the resident should keep track of are: Abstracts, Posters, Presentations, National Meetings, etc. Your PLP will be evaluated by the six core competencies:

| Competency | Assessment Method(s) | Evaluator(s) |
|---------------------------------------|--|--|
| Patient Care | direct observation, simulations/models, structured case discussions, mock oral exam, review of case or procedure log, review of patient outcomes | self, program director, nurse, faculty supervisor, faculty member, allied health professional resident supervisor, patient, consultants |
| Medical Knowledge | direct observation, global assessment, simulations/models, record/chart review, project assessment, in-training examination, oral exam, structured case discussions, formal oral exam, review of case or procedure log, review of patient outcomes | self, program director, faculty supervisor, faculty member, resident supervisor, patient, other residents, evaluation <i>committee</i> , consultants |
| Practice-Based Learning & Improvement | direct observation, global assessment, record/chart review, project assessment, in-training | self, program director, nurse, faculty supervisor, medical student, faculty member, allied |

| | | |
|--------------------------------------|--|---|
| | examination, oral exam, structured case discussions, formal oral exam, review of case or procedure log, review of patient outcomes | health professional, resident supervisor, patient, other residents, technicians, evaluation committee, consultants |
| Interpersonal & Communication Skills | direct observation, global assessment, simulations/models, record/chart review, project assessment, structured case discussions, formal oral exam | self, program director, nurse, faculty supervisor, medical student, faculty member, allied health professional, resident supervisor, patient, other residents, technicians, clerical staff, evaluation committee, consultants |
| Professionalism | direct observation, global assessment, structured case discussions, formal oral exam | self, program director, nurse, faculty supervisor, medical student, faculty member, allied health professional, resident supervisor, patient, other residents, technicians, clerical staff, evaluation committee, consultants |
| Systems-Based Practice | direct observation, global assessment, simulations/models, record/chart review, project assessment, in-training examination, oral exam, structured case discussions, formal oral exam, review of case or procedure log, review of patient outcomes | self, program director, nurse, faculty supervisor, medical student, faculty member, allied health professional, resident supervisor, patient, other residents, technicians, clerical staff, evaluation committee, consultants |

Conference and Class Attendance Policy

All PGY2-PGY4 residents are **required** to attend the daily case conferences and categorical courses. ACGME program requirements require that the program director monitor attendance and written proof of attendance is required at RRC (Residency Review Committee) site visits. **Make a habit of signing the attendance sheets** since you will not be able to do it later. The program coordinator will compile attendance data to review during your semi-annual evaluation sessions. *Accurate documentation of attendance is the responsibility of each individual resident and every effort should be made to make-up the lecture by recording of the lecture when available.*

The daily lectures and/or case conferences are given by faculty every Monday-Friday **12:00pm-1:00pm** and most mornings Monday-Friday **7:00am-7:45am**. On mornings which conference is not scheduled (usually Monday and/or Friday), resident may arrive at 8:00am to begin their shift. 4th year Residents are encouraged to go to Tumor Boards while on specific rotations. Tumor Boards are given throughout the week, mostly mornings. Residents are required to give presentations at Journal Club Meetings and Grand Rounds during their residency. A six-month conference schedule is available to all residents, fellows, and faculty, on New Innovations (*always subject to change*).

The attendance policy is as follows:

- *Resident attendance at conferences is mandatory, monitored, and incorporated into the 6-month resident performance reviews.*
- *Lecture Late Policy - Residents will be marked late 5 minutes after the conference has started. If a resident is going to be more than 15 minutes late they must notify the coordinator via text or email.*
- *Residents are expected to be at their rotation within 10 minutes after the conclusion of the lecture (15 minutes when rotating at Princeton).*
- *Resident attendance is mandatory at Grand Rounds Conferences, core curriculum conferences provided by the hospital, QI conferences, and conferences given by outside speakers when residents are notified (via the conference schedule automatically set-up through New Innovations (NI), or other notifications).*
- *Residents are excused from conferences when post-call (including overnight shifts), sick, at an approved meeting or on vacation. A resident must attend at least **90%** of required conferences, excluding those for which he/she is excused, to be eligible for elective rotation. This 90% will be cumulative (i.e. an 85% attendance record in one six-month interval and a 95% record in the following six-month interval results in a cumulative record of 90% attendance).*
-
- *PGY-5 morning attendance: If the PGY-5 resident elects to attend their assigned rotation, rather than morning conference or tumor board, random audits will occur once/month to ensure that the start time for working begins at 7 am. The late policy of after 5 minutes utilized for resident conference will be applied. If the resident does not comply with the 7 am start time (with the 5 minute window) during a random audit, first a warning will be issued. If this occurs a second time, then the resident will have to attend morning conference or tumor board at 7 am for one month.*

It is also expected that all residents will take categorical course exams when scheduled. The Radiology Department participates in many interdisciplinary conferences and residents may be involved in preparation and presentation of these conferences during specialty rotation. Conferences presented specifically for the Radiology Residents take precedence over interdisciplinary conferences. Presentations and conferences given by visiting professors are usually scheduled during the existing conference times.

Physics lectures, practical laboratory sessions, and examinations are an integral part of the Radiology Residents curriculum. These are scheduled multiple times throughout the month at 7:00 am and residents must attend. Residents are exempt from attending these lectures and labs once they have passed the ABR Core examination, but are encouraged to continue their attendance. Attendance at all radiology residency didactic or other learning opportunities is a part of the yearly criteria for all residents, as well as, promotion.

Didactic lecture series conferences, given by the AdventHealth Orlando staff cover the curriculum topics.

IR BIOPSY: Expected to **attend every morning and noon conference**. Biopsy service does not start until 8 am when the attending arrives, this allows for sufficient time to attend conference, return to service, and consent the first patient before the attending arrives. Noon conference should also be attended, unless there is an uncommon case taking place and you have discussed with PD/APD.

IR Vascular: Expected to start service before 7am, therefore **no morning conference required; noon lecture maybe attended**. Obviously, if you are scrubbed in on a case, you will arrive tardy, and that's ok. It is also understood that certain cases may run the length of conference, and that is also understood. It is the resident's responsibility to inform the Coordinator to properly document attendance. Residents are expected to watch missed lectures independently and email the Coordinator at the end of each week to confirm that they have watched available lectures.

ED Call 4p-12a: (R1: 4 weeks, R2-4: 1 week): The **shift starts at 4pm and ends at 12am, these times are not negotiable**. Alteration of schedule requires PD approval. During this shift residents are encouraged to take a "dinner break" during which to watch lectures. Residents are expected email the Program Coordinator at the end of each week to confirm that they have watched available lectures.

Overnight Call 11p-7a: The **shift start time is 11pm and ends at 7:00am, these times are not negotiable**. Residents are to complete all studies prior to 7am. Residents are expected to watch missed morning and noon lectures independently and email the Program Coordinator at the end of each week to confirm that they have watched available lectures.

Sample Conference & Lecture Schedule

Case Based Conference Series: Given by faculty at AdventHealth Orlando, Monday-Friday. These conferences focus on oral discussion of cases in preparation for oral board exams.

Physics Conference Series: Given many mornings throughout the week, by the AdventHealth Orlando Radiology Residency Physicist. The physics curriculum followed is approved by the American Academy of Physicists in Medicine and the Association of Program Directors in Radiology.

Personal and Professional Development Series: Given throughout the year by the Program Director, Assistant Program Director, and Visiting Professors.

AdventHealth Orlando Visiting Professor Series: The goal of these lectures is to enrich the teaching, clinical and research experience of radiologists through exposure to internationally renowned expertise. On average, 4 visiting professors are scheduled throughout the year.

Journal Club: A topic is presented by a resident at this conference and discussed as a group monthly.

Resident Case Conferences: Residents given case conferences bi-monthly.

Grand Rounds: PGY-5 Residents are required to present a Grand Rounds lecture to all radiology residents and invited faculty members. The PGY-5 Residents are to pick a quarter of the year in which they will conduct the Grand Rounds lecture, and then work with the Program Coordinator to determine the specific date of the presentation. The resident is to coordinate the topic with the section and educational chief of his/her future sub-specialty.

Sample Visiting Professor Lecture & Lab Training Schedule

AdventHealth Orlando Residency sponsors visiting professor events every year. The residency also works alongside the Adventist University of Health Sciences to give the Residents Ultrasound Lab Training.

Professional Development Lectures Topics

Sleep Deprivation & Fatigue
Medical Ethics
Physicians Ethical Dilemmas

ALARA Concept
Image Gently & Image Wisely
Professionalism (APDR)

Interdepartmental & Tumor Board Conferences

Radiology is invited to many of the conferences held by our clinical colleagues to present the pertinent radiographic findings for the particular case. Residents may attend interdisciplinary conferences at the institution where they are rotating, when not already attending a mandatory radiology conference. When attending interdepartmental & tumor board conferences please notify the Residency Coordinator. Tumor board conferences are highly recommended for Senior Residents.

Conference presentations may be assigned to residents by faculty on their service. Residents should familiarize themselves with the cases to be presented, including the history, and be prepared to discuss the disease process and radiologic findings in the cases.

These conferences should be viewed as an opportunity to shine, as the resident learns about the clinical issues, complications and post-imaging events that transpired. He/she is reminded of the patient behind the interesting case and is challenged to look beyond the black and white of the images to shades of gray of the patient care.

Conference attendance will be reviewed during the semi-annual review.

Resident Journal Club Conferences (12:00pm-1:00pm)

The Residents' Journal Club will be held monthly. There will be residents selected to give an article at the meeting (all residents will each present at least one time during their term). The selected resident should choose a faculty mentor on their assigned rotation or within their planned sub-specialty to assist in choosing a journal article and reviewing it. The mentoring attending physician must be able to attend the Journal Club Conference. The article should be selected at least one month prior to the Journal Club meeting and submitted first to the mentor for approval, and then to the Residency Coordinator; you must send the Journal Club article to the Residency Coordinator **2 weeks** before you present since the Residency Coordinator will circulate the selected articles to all faculty and residents. Journal Club participants will emphasize discussion of articles on current technology, articles of significant impact on radiologic practice and a critical analysis of reported data and conclusions. There is a Journal Club worksheet that must be completed by the presenting resident and given to the Residency Coordinator. All participants (faculty and residents) must sign in, to document participation (required).

Residents follow Evidence Based Medicine format performing a critical review of the article. Residents place a journal club work sheet (see below) in their portfolios and it is reviewed by the PD as their biannual review.

Resident Noon Conferences (12:00pm-1:00pm)

Brant and Helms chapter reviews will be provided by radiology residents. The initial chapters presented will be specific to the residents planned area of specialization/fellowship. Additional chapters will be assigned by the chief resident at their discretion, to ensure that all chapters are reviewed on a yearly basis.

Residents follow Evidence Based Medicine format performing a critical review of the article. Residents place a PDF copy of their presentation in their portfolios and it is reviewed by the PD as the biannual review.

Resident Case Conferences

Residents Case Review Conferences are scheduled through the week. Residents should start collecting interesting cases to present from the first day of residency. All residents have a teaching file on PACS that can be utilized for this conference. The conference room uses PACS, where you can pull your cases for the presentation.

One resident will be assigned for each conference. If they are unable to present at this conference for any reason, it must be made up.

Grand Rounds

PGY-5 Residents are required to present a Grand Rounds lecture to all radiology residents and invited faculty members. The PGY-5 Residents are to pick a quarter of the year in which they will conduct the Grand Rounds lecture, and then the Program Coordinator will work with the resident on determining the specific date of the presentation. The resident is to coordinate the topic with the section and educational chief of his/her future sub-specialty.

Resident Research/QI

R2-R4 residents are given a week of Research and a week of QI. RA research project and faculty mentor must be chosen at least two weeks prior to the assigned research rotation and submitted to the [Associate Program Director at the following link:](#)

<https://forms.office.com/Pages/ResponsePage.aspx?id=eGbDaoV3b0e-A7aLQDc0wh5scFhKH5tJkrKO8vQsqQdURFpLNVFGUkM4TEhMQUkwODQxRkhGTVZLRC4u>

Immediately upon choosing a research project, **you must contact** *Carole Coyne*, to complete all of the required paperwork before you do any research of patient information.

Two weeks prior to starting the research rotation, the resident MUST submit to the Associate Program Director, an abstract and/or detailed written plan of the project design and how the weeks of research rotation will be used.

Residents who do not meet the required deadlines stated above will be reassigned to a different Radiology rotation at the discretion of the Program Director. Residents projects may be encouraged to identify a project or case study that will lead to an exhibit, a presentation at a Regional or National meeting and publication of their research efforts as a peer-reviewed journal article. Resident research projects may also be presented at the Department's Intradepartmental Noon Conferences. Residents are also encouraged to pursue additional research projects during their training as time and experience permits.

Radiology Department QA/QI Meeting Attendance **(5:00pm-7:00 pm) - quarterly**

QA/QI Meetings – ALL residents are expected to attend QA/QI meetings. Residents MUST attend 6 QA/QI meetings per year. If you are unable to attend, you must contact Theresa Hutson, for Skype login information. Sessions cannot be made up. Currently, there are approximately 12 sessions per year..



AdventHealth Orlando Radiology Diagnostic Residency Program Journal Club Worksheet

Journal Club Worksheet (2018-2019)

Instructions: Use this worksheet to assist you in preparing your Journal Club presentation.

Resident name: _____

Date of Journal Club: _____

Attending mentor (print name): _____ Initials: _____

Title & full citation of Journal article: _____

Please comment on:

1) Abstract: (Ex – was it a concise overview of the study? Did the conclusion match the aim? Were there discrepancies between the abstract and the body of the paper?)

2) Introduction: (Ex – did it include reasonable rationale why to do the study? Were goals of study includes? Does it explain how the authors' aims fit into what is already known on the subject?)

3) Materials and Methods (Ex – is this a good blueprint that another person could read and reproduce? Do the methods attempt to minimize bias and confounding factors? Are the patients included and excluded appropriately? Are correct statistics used?)

4) Results: (Ex- Do the results follow the order of the methods? Are there any unexpected results data sets? Are the results clear? Are all subjects and materials accounted for?)

5) Discussion (Ex – Does it state if the hypothesis was verified? Does the discussion compare and contrast with prior literature? Is there an explanation of differences compared to prior literature? Are any

unexpected results explained?

6) Conclusion (Ex – Given the limitations of the study, are the conclusions valid? Does the conclusion respond to or answer the question asked in the aim of the study? Are the conclusions proven in the manuscript?)

What knowledge gap did this manuscript fill in (practice-based learning improvement)?

Any other comments?

Glossary:

Evidence based medicine – deciding which clinical practice to use based on critical literature analysis.

Practice based learning improvement – filling in knowledge gaps

Reference: Budovek JJ, Kahn CE. Evidence based radiology: A primer for reading scientific articles. AJR 2010; 195(1):W1-W4

AdventHealth Orlando Committee Involvement

The Residents are required to participate in at least one committee and attend all meetings
If you are unable to make it – please coordinate with another resident to attend your absence
It is your responsibility to inform the other residents on what was discussed in the meetings by giving a
realtime update or using the shared google document (unless it is confidential to the committee members
only):

<https://docs.google.com/spreadsheets/d/15h-JsoUXg4s64PEyCY1k54HjIensPBZrUK-rQi2Uico/edit?usp=sharing>

ACGME – CLER

Annual Institutional Review Committee – Multiple times a year

Annual Program Evaluation Committee – 2 x Year

Program Evaluation Committee (PEC) Committee (Annual Program Evaluations) – Yearly

GME - ACGME

GME Residency Association Meeting – Quarterly

GMEC Meeting – Quarterly

Medical Student Committee - 2 x Year

UCF Anatomy -

Patient Safety Committee - Quarterly

Radiology Residency Educational (Rad Ed) Committee Meetings – Monthly

Resident Wellness Advisory Board – Monthly

ADVENTHEALTH ORLANDO & RESEARCH

AdventHealth Orlando Institutional Review (IRB) - Monthly

GME Research Committee Meeting – Quarterly

Pediatric Dose Reduction Committee - Monthly

Pediatric Imaging Operations, Clinical Committee - Monthly

Pediatric Patient Safety and Quality Committee - Monthly

RSNA REPRESENTATIVE

Chelsea Dennison, MD

AdventHealth Orlando Library

The AdventHealth Orlando Medical Library offers comprehensive information resources to medical staff, hospital employees, students, patients, and the community.

Journal articles and books can be viewed at: <https://drupal01.floridahospital.org/medicallibrary/>

Articles/books can be requested most easily by contacting the library at:

- Phone: 407-303-1860
- Fax: 407-303-1786
- E-mail: medicallibrary@flhosp.org

It typically takes 24 hours to obtain an article. If the library has to pay for the article, it can take up to 7 days.

Hours: Monday - Thursday 8:00am - 4:30pm; Friday 8:00am - 1:00pm

After Hours Access:

The Library is available to physicians and other designated AdventHealth Orlando healthcare professionals on a 24-hour basis, with an ID badge security access system.

Electronic Resources:

The Library purchases and maintains access to more than 300 full text journals and over 100 online books. We also offer access to knowledge-based information databases such as Ovid, MD Consult, Clin-evidence, Lexi-Comp, Access Medicine, and CINAHL. Most of these electronic resources can be accessed outside of the library.

Print Collections:

The Library has an extensive array of medical journals as well as carefully selected reference and circulating book collections. Subject areas cover the full spectrum of medical specialties. To find a particular title, use our online catalog.

Interlibrary Loan:

Book chapters and journal articles not available in our library can be obtained from other libraries upon request. These items can be delivered to you electronically via e-mail. Interlibrary loan requests can be made by using our online request form.

Literature Searches:

Requests for customized literature searches can be made online, or by e-mail, fax, or phone. The staff also assists with searching and provides specialized database training upon request.

AdventHealth Orlando Residents also can access the online UCF Library once they are credentialed with their own username and password.

Residency Department Library

A substantial amount of money and effort has been expended to establish a well-balanced and current department library. This is in addition to the AdventHealth Orlando Library. In order to maintain a functioning library, the following rules were established.

1. The library is specifically intended for use by all faculty and residents of the Department of Radiology of AdventHealth Orlando, Orlando. It is located in the Radiology Residency Coordinator's Office.
2. Medical students, interns and clinical residents taking radiology rotations are allowed to use the library during normal working hours, but will not be allowed to check out books, unless cleared with the Coordinator and/or Program Director.

STATdx (Diagnostic Imaging for Radiology) has been purchased for the Residents by the Residency Program. Each resident has their **own** logon. This information is not to be given to anyone else (*Use of STATdx Graphic Illustration Content. All illustrations or images created, modified or commissioned by Amirsys and/or paid for (directly or indirectly) by Amirsys ("Graphic Illustrations") are protected by copyright and are the exclusive properties of Amirsys. Transfer and Other Restrictions. You may not license, sublicense, sell, resell, distribute, rent, lend, share, lease, assign, transfer or otherwise commercially exploit or make available the STATdx Product to another user or any third party. You may not and you may not cause or allow others to (a) disassemble, decompile, or otherwise derive source code from the Software, (b) reverse engineer the Software, (c) modify or prepare derivative works of the STATdx Product or any portion thereof, or (d) use the STATdx Product in any manner that infringes on the intellectual property rights or other rights of another party*) STATdx tracks the usage and will revoke your license if this rule has been broken. If your license has been revoked – it will be your responsibility to buy another license. Cost of a license is \$2400/year.

Return/Late Policy and Penalty Criteria

1. Textbooks must be returned within 1 month of taking them from the library.
2. The resident must replace the book if not returned or lost.

Policies and Procedures Overview

Residents and faculty share the major responsibility for radiology patient care. The faculty will assign tasks to the resident during each clinical rotation according to the resident's level of competence and experience. The resident completes assigned tasks under supervision of the faculty. The faculty assumes final responsibility for the quality of the resident's work. The scope of activities and levels of supervision vary according to the types of activities performed within each subspecialty rotation of the Radiology Department.

Duty Hour Policy

The ACGME requires all programs to have policies regarding duty hours for resident/fellows and to ensure each resident/fellow maintains a reasonable work schedule within his/her respective program

References: AdventHealth Orlando GME Resident Duty Hour Policy #1010. ACGME Common Program Requirements. VI.G. Resident Duty Hours.

Duty hours are defined as all clinical and academic activities related to the residency program; i.e., patient care (both inpatient and outpatient), administrative duties relative to patient care, the provision for transfer of patient care, time spent in-house during call activities, moonlighting activities, and scheduled activities such as conferences. Duty hours do not include reading and preparation time spent away from duty site.

All Residents are responsible for tracking and validating their duty hours weekly. It is the responsibility of the resident to: Monitor and validate duty hours in NI on a weekly basis (Sunday to Saturday). **All residents will complete the validation of their duty hours from the week before by 09:00 every Monday Morning.** *Reference: AdventHealth Orlando GME Manual - page 91.*

A. Maximum Hours of Work per Week.

Duty hours must be limited to 80 hours per week, averaged over a four-week period, inclusive of all in-house call activities and all moonlighting.

- B. Residents must be scheduled for a minimum of 1 day in 7 free from all educational and clinical responsibilities, averaged over a 4-week period, inclusive of call. One day is defined as one continuous 24-hour period free from all clinical, educational, and administrative duties.
- C. PGY-2 and above may be scheduled to a maximum of 24 hours of continuous duty in the hospital.
- D. PGY-3-5 are scheduled for overnight rotations and not scheduled for "on-call".
- E. Because residency education is a full-time endeavor, the Program Director must ensure that moonlighting does not interfere with the residents' ability to achieve the goals and objectives of the educational program.
- F. Duty Hour Oversight Compliance - The GMEC requires Program Directors to report their duty hour compliance at every other GMEC meeting. Any violation identified must be addressed immediately along with a contingent plan for remedy. The Program Director of concern shall submit a written report of evidence of resolve to the GMEC Chair within 30 days. Back-up support systems must be in place when patient care responsibilities are unusually difficult or prolonged, or if unexpected circumstances create resident fatigue sufficient to jeopardize patient care.

Expectations - 4th Years

1. Physics Lectures - 4th years are excused from physics or non-physics lectures, based on the chart below. Attendance must be reported to the Coordinator or Administrative Assistant, or the resident will be marked absent. If the 4th year attends tumor board, he/she can either contact the attending to present the cases, or solely attend the tumor board.
2. Lead Resident - Will be the lead resident on service and assume more responsibilities – protocol cases, do as many procedures as possible, and run tumor boards when on that service.
3. Tumor Boards – must review cases and relevant medical record information with the responsible attending and be prepared to present the cases. Residents may attend additional tumor boards in their fellowship specialty. Tumor board schedule is posted by the RF station.
4. Dictations - must be complete and not contain errors – dictations will be sent back to the residents, who must promptly return them to be finalized.
5. Templates - Residents will inquire if their fellowships have dictation templates and acquire them, if possible. They will be tested on 10 AdventHealth Orlando templates from each section, with the goal of having residents prepared to free-text dictate.
6. Conferences - Residents will collect interesting cases throughout the year and compile conferences to present to our residency and their future fellowships.
7. Licensure - Consider obtaining medical licenses in the state of your fellowship if you intend to moonlight.
8. IRB - Become certified in your future fellowship's IRB network, so you can immediately begin/continue your research.
9. In-service not required.

If there is a PGY-5 resident who has passed the ABR examination and there is a **physics lecture**, he/she may:

Find a tumor board to attend

OR

Go straight to rotation and start working

Resident must record Tumor Board Attendance on ADVENTHEALTH ORLANDOCME.com

If there is a PGY-5 resident who has passed the ABR examination and there is a **non-physics lecture**, he/she may:

Go to tumor board or conference

OR

Go straight to rotation - report to coordinator reason not going to conference or tumor board

And

Review lecture within 14 days to get credit - report to coordinator conferences read 2 x month

AdventHealth Orlando Radiology Residency

Fellowship Interview Travel Policy

Residency Interview Travel must be pre-approved by the Program Director, or Assistant Program Director, before registering or making any travel arrangements. Program Director must ensure compliance with AdventHealth Orlando GME Travel Policies, ACGME Duty Hour Compliance, and ABR Eligibility Requirements.

Radiology Residency Policy:

The Department of Radiology will provide each resident, during the course of resident's interview season, seven (7) interview days for travel. Any additional travel days, will come out of the resident's PDO bank. *****If a resident has CME days remaining, those will be depleted before PDO days.***

GME Policy:

Resident/Fellows will receive a set number of paid days off (PDO) at the beginning of each academic year (July 1st- June 30th). PDO is inclusive of time away due to vacation, illness, emergencies, appointments, personal time, interviews, holidays, and away conferences (after exhaustion of program specific CME day bank). Unused PDO cannot be sold or carried over from one academic year to the next; any unused PDO will be lost. Any resident who starts a program off-cycle shall have their paid time of prorated for the remainder of the academic year.

ACGME Policy for Radiology:

Total leave and vacation time (PDO) may not exceed six calendar weeks per year. If more time is granted, the required period of training must be extended accordingly.

Moonlighting

To define the standards by which moonlighting will be monitored as required by the ACGME. The ACGME requires the sponsoring institution to have policies regarding professional activities that take place outside of the educational program. *Reference: AdventHealth Orlando GME Moonlighting Policy #1011. ACGME Common Program Requirements. VI.G.2. Moonlighting.*

- A. A. ADVENTHEALTH ORLANDO Diagnostic Radiology Residents are not permitted to moonlight until passing the Contrast Reaction Simulation.
- B. Residents must stay to the end of their scheduled rotation, before leaving for moonlighting (usually 4:00 pm). Rotation responsibilities take precedence over moonlighting responsibilities. Ensure you follow proper hand-off procedures.
- C. Moonlighting must be counted towards the 80-hour maximum weekly hour limit, averaged over a four week period, inclusive of all in-house call services. Reference: ACGME Common Program Requirements. VI.G.1
- D. Residents must have a minimum in-service examination (DXIT) score >40% in order to qualify for moonlighting.
- E. Resident coordinator for moonlighting will either be the chief resident or another radiology resident that has been delegated this responsibility.
- F. Resident coordinator for moonlighting will organize the shifts on the Excel spreadsheet on Google Drive on a monthly basis, and send a monthly print out of the shifts to the program coordinator/program director.
- G. Shifts will be approximately weighted for PGY3-PGY5 classes, as follows: PGY5: 50%, PGY4: 30%, and PGY3: 20%. PGY2 residents will be offered remaining shifts after other residents have chosen their shifts. Variations in this shift arrangement are at the discretion of the resident coordinator.
- H. Lateness policy, cancellation policy, and conflict resolution are defined in the moonlighting proposal created 2016-2017.
- I. All residents participating in moonlighting need to submit the appropriate documentation to the program director and to the DIO for authorization, prior to beginning moonlighting.

Incoming residents desiring choosing to moonlight can follow the following steps to expedite their integration into the process/schedule:

1. Obtain full Florida medical license.
2. Obtain Florida DEA license.
3. Complete the moonlighting permission form that needs to be signed by the Program Director and DIO (this has to be done for each new academic year too).
4. Email Silvia De Jesus(Silvia.DeJesus@AdventHealth.com), and she can help get you signed up for the on-boarding process (this to be done only after the prior steps are completed).
5. On-boarding is done at the altamonte offices. Also allow enough time to get a quick drug test at the centracare at altamonte just on the west side of I-4 after your on-boarding.

Diagnostic Radiology Residency - Work Environment

Work Hours

Typical hours spent during clinical rotations are 7:00a.m. to 4:00p.m. Monday through Friday (9 hours a day, well below the maximum of 80/week).

NO excessive checking personal e-mail, watching videos, web surfing of non-radiology content during work hours.

Rotations – When on Nuclear Medicine rotations, the Residents are required to make up any hours missed. Residents are required to have **700 hours** of Nuclear Medicine training by the end of their residency. This will help ensure that the Resident isn't short at the end of the program. However, if the resident is participating in the Nuclear Medicine Pathway, they will be allowed to take PDO during their time on Nuclear Medicine in their PGY5 year.

Call

First year residents take evening call at AdventHealth Orlando Orlando from 4:00pm-12:00am, beginning in the seventh month of training.

Beginning in the second year, residents take in-house call on an evening shift rotation from 11:00p.m. to 7:00a.m. Residents are expected to review morning and noon conferences online and report their attendance to the Program Coordinator. (see below)

PM Rotations

PM Rotations or (4pm – 12am call): When on PM Cardiac, PM MSK, PM Neuro – hours are in Orlando from 3:00p.m. or 4:00p.m. to 11:00p.m. or 12:00a.m. You are expected to view the recording of the Noon lecture during your dinner break and report your attendance to the Program Coordinator for attendance purposes. (see below)

Study Selection

Faculty are available on-site for consultation and image review. All studies are reviewed with all residents frequently throughout the shift, before leaving for conferences and at the end of the shift, and immediately for STAT cases. Residents should ready studies that are STAT, then ED, then oldest to newest. Residents should ask which list to read from while on service. Residents' in-house the entire night (night float) are given the next day off after reviewing their cases with faculty. Residents do not take call from home.

Seating Assignment

Residents are assigned specific workstations, which are marked on the outside of each reading room. The workstations are specific to the sub-specialty for which you are assigned that month.

Residents are to answer phone calls directed to them from the RF's (Radiology Facilitators). These questions may relate to protocoling of examinations. The resident should attempt to answer the questions on their own; however, if they need assistance, they are to immediately ask the attending to ensure the proper examination or examination modification is done. This is to help the resident learn how to function independently, as well as to learn how to properly protocol examinations.

If the resident receives a phone call that is not related to their specific rotation, the resident can do one of the following:

- provide the information that is needed (as an example, to the technologist in order to complete the study);
- or
- politely instruct the RF that the case needs to be presented to the resident assigned to that rotation, so as to help the resident learn how to protocol for his/her specific rotation.

Please be sure to check in with the RFs at the beginning of your shift, to ensure you are sitting in your assigned seat. If you are asked to move during the shift to accommodate an on-call attending, etc, please let your Chief Resident know.

This is mainly to ensure that the RF's can find the residents to give them phone calls. The RFs are aware that all calls should go to residents first to help them learn to function independently.

Conference Attendance Policy

Daily conferences will take place from **7:00am-7:45am and 12:00pm-1:00pm** Monday-Friday. Residents are expected to be at their rotation within **10 minutes** after the conclusion of the lecture (**15 minutes** when rotating at Princeton).

Attendance - PGY2-PGY4 residents are required to be at **morning conferences**, excluding residents on IR/Angio. PGY-5 are excused from Physics or non-Physics lectures, based on the chart above. Attendance must be reported to the Coordinator or Administrative Assistant, or the resident will be marked absent. If the PGY-5 attends tumor board, he/she can either contact the attending to present the cases, or solely attend the tumor board.

Residents on 3/4pm, or ED shifts are required to view all recorded lectures, of missed lectures, and report their attendance to the Coordinator or Administrative Assistant on a weekly basis.

PGY-5 morning attendance: If the PGY-5 resident elects to attend their assigned rotation, rather than morning conference or tumor board, random audits will occur once/month to ensure that the start time for working begins at 7 am. The late policy of after 5 minutes utilized for resident conference will be applied. If the resident does not comply with the 7 am start time (with the 5-minute window) during a random audit, first a warning will be issued. If this occurs a second time, then the resident will have to attend morning conference or tumor board at 7 am for one month.

Late Policy

Late Policy - Residents will be marked as late **5 MINUTES** after the conference has started. Attendance/tardiness will be tracked on New Innovations and evaluated at semi-annual evaluations. If a resident is going to be more than 15 minutes late, they must notify the Program Coordinator, via text or email, so the department can ensure you are OK.

* When a unique circumstance arises (unique procedure, unique challenging case, specific attending, etc.), the resident must email, call or text the Program Coordinator to inform them of where you will be during that specific conference block.

Radiology Schedules

| Resident Rotation | Abbreviation | Resident Shift | RSF/QGenda |
|--|----------------------|----------------|---|
| Body / Chest/CV /Onc | | | |
| Body ORLANDO | Body/ORL | 7a-4p | Body/ORL 7a-4p |
| Body/Card/PM/ORLANDO | Body/Card/PM ORL | 4p-12a | Body/Card PM ORL 4p-12a |
| Chest/CV/ORLANDO | Chest / CV ORL | 6a-3p | Chest / CV ORL 6-3 |
| Emergency Radiology | | | |
| Emergency/Overnight/Orlando | ED Night ORL/On-Call | 11p-7a | ED Night ORL 11p-7a |
| Emergency Call / ED Call | ED Call | 4p-12a | ED Call: 4p-12a |
| Musculoskeletal | | | |
| MSK/ORLANDO | MSK/ORL | 7a-4p | MSK/ORL 7-4 |
| Neuroradiology | | | |
| Neuroradiology/Interv/ORLANDO | Neuro/ORL | 7a-4p | Neuro Interv ORL 7a-4p Neuro/Onc/ORL 7-4 |
| Neuroradiology/Medical Plaza | Neuro/MP | 7a-4p | Neuro/Onc/MP 7-4 |
| Nuclear Medicine | | | |
| NUCLEAR MEDICINE: ORL | NUC/ORL | 7a-4p | Nuc/PET ORL 7a-4p |
| Nuclear Medicine- Shadowing/ORLANDO | NUC-Shadowing/ORL | 7a-4p | - |
| Pediatrics | | | |
| PEDIATRIC: ORL | Peds/ORL | 7a-4p | Peds ORL 7a-4p |
| Ultrasound Imaging / Fluoroscopy | | | |
| Ultrasound/ORLANDO | Body/US/ORL | 7a-4p | Body US OrI 7a-4p |
| Ultrasound-Shadowing/ORLANDO | US-Shadowing/ORL | 7a-4p | - |
| Fluoroscopy | Fluoro | 7a-4p | Fluoro |
| Vascular/Interventional Radiology | | | |
| IR Angio/ORLANDO | IR Angio/ORL | 6:30a-4:30p | IR2 ORL 7:30a-4:30p |
| IR Biopsy/ORLANDO | IR Biopsy/ORL | 7a-5p | IR1 Bx ORL 8a-5p |
| Women's Imaging | | | |
| WOMEN'S IMAGING: PRINCETON | Mammo/PRI | 7a-5p | Mammo/B PRIN 8a-5p |
| | | | |
| Away | | | |
| CONFERENCE: AWAY | Conf/Away | - | - |

| | | | |
|--------------------------------------|-------------------|---|---|
| LOA: Away | LOA | - | - |
| PLD: AWAY | PLD/Away | - | - |
| QI/AWAY | QI/Away | - | - |
| RADIOPHARMACY | Radio/ORL | - | - |
| RESEARCH/AWAY | Research/Away | - | - |
| ORIENTATION: ADVENTHEALTH ORLANDO | Orientation/Admin | - | - |
| PATHOLOGY: AWAY | AIRP/Pathology | - | - |

Transition of Care (Hand-off) Policy

GOAL

To provide guidelines for effective transitions of care for radiology residents.

POLICY

Because the majority of radiologic practice involves image interpretation, direct patient care of a length requiring transition of care is generally limited to the setting of post-procedural observation (for example, monitoring of patients for pneumothorax following lung biopsy). In the majority of cases, the time of observation still is of a short length, and periods of observation usually do not span greater than a single shift.

However, the concept of transfer of care may also be applied to the transfer of patient information, a situation that applies more frequently than the situation above in radiologic practice. Pending scans or procedures are often discussed with referring clinical services, and important information regarding patient history conveyed. The transfer of this information at change of shift is important for proper protocoling of radiologic examinations, for informed interpretation of images obtained, and proper triaging and performance of imaging guided interventional procedures or fluoroscopic examinations.

PROCEDURE

Transitions of care occur in the radiology department daily:

1. At the start of the day, the radiology resident completing an overnight call shift transitions care to the members of the department covering the various radiologic services for the workday.
 - a. The on-call resident reviews the results of all imaging studies with the assigned attending staff.
 - b. The post call resident is also responsible for conveyance of information regarding upcoming procedures or imaging studies to the individual responsible for the relevant radiology service. This individual could include either a resident or an attending staff member.
2. At the end of the workday, radiology residents and staff covering individual services are responsible for communication of information to the attending staff and/or resident covering the evening shift.
3. At the end of the evening shift, the attending staff performing the shift is responsible for communication of information to the overnight call resident.

Conveyance of information during transitions of care outlined above will be performed verbally, with review of any relevant imaging studies, at the time of change of shift. Important information includes:

1. Patient history of contrast allergy
2. Clinical indications for upcoming studies which require specific tailoring of exams to be performed.
3. Patient history pertinent to tailored interpretation of exam findings
4. Indications for and specific information pertinent to fluoroscopy examinations and imaging guided (interventional) procedures.
5. History regarding any patient undergoing active monitoring for post procedural complications following imaging guided procedures.

Immediate Post-Op / Post Procedure Note

*** Immediate Post-Op/Post Procedure Note – Important Communication ***

May 2, 2018

To the Florida Hospital Physicians and Allied Health Professionals:

Those of you who perform surgery or procedures are aware that CMS requires an Immediate Post-Op/Post Procedure Note after the procedure and before the patient moves to the next level of care. In previous DNV Surveys, we have received warnings about this and our compliance rate, using paper, has never gotten above 85%. Unfortunately, compliance must be at 100%. During our full DNV Accreditation Survey in December 2017, we received a “Non-Conformity” due to continued non-compliance.

The Non-Conformity requires that a plan be submitted to DNV that specifically outlines the steps that will be taken to bring the organization into compliance. Over the last few months, multiple teams have worked on this issue. This is the plan that was approved by the Medical Executive Committee and submitted to DNV.

- On May 2, education for Physicians, AHPs, and Nursing, begins with this letter
- All surgeons and proceduralists must complete an Immediate Post-Op/Post Procedure Note for all procedures done in designated procedural areas (OR, Endoscopy, Cath Lab, etc.)
 - The Note must contain all required elements or it will not count
 - It must be completed after the procedure but before the patient is moved to the next level of care
 - There will be a 90-Day Transition Period to get to all electronic notes
 - Only electronic Notes will meet the metric after 90 days
- During the Transition Period
 - An electronic option to facilitate compliance was shared with the Medical Staff (see FH MedicalStaff email dated April 26, 2018)
 - Compliance will be monitored by HIM and shared with Med Staff Officers
 - Physicians will receive feedback about non-compliance
 - Physicians will have the opportunity to get additional assistance
- After the 90-Day Transition Period
 - Only electronic notes will satisfy the Immediate Post-Op/Post Procedure Note requirement and paper will not be accepted
 - Non-Compliance will result in an HIM infraction and entry into the Progressive Discipline Schedule

Please let us know if you have any questions,

Tanya Agard
Tanya Agard, MD
Med Staff President

Tim Pursley
Timothy Pursley, MD
President Elect

David Varnagy
David Varnagy, MD
Secretary/Treasurer

Jeff Lehman
Jeffrey Lehman, MD
Past President

Conscious Sedation Policy and Procedures

Radiology Residents may participate in Conscious Sedation of patients under the direct supervision of an Attending Radiologist who is credentialed by the hospital to administer Conscious Sedation, if they fulfill the following:

- BLS and ACLS Certified
- Attended the Conscious Sedation lecture from the Radiology Department
- Comply with AdventHealth Orlando's Conscious Sedation policy and procedures (including dosing of medication and reversal agents)
- Resident should evaluate the patient and reason for Conscious Sedation request
- Verify that a history and physical within the last 30 days is in the chart – provide an updated patient history and physical findings
- Explain the risks and benefits for Conscious Sedation to the patient prior to the attending radiologist evaluating the patient
- Verify resident documentation
- Obtain Informed Consent Form

Resident Dress Code

Lab coats - two white lab coats will be furnished to Resident by the Hospital at the beginning of the first year of training to insure uniformity and identification of Residents. Replacement shall be the responsibility of the Resident. One new coat will be provided at the beginning of each subsequent training year by the GME. It is expected that each resident will comply with the hospital dress code to include name tag and appropriate Hospital affiliation identification. Lab coats with insignia or names of other institutions are not to be worn in hospital or while providing any patient care duties. AdventHealth Orlando Lab coats and/or badges **are not** to be worn while moonlighting.

Black Jackets - are provided to use in the reading rooms, which can be cold. When at AHi Princeton on the Women's rotation, attending Grand Rounds, or participating in the residency interviews, please dress professionally.

Scrubs - will be provided for Angio-Interventional rotations. You can also wear a long sleeve t-shirt under your scrubs. You are not allowed to wear sweat shirts or hoodies.

Lead Aprons – all residents are provided one set of lead at the beginning of the year. It is your responsibility to hang them up properly on the lead apron hangers. Reminder – Radiation Safety badges – are not to be left on the lead apron. These are to be worn on your body.

Professionalism (AdventHealth Orlando GME Requirement)

The Residents are required to identify themselves and their positions clearly when interacting with med staff members (requesting consults, discussing clinical plan, or responding to the ER, etc.). Additionally, the trainee should clearly identify their supervising faculty member. For example: *“Hello, Dr. Smith, I am Dr. Jones, a 2nd year Radiology Resident working with Dr. Bancroft and I would like to discuss the condition of Mrs. Jones.”*

Communication Modes

All residents have an AdventHealth Orlando Outlook email address (ex. John.doe.md@flhosp.org) and an Outlook calendar and are required to monitor their email and calendar for communications **DAILY**.

The Office of GME will utilize the resident's AdventHealth Orlando email address exclusively.

AdventHealth Orlando utilizes New Innovations ('NI') for all residency training tracking. Important program and/or administrative announcements will be posted to the main page on NI, in addition to email and bulletin boards, as a means of assuring notice to all residents and faculty. Messages from NI and/or the NI Coordinator are pertinent to your training and accreditation requirements; therefore, all residents must monitor NI at least twice a week. *Reference: AdventHealth Orlando GME Manual, page 98*

Social Media and Online Networking Policy & Guidelines

The graduate medical education programs sponsored by AdventHealth Orlando, recognize social media has changed the way individuals and organizations communicate and share information. As professionals with a unique social contract and obligation, all medical students, residents and faculty physicians must be cognizant of the public nature of these forums and the permanent nature of postings therein. While these sites offer terrific potential to bolster communication with friends and colleagues, they are also a potential forum for lapses of professionalism and professional behavior. These sites may give the impression of privacy, but postings and other data should be considered in the public realm and freely visible by anyone with access to the internet. *Reference: AdventHealth Orlando GME Social Media and Online Networking Policy & Guidelines. Policy #1013*

Resident Well-Being

An introductory course on Fatigue and Sleep Deprivation will be given at one of the Professional Development Lectures given monthly by the Program Director. Continuous monitoring by staff and the Program Director will also be done.

Additionally, Residents will participate in the AdventHealth FLOURISH program annually. This is administered through the office of physician well-being.

Resident Mentoring

Residents will meet with their selected faculty Mentor on a quarterly basis. Mentors will be assigned to the incoming PGY2 residents, who have the option of changing their faculty mentor later in the year.

Leave of Absence

Leaves of absence and vacation may be granted to residents at the discretion of the program director, working with the DIO/GME office, in accordance with AdventHealth Orlando *GME Policy #1016*.

ABR - Radiology residents can take up to 120 days TOTAL away from education during training: This includes vacation time, sick time, LOA, **According to the American Board of Radiology** requirements (<http://theabr.org/ic-dr-req>): Within the required period(s) of graduate medical education, the total such leave and vacation time may not exceed:

| | |
|-------------------------------------|--|
| 6 calendar weeks (30 working days) | for residents in a program for one year |
| 12 calendar weeks (60 working days) | for residents in a program for two years |
| 18 calendar weeks(90 working days) | for residents in a program for three years |
| 24 calendar weeks(120 working days) | for residents in a program for four years |

If a longer leave of absence is granted, the required period of graduate medical education must be extended accordingly. The ABR leave policy is based on educational requirements and is not affected by other institutional, state, or federal policies.

Title: Resident Leave Policy; Effects of Leave

Policy #1016

Issue date: 3/2016

Developed by: GME Admin

Revision dates: **5/2018**

Approved by: GMEC

I. PURPOSE:

This policy and procedure describes the types of leaves of absence that are available to all Residents, the conditions surrounding each type of leave of absence, and the effects that an extended leave of absence will have upon the satisfactory completion of a program and/or eligibility to participate in relevant certifying board examinations.

II. POLICY:

It is the policy of AdventHealth Orlando Graduate Medical Education to provide appropriate leaves of absence for Residents in accordance with applicable laws, regulations and requirements. Leaves of absence must also comply with applicable requirements of the ACGME, AOA and the certifying board for each Graduate Medical Education program sponsored by AdventHealth Orlando.

Paid/unpaid leave may be available, under certain circumstances, with advanced approval of the Program Director and satisfaction of AdventHealth Orlando eligibility requirements as outlined in AdventHealth Orlando Leave of Absence Policy #800.216.

Leave that extends a resident’s total time away from program beyond 30 days within a single academic year, business days and weekends included, will require an extension to the length of training equal to each additional day of leave. Additional guidelines may also be established by the ACGME, AOA, and/or the certifying board for that particular program. The more stringent of the AdventHealth Orlando GME and certifying board policies shall take precedence.

Time away from program is defined as all time away from training activities, including vacation, illness, emergencies, personal time, interviews, family medical leave, extended sick leave, administrative leave, and personal leave.

It is the responsibility of the Program Director, Program Staff, and Resident to be in compliance with the AdventHealth Orlando GME, program and certifying board requirements concerning the effect of leaves of absence on satisfying the criteria for completion of the training program, and guaranteeing eligibility for certification by the relevant certifying board. Prior to granting leave, American Board of Medical Specialties (ABMS) and/or AOA board requirements, in addition to the AdventHealth Orlando GME and program policies, should be reviewed by the Program Director and Resident to assure that he or she is familiar with the any additional effects of leave. If extended leave results in the requirement for additional training in

order to satisfy AdventHealth Orlando GME and/or board requirements, financial support for the additional training time must be determined when arrangements are made for the leave and the makeup activity.

III. PROCEDURES:

28 ACGME Institutional Requirements, IV.G: Leaves of absence. AOA Postdoctoral Requirements, Section VII, C.

1. A Resident must submit a written request, to his/her Program Director, that outlines the type of leave and duration of leave. All leave of absence request must then follow the AdventHealth Orlando procedure as set forth in ADVENTHEALTH ORLANDO SOP#800.216A.
2. Requests for leave are required at least thirty (30) days prior to the inception of the leave, except in cases of emergent or urgent need.
3. Written approvals must be documented and sent to the ADVENTHEALTH ORLANDO GME HR Coordinator. Leave must be documented in the Resident training record on New Innovations RMS and include the duration and type of leave, paid or unpaid, and whether or not it will result in extended training.
4. In any case in which a resident is absent for three (3) or more days due to medical reasons, the resident will require a health clearance to return to work, from the AdventHealth Orlando Employee Health Clinic and/or the resident's personal medical provider, as outlined in AdventHealth Orlando Policy #815.026 - Employee Illness & Injury.

IV. TYPES OF LEAVE

1. Residents and Fellows may be granted the following types of leave:
 - a. Family/Medical Leave of Absence (FMLA) - includes birth or placement (adoption) of a child, care for a spouse, child, or parent, and serious health conditions.
 - b. Extended Sick Leave - Employees may require additional time off from work for the treatment of an on or off-the-job injury, illness or medical condition after exhausting a statutory or Hospital medical leave.
 - c. Administrative Leave - Follows AdventHealth Orlando Fitness for Duty Policy #800.257.
 - d. Other/Personal Leave
2. Eligibility and Benefits of each type of leave follow the AdventHealth Orlando Leave of Absence Policy #800.216. All AdventHealth Orlando Policies can be found on the AdventHealth Orlando Intranet.

V. EFFECTS OF LEAVE:

1. Depending on the length of leave, the particular specialty or subspecialty Board certification requirements, or the requirements of Hospital or its training programs, Residents/Fellows may be required to extend their appointment to make up for time lost from their training program while on leave. The Resident's additional time away must be made up immediately and consecutively, within the academic year in which the leave is taken. There is no guarantee that after a Leave of Absence a resident will complete their training program as originally planned.
2. Upon Program Director approval of leave, Resident should arrange an appointment with the Program Director to obtain further information in regard to how a leave of absence could affect specific program completion and board exam eligibility. The Resident can also contact the board directly.

Resident Supervision

1. The Program Director and Assistant Program Director will monitor the program's supervision of residents and ensure that supervision is consistent with:
 - Provision of safe and effective patient care

- Educational needs of residents
 - Progressive responsibility appropriate to residents' level of education, competence and experience
2. All patient care must be supervised by qualified faculty. Faculty schedules must be structured to provide residents with continuous supervision and consultation. The Program Director must ensure, direct and document adequate supervision of physicians in training at all times as mandated by the appropriate accrediting body. This will be accomplished by having direct availability of residents to supervising staff by direct contact or consultation through teleradiology.
- Residents will have graduated responsibilities based upon the year of training and the individual resident's capability. These responsibilities will be based upon the established goals and objectives for each subspecialty.
 - Faculty and residents must be educated to recognize the signs of fatigue, and apply policies to prevent and counteract its potential negative effects.



AdventHealth Orlando Radiology Diagnostic Residency Program

Resident General Responsibilities

Residents entering the Radiology Residency Program as R1 and will assume general imaging duties, as well as, rotational training level-specific tasks and responsibilities as outlined below, with a programmed graduated increase in degree of independence determined by level of training and individual progress, as determined by faculty evaluation. Radiology faculty provides appropriate supervision and must review ALL studies performed by residents during their four years of radiology residency training.

General Responsibilities of Residents During Their Radiology Rotations

1. Attend all conferences, categorical courses, and film review sessions that are part of teaching activities of the department.
2. Share in the faculty responsibility for patient care and appropriate completion of procedures in general radiology diagnosis at AdventHealth Orlando.
3. Consult on cases as appropriate, with assistance and supervision from radiology faculty.
4. Gradually join the call schedule rotation after appropriate training and verification of readiness, as outlined under call responsibilities section.
5. Provide confidential evaluations of individual rotations, teaching programs and supervising faculty in timely manner, submitted through the Residency Coordinator.
6. Participate in in-training exams, Raphex exams, mock oral board exams and other exams or evaluations conducted by the faculty to assess resident performance.
7. Mentor fellow radiology residents at lower levels of training.
8. Serve as clinical instructor for medical students taking radiology elective courses. Assist with instruction of house staff from other services on clinical rotations in radiology.
9. Present cases, seminars and research work as assigned for intra- and interdepartmental conferences.
10. Keep up-to-date your PLP and CVs at all times.
11. **Maintain a logbook** of all procedures according to guidelines in the Resident Manual.
12. Perform other duties as appropriate when assigned by the faculty or Program Director.

Evaluation System

AdventHealth Orlando meets the ACGME requirement for a variety of valid and reliable evaluations of each competency. A 360° evaluation process is in place to assess all core competencies. **All** evaluations are kept confidential. The different types of evaluations used in this program are described below.

360° Evaluation – The 360° evaluation, with attention to the six core competencies and radiology milestones, includes the following:

1. Monthly *formative* faculty evaluation of residents
2. Monthly *formative* resident evaluation of faculty
3. Monthly *formative* resident evaluation of the rotation
4. Monthly *formative* technologist evaluation of residents
5. Monthly *formative* nurse evaluation of residents (*rotation specific*)
6. Monthly *formative* patient evaluations (*procedural-based rotations*)
7. Semi-annual *formative* self-reflection evaluation
8. Semi-annual core faculty evaluation of the resident (*using radiology milestones*)
9. Semi-annual program director *summative* evaluation
10. Resident annual *summative* evaluation of program
11. Resident annual *formative* peer evaluation
12. Completion of residency training evaluation (*end of 4-year program*)

1. Monthly faculty *formative* (constructive) evaluation of residents:

- Residents undergo monthly electronic evaluation by various faculty members that the resident is exposed to during each rotation. These evaluations include constructive criticism information on the six core competencies: patient care, medical knowledge and clinical performance, interpersonal/communication skills, practice-based learning and improvement, professionalism, and systems-based practice.
- The evaluations are electronically submitted by the faculty member through New Innovations. The PC is responsible for collating the data which will be discussed at Educational Committee Meetings and with the PD biannually. The collated data are placed in the resident's portfolio.
- The evaluations will remain confidential, to be discussed with the resident as part of their semi-annual program director evaluation. Residents may view evaluations on line through New Innovations at any time.

2. Monthly resident *formative* (constructive) evaluation of faculty:

- Faculty undergo monthly electronic evaluation by residents. These evaluations include constructive criticism information on the six core competencies (as already listed).
- The evaluations are electronically submitted by the resident through New Innovations. The PC is responsible for collating the data which will be discussed quarterly at Faculty Meetings.

3. Monthly resident *formative* (constructive) evaluation of rotation:

- Residents are to evaluate each rotation, at the end of rotation. These evaluations include constructive criticism. All suggestions and/or critiques are reviewed by the educational committee and changes are voted on and implemented.
- The evaluations are electronically submitted by the resident through New Innovations. The PC is responsible for collating the data which will be discussed quarterly at Faculty Meetings.

4. Monthly *formative* (constructive) technologist evaluation:

- Residents receive *formative* (constructive criticism) evaluations from selected technologists that they are exposed to during various rotations. These evaluations include information on the six core competencies (as already listed) as appropriate for a technologists' assessment of resident performance.

- Evaluation forms used are those recommended by the ACME. Data collected will be collated biannually by the program coordinator, copied and shared with the residents in an anonymous format. The technologist reviewers are from AdventHealth Orlando and FRi campuses and their identity are kept confidential and reviewed with program director semi-annually.

5. Monthly *formative* (constructive) nurse evaluation:

- Residents receive *formative* (constructive criticism) evaluations from selected technologists that they are exposed to during various rotations. These evaluations include information on the six core competencies (as already listed) as appropriate for a nurses' assessment of resident performance.
- Evaluation forms used are those recommended by the ACME. Data collected will be collated biannually by the program coordinator, copied and shared with the residents in an anonymous format. The nurse reviewers are from AdventHealth Orlando and FRi campuses and their identity are kept confidential and reviewed with program director semi-annually.

6. Monthly *formative* (constructive) patient evaluation:

- Residents will receive anonymous written *formative* survey evaluations of their performance from patients they care for during various rotations. These evaluations include information relevant to the core competencies, specifically patient care, clinical performance, interpersonal/communication skills and professionalism.
- The evaluations are forwarded to the Resident Coordinator who is responsible for collating the results and placing them in the resident's portfolio. The evaluations remain confidential (the patient's or guardians name who filled out the survey will remain confidential). The patient evaluations are reviewed with the resident as part of their semi-annual program director evaluation.

7. Semi-annual *formative* self-assessment:

- Residents are asked to fill out a semi-annual self-assessment *formative* evaluation where they reflect on their goals and accomplishments during the prior six-month period. The resident discusses their self-evaluation with the PD biannually. Plans for reaching new goals for the following year will be discussed.

8. Semi-annual Core Faculty evaluation of residents using the Radiology Milestones:

- The Core Faculty will evaluate each resident using the Radiology Milestones. These evaluations will be reviewed with the Educational Team, Program Director, and Assistant Program Director during Clinical Competency Committee Meetings. The results of the evaluations will be used to consider the resident for promotion to the next training year level and/or graduate the resident at the end of the residency. The results of the evaluations will be discussed with the resident during the semi-annual review.

9. Semi-annual Program Director *summative* evaluation:

- The PD conducts a biannual *summative* evaluation with each resident. At this meeting, the resident is given the opportunity to discuss individual and collated evaluations that he/she has received. In doing so, the resident will be given an opportunity to explain their understanding/interpretation of any negative or controversial evaluations received. The resident will be given an opportunity to ask questions.
- The PD prepares a semi-annual *summative* evaluation that rates the resident as approved to remain in the program, recommended to enter remediation or probation, or recommend to not remain in the program. The resident signs the evaluation form to document that they have participated in the process and understand the outcome of the evaluation review session.
- In exceptional cases, the resident may later be given a summary of the discussion. Any resident entering remediation or probation status will be told that his/her performance must improve or he/she will not be retained by the program. In the case of receiving remediation or probation status, the resident will receive guidelines which he/she will be later reevaluated.

10. Resident *summative* annual evaluation of program:

- Residents will complete a yearly electronic evaluation of the program. These evaluations include constructive criticism information on the six core competencies: patient care, medical knowledge and clinical performance, interpersonal/communication skills, practice-based learning and improvement, professionalism, and systems-based practice.
- The evaluations are electronically submitted by the resident through New Innovations. The PC is responsible for collating the data which will be discussed at Educational & Faculty Meetings.

11. Yearly *formative* (constructive) peer review:

- Residents receive a yearly written *formative* peer evaluation from each of their fellow residents in the program. These evaluations include information on the six core competencies: patient care, medical knowledge and clinical performance, interpersonal/communication skills, practice-based learning and improvement, professionalism, and systems-based practice.
- Peer evaluations remain confidential, to be reviewed with the resident as part of their semi-annual program director evaluation. Data collected will be shared with the resident annually in an anonymous format so that the resident peer reviewers' identity is kept confidential.

12. Completion of residency training evaluation (*end of 4-year program*):

- At the completion of the residency training program, the PD will sign and date a completion of residency training evaluation that rates the resident as either “outstanding”, “good”, “satisfactory”, or “marginally” approved. This form will serve to document the successful completion of the residency training program.
- Should resident evaluation/performance result in a probationary status, this probationary status must be removed before any letters of recommendation or ABR Certifying Boards administrative information will be sent.

ACGME Milestones

PCTS1: Consultant

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|--------------------------|---|---|---|---|--|
| | <p>Uses established evidence-based imaging guidelines such as American College of Radiology (ACR) Appropriateness Criteria</p> <p>Appropriately uses the Electronic Health Record to obtain relevant clinical information</p> | <p>Recommends appropriate imaging of common* conditions independently</p> | <p>Recommends appropriate imaging of uncommon* conditions independently</p> | <p>Integrates current research and literature with guidelines, taking into consideration cost effectiveness and risk-benefit analysis, to recommend imaging</p> | <p>Participates in research, development, and implementation of imaging guidelines</p> |

PCTS2: Competence in procedures

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|--------------------------|---|---|---|--|---|
| | Competently performs basic procedures* under indirect supervision | Competently performs intermediate procedures, as defined by the residency program | Competently performs advanced procedures, as defined by the residency program | Able to competently and independently perform the following procedures: - adult and pediatric fluoro studies - lumbar puncture - image-guided venous and arterial access - hands-on adult and pediatric ultrasound studies - drainage of effusions and abscesses - image-guided biopsy - nuclear medicine I-131 treatments (< 33 and > 33 mCi) | Able to teach procedures to junior-level residents Competently performs complex procedures, modifies procedures as needed, and anticipates and manages complications of complex procedures |
| | Recognizes and manages complications of basic procedures | Recognizes and manages complications of intermediate procedures | Recognizes and manages complications of advanced procedures | | |

MK1: Protocol selection and optimization of images

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|--------------------------|---|--|--|--|---|
| | Selects appropriate protocol and contrast agent/dose for basic imaging, including protocols encountered during independent call as defined by the residency program | Selects appropriate protocols and contrast agent/dose for intermediate imaging as defined by the residency program | Selects appropriate protocols and contrast agent/dose for advanced imaging as defined by the residency program | Independently modifies protocols as determined by clinical circumstances | Teaches and/or writes imaging protocols |
| | Recognizes sub-optimal imaging | | Demonstrates knowledge of physical principles to optimize image quality | Applies physical principles to optimize image quality | |

MK2: Interpretation of examinations

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|--------------------------|--|--|--|--|--|
| | Makes core observations, formulates differential diagnoses, and recognizes critical findings | Makes secondary observations, narrows the differential diagnosis, and describes management options | Provides accurate, focused, and efficient interpretations | Makes subtle observations | Demonstrates expertise and efficiency at a level expected of a subspecialist |
| | Differentiates normal from abnormal | | Prioritizes differential diagnoses and recommends management | Suggests a single diagnosis when appropriate | |
| | | | | Integrates current research and literature with guidelines to recommend management | |

SBP1: Quality Improvement (QI)

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|--------------------------|---|---|---|--|---|
| | Describes departmental QI initiatives | Incorporates QI into clinical practice | Identifies and begins a systems-based practice project incorporating QI methodology | Completes a systems-based practice project as required by the ACGME Review Committee | Leads a team in the design and implementation of a QI project |
| | Describes the departmental incident/occurrence reporting system | Participates in the departmental incident/occurrence reporting system | | Describes national radiology quality programs (e.g., National Radiology Data Registry, accreditation, peer-review) | Routinely participates in root cause analysis |

SBP2: Health care economics

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|--------------------------|---|---|--|---|---------------------------------------|
| | Describes the mechanisms for reimbursement, including types of payors | States relative cost of common procedures | Describes the technical and professional components of imaging costs | Describes measurements of productivity (e.g., RVUs) | Describes the radiology revenue cycle |

PBLI1: Patient safety: contrast agents; radiation safety; MR safety; sedation

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|--------------------------|--|--|--|--|--|
| | Contrast Agents: Recognizes and manages contrast reactions | Contrast Agents: Re-demonstrates recognition and management of contrast reactions | Contrast Agents: Re-demonstrates recognition and management of contrast reactions | Contrast Agents: Re-demonstrates recognition and management of contrast reactions | Contrast Agents: Teaches appropriate treatment of contrast reactions |
| | Radiation Safety: Describes the mechanisms of radiation injury and the ALARA ("as low as reasonably achievable") concept | Radiation Safety: Accesses resources to determine exam-specific average radiation dose information | Radiation Safety: Communicates the relative risk of exam-specific radiation exposure to patients and practitioners | Radiation Safety: Applies principles of Image Gently and Image Wisely | Radiation Safety: Promotes radiation safety |
| | MR Safety: Describes risks of MRI | MR Safety: Accesses resources to determine the safety of implanted devices and retained metal | MR Safety: Communicates MR safety of common implants and retained foreign bodies to patients and practitioners | MR Safety: Applies principles of MR safety including safety zones and pre-MR screening | MR Safety: Participates in establishing or directing a safe MR program |
| | | | | Sedation: Describes the principles of conscious sedation | Sedation: Selects appropriate sedation agent and dose for conscious sedation |

PBLI2: Self-Directed Learning

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|--------------------------|--|--------------------------------------|--------------------------------------|--------------------------------------|--|
| | Develops an annual learning plan based on self-reflection and program feedback | Evaluates and modifies learning plan | Evaluates and modifies learning plan | Evaluates and modifies learning plan | Advocates for lifelong learning at local and national levels |

PBLI3: Scholarly activity

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|--------------------------|--|---|--------------------------|--|---|
| | Documents training in critical thinking skills and research design | Works with faculty mentors to identify potential scholarly projects | Begins scholarly project | Completes and presents a scholarly project | Independently conducts research and contributes to the scientific literature and/or completes more than one scholarly project |
| | | | | | Completes an IRB submission |

PROF1: Professional Values and Ethics

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|--|
| | Demonstrates the following professional behaviors: recognizes the importance and priority of patient care and advocates for patient interests; fulfills work-related responsibilities; is truthful; recognizes personal limitations and seeks help when appropriate; recognizes personal impairment and seeks help when needed; responds appropriately to constructive criticism; places needs of patients before SELF; maintains appropriate boundaries with patients, colleagues, and others; | Is an effective health care team member | Is an effective health care team leader, promoting primacy of patient welfare, patient autonomy, and social justice | Serves as a role model for professional behavior | Participates in local and national organizations to advance professionalism in radiology |
| Demonstrates professional behaviors listed in the second column | | Demonstrates professional behaviors listed in the second column | | Demonstrates professional behaviors listed in the second column | |
| | | | | | Mentors others regarding professionalism and ethics |

| | | | | | |
|---|--|--|--|--|--|
| exhibits tolerance and acceptance of diverse individuals and groups; maintains patient confidentiality; fulfills institutional and program requirements related to professionalism and ethics; attends required conferences | | | | | |
|---|--|--|--|--|--|

ICS1: Effective communication with patients, families, and caregivers

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|--------------------------|--|--|--|---|--|
| | Communicates information about imaging and examination results in routine, uncomplicated circumstances | Communicates, under direct* supervision, in challenging circumstances (e.g., cognitive impairment, cultural differences, language barriers, low health literacy) | Communicates, under indirect* supervision, in challenging circumstances (e.g., cognitive impairment, cultural differences, language barriers, low health literacy) | Communicates complex and difficult information, such as errors, complications, adverse events, and bad news | Serves as a role model for effective and compassionate communication |
| | Obtains informed consent | Communicates, under direct supervision, difficult information such as errors, complications, adverse events, and bad news | | | Develops patient-centered educational materials |

ICS2: Effective communication with members of the health care team

| Has not achieved Level 1 | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|--------------------------|--|--|---|--|---|
| | Adheres to transfer-of-care policies | Written/Electronic: Efficiently generates clear and concise reports that do not require substantive faculty member correction on routine cases | Written/Electronic: Efficiently generates clear and concise reports that do not require substantive faculty member correction on common complex cases | Written/Electronic: Efficiently generates clear and concise reports that do not require substantive faculty member correction on all cases | Leads interdisciplinary conferences |
| | Written/Electronic: Generates accurate reports with appropriate elements required for coding | | | | Written/Electronic: Generates tailored reports meeting needs of referring physician |
| | Verbal: Communicates urgent and unexpected findings according to institutional policy and ACR guidelines | Verbal: Communicates findings and recommendations clearly and concisely | Verbal: Communicates appropriately under stressful situations | Verbal: Communicates effectively and professionally in all circumstances | Develops templates and report formats |
| | | | | | Verbal: Serves as a role model for effective communication |

Resident Evaluation of Faculty (End of Rotation)

CONFIDENTIAL EVALUATION

Instructions:

Formative (constructive) evaluation of faculty, following the end of each rotation. Reviewed quarterly with the Radiologists at the Educational Meetings.

| | |
|---|---------------------|
|  | Subject Name |
| | Status |
| | Employer |
| | Program |
| | Rotation |
| | Evaluation Dates |
| Evaluated by: | |
| Evaluator Name | |
| Status | |
| Employer | |
| Program | |

1* Faculty should promote excellent and thorough patient care (Patient Care) - teaches how to gather essential and accurate patient information - teaches how to develop a diagnostic plan and implementing the plan - improves learners bedside and physical examination skills - assists in counseling patients and families

| 1* Poor Competence | 2 Below Average Competence | 3 Average Competence | 4 Above Average Competence | 5* Excellent Competence (top 10%) |
|-----------------------|----------------------------|-----------------------|----------------------------|-----------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

2* Faculty should teach thoroughly and effectively (Medical Knowledge) - gives resident feedback during the rotation about how the resident is performing - gives learner regular, useful feedback on performance - gives frequent high-quality teaching experience by varying teaching methods - encouraged residents to pursue the literature and answer specific questions - incorporated learning topics as outlined by the curriculum - regularly takes time out of work to teach resident how to recognize a diagnosis and associated image findings on an imaging study - maintains updated expertise by citing recent literature and new technology to residents

| 1* Poor Competence | 2 Below Average Competence | 3 Average Competence | 4 Above Average Competence | 5* Excellent Competence (top 10%) |
|-----------------------|----------------------------|-----------------------|----------------------------|-----------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

3* Faculty should investigate and evaluate patient care practice, appraise and assimilate scientific evidence in order to improve their practices (Practice-based Learning and Improvement) - integrates imaging findings and clinical history to narrow the differential diagnosis - asked team members to discuss alternative management options for patients - organizes time to balance both teaching and care giving - started and finished work on time - minimized delays and interruptions

| 1* Poor Competence | 2 Below Average Competence | 3 Average Competence | 4 Above Average Competence | 5* Excellent Competence (top 10%) |
|-----------------------|----------------------------|-----------------------|----------------------------|-----------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

4* Faculty should communicate and teach effectively (Interpersonal and Communication Skills) - made learners feel comfortable asking questions - established a good learning environment, enthusiastic, encouraging, collaborative - inspired learners to learn on their own

| 1* Poor Competence | 2 Below Average Competence | 3 Average Competence | 4 Above Average Competence | 5* Excellent Competence (top 10%) |
|-----------------------|----------------------------|-----------------------|----------------------------|-----------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

5* Faculty should be accountable and adhere to principles of medical ethics by respecting resident learners (Professionalism) - expressed respect for learners; approachable, non-threatening, professional - communication goals; emphasized learning goals with me throughout the rotation - speaks well of other staff in front of colleagues or residents - disagrees with a resident's interpretation with being insulting - handles interruptions effectively - regularly attends scheduled conferences/lectures

| 1* Poor Competence | 2 Below Average Competence | 3 Average Competence | 4 Above Average Competence | 5* Excellent Competence (top 10%) |
|-----------------------|----------------------------|-----------------------|----------------------------|-----------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

6* Faculty should understand healthcare practice (Systems-Based Practice) - demonstrates knowledge and applies appropriateness criteria and other cost-effective healthcare principles to professional practice - understands the role of regulatory agencies and licensing regulations - knowledge of financing and reimbursement methods

| 1* Poor Competence | 2 Below Average Competence | 3 Average Competence | 4 Above Average Competence | 5* Excellent Competence (top 10%) |
|-----------------------|----------------------------|-----------------------|----------------------------|-----------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

7 Should this faculty member be considered for the Resident Teacher of the Year Award?

| Yes | No | Maybe |
|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Overall Comment *

Nurse/Tech Evaluation of Resident

This evaluation is confidential.

Instructions:
Upon completion, please put it in the Radiology Residency Coordinator's mailbox. These evaluations need to be done no less than monthly, but preferably as often as possible.

| | |
|---|---------------------|
|  | Subject Name |
| | Status |
| | Employer |
| | Program |
| Relation | |
| Evaluation Dates | |
| Evaluated by: Evaluator Name | |
| Status | |
| Employer | |
| Program | |

1 Evaluator/Rater's role in clinical setting:

Rating Scale:

1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree N/A = Not applicable or inadequate information

2 The resident consistently maintains respectful relationships with patients and members of their support system

| | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | N/A |
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> |

3 The resident consistently maintains respectful relationships with other members of the treatment team.

| | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | N/A |
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> |

4 The resident communicates effectively through verbal and non-verbal means.

| | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | N/A |
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> |

5 The resident communicates effectively in writing.

| | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | N/A |
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> |

6 The resident consistently displays professional and ethical behavior.

| | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | N/A |
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> |

7 The resident demonstrates appropriate understanding of the roles of treatment team members and other coworkers.

| | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | N/A |
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> |

9 The resident works effectively with other systems or agencies.

| | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | N/A |
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> |

10 Overall Comments

Overall Comment

Patient Care Evaluation of Resident

Instructions:
This evaluation is confidential. Upon completion, please put in the Radiology Residency Coordinator's mailbox. These evaluations need to be done no less than monthly, but preferably as often as possible.

| | |
|---|---------------------|
|  | Subject Name |
| | Status |
| | Employer |
| | Program |
| Rotation | |
| Evaluation Dates | |
| Evaluated by: Evaluator Name | |
| Status | |
| Employer | |
| Program | |

1* Department: Please Select

- IR
- Fluoro
- US
- NM
- MRI
- CT
- Neuro
- Peds
- FRI/Womens
- N/A

2 Overall Satisfaction (Select one: 1 = very poor.....10 = excellent)

| | | | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Very Poor | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Excellent |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <input type="radio"/> |

Comment

3 Introduced him/herself to you and your family

- Yes
- No

4 Was polite and considerate at all time

- Yes
- No

5 Was your exam started in a timely manner

- Yes
- No

6 Listened carefully to your concerns and questions

- Yes
- No

7 Explained risk and benefits of the procedure in a clear fashion

- Yes
- No

8 Discussed results of procedure to your satisfaction

- Yes
- No

9 Gave good, clear, accurate instructions for post-care

- Yes
- No

10 Please share any compliments or suggestions you might have:

Comment

Overall Comment

Resident Self-Reflection **Semi-Annually**

Instructions:

Reflection is the way we mature as professionals and judge our progress with regard to internal goals rather than external standards. Self-Reflection evaluations are reviewed semi-annually with Program Director.

| | |
|---|---------------------|
|  | Subject Name |
| | Status |
| | Employer |
| | Program |
| Evaluation Dates | |
| Evaluated by: Evaluator Name | |
| Status | |
| Employer | |
| Program | |

1 Reflect on this academic period: List 2 or 3 things you wish you would have known before this academic period. List information which you have learned during this period that you think will be most helpful to the class of residents below you

Comment

2 Exams taken (ACR in-training, written, oral, USMLE, physics boards, etc). Scores: Strengths, Weaknesses; Goal (with plan):

Comment

3 Did you do required self-study (10 learning file cases per day & required rotational readings)? If not, why not.....

Comment

4 Case Logs: Number of case logs submitted to ACGME? Interventional Logs? Nuclear Medicine Procedures?

Comment

5 Duty Hours documented on/before deadline? Portfolio kept up-to-date at all times? Case Logs kept up-to-date at all times?

Comment

6 Participation in Internal Review of Radiology Residency? Hospital Committee or Residency Committee memberships? Participated in the Residency Interview Season? Nominated for anything? Documented in your PLP & CV?

Comment

7 Did you participate in any QA/QI projects? Did you attend all required departmental QA/QI meetings?

Comment

8 Resident lecture, journal club, publication, poster and/or QA/QI project prepared & presented? Included in your PLP?

Comment

9 Professional meetings attended? Publications, posters, oral presentations, journal clubs? Added to your CV and/or portfolio? Career Planning?

Comment

Overall Comment

Semi-Annual Evaluation

| |
|--|
| <i>Patient Care</i> |
| Invasive Procedure Logs |
| PCTS1 Evaluation Competency- Rated Average (Faculty) |
| PCTS2 Evaluation Competency- Rated Average (Faculty) |
| 360 ^o Evaluations (Nurse, Tech, Patient) |
| <i>Medical Knowledge</i> |
| RadPrimer Tests – Post Test Average |
| RadPrimer Tests – Total Questions Answered/Assignments |
| Physics Lecture Quizzes (R1 Goal: 60%, R2 Goal: 75%) |
| In-Service Exam Overall % Rank |
| Mock Oral Exam Score Percentile |
| Physics Exam Scores (DXIT) % Rank |
| Ultrasound Bootcamp Test Score |
| Contrast Reaction Simulation Test Score |
| ER Simulation Test Score |
| CME Transcripts (Tumor boards) |
| CME Learning Modules (ACR Image Wisely, Pediatric Learning Modules, Radiation Safety and Exposure) |
| MK1 Evaluation Competency- Rated Average (Faculty) |
| MK2 Evaluation Competency- Rated Average (Faculty) |
| <i>Practice-Based Learning</i> |
| Total Didactic Exams Read |
| ACGME Case Logs |
| QA/QI Meetings |
| Departmental Meetings Attended |
| Away Meetings Attended (Days) |
| Didactic Lecture Series Conference Attendance (90% Required) |
| Physics Lecture Attendance (90% required) |
| PBLI1 Evaluation Competency- Rated Average (Faculty) |
| PBLI2 Evaluation Competency- Rated Average (Faculty) |
| PBLI3 Evaluation Competency- Rated Average (Faculty) |

| |
|---|
| <i>Interpersonal Comm. Skills</i> |
| Multidisciplinary Conf. Attendance Total (Grand Rounds, RadEndo) |
| ICS1 Evaluation Competency- Rated Average (Faculty) |
| ICS2 Evaluation Competency- Rated Average (Faculty) |
| <i>Professionalism</i> |
| Duty Hour Log Total |
| PROF1 Evaluation Competency- Rated Average (Faculty) |
| <i>Systems-Based Practice</i> |
| License Renewal (ACLS, DEA, PALS, Med License (full or temporary), BLS) |
| Committee Involvement |
| Professional Societies |
| Presentation at Journal Club/Case Review/Resident Conferences |
| Scholarly Activity |
| SBP1 Evaluation Competency- Rated Average (Faculty) |
| SBP2 Evaluation Competency- Rated Average (Faculty) |

Future Goals: _____

Self-Identified Areas for Improvement: _____

Portfolio/CV Up-to-Date: _____

Self- Reflection Completed: _____

Peer Review Completed: _____

Program Evaluation Completed: _____

Resident Evaluation of Program: Annual

Resident Summative Evaluation of Program: Annual

Instructions:
Resident Annual Evaluation of Program. Discussed annually at Educational and Faculty Meetings.

| | |
|---|---------------------|
|  | Subject Name |
| | Status |
| | Employer |
| | Program |
| | Rotation |
| Evaluation Dates | |

| | |
|---------------|-----------------------|
| Evaluated by: | Evaluator Name |
| | Status |
| | Employer |
| | Program |

1 On average, how many hours do you spend per week in assigned duties?

2 Do you average at least one day off per week? If not, which rotation(s)?

- Yes
- No

3 Do you feel that the program director and faculty members are available to you for advice and counseling?

- Yes
- No

4 Do you feel you get enough advice and counseling? Please explain.

- Yes
- No

5 Does the staff radiologist, at the beginning of each rotation, review the written goals & objectives and expectations with you? If not, on which rotation(s) did this not occur?

- Yes
- No

7 Does the residency program place excessive reliance on service as opposed to education? If yes, on which rotation(s) did this occur?

- Yes
- No

8 Is there a rapid and reliable system for you to communicate with your attending physicians? If not, on which rotation(s) are there issues and what are the issues?

- Yes
- No

9 Are you provided an adequate work area (including computer/place to hang coat)? If not, at which facilities?

- Yes
- No

10 Do you have any concerns regarding your safety while at FH or FRI? If yes, state which facilities and the time of day/night?

- Yes
- No

11 Are the library facilities adequate? If not, please comment:

- Yes
- No

Comment

12 Are you able to get enough procedures? If not, please comment on why that may be or give your suggestions for improvement.

- Yes
- No

Comment

13 My least favorite parts of the residency are:

Comment

14 My favorite parts of the residency program are:

Comment

15 What would you suggest be done to improve the diagnostic radiology residency program at FH?

Comment

Overall Comment

Comment

Annual Peer Evaluation
CONFIDENTIAL EVALUATION.

Instructions:
Yearly formative (constructive) peer evaluation. Discussed confidentially with Program Director.

| | |
|---|---------------------|
|  | Subject Name |
| | Status |
| | Employer |
| | Program |
| | Rotation |
| | Evaluation Dates |
| Evaluated by: Evaluator Name | |
| Status | |
| Employer | |
| Program | |

1* Residents should 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. Resident developed a management plan based on radiologic findings and clinical information.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | **Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|----------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

2* Resident demonstrated proper technique in planning and performing image-guided procedures.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | **Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|----------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

3* Residents should engage in continuous learning 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. Resident recognized and described relevant radiologic abnormalities.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | **Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|----------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

4* Resident synthesized radiologic and clinical information in forming an impression.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | **Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|----------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

5* Resident utilized information technology to investigate clinical questions and for continuous self-learning.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | **Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|----------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

6* Resident demonstrated a knowledge of, and aptitude with, imaging technology (imaging machines, molecular tracers, etc).

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | **Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|----------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

7* Residents should 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. Resident showed sensitivity to and communicated effectively with all members of the health care team.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | **Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|----------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

8* Were Resident Journal Clubs or Noon Conferences prepared or given? List items that need improvement and/or exceeded expectations.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | *Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|---------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

9* Resident recognized, appropriately communicated, and documented in the patient record, urgent or unexpected radiologic findings.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | *Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|---------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

10* Resident produced radiologic reports that were accurate, concise, and grammatically correct.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | *Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|---------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

11* Resident effectively taught residents, medical students, and other health care professionals.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | *Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|---------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

12* Residents should participate in evaluation of one's personal practice utilizing scientific evidence, "best practices" and self-assessment programs in order to optimize patient care through lifelong learning. Resident participated in QI (quality improvement)/QA (quality assurance) meetings and activities.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | *Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|---------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

13* Resident recognized and corrected personal errors.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | *Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|---------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

14* Residents should commit to high standards of professional conduct, demonstrating altruism, compassion, honesty and integrity, follow principles of ethics and confidentiality, and consider religious, ethics, gender, educational and other differences when interacting with patients and other members of the health care team. Resident demonstrated a responsible work ethic with regard to conference attendance and work assignments.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | *Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|---------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

15* Resident demonstrates acceptable personal demeanor and hygiene.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | *Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|---------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

16* Residents should 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. Resident demonstrates knowledge of and apply appropriateness criteria and other cost-effective healthcare principles of professional practice.

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | *Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|---------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

17* Residents should understand and apply imaging physics principles to ensure dose and image quality are appropriate. Resident demonstrated knowledge of factors impacting patient dose and imaging quality (including identification, cause, and evolution of image artifacts).

| * Poor Competence | Below Average Competence | Average Competence | Above Average Competence | *Excellent Competence (top 10%) | N/A |
|-----------------------|--------------------------|-----------------------|--------------------------|---------------------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Comment

OVERALL PERFORMANCE

Any unsatisfactory rating requires narrative comment.

Overall Comment *



Residency Training Summative Evaluation

Resident Name: _____

Training Program: AdventHealth Orlando Diagnostic Radiology Residency

Period of Training: July 1, 201- to June 30, 201-

This is to verify that _____ has successfully completed the Diagnostic Radiology Residency at AdventHealth Orlando.

Dr. ____ completed PGY-1 in _____ at _____ from _____.

Dr. ____ successfully completed our training program on June 30, 201-.

During the course of his/her training, Dr. ____ progressively gained proficiency in all areas of clinical Diagnostic Radiology. His/her skills in image perception and diagnosis aptitude steadily advanced during the course of his training. Dr. ____ achieved ongoing improvement in the six ACGME General Competencies.

The following is derived from a composite of multiple evaluation by supervisors in this resident's rotations and experiences during his/her residency training. The evaluation is based upon the Accreditation Council for Graduate Medical Education (ACGME). General Competencies, which define the essential components of clinical competence.

| | Unsatisfactory | Satisfactory |
|--|----------------|--------------|
| Medical Knowledge | | |
| Patient Care | | |
| Professionalism | | |
| Communication and Interpersonal Skills | | |
| Practice-Based Learning | | |
| Systems-Based Practice | | |

Resident performance during the final period of training was satisfactory in all evaluation sub-categories and on all evaluations. All faculty evaluations during the final year judged him competent to complete the AdventHealth Orlando Diagnostic Radiology Residency program.

In summary, I verify that _____ has demonstrated sufficient competence to enter practice without direct supervision in the specialty of Diagnostic Radiology.

 Rola Altoos, MD
 Program Director, AdventHealth Orlando
 Diagnostic Radiology Residency Program

 Date

Rotation Curriculum

2018-2019

| <u>Summary of Training</u> | <u>R1</u> | <u>R2</u> | <u>R3</u> | <u>R4</u> | <u>Total</u> |
|--------------------------------|-----------|-----------|-----------|-----------|--------------|
| Body (R1) ORL | 4 | 0 | 0 | 0 | 4 |
| Body (R2/3) PRI | 0 | 4 | 8 | 0 | 12 |
| Body – US ORL | 4 | 4 | 4 | 0 | 12 |
| Body – Fluoro ORL | 4 | 4 | 4 | 1 | 13 |
| Chest/Cardiac (6a) | 4 | 4 | 4 | 0 | 12 |
| <i>ED Night float:</i> | | | | | |
| R1: 4-12pm | 4 | 0 | 0 | 0 | 4 |
| R2-4: 1wk (4-12), 3wks (11p) * | 0 | 4 | 4 | 4 | 12 |
| IR Bx (7a) (after lecture) | 2 | 2 | 2 | 0 | 6 |
| IR Vasc (Angiography) (6:30a) | 2 | 2 | 2 | 0 | 6 |
| IR 4 th year | 0 | 0 | 0 | 12 | 12 |
| Mammo PRI | 4 | 4 | 4 | 0 | 12 |
| MSK ORL | 4 | 4 | 4 | 0 | 12 |
| Neuro ORL | 8 | 8 | 4 | 0 | 20 |
| Nuclear Medicine | 8 | 8 | 4 | 0 | 20 |
| Pathology/ AIRP | 0 | 0 | 4 | 0 | 4 |
| Peds ORL | 4 | 4 | 4 | 0 | 12 |
| Research/QI 2 wks ** | 0 | 0 | 0 | 0 | 0 |
| Rotation Electives | 0 | 0 | 0 | 35 | 35 |
| Total (in weeks) | 52 | 52 | 52 | 52 | 208 |

- Personal time off is provided per the terms of your contract. Residents receive **twenty (20) paid days off** each academic year (to include all vacation, holiday, and/or sick time). Additional days provided for interviews (R3).
- In circumstances when vacation weeks (**PDO/PLD**) remove a week of a rotation, those weeks will not be made up in the schedule during electives R4.
- It is highly recommended that residents do **not** take time off during Nuclear Medicine or Women’s rotations, as those rotations are tracked, along with I-131 therapy logs, to determine a residents’ eligibility for the Core Exam.
- Residents are *not* permitted to request rotations based on faculty.

* Overnight shifts begin strictly at 11 pm. Residents **must attend morning conference** following overnight shift from 7-7:45 am. R4 residents may attend morning conference or continue reading on rotation until 7:45 am.

** Research/QI weeks – Residents will be required to present their project to the **Program Director on the Friday of their approved Research/QI week.**

Rotation Curriculum Requirements and Example

Resident rotations are 4 weeks in length. Schedules are planned so that each resident will experience a predetermined number of rotations on each service. Because of schedule complexity, it is required that everyone take the rotations as scheduled.

In extreme cases where a rotation change must be made, the resident will work with the Program Coordinator and Chief Resident to come up with a suitable change.

Individual residents may have different rotations or amounts of time on specific rotations at the end of the first and third years. If at the end of the training program, the number of rotation graduation requirements is not completed, the resident may have to make up any missing rotations beyond graduation time, delaying receipt of the certificate of residency.



AdventHealth Orlando Diagnostic Radiology Residency Program

Overall Goals and Objective and Rotation Curriculum

Residents will rotate through the following areas: Body Imaging (GI and GU), Ultrasound, Musculoskeletal Radiology, Pediatric Radiology, Neuroradiology, Nuclear Medicine, Chest/Thoracic/Cardiac Imaging, Emergency Radiology, Vascular and Interventional Radiology, and Women's Imaging.

During Body Imaging rotation, the resident will learn the procedures and interpretation of GI fluoroscopy, GU examinations, Body CT and Body MRI.

Residents assigned to Ultrasound will learn to perform and interpret ultrasound studies, including Doppler examinations.

Residents assigned to Musculoskeletal Radiology will learn to interpret musculoskeletal radiographs, CT, US and MRI. Residents will participate in musculoskeletal procedures such as biopsies and arthrography, as appropriate.

Residents on Nuclear Medicine will participate and learn all aspects of this field including basic knowledge of radiopharmacy, nuclear physics, radiation safety, quality control, regulatory agencies, routine protocols and interpretation of images (including SPECT and PET images).

During the Chest/Cardiac rotation, the residents will participate in the interpretation of chest X-rays, chest CT, and cardiac MRI, CT, CT angiography.

Residents in Vascular and Interventional Radiology (VIR) participate in the performance and interpretation of all procedures and studies performed.

Residents on Women's Imaging will learn to interpret mammograms and assist in the performance of biopsy procedures including stereotactic and ultrasound-guided biopsy.

Residents on the Emergency Radiology rotation will learn to interpret all imaging modalities used in the Emergency Department.

Training Level Specific Roles, Responsibilities, and Functions

The roles, responsibilities and functions of the diagnostic radiology resident per training year are based on the following objectives incorporating the ACGME Developmental Milestones

R1 Year

1. Gathers information about patient's current clinical condition and prior imaging exams. (Patient Care & Technical Skills)
2. Is aware that protocols exist for various studies (Adult and Pediatric fluoroscopy; neuro, body and Peds CT; neuro, body and Peds MR; diagnostic nuclear medicine, breast imaging; IR; basic ultrasound) and where they can be found. (Medical Knowledge)
3. Completes many assigned tasks on time, but occasionally requires guidance on local practice and/or policy for patient care; attends the vast majority of educational conferences. (Professionalism)
4. Describes the important components of written communications between physicians and is aware of the contribution of poor written communication to medical error. (Interpersonal and Communication Skills)
5. Describes the mechanisms of radiation injury. (Systems-based Practice)
6. Can identify radiology –specific quality improvement. (Practice-based Learning)
7. In-depth discussion of all cases with attending prior to initiation of all but the most basic diagnostic studies or therapeutic interventions.
8. Take no supervisory role or direction of decisions of other residents or medical students, but ensure active medical student involvement.
9. All procedures must be done under direction approval and supervision of attending radiologist.
10. By completion of the first 6 months of residency and the minimum required training in core rotations, residents should be judged by the faculty to be capable of serving as the Short Call Resident, providing immediate radiographs consultation to Emergency Room and Hospital physicians.
11. By completion of the first 10 months of residency and the minimum required training in core rotations, residents should be judged by the faculty to be capable of serving as the Night Call Resident, providing immediate radiographs, CT, ultrasound and nuclear radiology consultation to Emergency Room and hospital physicians.
12. All radiology residents on R1-3 levels are required to take the Resident In-Training examination each January. Residents are expected to pass this examination with a global score of 50% or more. A performance below 30% will require performance review by Program Director. Percentile scores will be included in the yearly performance criteria required from promotion to the next year of radiology residency training.

R2 Year

1. Can arrive at a list of potential exams or procedures, and is able to discriminate the best choice in the simplest situations. This is documented or communicated as appropriate (Patient Care and Clinical Skills)
2. Is aware that protocols exist for various studies (adult and Peds fluoroscopy; neuro, body and Peds CT; neuro, body and Peds MR; diagnostic nuclear medicine, Women's imaging; IR; ultrasound) and where they can be found on [Radportal](#) website. (Medical Knowledge)
3. Routinely completes most assigned tasks on time, in accordance with local practice and/or policy for patient care; still requires guidance in more complex clinical situations and unfamiliar circumstances. (Professionalism)
4. Is proficient in speech recognition and self-editing and adheres to institutional/national policies for reporting in radiology. Radiology reports accurately describe findings in simple and emergent

- cases. Impression is clear and concise. Reports accurately identify urgent and unexpected findings. Few corrections required by attending radiologist. (Interpersonal and Communication Skills)
5. Lists resources for determining average radiation dose estimates for radiologic exam. Can describe the ALARA (as low as reasonably achievable) concept. (Systems-Based Practice)
 6. Assists, as part of a team, in the design and implementation of a quality improvement project. (Practice-Based Learning)
 7. Primarily responsible for teaching medical students.
 8. Emphasis on gaining experience with full spectrum of diagnostic and invasive radiology procedures and increasing proficiency on skills already acquired.
 9. All decisions regarding invasive radiology procedures and specialized diagnostic procedures are discussed in depth with the attending.
 10. All procedures must be done with complete attending supervision and approval.
 11. By completion of the second year of training, residents should show increased ability in interpretation of radiographs, computed tomography, ultrasound, magnetic resonance imaging and nuclear radiology studies.
 12. AIRP rotation is to be scheduled within the R2 year or within the first half of the R3 year.
 13. Research Rotation.
 14. All radiology residents are required to take the Resident In-Training examination each January. Residents are expected to pass this examination with a global score of 50% or more. A performance below 30% will require performance review by Program Director. Percentile scores will be included in the yearly performance criteria required for promotion to the next year of radiology residency training.

R3 Year

1. Can synthesize clinical information using evidence based medicine and acceptance guidelines and standards to arrive at the most appropriate exam or procedure for routine clinical situations and appropriately seeks help in arriving at the best choice for more complex clinical situations. This is documented or communicated as appropriate. (Patient Care and Technical Skills)
2. Independently chooses protocol for previous studies and low dose nuclear medicine therapy; basic OB and pediatric ultrasound. (Medical Knowledge)
3. Frequently prioritizes multiple competing demands, and completes the vast majority of his/her responsibilities in a timely manner, including more complex clinical situations; actively seeks guidance in unfamiliar circumstances. (Professionalism)
4. Accurately and efficiently dictates reports even in complex cases and demonstrates a turnaround time in-line with peers; reports for complex cases accurately convey findings and impression as discussed with attending radiologist. (Interpersonal and Communication Skills)
5. States average radiation doses of common imaging studies in adults and children (e.g., CXR, UGI, mammography, non-contrast Head CT, Abdomen CT) and can compare institutional dose to national benchmarks. (Systems-based Practice)
6. Completes quality improvement project and records performance in the learning portfolio. (Practice-Based Learning)
7. Senior residents play a supervisory role of junior residents, with increased teaching responsibilities.
8. Senior residents play an increased role in consultation with other residents or attending physicians from other clinical services.
9. Increased proficiency with full range of invasive and diagnostic procedures.
10. Must discuss all cases with attending prior to performance of vascular/interventional procedures and complex diagnostic studies.
11. Vascular Ultrasound rotation to occur this year.
12. OB Ultrasound and Cardiac rotation usually occur this year.
13. By completion of the third year of training, residents should demonstrate advanced skills in interpretation of routine and complicated imaging studies in all areas of radiology.
14. Research Rotation.

15. R3 residents should be adequately prepared to pass the ABR Core Examination, and will take it in June.
16. All radiology residents are required to take the Resident In-Training examination each January. Residents are expected to pass this examination with a global score of 50% or more. A performance below 30% will require performance review by Program Director. Percentile scores will be included in the yearly performance criteria required for promotion to the next year of radiology residency training.

R4 Year

1. Can synthesize clinical information using evidence based medicine and accepted guidelines and standards to arrive at the most appropriate exam or procedure in all but the most complex or rare clinical situations. This is documented or communicated as appropriate (Patient Care and Technical Skills).
2. Independently offers changes in protocol or alternative exam for previous studies and high dose nuclear medicine therapy; vascular and MSK ultrasound. (Medical Knowledge)
3. Effectively prioritizes multiple competing demands, and willingly works on multiple routine and complex clinical situations in a timely manner; actively and appropriately seeks guidance; oversees junior residents in the provision of care; provides them effective guidance. (Professionalism)
4. Produces a concise report with significant findings, impressions and recommendations and can accurately identify all urgent and essentially all unexpected findings in the report. (Interpersonal and Communication Skills)
5. Optimizes radiation dose for children and adults in common procedures. Describes components of Image Gently and Image Wisely. (Systems-Based Practice)
6. Leads a team in the design and implementation of a quality improvement project. (Practice-Based Learning)
7. Trainee must fulfill complete requirements for credentialing for year of training with consultation with fellowship program director.
8. Trainee must carry out procedures with attending input and supervision as required before, during and after procedure.
9. Trainee will play a major role in instruction and supervision of radiology residents as well as medical students.
10. Trainee will interact with residents and attending physicians on other services on a coequal footing in relation to procedures and diagnostic test results as part of integrated patient care team.
11. Trainee must demonstrate competence to function independently without significant faculty supervision as a general diagnostic radiologist for coverage of services outside of their subspecialty field of study, according to radiology department needs.
12. Trainee will be expected to be qualified to pass the American Board of Radiology Certifying Examination to be taken 15 months after completion of residency training.



ADVENTHEALTH ORLANDO DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAM

Resident Requirements for Advancement

Resident Promotion and Reappointment

- Successful completion of all clinical rotations. AdventHealth Orlando adheres to the ACGME standards of the six areas of clinical competency. Residents must be deemed competent or show consistent improvement in all the six areas of competency as defined in the following pages by the Association of Program Directors in Radiology (APDR).
- Resident attendance at conferences as defined in this manual.
- Residents (R1-R3) are required to take the ACR Diagnostic Radiology In-Training (DXIT) "in-service" examination (www.acr.org/Education/Exams-Certifications/DXIT-TXIT) in January. Residents are expected to pass this examination with a global score of 50% or more. A performance below 30% will require performance review by Program Director. Percentile scores will be included in the yearly performance criteria required for promotion to the next year of radiology residency training. Residents who pass the ABR Core Examination are exempt from this requirement.
- Residents are expected to fill out monthly evaluations on the faculty involved in their instruction as well as their peers. They need to be completed online **within two weeks** of completing the rotation.
- Residents are expected to attend and participate in the Quarterly Quality Assurance/Improvement conferences.
- The department adheres to GME policies in regards to disability and sick time, but if that time is in excess of 10 days per year, the residency committee will review the resident's activities to determine if additional days of training need to be added to that year before advancement to the next year or graduation from the program.

Resident in Good Standing Policy

To establish criteria for a resident to be considered in good standing by his or her program, to identify performance deficiencies that may affect a resident's standing, and to define adverse actions of performance deficiencies.

POLICY:

A resident whose performance conforms to established evaluation criteria in a consistent and satisfactory manner will be considered to be in "good standing" with the program and institution. Misconduct, failure to comply with the policies and procedures governing the program or unsatisfactory performance based on one or more evaluations may adversely affect the residents' standing in the program. The minimum criteria for a resident to be considered to be in good standing, adverse actions that affect standing, and academic actions in case of performance deficiencies are set forth below:

1. A resident in good standing meets the following expectations:

- Satisfactory completion or expected completion of training requirements based on the expectations for the resident's post graduate year (PGY).
 - Satisfactory overall performance based on faculty evaluations.
 - Documented competence commensurate with current level of training.
 - Successful completion and passing of the USMLE Step 3 or Comlex Level 3 exam, prior to entering the PGY-2 level.
 - Full compliance with all terms of the resident agreement.
2. Good standing may be adversely affected by:
- Misconduct, lapses of professionalism, or unethical behavior
 - Failure to comply with bylaws, policies, procedures, rules regulations of sponsoring and affiliated institutions, departments, or medical staff.
 - Unsatisfactory clinical performance based on documented evaluations.
 - Below satisfactory academic performance based on relevant exam scores.
 - Failure to satisfy licensure, visa, immunization, registration or other eligibility requirements for training.
 - Delinquent chart completion, inpatient or outpatient.
3. Academic actions in case of performance deficiency. If at any time the Program Director, in concurrence with the Clinical Competency Committee (CCC), determine that a resident is deficient in any of the criteria set forth in this document, one or more academic actions may be taken. These actions may include, but are not limited to the following:
- a. Counseling:**
- i. The purpose of counseling, whether verbal or written, is to give the resident specific notice of performance deficiencies and their possible effect on current standing.
 - ii. Counseling period may vary, but must be specified in writing by the program and give trainee a meaningful opportunity to remedy the identified performance problems. Documentation must be maintained at department level.
 - iii. Possible outcomes after counseling are return to good standing, probation, and or non-promotion.
- b. Probation with Remediation:**
- i. A resident who is in jeopardy of not successfully completing requirements of their program may be placed on probation.
 - ii. Probationary status will be communicated verbally and in writing, and will include a description of reasons for probation and required remedial activity.
 - iii. Actions to take place should fail to fulfill corrective actions during a probationary period are outlined in the AdventHealth Orlando GME Disciplinary Policy.
 - iv. Probation will result in adverse reporting to external entities, including, but not limited to, accreditation agencies, potential employers, credentialing committees, and state medical boards.
- c. Other academic actions as stipulated in the AdventHealth Orlando GME Manual:**
- i. These actions include, but are not limited to: suspension, non-promotion, and dismissal from the program.

Radiology Residency Resident Promotion and Dismissal Policy

ADVENTHEALTH AdventHealth Orlando residents with standards for promotion to each successive level of the residency training. As such:

- A. There shall be evaluations for each resident, which shall be augmented by other evaluation methods, including a 360 evaluation, and other relevant observations.
- B. Residents must meet standards for promotion as defined by the Residency Review Committee and the program.
- C. If significant deficiencies in the resident's performance are identified, a counseling plan will be given to the resident in both verbal and written notification in accordance with the program's Resident in Good Standing Policy.
 - (1) Resident failing to demonstrate satisfactory progress of performance or achieve specified performance goals may be dismissed from the training program with four (4) months' notice (if possible).
- D. If a resident will not be promoted, the program director will notify the resident in both verbal and written notification.

Resident Dismissal Procedures:

A. AdventHealth Orlando GME training programs subscribe to a policy that residents may be dismissed for cause including but not limited to:

- Failure to fulfill probationary corrective actions;
- Unsatisfactory academic and/or clinical performance;
- Failure to appear for duty when scheduled without notification to the program;
- Failure to comply with the rules and regulations of the residency program;
- Revocation, suspension or restriction of license to practice medicine;
- Theft;
- Unprofessional behavior;
- Insubordination;
- Use of professional authority to exploit others;
- Conduct that is detrimental to patient care; and,
- Falsification of information in patient charts or other documents of the residency program.

B. The Program Director, who is considering dismissing a resident shall consult with the resident's Advisor/Mentor, the Director and DIO who will compose the Dismissal Panel. The process for dismissal shall be:

- (1) The resident will be notified in writing that the program is considering dismissal. The reasons dismissal is being considered must be included;
- (2) Upon notification, the resident will have an opportunity to meet with the Dismissal Committee to present oral and written support for his/her position in response to the reasons for the action set forth by the program director; and,
- (3) If after the meeting (or, if the resident declines to meet, after the opportunity to meet is provided), the program director determines that dismissal is still recommended, the resident will be informed of the dismissal in writing and offered a hearing regarding the dismissal.

Chief Resident Election Process

The process for electing the chief resident position will involve both faculty and resident input. The election for the chief resident position will occur in May of each year.

The residents will first have an anonymous, electronic vote, that will be reviewed by the program director, assistant program director, and program coordinator. The core faculty will review, in a closed Residency Education Committee Meeting, the names of those that have been proposed to serve as chief resident.

The program director and assistant program director will use the input from both the anonymous, electronic vote and the core faculty to make the final decision for chief resident. The chief resident will be individually notified one week before graduation, and the formal announcement of the chief resident position will be made at the annual graduation ceremony.

Chief Resident Duties

The chief resident(s) position is to serve as an advocate for his/her cohorts, as well as to serve as a main line of communication from the program coordinator and program director/assistant program director. Specific responsibilities are as follows:

Schedule

- annual resident rotation schedule planning
- weekly resident rotation schedule planning (determining which available attendings will work with residents on a weekly basis, coordinate with the Program Coordinator)
- monthly moonlighting schedule (or can delegate to a junior/senior level radiology resident, if interested)
- Monthly attending lecture schedule

Meetings

- attend the monthly Residency Education Committee meeting
- coordinate with Residency Association representative (for radiology) and disperse to all residents pertinent information
- plan the yearly resident retreat (or can delegate to a junior/senior level radiology resident, if interested)
- plan the resident team-building activity/workshop (every other month)
- CLER site visit liaison (or can delegate to a junior/senior level radiology resident)

Events

- provide AM or PM lecture for new resident orientation
- organize welcome party for new resident orientation (coordinate with faculty members)
- organize graduation ceremony award nomination process
- organize RSVP cares resident participation (or can delegate to a junior/senior level radiology resident)

Recruitment/Interviews

- schedule residents to attend the residency interview dinners
- participate as an interviewer in the residency interview process
- Monitor Aunt Minnie and student doctor network forums for comments about our program

Visiting Professor

- coordinate hospital/worksite tour for Visiting Professors
- coordinate transportation for Visiting Professor to and from the airport

Day-to-Day Operations

- concerns from residents should be presented first to the chief resident, who will solicit input from other residents to understand the full scope of a potential issue
- chief resident will then discuss with Program Coordinator, who then if needed can present the concern together to the Program Director or Assistant Program Director

Website

- Manage website for updates and add residency photos

AdventHealth Orlando Diagnostic Radiology Residency

Body Imaging Goals and Objectives

Training Locations: Orlando/FRI Princeton

Many of the goals and objectives apply to all rotations and are listed below. Those goals that are more specific to a rotation are listed separately.

Body Imaging Curriculum

The educational curriculum in Body Imaging is comprised primarily of the rotations through the Body Imaging Section at AdventHealth Orlando where the faculty provide direct training and supervision; as well as, a comprehensive series of lectures and conferences in Body Imaging. Correlation is made on a case-by-case basis with other imaging modalities, facilitated by the PACs system. A series of interdepartmental conferences, grand rounds, Journal Clubs, meetings and other venues are expected to enhance the residents' knowledge of Body Imaging.

Because a full outline of disease entities and conditions is provided under each organ system elsewhere in the Radiology Residency Curriculum, a summarized curriculum for the Body Imaging Section follows:

- A review of the principles of physics and instrumentation/technology that underlie CT, GI/GU, and MRI imaging.
- A review of the normal anatomy, physiology, pathology and clinical conditions that are evaluated by CT, GI/GU, and MRI.
- The indications, limitations, contraindications and optimal protocols for the various studies, diseases, conditions, as well as, the optimal sequencing of various imaging studies is reviewed.
- The use, delivery systems, timing and dosages of intracavitary and intravenous contrast material is reviewed including any appropriate patient preparation, indications, contraindications, and the physiology and pathophysiology of contrast materials. The recognition and treatment of any allergic, chemotoxic reactions, or other adverse reactions is reviewed. The characteristic appearance of contrast during imaging in various normal and pathologic conditions is reviewed.
- The ACR appropriateness criteria and the economic implications for the health care system and patient of various diagnostic pathways are reviewed as appropriate.

Daily Required Worklists and Reading Minimums

Assigned Worklists

Body/Orlando Rotation – Fluoro and read from Body Worklist

Body/Princeton Rotation – Oncology/Body Worklist

ER Rotation (4 pm-12 pm) – ER worklist

On-Call (11p-7a) – ER worklist

Training using the ACGME Six-Core Competencies:

Year 1: Body Imaging

1) Patient Care: Residents should be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.

- Shows ability to interact with clinicians when reviewing GI/GU studies.
- Shows ability to recommend additional imaging studies as appropriate to better assess
- GI/GU studies mainly focusing on plain films and CT
- Shows ability to use PACS and hospital information systems.

Milestones include:

- Using established evidence based guidelines such as ACR appropriateness criteria
- Appropriately use the electronic health record to obtain relevant clinical information
- Competently perform basic fluoro studies under indirect supervision
- Recognize and manage complications of basic procedures

2) Medical Knowledge: At the end of the rotation, the resident should be able to:

- Demonstrates knowledge of normal/abnormal anatomy as seen on GI/GU studies including fluoro, CT and plain films.
- Shows ability to recognize and describe common medical conditions as depicted on GI/GU imaging studies.
- Discuss the proper clinical and radiological indications for the following studies:
 - 1) Video swallowing study
 - 2) Barium swallow
 - 3) Upper GI series
 - 4) Single-contrast barium enema
 - 5) Air-contrast barium enema
 - 6) Small bowel follow-through
 - 7) Cystogram
- State the physiologic properties, proper concentrations and proper indications for the use of the following contrast media:
 - 1) Ionic intravenous contrast media
 - 2) Non-ionic contrast media
 - 3) Standard barium mixtures
- List the risk factors for allergic reaction to intravenous contrast media.
- State the proper assessment and treatment for allergic reactions to contrast media.
- Begin reviewing the core curriculum for GI and GU at the end of this document.

Medical Training:

- Setup & Positioning of patients
- Actively use software/machine to perform scanning
- Perform Prescan interview to ensure safe scanning and adhere to protocol regarding contrast, metal (MRI, etc)

Expected Reading List:

- Fundamentals of Diagnostic Radiology, By Brandt and Helms – GI/GU Chapters
- Practical Fluoroscopy of the GI and GU Tracts by Marc Levine
- Fundamentals of Body CT by Richard Webb, William Brandt, and Nancy Major
- Case Review Series GI Imaging

- Case Review Series GU Imaging

Milestones include:

- Selecting appropriate protocol and contrast agent/dose for basic fluoro and CT procedures
- Makes core observations
- Formulate differential diagnoses
- Recognize critical findings
- Differentiate normal from abnormal

3) Practice-Based Learning and Improvement: Residents must demonstrate skills to:

- Shows evidence of independent study using textbooks from expected reading list.
- Demonstrates appropriate follow up of interesting cases.
- Prepares teaching file of interesting cases.

Milestones include:

- Recognizes and manages contrast reactions
- Describes the mechanism of radiation injury and the ALARA concept
- Documents training in critical thinking skills and research design

4) Interpersonal and Communication Skills: Residents must demonstrate skills to:

- Interact with x-ray technologists, medical students, fellow residents, and attending radiologists.
- Interact with clinicians when reviewing cases involving GI/GU imaging studies.

Milestones include:

- Communicating information about imaging and examination results in routine, uncomplicated cases
- Obtains informed consent
- Adhere to transfer of care policies
- Generates accurate reports with appropriate elements for coding
- Communicates urgent and unexpected findings according to RSF policy

5) Professionalism: Residents must demonstrate ability to interact with patient/patient's family/clinician when discussing significance of x-ray findings and their impact on patient care including what imaging studies may or may not be appropriate.

Milestones include:

- Recognizing the importance and priority of patient care and advocates for patient interests
- Fulfills work related responsibilities
- Recognizes personal limitations and seeks help when appropriate
- Responds appropriately to constructive criticism
- Maintains patient confidentiality
- Attends required meetings

6) Systems-Based Practice: Residents must demonstrate skills to:

- Shows ability to interact with clinicians regarding cost effective and streamlined patient evaluation for differing clinical entities.
- Able and willing to participate in clinical conferences in which imaging studies used to guide patient care/evaluation.

Milestones include:

- Describes departmental QI initiatives
- Describes the departmental QA system

Year 2: Body Imaging

1) Patient Care: At the end of the rotation, the resident should be able to:

- Refine interpretive skills with complex pathology. Residents should mainly focus on reading CT with introduction to a few MRI studies.
- Better perform the GI/GU studies listed in the first rotation
- Identify the abnormality at fluoroscopy and modify the technique or change the patient's position or obtain special views or perform special maneuvers to obtain diagnostic fluoroscopic spot films
- Decreasing fluoroscopic time needed to perform a study without compromising diagnostic acumen
- Demonstrate more confidence when evaluating and integrating data from other studies (CT, MRI, sonography and nuclear medicine) of the GI/GU tract to make recommendations to the referring physician about more appropriate or additional diagnostic studies needed for evaluation of the patient's abnormality
- Be able to direct the choice of imaging modality and protocol emergent studies
- Understand when referral or other imaging modalities is necessary
- Understand the basic physics of MR including TR, TE, T1W, Spin echo, Gradient Recall Echo imaging, and Inversion Recovery
- Learn the basic principles of contrast distribution, particularly as applied to arterial and venous phase scanning
- Protocol and monitor MR studies. Modify protocols when appropriate
- Understand the principle of a saline chaser
- Learn to recognize and treat contract reactions
- Develop skills in interpretation of basic MR pathology
- Learn the appropriate format for dictation of MR reports

Milestones include:

- Recommends appropriate imaging of common conditions independently
- Competently performs intermediate procedures (HSG, thyroid biopsy, etc)
- Recognizes and manages complications of intermediate procedures

2) Medical Knowledge: At the end of the rotation, the resident should be able to:

- Demonstrate review and/or retention of knowledge requirements set forth for the first year rotations.
- Learn the basic concepts of surgical procedures, their indications, their normal radiographic appearance, and finally the radiographic appearance of their complications. In addition to the traditional surgical procedures, this would include new procedures such as new laparoscopic GI and GU procedures.
- Describe and/or discuss GI/GU tract pathology in specific detail.
- Reviewed the entire core curriculum for GI and GU imaging at the end of this document.
- Learn the radiographic appearance of specific diseases on the following procedures:
 - a) Barium swallow
 - b) Upper gastrointestinal series (UGI)
 - c) BE
 - d) ACBE
 - e) Small bowel follow through (SBFT)
 - f) Fistulograms
 - g) Cystogram
 - h) HSG
- Understand the basic physics of MR including TR, TE, T1W, Spin echo, Gradient Recall Echo imaging, and Inversion Recovery.
- Learn the basic principles of contrast distribution, particularly as applied to arterial and venous phase scanning.

- Protocol and monitor MR studies. Modify protocols when appropriate.
- Understand the principle of a saline chaser.
- Develop skills in interpretation of basic MR pathology.
- Learn the appropriate format for dictation of MR reports.

Medical Training:

- Setup & Positioning of patients
- Actively use software/machine to perform scanning
- Perform Prescan interview to ensure safe scanning and adhere to protocol regarding contrast, metal (MRI, etc)

Expected Reading List:

- Textbook of Uroradiology by Dunnick
- Body MRI by Evan Siegelman
- CT and MRI of the Abdomen and Pelvis by Pablo Ross and Koenraad Mortele

Milestones include:

- Selects appropriate protocols and contrast agent/dose for intermediate imaging like basic abdominal MRI
- Makes secondary observations
- Narrows differential diagnosis
- Describes management options

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Shows evidence of independent study using textbooks from expected reading list.
- Demonstrates appropriate follow up of interesting cases.
- Prepares teaching file of interesting cases.
- Is able and willing to make detailed presentations of GI/GU studies at both intra and interdepartmental conferences.
- Upon request, participates in educational courses for clinicians, medical students, and fellow residents.

Milestones include:

- Re-demonstrates recognition and management of contrast reactions
- Accesses resources to determine exam specific average radiation dose info
- Accesses resources to determine safety of implanted devices and retained metal
- Works with faculty mentors to identify potential scholarly projects

4) Interpersonal and Communication Skills: Residents must demonstrate skills to:

- Interact with x-ray technologists, medical students, fellow residents, and attending radiologists.
- Interact with clinicians when reviewing cases involving GI/GU studies.
- Participate in administrative and scholarly committees when asked.

Milestones include:

- Communicates under direct supervision in challenging circumstances
- Communicates under direct supervision difficult information such as errors, complications, adverse events, and bad news
- Efficiently generates clear and concise reports that do not require substantive faculty member correction on routine cases
- Communicates findings and recommendations clearly and concisely

5) Professionalism: At the end of the rotation, the resident should be able to:

Residents must demonstrate ability to interact with patient/patient's family/clinician when discussing significance of GI/GU findings and their impact on patient care including what imaging studies may or may not be appropriate.

Milestones include:

- Becomes an effective health care team member
- Continues to demonstrate professional behaviors described under year 1

6) Systems-Based Practice: At the end of the rotation, the resident should be able to:

- Shows ability to interact with clinicians regarding cost effective and streamlined patient evaluation for differing clinical entities.
- Able and willing to participate in clinical conferences in which imaging studies used to guide patient care/evaluation.
- Is able and willing to organize and present case conferences/didactic sessions as directed and supervised by radiology staff.

Milestones include:

- Incorporating QI into clinical practice
- Participates in the QA department process
- States relative cost of common procedures

Year 3 and 4: Body Imaging

1) Patient Care: At the end of the rotation, the resident should be able to:

- Perform, interpret, and dictate the GI/GU studies with sufficient competence to be able to practice independently. This includes all high-level CT and MRI.
- Continue to expand the knowledge of CT anatomy and pathology begun in the first two rotations.
- Assist technical staff in the performance of CT angiography and its interpretation.
- Refine MRI interpretive skills with complex pathology.
- Understand the principles of magnetic resonance angiography.
- Be able to identify life-threatening findings, particular with aortic aneurysm and grafts.
- Provide emergent provisional interpretation as needed.
- Be able to direct the choice of imaging modality and protocol emergent studies.
- Understand when referral or other imaging modalities is necessary.
- Become a more autonomous consultant and teacher.

Milestones include:

- Recommends appropriate imaging of uncommon conditions independently
- Integrates current research and literature with guidelines, taking into consideration cost effectiveness and risk benefit analysis, to recommend imaging
- Competently performs advanced procedures
- Recognizes and manages complications of advanced procedures
- Independently performs fluoro studies and image guided body procedures

2) Medical Knowledge: At the end of the rotation, the resident should be able to:

- Demonstrate review and/or retention of knowledge requirements set forth for the first two years.
- Understand the role and basic principles of newly evolving and potential future new examinations such as CT urography, MR angiography, CT/PET, and molecular imaging in the evaluation of GI/GU disease.
- Understand the uses, interpretation, and limitation of techniques that have been replaced e.g. oral cholecystogram and intravenous cholangiogram.
- Assist in preparation and presentation of interdepartmental case conferences.

Expected Reading List:

- CT Urography by Stuart Silveraman and Richard Cohan
- Mayo Clinic GI Imaging Review by Dainel Johnson and Grant Schmit
- Abdominal and Pelvic MRI by Richard Semelka

Milestones include:

- Selects appropriate protocols and contrast agent/dose for advanced imaging
- Demonstrates knowledge of physical principles to optimize imaging quality
- Independently modifies protocols as determined by clinical circumstances
- Provides accurate, focused, and efficient interpretations
- Prioritizes differential diagnoses and recommends management
- Makes subtle observations
- Suggests a single diagnosis when appropriate
- Integrates current research and literature with guidelines to recommend management

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Shows evidence of independent study using textbooks from expected reading list.
- Demonstrates appropriate follow up of interesting cases.
- Prepares teaching file of interesting cases.
- Is able and willing to make detailed presentations of GI/GU studies at both intra and interdepartmental conferences.
- Upon request, participates in educational courses for clinicians, medical students, and fellow residents.
- Upon request, participates in educational activities at the local/national level.

Milestones include:

- Re demonstrates recognition and management of contrast reactions
- Communicates the relative risk of exam specific radiation exposure to patients and practitioners.
Applies principles of image Gently and Wisely
- Communicates MR safety of common implants and retained foreign bodies to patients and practitioners
- Selects appropriate sedation agent and dose of conscious sedation

4) Interpersonal Skills: Residents must demonstrate skills to:

- Interact with x-ray technologists, medical students, fellow residents, and attending radiologists.
- Interact with clinicians when reviewing cases involving GI/GU imaging studies.
- Can participate in administrative and scholarly committees when asked.
- Can serve as a liaison between our department with both other radiology departments and other specialty groups in our institution.

Milestones include:

- Communicates without supervision in challenging circumstances
- Efficiently generates clear and concise reports that do not require substantive faculty member correction on all cases
- Communicates appropriately under stressful situations

5) Professionalism: Residents must demonstrate skills to:

- Residents must demonstrate ability to interact with patient/patient's family/clinician when discussing significance of x-ray findings and their impact on patient care including what imaging studies may or may not be appropriate.
- Can participate in activities relative to the role of GI/GU imaging both to the medical community and the general public.

- Is perceived as a role model for radiology from both within and outside the department.

Milestones include:

- Is an effective team leader promoting patient welfare, patient autonomy, and social justice
- Serves as a role model for professional behavior

6) Systems-Based Practice: Residents must demonstrate skills to:

- Shows ability to interact with clinicians regarding cost effective and streamlined patient evaluation for differing clinical entities.
- Able and willing to participate in clinical conferences in which imaging studies used to guide patient care/evaluation.
- Is able and willing to organize and present case conferences/didactic sessions as directed and supervised by radiology staff.
- Is able and willing to participate in activities at the local/national level under staff supervision.

Milestones include:

- Identifying and completing a systems based practice project

Assessment tools for all Body Rotations:

- Reviewing rotation curriculum, goals and objectives, as a benchmark for progress of resident, and success of faculty, is educating the resident. Discussion regarding the specifics of the document is encouraged to promote improvement of the resident's learning and the program's teaching. Positive points and deficiencies and unfulfilled goals and objectives should be discussed by the residents and faculty
- Global ratings by faculty including rotation evaluation sheet
- Resident's performance discussing unknown cases in conference (one of the metrics on Global Evaluation sheet is particularly important)
- Placing cases in teaching file (one of the metrics on Global Evaluation)
- Conference attendance logs
- In-service examination
- 360 degree evaluations – supervisory technologists in radiology core
- Fluoroscopy time log submitted by physicist to Program Director
- Self assessment based on Rad Primer quizzes
- Future plans: evaluation of teaching by medical students

Gastrointestinal Imaging Curriculum based off the ABR Core Exam

- 1) Pharynx
 - a) Benign diseases
 - i) Zenker diverticulum
 - ii) Foreign bodies
 - iii) Trauma
 - b) Motility disorders
- 2) Esophagus
 - a) Benign diseases
 - i) Diverticula
 - ii) Trauma
 - iii) Esophagitis
 - (1) Reflux
 - (2) Infectious
 - (3) Caustic
 - (4) Drug-induced
 - iv) Barrett's esophagus
 - v) Rings, webs, strictures
 - vi) Varices
 - vii) Benign tumors and tumor-like conditions
 - viii) Extrinsic processes affecting the esophagus
 - 1) Pulmonary lesions
 - (2) Mediastinal structures
 - ix) Hiatal hernia (types, significance)
 - b) Malignant tumors
 - i) Squamous
 - ii) Adenocarcinomas
 - iii) Other malignant tumors
 - (1) Lymphoma
 - (2) Kaposi
 - (3) Metastases (lymphatic and hematogenous)
 - c) Motility disorders
 - i) Primary motility disorders
 - ii) Secondary motility disorders
 - d) The postoperative esophagus
- 3) Stomach
 - a) Benign diseases
 - i) Diverticula
 - ii) Gastritis
 - (1) Erosive
 - (2) Atrophic
 - (3) Infectious
 - (4) Other
 - (a) Crohn's disease
 - iii) Peptic ulcer disease
 - iv) Hypertrophic gastropathy
 - v) Varices
 - vi) Volvulus
 - vii) Entrapment after diaphragmatic injury
 - b) Malignant diseases
 - i) Primary

- (1) Adenocarcinoma
 - (2) Lymphoma
 - (3) GI stromal tumors
 - (4) Carcinoid
 - ii) Metastatic
 - c) The postoperative stomach
 - i) Expected surgical appearance
 - (1) Bariatric, including gastric banding
 - (2) Nissen and other funduplications
 - (3) Whipple
 - (4) Billroth procedures
 - d) Complications
- 4) Duodenum
 - a) Benign diseases
 - i) Congenital abnormalities
 - ii) Diverticula
 - iii) Trauma
 - iv) Inflammation
 - (1) Duodenitis
 - (2) Ulcer disease
 - (3) Crohn's disease
 - v) Aortoduodenal fistula
 - vi) Benign tumors
 - b) Malignant diseases
 - i) Adenocarcinoma
 - ii) Lymphoma
 - iii) Metastatic disease
- 5) Small Intestine
 - a) Benign diseases
 - i) Congenital disorders
 - ii) Diverticula
 - iii) Trauma
 - iv) Vascular diseases
 - (1) Intestinal ischemia and infarction
 - (2) Radiation enteritis
 - (3) Scleroderma
 - (4) Vasculitides
 - (a) Henoch-Schönlein purpura
 - (b) Polyarteritis nodosa
 - (c) Systemic lupus erythematosus
 - v) Malabsorption
 - (1) Sprue
 - (2) Lymphangiectasia
 - vi) Inflammatory diseases
 - (1) Crohn's disease
 - (2) Infectious and parasitic diseases
 - vii) Benign tumors
 - (1) Sporadic
 - (2) Associated with polyposis syndromes
 - viii) Malrotation/Volvulus
 - ix) Obstruction
 - x) Hemorrhage

- xi) Other
 - (1) S/p Bone Marrow Transplant
 - (2) Drug effects
 - (a) NSAIDS enteritis
 - (b) ACE inhibitors
 - b) Malignant tumors
 - i) Adenocarcinoma
 - ii) Lymphoma
 - iii) Carcinoid
 - iv) GI stromal tumors
 - v) Metastases
- 6) Colon and Appendix
- a) Benign disease
 - i) Congenital abnormalities
 - ii) Diverticular disease
 - iii) Inflammatory diseases
 - (1) Crohn's disease
 - (2) Ulcerative colitis
 - (3) Infectious colitis
 - (a) Pseudomembranous
 - (b) Viral
 - (c) Bacterial
 - (d) Colitis in AIDS
 - (4) Appendicitis
 - iv) Ischemic colitis
 - v) Benign neoplasms
 - (1) Adenoma
 - (2) Mesenchymal tumors
 - (3) Polyposis syndromes
 - b) Malignant diseases
 - i) Adenocarcinoma
 - ii) Other malignant tumors
 - (1) Lymphoma
 - (2) Carcinoid
 - (3) Melanoma
 - (4) Squamous (anal)
 - (5) Metastases
- 7) Pancreas
- a) Congenital abnormalities and variants
 - b) Pancreatitis
 - i) Acute
 - ii) Chronic
 - iii) Complications
 - iv) Autoimmune
 - c) Pancreatic neoplasms
 - i) Duct cell adenocarcinoma
 - ii) Cystic pancreatic neoplasms
 - (1) IPMN
 - (2) Mucinous cystadenomas
 - (3) Serous cystadenomas
 - iii) Islet cell tumors
 - iv) Lymphoma

v) Metastases

8) Liver

- a) Normal anatomy
- b) Diffuse diseases of the liver
 - i) Cirrhosis
 - ii) Diseases associated with infiltration
 - (1) Fatty infiltration/NASH/NAFLD
 - (2) Hemochromatosis
 - (3) Storage diseases
 - iii) Vascular diseases
 - (1) Portal hypertension
 - (2) Portal vein occlusion
 - (3) Hepatic venous hypertension/Budd Chiari, nutmeg liver
- c) Focal diseases of the liver
 - i) Benign
 - (1) Cavernous hemangioma
 - (2) Liver cell adenoma
 - (3) Focal nodular hyperplasia
 - ii) Malignant
 - (1) Hepatocellular carcinoma
 - (2) Metastases
 - (3) Other malignant liver lesions
- d) Liver transplantation
 - (1) Surgical candidates
 - (2) Expected postoperative appearance
 - (3) Complications

9) Spleen

- a) Splenomegaly
- b) Focal lesions
 - i) Cysts
 - ii) Hemangioma
 - iii) Infarction
 - iv) Abscess/microabscesses
 - v) Granulomatous disease
- c) Trauma

10) Bile Ducts and Gallbladder

- i) Congenital abnormalities and variants
 - (1) Choledochal cysts
 - (2) Caroli disease
- ii) Inflammatory diseases
 - (1) Gallbladder
 - (a) Acute cholecystitis
 - (b) Emphysematous cholecystitis
 - (c) Porcelain bladder
 - (2) Biliary ducts
 - (a) Primary sclerosing cholangitis
 - (b) Ascending cholangitis
 - (c) Recurrent pyogenic cholangitis
 - (d) AIDS cholangiopathy
 - (e) Ischemic injury
 - (f) Surgical injury

- (g) Stone disease
 - iii) Tumors
 - (1) Gallbladder cancer
 - (2) Cholangiocarcinoma
 - (3) Metastases
- 11) Peritoneal Spaces
- a) Normal anatomy
 - b) Fluid collections
 - c) Diseases of the peritoneum
 - i) Inflammatory diseases
 - (1) Bacterial peritonitis
 - (2) TB
 - (3) Other
 - ii) Primary tumors
 - iii) Metastatic tumors
 - d) Mesenteries
 - i) Normal anatomy
 - ii) Pathologic conditions
 - (1) Sclerosing mesenteritis/misty mesentery
 - (2) Mesenteric fibromatosis
 - e) Retroperitoneum
 - i) Normal anatomy
 - ii) Retroperitoneal spaces
 - iii) Benign diseases
 - (1) Fibrosis
 - (2) Inflammatory diseases
 - iv) Malignant tumors
- 12) Multisystem Disorders
- a) Acute abdomen
 - b) Trauma to the abdomen
 - c) Syndromes involving the gastrointestinal tract
 - d) Hernias, including internal hernias
 - e) All obstruction

GU Imaging Curriculum based off the ABR Core Exam

- 1) Kidneys
- a) Malignant tumors
 - i) Primary
 - ii) Secondary
 - b) Benign tumors
 - c) Endocrine tumors
 - d) Cystic disease
 - e) Complicated cysts
 - f) Granulomatous diseases
 - g) Infection/inflammation
 - h) Hemorrhage
 - i) Infarction and ischemia
 - j) Trauma/iatrogenic
 - k) Congenital anomalies
 - l) Medical renal disease
 - m) Inherited diseases involving the kidneys (including transplantation)

- 2) Ureter
 - a) Malignant tumors
 - b) Benign tumors
 - c) Infection/inflammation
 - d) Hemorrhage
 - e) Trauma/iatrogenic
 - f) Congenital anomalies
 - g) Stricture
 - h) Filling Defects

- 3) Bladder and Neobladder
 - a) Malignant tumors
 - b) Benign tumors
 - c) Infection/inflammation
 - d) Hemorrhage
 - e) Trauma/iatrogenic
 - f) Congenital anomalies

- 4) Prostate Gland and Seminal Vesicles
 - a) Malignant tumors
 - b) Benign tumors and hyperplasia
 - c) Infection/inflammation
 - d) Trauma/iatrogenic
 - e) Congenital anomalies

- 5) Urethra and Penis
 - a) Malignant tumors
 - b) Benign tumors
 - c) Infection/inflammation
 - d) Trauma/iatrogenic
 - e) Congenital anomalies
 - f) Stricture

- 6) Retroperitoneum
 - a) Malignant tumors
 - i) Primary
 - ii) Secondary
 - b) Benign tumors
 - c) Hemorrhage
 - d) Trauma/iatrogenic
 - e) Congenital anomalies
 - f) Aortic aneurysm
 - g) Retroperitoneal fibrosis
 - h) Pelvic lipomatosis
 - i) Venous anomalies
 - j) Fournier gangrene

- 7) Vascular Diseases Affecting the Genitourinary Tract
 - a) Aneurysms
 - b) Stenoses
 - c) Malformations
 - d) Fistulae
 - e) Occlusions

- f) Congenital anomalies
- 8) Intravascular Contrast Media
 - a) Extravasation
 - b) Physiology
 - c) Adverse reactions (idiosyncratic and non-idiosyncratic)
 - d) Prevention and treatment of adverse reactions
- 9) Urolithiasis (Including Kidney, Ureter, Bladder)
- 10) Adrenal
 - a) Congenital abnormalities
 - b) Benign masses
 - c) Malignant primary and secondary neoplasms
 - d) Endocrine disorders
 - e) Acquired diseases and conditions
 - i) Infection
 - ii) Inflammatory conditions
 - iii) Hemorrhage
- 11) Female genitourinary tract
 - a) Congenital abnormalities
 - b) Infertility
 - c) Menopause
 - d) Uterus and cervix
 - i) Benign and malignant masses
 - ii) Acquired conditions (infection, hemorrhage)
 - e) Ovaries and fallopian tubes
 - i) Benign and malignant masses
 - (1) Cysts and cystic lesions
 - ii) Acquired conditions (infection, hemorrhage)
 - (1) Infections
 - (a) Pelvic inflammatory disease
 - (2) Torsion
 - (3) Ovarian failure
 - f) Vulva and vagina
 - i) Benign and malignant masses
 - (1) Cysts and cystic lesions
- 12) Techniques
 - a) Excretory urography
 - b) Cystography
 - c) Urethrography (including antegrade and retrograde)
 - d) Computed tomography (including CT urography, CT angiography)
 - e) Magnetic resonance imaging (including MR urography, MR angiography)
 - f) Ultrasound (including Doppler and color flow)
 - g) Hysterosalpingography

AdventHealth Orlando Radiology Residency Technologist Shadowing Log

Modality (please circle): CT MR Fluoroscopy X-Ray Portable X-Ray
Resident's Name: _____

General Requirement

Date, print supervisor's last name (printed), supervisor's signature

1) The resident has helped perform (not only observed) the daily QA

Date: _____ Supervisor (Printed): _____ Signature: _____

2) The resident has helped perform (not only observed) the weekly QA (as applicable by modality)

Date: _____ Supervisor (Printed): _____ Signature: _____

3) The resident has helped perform (not only observed) the quarterly QA (as applicable by modality)

Date: _____ Supervisor (Printed): _____ Signature: _____

4) The resident has aided (not only observed) in the setup/positioning of at least 5 patients

Date: _____ Supervisor (Printed): _____ Signature: _____

5) The resident has actively used the software/machine to perform the scanning of at least 5 patients

Date: _____ Supervisor (Printed): _____ Signature: _____

6) The resident has performed the a "prescan" interview (as applicable by modality) with at least 3 patients to ensure that it is safe to scan the patient with the current protocol in regards to contrast, metal (MRI), etc.

Date: _____ Supervisor (Printed): _____ Signature: _____

Date: _____ Supervisor (Printed): _____ Signature: _____

Date: _____ Supervisor (Printed): _____ Signature: _____

ADVENTHEALTH ORLANDO DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAM

CONFIRMATION OF RECEIPT OF
BODY IMAGING GOALS AND OBJECTIVES

2018-2019

By signing this document, you are confirming that you have received and reviewed, with your preceptor, the Abdominal imaging goals and objectives for this academic year.

This receipt will be kept in your personal file.

Resident Name (please print) _____

Resident Signature _____
by signing this - you confirm that you have reviewed the G&O with your preceptor

Date _____

Preceptor Signature _____
by signing this - you confirm that you have reviewed the G&O with the resident

Date _____

AdventHealth Orlando Diagnostic Radiology Residency

Cardiothoracic Radiology Goals and Objectives

Training Location: FRi Princeton

Many of the goals and objectives apply to all rotations and are listed below. Those goals that are more specific to a particular rotation are listed separately.

Cardiothoracic Imaging Curriculum

The educational curriculum in Cardiothoracic Imaging is comprised primarily of the rotations through the Cardiothoracic Imaging Section at FRi Princeton and chest imaging rotation at AdventHealth Orlando where the Faculty provide direct training and supervision; as well as, a comprehensive series of lectures and conferences in Cardiothoracic Imaging. Correlation is made on a case-by-case basis with other imaging modalities, facilitated by the PACs system. A series of interdepartmental conferences, grand rounds, Journal Clubs, meetings and other venues are expected to enhance the residents' knowledge of Cardiothoracic Imaging.

Because a full outline of disease entities and conditions is provided under each organ system elsewhere in the Radiology Residency Curriculum, a summarized curriculum for the Cardiothoracic Imaging Section follows:

- A review of the principles of physics and instrumentation/technology.
- A review of the normal anatomy, physiology, pathology and clinical conditions that are evaluated by CT, and MRI.
- The indications, limitations, contraindications and optimal protocols for the various studies, diseases, conditions, as well as, the optimal sequencing of various imaging studies is reviewed.
- The use, delivery systems, timing and dosages of intracavitary and intravenous contrast material is reviewed including any appropriate patient preparation, indications, contraindications, and the physiology and pathophysiology of contrast materials. The recognition and treatment of any allergic, chemotoxic reactions, or other adverse reactions is reviewed. The characteristic appearance of contrast during imaging in various normal and pathologic conditions is reviewed.
- The ACR appropriateness criteria and the economic implications for the health care system and patient of various diagnostic pathways are reviewed as appropriate

Daily Required Reading Minimum

Please see your preceptor at the beginning of your Chest/Thoracic rotation to discuss the requirements.

Training using the ACGME Six-Core Competencies:

Year 1: Cardiothoracic Radiology

1) **Patient Care:** At the end of the rotation, the resident should be able to:

- Gather clinical and radiological data on patients with thoracic disease
- Develop diagnostic plan based on the clinical presentation and prior imaging
- Demonstrate basic knowledge of PACS and chest equipment including basic MDCT theory
- Aid technologist in performing the correct x-ray/CT exam responsibly and safely, assuring that the correct exam is ordered and performed
- Demonstrate the ability to use the internet as an educational instrument
- Perform chest fluoroscopy

Milestones include:

- Using established evidence-based guidelines such as ACR appropriateness criteria
- Appropriately use the electronic health record to obtain relevant clinical information
- Competently perform basic fluoro studies under indirect supervision
- Recognize and manage complications of basic procedures

2) **Medical Knowledge:** At the end of the rotation, the resident should be able to:

- Demonstrate knowledge of normal chest anatomy and appropriate positions for tubes, catheters and other medical devices on chest image
- Demonstrate ability to diagnose common conditions (e.g. collapsed lobes) and other life-threatening conditions (e.g. pneumothorax) on chest radiographs
- Demonstrate a clinical appropriate diagnostic treatment plan
- Demonstrate the proper use of radiological equipment such as fluoroscopy equipment and to obtain special radiographic views
- Understand cardiac and aortic arch great vessel anatomy and the physiological basis for common diseases (e.g. congestive heart failure with pulmonary edema, pulmonary hypertension, pleural effusions with pulmonary collapse, pericardial effusions with tamponade) and understand the plain image findings in common diseases of the heart and great vessels

Work training

- 1st year should mainly focus primarily on chest x-rays with minimal CT. No cardiac exams.
- During Cardio (Chest) 2-week rotation – spend a half a day each Friday with a tech, one day on CT, one day on plain films.

Required Reading List:

- Fundamentals of Diagnostic Radiology (Brant & Helms) Cardiovascular and pulmonary chapters
- High Resolution CT of the Lung (Webb, Muller, Naidich) – Chapters 1-3 (Basic technique, normal anatomy and overview of HRCT descriptors)
- Cardiac Imaging – Case Review Series
- Cardiac Imaging – The Requisites
- Chest Radiology: Plain Film Patterns and Differential Diagnosis

Milestones include:

- Selecting appropriate protocol and contrast agent/dose for basic fluoro and CT procedures
- Makes core observations
- Formulate differential diagnoses
- Recognize critical findings
- Differentiate normal from abnormal

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Review all cases and dictate a preliminary report. Then review your interpretation with faculty and then correct report as needed before sending it to the faculty members report queue
- Share good learning cases and missed diagnosis with others in the department through conferences

Milestones include:

- Recognizes and manages contrast reactions
- Describes the mechanism of radiation injury and the ALARA concept
- Documents training in critical thinking skills and research design

4) Interpersonal and Communication Skills: At the end of the rotation, the resident should be able to:

- Provide a concise report to include observations, description of findings and differential diagnoses based on clinical data
- Provide direct communication to referring physicians or their appropriate representative, and document communication in the report for emergent or important unexpected findings
- Demonstrate the verbal and non-verbal skills necessary for face-to-face listening and speaking to physicians, families, and support personnel
- Minimize transcription errors

Milestones include:

- Communicating information about imaging and examination results in routine, uncomplicated cases
- Obtains informed consent
- Adhere to transfer of care policies
- Generates accurate reports with appropriate elements for coding
- Communicates urgent and unexpected findings, per RSF policy

5) Professionalism: At the end of the rotation, the resident should be able to:

- Demonstrate altruism
- Demonstrate compassion (be understanding and respectful of patient, their families, and medical colleagues, technologists, nurses, IT, clerical staff)
- Demonstrate excellence: perform responsibilities at the highest level and continue active learning throughout one's career
- Demonstrate honesty with patients and staff
- Demonstrate honor and integrity: avoid conflict of interests when accepting gifts from patients and vendors
- Demonstrate sensitivity without prejudice 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
- Demonstrate positive work habits, including punctuality and professional appearance
- Demonstrate the broad principles of biomedical ethics
- Demonstrate principles of confidentiality with all information transmitted during a patient encounter
- Teaching of medical students

Milestones include:

- Recognizing the importance and priority of patient care and advocates for patient interests
- Fulfills work related responsibilities
- Recognizes personal limitations and seeks help when appropriate
- Responds appropriately to constructive criticism

- Maintains patient confidentiality
- Attends required meetings

6) Systems-Based Practice: At the end of the rotation, the resident should be able to:

- Demonstrate ability to design cost-effective care plans via a case example
- Demonstrate knowledge of the regulatory environment

Milestones include:

- Describes departmental QI initiatives
- Describes the departmental QA system

Year 2: Cardiothoracic Radiology

1) Patient Care: At the end of the rotation, the resident should be able to:

- Correlate physical findings by other clinicians with radiographic findings
- Based on your radiographic findings and the clinical setting, guide clinicians in the appropriate use of thoracic imaging techniques such as high-resolution CT, Chest MRI/MRA and nuclear procedures such as PET-CT
- Refine interpretive skills with complex pathology
- Better perform the Cardiothoracic studies listed in the first rotation now to include the interpretation of HRCT and thoracic CTA studies
- Identify the abnormality at fluoroscopy and modify the technique or change the patient's position or obtain special views or perform special maneuvers to obtain diagnostic fluoroscopic spot films
- Decreasing fluoroscopic time needed to perform a study without compromising diagnostic accuracy
- Demonstrate competence when evaluating and integrating data from other studies (CT, MRI, sonography and nuclear medicine) and make appropriate recommendations to the referring physician about additional diagnostic studies needed for evaluation of the patient's abnormality
- Be able to direct the choice of imaging modality and protocol emergent studies
- Understand when referral or other imaging modalities are necessary
- Understand the basic physics of MR including TR, TE, T1W, Spin echo, Gradient Recall Echo imaging, Steady State Free Precession and Inversion Recovery techniques
- Understand the basic physics of MDCT and appropriate dose reduction techniques
- Learn the basic principles of contrast distribution, particularly as applied to arterial and venous phase scanning
- Learn to recognize and treat contract reactions
- Develop skills in interpretation of basic cardiac pathology
- Learn the appropriate format for dictation of cardiac reports

Milestones include:

- Recommends appropriate imaging of common conditions independently
- Competently performs intermediate procedures (HSG, thyroid biopsy, etc)
- Recognizes and manages complications of intermediate procedures

2) Medical Knowledge: At the end of the rotation, the resident should be able to:

- Demonstrate understanding of the principles of research project design and implementation and consider starting a scholarly project in thoracic radiology such as a case report or research project with the faculty and, if appropriate, interested medical student
- Understand the proper use of radiological equipment such as chest sonography and demonstrate its use while on the ultrasound rotation
- Monitor and interpret CTA for pulmonary embolism, aortic dissection and CTA for coronary artery disease

- Monitor and interpret HRCT studies for the evaluation of the common diseases of the pulmonary parenchyma, pleura, chest wall and mediastinum
- Understand the anatomy and physiology of common, acquired, and congenital heart disease and basic radiographic findings in these conditions
- Reviewed the entire core curriculum for Cardiac imaging at the end of this document.
- Learn the radiographic appearance of specific cardiac diseases
- Develop skills in interpretation of basic cardiac pathology
- Learn the appropriate format for dictation of cardiac reports

Required Reading List:

- Cardiac CT, PET, MR
- Cardiac Imaging Cases
- High Resolution CT of the Lung (Webb, Muller, Naidich)
- Expertddx: Chest
- Thoracic Imaging: Case Review Series
- Thoracic Radiology: The Requisites

Milestones include:

- Selects appropriate protocols and contrast agent/dose for intermediate imaging like basic abdominal MRI
- Makes secondary observations
- Narrows differential diagnosis
- Describes management options

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Demonstrate knowledge of and apply the principles of evidence-based medicine in practice
- Demonstrate critical assessment of the scientific literature
- Shows evidence of independent study using textbooks from expected reading list.
- Demonstrates appropriate follow up of interesting cases.
- Prepares teaching file of interesting cases.
- Is able and willing to make detailed presentations of Cardiac studies at both intra and interdepartmental conferences.
- Upon request, participates in educational courses for clinicians, medical students, and fellow residents.

Milestones include:

- Re-demonstrates recognition and management of contrast reactions, now to include precautions related to the use of Gadolinium agents.
- Accesses resources to determine exam specific average radiation dose info
- Accesses resources to determine safety of implanted devices and retained metal
- Works with faculty mentors to identify potential scholarly projects

4) Interpersonal and Communication Skills: At the end of the rotation, the resident should be able to:

- Interact with x-ray technologists, medical students, fellow residents, and attending radiologists.
- Interact with clinicians when reviewing cases involving cardiac studies.
- Participate in administrative and scholarly committees when asked.

Milestones include:

- Communicates under direct supervision in challenging circumstances

- Communicates under direct supervision difficult information such as errors, complications, adverse events, and bad news
- Efficiently generates clear and concise reports that do not require substantive faculty member correction on routine cases
- Communicates findings and recommendations clearly and concisely

5) Professionalism: At the end of the rotation, the resident should be able to:

- Help in the teaching of junior radiology residents and house staff from other departments

Milestones include:

- Becomes an effective health care team member
- Continues to demonstrate professional behaviors described under year 1

6) Systems-Based Practice: At the end of the rotation, the resident should be able to:

- Demonstrate knowledge of funding sources
- Demonstrate knowledge of reimbursement methods
- Shows ability to interact with clinicians regarding cost effective and streamlined patient evaluation for differing clinical entities.
- Able and willing to participate in clinical conferences in which imaging studies used to guide patient care/evaluation.
- Is able and willing to organize and present case conferences/didactic sessions as directed and supervised by radiology staff

Milestones include:

- Incorporating QI into clinical practice
- Participates in the QA department process
- States relative cost of common procedures

Years 3 and 4: Cardiothoracic Radiology

1) Patient Care: At the end of the rotation, the resident should be able to:

- Understand and be able to monitor, supervise and interpret specialized thoracic procedures such as a high-resolution CT, thoracic CTA, coronary CTA, thoracic MRI/MRA and basic cardiac MRI studies.
- Continue to expand the knowledge of CT anatomy and pathology begun in the first two rotations, now to include advanced cardiac CT, coronary CTA and cardiac MRI.
- Refine MRI interpretive skills with complex pathology.
- Provide emergent provisional interpretation as needed.
- Be able to direct the choice of imaging modality and protocol emergent studies to include medically managing coronary CTA examinations in conjunction with the radiology nursing staff.
- Understand when referral or other imaging modalities is necessary.
- Become a more autonomous consultant and teacher.

Milestones include:

- Recommends appropriate imaging of uncommon conditions independently
- Integrates current research and literature with guidelines, taking into consideration cost effectiveness and risk benefit analysis, to recommend imaging
- Competently performs advanced procedures
- Recognizes and manages complications of advanced procedures
- Independently performs fluoro studies and image guided body procedures

- 2) **Medical Knowledge:** At the end of the rotation, the resident should be able to:
- Understand the common radiographic findings in the major cardiac congenital abnormalities and offer a reasonable differential diagnosis based on the radiographic findings
 - Consider starting or continuing a scholarly project in thoracic radiology such as a case report or research project with the faculty and, if appropriate, interested medical student
 - Master the knowledge of congenital heart disease including the radiographic findings and physiology
 - Assist in preparation and presentation of interdepartmental case conferences.
 - Independently monitor and triage Coronary CTA studies

Required Reading List:

- Cardiovascular Magnetic Resonance
- Cardiovascular MRI: Physical Principles to Protocols (Vivian Lee)
- High Resolution CT of the Lung
- High Resolution CT of the Chest: Complete Atlas
- Thoracic Imaging: Pulmonary & Cardiovascular
- Thyroid Cancer in Clinical Practice

Milestones include:

- Selects appropriate protocols and contrast agent/dose for advanced imaging
- Demonstrates knowledge of physical principles to optimize imaging quality
- Independently modifies protocols as determined by clinical circumstances
- Provides accurate, focused, and efficient interpretations
- Prioritizes differential diagnoses and recommends management
- Recommends ancillary imaging when appropriate
- Makes subtle observations
- Suggests a single diagnosis when appropriate
- Integrates current research and literature with guidelines to guide management

- 3) **Practice-Based Learning and Improvement:** At the end of the rotation, the resident should be able to:

- Analyze and develop improvement plans in the clinical practice, including knowledge, observation, and procedural skills
- Shows evidence of independent study using textbooks from expected reading list.
- Demonstrates appropriate follow up of interesting cases.
- Prepares teaching file of interesting cases.
- Is able and willing to make detailed presentations of cardiac studies at both intra and interdepartmental conferences.
- Upon request, participates in educational courses for clinicians, medical students, and fellow residents.
- Upon request, participates in educational activities at the local/national level.

Milestones include:

- Re demonstrates recognition and management of contrast reactions
- Communicates the relative risk of exam specific radiation exposure to patients and practitioners. Applies principles of Image Gently and Image Wisely
- Communicates MR safety of common implants and retained foreign bodies to patients and practitioners
- Selects appropriate sedation agent and dose of conscious sedation

- 4) **Interpersonal and Communication Skills:** At the end of the rotation, the resident should be able to:

- Interact with x-ray technologists, medical students, fellow residents, and attending radiologists.
- Interact with clinicians when reviewing cases involving cardiac imaging studies.
- Can participate in administrative and scholarly committees when asked.

- Can serve as a liaison between our department with both other radiology departments and other specialty groups in our institution.

Milestones include:

- Communicates without supervision in challenging circumstances
- Efficiently generates clear and concise reports that do not require substantive faculty member correction on all cases
- Communicates appropriately under stressful situations

5) Professionalism: At the end of the rotation, the resident should be able to:

- Participate in teaching of faculty, residents and medical students on rounds
- Residents must demonstrate ability to interact with patient/patient's family/clinician when discussing significance of x-ray findings and their impact on patient care including what imaging studies may or may not be appropriate.
- Can participate in activities relative to the role of cardiac imaging both to the medical community and the general public.
- Is perceived as a role model for radiology from both within and outside the department.

Milestones include

- Is an effective team leader promoting patient welfare, patient autonomy, and social justice?
- Serves as a role model for professional behavior

6) Systems-Based Practice: At the end of the rotation, the resident should be able to:

- Demonstrate knowledge of basic management principles such as budgeting, record keeping, medical records, and the recruitment, hiring, supervision and management of staff
- Shows ability to interact with clinicians regarding cost effective and streamlined patient evaluation for differing clinical entities.
- Able and willing to participate in clinical conferences in which imaging studies used to guide patient care/evaluation.
- Is able and willing to organize and present case conferences/didactic sessions as directed and supervised by radiology staff.
- Is able and willing to participate in activities at the local/national level under staff supervision.

Milestones include:

- Identifying and completing a systems-based practice project

Assessment tools for all Cardiothoracic Rotations:

- Reviewing rotation curriculum, goals and objectives, as a benchmark for progress of resident, and success of faculty in educating the resident. Discussion regarding the specifics of the document is encouraged to promote improvement of the resident's learning and the program's teaching. Positive points and deficiencies and unfulfilled goals and objectives should be discussed by the residents and faculty
- Global ratings by faculty including rotation evaluation sheet
- Resident's performance discussing unknown cases in conference (one of the metrics on Global Evaluation sheet is particularly important)
- Placing cases in teaching file (one of the metrics on Global Evaluation)
- Conference attendance logs
- In-service examination
- 360-degree evaluations – supervisory technologists in radiology core
- Fluoroscopy time log submitted by physicist to Program Director
- Self-assessment based on Rad Primer quizzes
- Future plans: evaluation of teaching by medical students

Cardiothoracic Procedure Logs:

- Coronary CTA studies for CCTA proficiency examinations

Cardiovascular Imaging Curriculum based off the ABR Core Exam

1) Basics of imaging: radiography, CT, and MR

- a) Indications and limitations of the modalities and comparison to echocardiography, angiography and cardiac catheterization, SPECT, and PET.
- b) Physics behind image creation and potential artifacts on radiography, CT, and MR
 - i) X-ray physics
 - ii) CT physics
 - (1) Multidetector CT artifacts relevant to cardiac imaging
 - (2) Tradeoffs between noise, dose and image quality
 - (3) Spatial resolution, contrast resolution, and imaging reconstruction algorithms
 - (4) Temporal resolution, half scan, and multi-segment reconstruction
 - (5) Contrast injection—principles, protocols, bolus geometry, iodine flux
 - iii) MR physics
 - (1) MR artifacts relevant to cardiac and vascular imaging
 - (2) Trade-off between spatial resolution, temporal resolution, contrast resolution, and acquisition time
 - (3) Principles of black blood, edema, and scar imaging
 - (4) Steady-state free precession cine imaging
 - (5) Velocity-encoded cine (phase contrast) imaging—principles, applications, and limitations
- c) Three-dimensional imaging and post-processing
 - i) Multiplanar reconstruction (MPR)
 - ii) Maximum intensity projection (MIP)
 - iii) Volume rendering (VR)
- d) Patient safety
 - i) Radiation exposure and how technical modifications may modify dose
 - ii) Drugs and contrast agents used for cardiac imaging
 - iii) Cardiac devices and the effect of the magnetic field of the MR unit

2) Normal anatomy, including variants, encountered on radiography, CT, and MR

- a) Heart, including chambers, valves, pericardium, and coronary arteries
- b) Aorta and pulmonary arteries
- c) Venae cavae and pulmonary veins

3) Physiological aspects of cardiac imaging as assessed with radiography, CT, and MR

Normal cardiac cycle

Physiological anatomy of cardiac muscle

Mechanics of cardiac contraction

Physical basis for blood flow, pressure, and resistance

- i) Ventricular volume and pressure relationship
- ii) Functional cardiac measurements
 - (1) Ejection fraction
 - (2) Stroke volume
 - (3) Left ventricular mass
- (4) Flow ($Q=V \times A$)

- (5) Pressure gradient (modified Bernoulli equation, $\Delta P = 4v^2$)
 - (6) Pulmonary-to-systemic flow (Q_p/Q_s) ratio
 - (7) Regurgitant volume and regurgitant fraction
 - (8) Diastolic heart function
 - iii) Normal cardiac and pulmonary pressures
 - iv) Vascular regions supplied by the coronary arteries
- 4) Ischemic heart disease**
- a) Risk factors, primary prevention, and screening
 - b) Roles of echocardiography, angiography, SPECT, PET, CT, and MR in the evaluation of a patient with suspected ischemic heart disease, including the advantages and limitations of each modality
 - c) Inducible myocardial ischemia
 - d) Acute MI
 - e) Chronic MI
 - f) Post-MI complications
 - i) Cardiac rupture
 - ii) Left ventricular aneurysm and pseudoaneurysm
 - iii) Papillary muscle rupture
 - iv) Congestive heart failure
 - v) Dressler syndrome
 - g) Myocardial perfusion and viability
 - i) Stunned myocardium
 - ii) Hibernating myocardium
 - h) Role of myocardial delayed-enhancement imaging in guiding management of left ventricular dysfunction
 - i) Coronary artery stenosis and aneurysm
 - j) Role of coronary CT angiography in guiding management of chest pain
 - k) Therapeutic and interventional options
- 5) Cardiomyopathy**
- a) Hypertrophic
 - b) Dilated
 - c) Restrictive
 - i) Distinguish restrictive cardiomyopathy from constrictive pericarditis
 - d) Arrhythmogenic right ventricular dysplasia
 - e) Therapeutic and interventional options
- 6) Cardiac masses**
- a) Thrombus
 - i) Distinguish thrombus from tumor
 - b) Primary benign tumors
 - i) Myxoma
 - ii) Lipoma
 - iii) Rhabdomyoma
 - iv) Fibroma
 - v) Lipomatous hypertrophy of the interatrial septum
 - c) Primary malignant tumors
 - i) Angiosarcoma

- ii) Lymphoma
 - d) Metastasis
 - e) Therapeutic and interventional options
- 7) Valvular disease**
- a) Myxomatous degeneration
 - b) Rheumatic heart disease
 - c) Infective endocarditis
 - d) Congenital valve disease
 - e) Specific lesions
 - i) Aortic stenosis
 - ii) Aortic regurgitation
 - iii) Mitral stenosis
 - iv) Mitral regurgitation
 - v) Mitral annular calcification
 - vi) Tricuspid regurgitation
 - vii) Pulmonary stenosis
 - viii) Pulmonary regurgitation
 - f) Therapeutic and interventional options
- 8) Pericardial disease**
- a) Acute pericarditis
 - b) Constrictive pericarditis
 - i) Distinguish restrictive cardiomyopathy from constrictive pericarditis
 - c) Pericardial effusion
 - i) Hemopericardium
 - ii) Tamponade
 - d) Pericardial cyst
 - e) Pericardial defect
 - f) Pneumopericardium
 - g) Therapeutic and interventional options
- 9) Congenital heart disease**
- a) Left-to-right shunts
 - i) Atrial septal defect
 - ii) Ventricular septal defect
 - iii) Partial anomalous pulmonary venous connection (1) Scimitar syndrome
 - iv) Patent ductus arteriosus
 - b) Eisenmenger syndrome
 - c) Admixture lesions (bidirectional shunts)
 - i) Transposition of the great arteries
 - ii) Truncus arteriosus
 - iii) Total anomalous pulmonary venous connection
 - d) Right-to-left shunts
 - i) Tetralogy of Fallot and pulmonary atresia with ventricular septal defect
 - ii) Ebstein anomaly

- e) Great vessel anomalies
 - i) Coarctation of the aorta
 - (1) Distinguish from pseudocoarctation
 - ii) Double aortic arch
 - iii) Right aortic arch
 - (1) Mirror image
 - (2) Non-mirror image
 - iv) Pulmonary sling
 - v) Persistent left superior vena cava
- f) Coronary artery anomalies
 - i) Retroaortic course
 - ii) Interarterial course
- g) Miscellaneous anomalies
 - i) Cardiac malposition, including situs abnormalities
 - ii) Congenitally corrected transposition of the great arteries
- h) Therapeutic and interventional options
- 10) Acquired disease of the thoracic aorta and great vessels**
 - a) Aneurysms
 - i) Atherosclerotic
 - ii) Marfan syndrome
 - iii) Ehlers-Danlos syndrome
 - b) Pseudoaneurysms
 - i) Mycotic
 - ii) Post-traumatic and post-surgical
 - c) Dissection
 - i) Intramural hematoma
 - d) Aortitis and arteritis
 - e) Atherosclerosis
 - i) Plaque
 - ii) Ulcerated plaque
 - iii) Penetrating ulcer
 - f) Thromboembolism
 - i) Acute pulmonary embolism
 - ii) Chronic pulmonary embolism
 - g) Pulmonary hypertension
 - h) Pulmonary arteriovenous malformation
 - i) Compression
 - i) Superior vena cava syndrome
 - j) Pulmonary vein complications after radiofrequency ablation
 - k) Therapeutic and interventional options
- 11) Devices and postoperative appearance**
 - a) Monitoring and support devices
 - i) Intra-aortic balloon pump
 - ii) Pacemaker generator and pacemaker leads
 - iii) Implantable cardiac defibrillator

- iv) Left ventricular assist device
- v) Pericardial drain
- b) Postoperative chest
 - i) Coronary artery bypass graft surgery
 - ii) Cardiac valve replacement
 - iii) Transluminal septal closure
 - iv) Aortic graft and aortic stent
 - v) Heart transplant

12) Requirements for Cardiac CTA Certification (via SCCT Exam)

a) **Level 1**

- vi) Mentored interpretative experience of 50 cases

b) **Level 2**

- vi) Evaluation of 50 non-contrast studies
- vii) Evaluation of 150 contrast studies, which 50 are live cases

- viii) 20 hours of lectures related to CT or CCT
Evaluation of 50 contrast studies per year
20 hours of Category 1 every 36 months of CCT

c) **Level 3**

- ix) Evaluation of 100 non-contrast studies
- x) Evaluation of 300 contrast studies, which 100 are live cases
- xi) 40 hours of lectures related to CT or CCT
Evaluation of 50 contrast studies per year
40 hours of Category 1 every 36 months of CCT

ADVENTHEALTH ORLANDO DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAM

**CONFIRMATION OF RECEIPT OF
CARDIOTHORACIC RADIOLOGY GOALS AND OBJECTIVES**

2018-2019

By signing this document, you are confirming that you have received and reviewed, with your preceptor, the Cardiothoracic radiology goals and objectives for this academic year.

This receipt will be kept in your personal file.

Resident Name (please print) _____

Resident Signature _____
by signing this – you confirm that you have reviewed the G&O with your preceptor

Date _____

Preceptor Signature _____
by signing this – you confirm that you have reviewed the G&O with the resident

Date _____

AdventHealth Orlando Diagnostic Radiology Residency

Emergency Radiology Goals and Objectives

Training Location: Orlando

Many of the goals and objectives apply to all rotations and are listed below. Those goals that are more specific to a particular rotation are listed separately.

Emergency Radiology Curriculum

The educational curriculum Emergency Radiology is comprised primarily of the rotations through the AdventHealth Orlando – ER Rotation and On-Call Rotation. Faculty provide direct training and supervision; as well as, a comprehensive series of lectures and conferences in Body Imaging. Correlation is made on a case-by-case basis with other imaging modalities, facilitated by the PACs system. A series of interdepartmental conferences, grand rounds, Journal Clubs, meetings and other venues are expected to enhance the residents' knowledge of Emergency Radiology.

Assigned Worklists

ER Rotation (12p-9p) – ER Worklist

On-Call (11p-7a) – ER Worklist first, then Neuro Worklist

Rotation 1: ER Radiology

Patient Care

Skills - At the end of the rotation, the resident should be able to:

- Gather clinical and radiographic data on patient's disease. When indicated, this includes discussing the case with the Emergency staff, reviewing the patient's chart and examining the patient
- Develop diagnostic plan based on the clinical presentation and prior imaging
- Demonstrate basic knowledge of IDX-RAD and UHIS computer systems
- Aid technologist in performing the correct x-ray/CT exam responsibly and safely, assuring that the correct exam is ordered and performed

Education

- Required readings - The Radiology of Emergency Medicine (Harris & Harris) 5th Edition
- Active participation with faculty in patient workup
- Participation in Journal Club, clinical conferences, and independent learning
- Radiation safety lectures

Assessment

- Global competency ratings by faculty
- 360 degree review from Core Supervising Technologist
- Place evidence of your accomplishments in your Personal Learning Portfolio (PLP)

Medical Knowledge:

Skills - At the end of the rotation, the resident should be able to:

- Demonstrate to recognize normal plain film anatomy and appropriate positions for tubes, catheters and other medical devices on plain films
- Demonstrate ability to diagnose common conditions (e.g. collapsed lobes) and life threatening conditions (e.g. pneumothorax) on chest radiographs, pneumoperitoneum on abdominal radiographs and spine fractures
- Demonstrate a clinically appropriate diagnostic treatment plan

- Demonstrate the proper use of radiological equipment such as fluoroscopy equipment during emergency GI/GU procedure in adults and children and to obtain special radiographic views (e.g. decubitus views and swimmer's views, etc.)
- Understand cardiac and aortic arch great vessel anatomy and the physiological basis for common diseases (e.g. congestive heart failure and pulmonary hypertension, pericardial effusions with tamponade and coarctation of the aorta) and understand the plain film findings in common diseases of the heart and great vessels

Education

- Required readings
- Didactic lecture series
- Participation in case conferences
- Participation in the clinical activities including the combined Radiology Department/Emergency Medicine Department Conference
- Review a portion of the cases in the department teaching file

Assessment

- Same as above
- Raphex physics exam

Interpersonal and Communication:

Skills - At the end of the rotation, the resident should be able to:

- Provide direct communication to referring physicians or their appropriate representative, and documenting communication in report for emergent or important unexpected findings
- Demonstrate the verbal and non-verbal skills necessary for face to face listening and speaking to physicians, families, and support personnel

Education

- Participation as an active member of the radiology team by communicating with clinicians face to face, providing consults, answering phones, problem solving and decision-making
- Act as contact person for technologists and nurses in managing patient and imaging issues
- Practical experience in dictating radiological reports

Assessment

- Same as above
- ACR in-training examination

Professionalism

Skills - At the end of the rotation, the resident should be able to:

- Demonstrate altruism
- Demonstrate compassion (be understanding and respectful of patient, their families, and medical colleagues)
- Demonstrate excellence: perform responsibilities at the highest level and continue active learning throughout one's career
- Demonstrate honesty with patients and staff
- Demonstrate honor and integrity: avoid conflict of interest when accepting gifts from patients and vendors
- Demonstrate sensitivity without prejudice 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
- Demonstrate positive work habits, including punctuality and professional appearance
- Demonstrate the broad principles of biomedical ethics
- Demonstrate principles of confidentiality with all information transmitted during a patient encounter
- Teaching of medical students and technologists

Education

- Discussion of above issues during daily clinical work

Assessment

- Same as above
- Attendance at the above conferences with logs as necessary

Practice Based Learning and Improvement

Skills - At the end of the rotation, the resident should be able to:

- Review all cases and dictate a preliminary report. Then review your interpretation with faculty and then correct report as needed before sending it to the faculty members report queue
- Share good learning cases and missed diagnoses with others in the department

Education

- Participate in Journal Club, clinical conferences, and independent learning
- Active participation in quality control and quality assurance
- Submit quality improvement form to supervising technologist, residency review coordinator, and department quality improvement secretary

Assessment

- Same as above

Systems Based Practice

Skills – At the end of the rotation, the resident should be able to:

- Demonstrate ability to design cost-effective care plans
- Demonstrate knowledge of the regulatory environment

Education

- Review of literature related to thoracic imaging, including ACR appropriateness criteria and ACR practice guidelines and technical standards
- Attendance and participation in multi-disciplinary conference
- Interaction with department administrators
- Discussions with faculty about cost-effective care plans and regulation
- Journal Club articles on issues related to systems based practice
- Management lectures on issues such as JCAHO inspections, corporate compliance, medication ordering and errors, patient safety, etc
- ACR/APDR initiative for Residents in Diagnostic Radiology Modules

Assessment

- Same as above

Rotations 2-3: ER Radiology

Patient Care

Skills – At the end of the rotation, the resident should be able to:

- Correlate diagnosis with specific treatments and operative procedures performed by the clinicians treating the patient
- Based on your radiographic findings and the clinical setting, guide clinicians in the use of more advanced imaging techniques such as high resolution CT, MR or cardiac and great vessel conditions and nuclear procedures such as PET-CT. Correlate the findings on plain films with the findings or other modalities such as ultrasound, CT, MR, etc

Education

- Understand the indications for radiographic interventional procedures and other specialized diagnostic procedures

Assessment

- Global competency ratings by faculty
- 360 degree review from Core Supervising Technologist
- Place evidence of your accomplishments in your PLP

Medical Knowledge

Skills – At the end of the rotation, the resident should be able to:

- Demonstrate understanding of the principles of research project design and implementation and consider starting a scholarly project in emergency radiology such as a case report or research project with the faculty and, if appropriate, interested medical student
- Understand the proper use of radiological equipment such as chest sonography and demonstrate its use while on the ultrasound rotation
- Be able to monitor and interpret plain films and know when to obtain additional studies and to classify injuries by the appropriate staging classification

Education

- Suggested reading
- Review current articles related to emergency imaging in current issues of AJR, Radiology and Radiographics
- Didactic lecture series provided by other sections
- Attend the core conferences and lectures
- Participation in the combined Radiology Department/Emergency Department Conference

Assessment

- Same as above
- Raphex physics exam

Interpersonal and Communication Skills

Skills – At the end of the rotation, the resident should have mastered the following:

- Present interesting cases at noon conference

Education

- Review the ACR practice guideline for communication: diagnostic radiology

Assessment

- Same as above

Professionalism

Skills – At the end of the rotation, the resident should have mastered the following:

- Help teaching of Junior Residents and house staff from other departments

Education

- Participation in department and hospital based committees and educational activities
- Plan for Future: Training programs and/or videotapes on harassment and discrimination

Assessment

- Same as above
- ABR written exam
- Attendance at the above conference with logs as necessary
- Place evidence of your accomplishments in your PLP

Practice Based Learning and Improvement

Skills – At the end of the first rotation, the resident should have mastered the following:

- Demonstrate knowledge of and apply the principles of evidence-based medicine in practice
- Demonstrate critical assessment of the scientific literature

Education

- Participate in Journal Club, clinical conferences, and independent learning
- When on-call and when on thoracic service correlate and discuss your reading of chest plain radiographs with the residents and faculty who are interpreting the patient's CT or MR examinations

Assessment

- Same as above
- ACR in-training exam
- ABR written examination

Systems Based Practice

Skills – At the end of the rotation, the resident should have mastered the following:

- Demonstrate knowledge of funding sources
- Demonstrate knowledge of reimbursement methods

Education

- Interaction with department administrators
- Discussions with faculty about funding and reimbursement issues
- Journal Club articles on issues related to systems based practice
- Clinical practice management lectures on issues such as JCAHO inspections, corporate compliance, etc
- ACR/APDR initiative for Residents in Diagnostic Radiology Modules

Assessment

- Same as above
- ACR in-training exam
- Documented membership in societies

ADVENTHEALTH ORLANDO DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAM

**CONFIRMATION OF RECEIPT OF
EMERGENCY RADIOLOGY GOALS AND OBJECTIVES**

2018-2019

By signing this document, you are confirming that you have received and reviewed, with your preceptor, the Emergency radiology goals and objectives for this academic year.

This receipt will be kept in your personal file.

Resident Name (please print) _____

Resident Signature _____
by signing this – you confirm that you have reviewed the G&O with your preceptor

Date _____

Preceptor Signature _____
by signing this – you confirm that you have reviewed the G&O with the resident

Date _____

AdventHealth Orlando Diagnostic Radiology Residency

Musculoskeletal Radiology Goals and Objectives

Training Location: Orlando

Many of the goals and objectives apply to all rotations and are listed below. Those goals that are more specific to a particular rotation are listed separately.

Musculoskeletal Radiology Curriculum

The educational curriculum in Musculoskeletal Radiology is comprised primarily of the rotations through the Musculoskeletal at AdventHealth Orlando where the Faculty provide direct training and supervision; as well as, a comprehensive series of lectures and conferences in Musculoskeletal radiology. Correlation is made on a case-by-case basis with other imaging modalities, facilitated by the PACs system. A series of interdepartmental conferences, grand rounds, Journal Clubs, meetings and other venues are expected to enhance the residents' knowledge of Musculoskeletal radiology.

Because a full outline of disease entities and conditions is provided under each organ system elsewhere in the Radiology Residency Curriculum, a summarized curriculum for the Musculoskeletal Section follows:

- The resident is expected to report to the Musculoskeletal Radiology reading area at 8 a.m. The resident should be available in the area until 4p.m. each day. The musculoskeletal resident is an essential part of the program and not an observer. He/she is directly responsible for, and an integral part of, all activities relating to bone imaging and is expected to act accordingly
- Musculoskeletal plain film, CT, and MR studies are available on PACS
- The Resident is required to attend quarterly MSK/Ortho conferences while on rotation
- **First year residents** or those assigned to **MSK1** will cover plain film studies
- **Senior residents** or those assigned to **MSK2** will read plain films, CT and MRI examinations. The resident will protocol all CT and MR exams, and monitor these examinations as necessary. Verification from the clinician should be sought when there is some doubt that the correct examination is ordered, or if the patient is unable to cooperate
- Musculoskeletal radiology procedures are generally performed by residents. Procedures done by the resident are performed under faculty supervision. The resident is responsible for the following
 - Checking with the Radiology facilitators (RFs) first thing each morning to determine if and when we have MSK procedures
 - Verifying the type of procedure
 - Obtaining the written consent and viewing relevant prior imaging
 - Supervising the appropriateness of preliminary radiographs
 - Verifying laboratory orders and specimen labeling
 - Writing pre- and post-procedure notes in the chart progress sheet
 - Making a patient follow-up visit (inpatients only)
- Dictations are completed by the end of each workday
- The resident should review all preliminary reports, correct as necessary and sign at least twice daily
- To provide each resident a basic understanding of the currently available imaging modalities as applied to the diagnosis and evaluation of: musculoskeletal disorders, including conventional radiographs, computed tomography, magnetic resonance imaging, ultrasound, and arthrography
- To teach **imaging strategies**: how to choose the most effective imaging technique in specific clinical situations to diagnose a musculoskeletal problem, and deciding which modality to use next to further evaluate a given disorder or a lesion
- To teach the concept of quality imaging, reinforce the importance of quality control in terms of

- optimal imaging techniques and radiation safety
- To teach the specificity of the musculoskeletal abnormalities, and, in particular, what specific information is important to the referring physician
- To reinforce the knowledge of radiographic anatomy of the musculoskeletal system
- The residents are expected to develop their skills in a variety of interventional MSK procedures including arthrography, anesthetic injections and delivery of intra-articular therapeutic agents

Training using the ACGME Six-Core Competencies:

Year 1: Musculoskeletal Radiology

Cognitive Objectives:

Medical Knowledge, Interpersonal and Communication Skills, Systems-Based Practice: At the end of the first MSK rotation, a radiology resident should be able to:

- Dictate a succinct, precise and coherent radiology report
- Describe pertinent normal anatomy in an MSK radiograph
- Establish a diagnosis and provide an appropriate description of a fracture involving either the peripheral or axial skeleton
- Discuss the imaging findings of septic arthritis, osteomyelitis, and metastatic diseases
- Evaluate orthopedic follow-up imaging including the imaging findings of loosening and infection of orthopedic hardware
- Discuss the most common techniques in MSK imaging, the indications and contra-indications, and complications of the following:
 - Radiographs & fluoroscopy
 - MSK scintigraphy
 - Hematoma
 - Baker's Cyst, including rupture
 - Arthrography
 - Ultrasound
 - Cellulitis
 - Abscess
 - CT
 - MR

Affective Objectives:

Professionalism, Interpersonal and Communication Skills, Patient Care, Medical Knowledge, Practice-Based Learning and Improvement: At the end of the first MSK rotation, a radiology resident should be able to:

- Project a professional image
- Demonstrate empathy and respect towards patients, referring clinicians, radiology personnel, and colleagues
- Function as a consultant to clinicians for radiographic evaluation of MSK trauma and orthopedic follow-up (e.g. - if a clinician enters the reading room, he or she should be greeted within 30 seconds and then assisted as soon as possible with image retrieval and/or interpretation)
- Participate actively in the MSK division's academic program (e.g. teaching medical students on the rotation)
- A formative verbal evaluation will be given at the half-way point of the rotation. The resident should utilize this information in order to improve performance when necessary

Work Training:

- 1-2 days spent with a technologist

- Participate in all arthrogram and aspiration procedures with Attending (except during conferences)

Expected Reading List:

- Fundamentals of Diagnostic Radiology (Brant & Helms) – week 1 (Chapters 40-42); week 2 (Chapters 43-45); week 3 (Chapters 46-67); week 4 (Chapters 48-49)
- Diagnostic Imaging: Musculoskeletal Trauma
- Musculoskeletal Imaging: The Requisites

Milestones include:

- Using established evidence based guidelines such as ACR appropriateness criteria
- Appropriately use the electronic health record to obtain relevant clinical information
- Competently perform basic procedures under indirect supervision
- Recognize and manage complications of basic procedures
- Selecting appropriate protocol
- Makes core observations
- Formulate differential diagnoses
- Recognize critical findings
- Differentiate normal from abnormal
- Recognizes and manages contrast reactions
- Describes the mechanism of radiation injury and the ALARA concept
- Documents training in critical thinking skills and research design
- Communicating information about imaging and examination results in routine, uncomplicated cases
- Obtains informed consent
- Adhere to transfer of care policies
- Generates accurate reports with appropriate elements for coding
- Communicates urgent and unexpected findings according to RSF policy
- Recognizing the importance and priority of patient care and advocates for patient interests
- Fulfills work related responsibilities
- Recognizes personal limitations and seeks help when appropriate
- Responds appropriately to constructive criticism
- Maintains patient confidentiality
- Attends required meetings
- Describes departmental QI initiatives
- Describes the departmental QA system

Year 2: Musculoskeletal Radiology

Cognitive Objectives:

Medical Knowledge, Interpersonal and Communication Skills, Systems-Based Practice: At the end of the second MSK rotation, a radiology resident should be able to:

- Perform all cognitive objectives stated under Rotation 1
- Discuss the imaging findings and provide an appropriate differential diagnosis for:
 - Articular diseases
 - Benign and malignant bone tumors
 - Metabolic and endocrine diseases
 - Miscellaneous diseases entities (as listed in addendum)
 - Soft tissue lesions
 - Congenital syndromes
 - Be proficient at reading MR Imaging of the knee and shoulder
 - Normal Tendon appearance
 - Foreign Body

- Soft Tissue Gas
- Joint fluid
- Muscle tear

Affective Objectives:

Professionalism, Interpersonal and Communication Skills, Patient Care, Medical Knowledge,

Practice-Based Learning and Improvement: At the end of the second MSK rotation, a radiology resident should be able to:

- Function as a consultant for conventional radiographic evaluation of MSK pathology and for planning the MSK imaging to solve a particular problem

Work Training:

- 1-2 days spent with a technologist
- Participate in all arthrogram and aspiration procedures with Attending (except during conferences)

Expected Reading List:

- Diagnostic Imaging: Musculoskeletal Trauma
- Expertddx: Musculoskeletal
- Oral and Maxillofacial Radiology
- Oral Radiology: Principles & Interpret
- Musculoskeletal MRI, 2nd Edition. Helms, MD, Major, MD, et al

Milestones include:

- Recommends appropriate imaging of common conditions independently
- Competently performs intermediate procedures
- Recognizes and manages complications of intermediate procedures
- Selects appropriate protocols and contrast agent/dose for intermediate imaging
- Makes secondary observations
- Narrows differential diagnosis
- Describes management options
- Re-demonstrates recognition and management of contrast reactions
- Accesses resources to determine exam specific average radiation dose info
- Accesses resources to determine safety of implanted devices and retained metal
- Works with faculty mentors to identify potential scholarly projects
- Communicates under direct supervision in challenging circumstances
- Communicates under direct supervision difficult information such as errors, complications, adverse events, and bad news
- Efficiently generates clear and concise reports that do not require substantive faculty member correction on routine cases
- Communicates findings and recommendations clearly and concisely
- Becomes an effective health care team member
- Continues to demonstrates professional behaviors described under year 1
- Incorporating QI into clinical practice
- Participates in the QA department process
- States relative cost of common procedures

Years 3 and 4: Musculoskeletal Radiology

Cognitive Objectives:

Knowledge, Patient Care, Systems-Based Practice: At the end of the third MSK rotation, a radiology resident should be able to:

- Protocol all MR imaging studies based on the clinical information

- Interpret with competence MRI studies of the shoulder, pelvis, and knee, and ankle
- Plan and interpret with competence all radiographic MSK imaging studies
- Tendon tear, inflammation
- Rotator cuff tear

Affective Objectives:

Professionalism, Interpersonal and Communication Skills, Patient Care, Medical Knowledge,

Practice-Based Learning and Improvement: At the end of the third and fourth MSK rotation, a radiology resident should be able to:

- Serve as a high-level consultant for clinicians inquiring about MSK imaging studies
- Participate actively in the teaching of junior residents, other residents, interns, and medical students
- Competently perform placement of needles into hip, shoulder, and wrist joints for arthrography and joint aspiration

Expected Reading List:

- Diagnostic Imaging: Musculoskeletal Trauma
- Expertddx: Musculoskeletal
- Oral and Maxillofacial Radiology
- Oral Radiology: Principles & Interpret
- Musculoskeletal MRI, 2nd Edition. Helms, MD, Major, MD, et al

Milestones include:

- Recommends appropriate imaging of uncommon conditions independently
- Integrates current research and literature with guidelines, taking into consideration cost effectiveness and risk benefit analysis, to recommend imaging
- Competently performs advanced procedures
- Recognizes and manages complications of advanced procedures
- Independently performs fluoro studies and image guided body procedures
- Selects appropriate protocols and contrast agent/dose for advanced imaging
- Demonstrates knowledge of physical principles to optimize imaging quality
- Independently modifies protocols as determined by clinical circumstances
- Provides accurate, focused, and efficient interpretations
- Prioritizes differential diagnoses and recommends management
- Makes subtle observations
- Suggests a single diagnosis when appropriate
- Integrates current research and literature with guidelines to recommend management
- Redemonstrates recognition and management of contrast reactions
- Communicates the relative risk of exam specific radiation exposure to patients and practitioners.
- Applies principles of image Gently and Wisely
- Selects appropriate sedation agent and dose of conscious sedation
- Communicates without supervision in challenging circumstances
- Efficiently generates clear and concise reports that do not require substantive faculty member correction on all cases
- Communicates appropriately under stressful situations
- Is an effective team leader promoting patient welfare, patient autonomy, and social justice
- Serves as a role model for professional behavior
- Identifying and completing a systems based practice project

Assessment tools for Musculoskeletal Radiology:

- Reviewing rotation curriculum, goals and objectives, as a benchmark for progress of resident, and success of faculty, is educating the resident. Discussion regarding the specifics of the document is

encouraged to promote improvement of the resident's learning and the program's teaching. Positive points and deficiencies and unfulfilled goals and objectives

- Global ratings by faculty including rotation evaluation sheet
- Resident's performance discussing unknown cases in conference (one of the metrics on Global Evaluation sheet is particularly important)
- Placing cases in teaching file (one of the metrics on Global Evaluation)
- Conference attendance logs
- In-service examination
- 360 degree evaluations – supervisory technologists in radiology core
- Fluoroscopy time log submitted by physicist to Program Director
- Self assessment based on Rad Primer quizzes
- Future plans: evaluation of teaching by medical students

ACGME Required Documentation of Case & Procedure Logs:

- Ankle Arthrogram
- Elbow Arthrogram
- Hip Arthrogram
- Knee Arthrogram
- Shoulder arthrogram
- Wrist arthrogram

Following completion of 14 weeks of musculoskeletal radiology, residents should be able to discuss, based on the Musculoskeletal Radiology ABR Core Exam

Traumatic Osteoarticular Lesions of the Axial and Peripheral Skeleton

- Classification of fracture type
- Radiographic findings of a fracture
- Physiopathology and radiologic correlation of fracture healing
- Radiographic findings according to anatomic site

Articular Disease

- Classification of articular disease
- Radiographic findings of articular lesions
- Physiopathology and radiologic correlation of articular disease:
 - Infections
 - Inflammatory/immune
 - Degenerative
 - Neuropathic
 - metabolic and endocrine
 - synovial tumors

Benign and malignant bone tumors

- Classification of bone tumors
- Radiographic findings of benign and malignant features of bone tumors
- Characteristics (age, site, location, radiographic findings) of benign and malignant bone tumors
- Cartilaginous origin
- Osseous origin
- Fibrous origin
- Cyst
- Myelogenous origin
- Metastasis

Infectious lesions

- Classification of infections
- Radiographic findings of infectious lesions
- Physiopathology and radiographic correlation of infectious diseases

Metabolic and endocrine diseases

- Classification of osteopenia
- Radiographic findings of the three forms of diffuse osteopenia
- Osteoporosis
- Osteomalacia
- Hyperparathyroidism
- Physiopathology and radiographic correlation of diffuse and localized osteopenia
- Physiopathology and radiographic correlation of endocrine disorders originating from:
 - hypophysis
 - thyroid
 - parathyroid
 - adrenals
 - gonads
 - diabetes
 - Physiopathology and radiographic correlation of hypo and hypervitaminoses
 - vitamin A
 - vitamin D

Miscellaneous disease entities

- Paget's disease
- Reticulo-endothelioses (histiocytosis X / Langerhans cell histiocytosis)
- Storage Disease (Gaucher's disease)
- Ischemic Disease (Osteonecrosis, osteochondrosis)
- Anemias
- Marrow disease
- Radiographic findings of these entities
- Physiopathology and radiographic correlation of these entities
- Complications and radiographic findings of these entities

Soft tissue lesions

- Classifications of soft tissue lesions
- Radiographic findings of soft tissue lesions
- Physiopathology and radiographic correlations of soft tissue lesions

Congenital Syndromes

- Radiographic findings of:
 - Congenital dislocation of the hip
 - Flat foot and club foot
 - Osteochondrodysplasia
 - Failure of growth of tubular bones and spine
 - Achondroplasia
 - Spondylo-epiphyseal dysplasia
 - Failure of growth and development of cartilage and fibrous tissue
 - Dysplasia epiphysialis hemimelica
 - Multiple exostoses
 - Enchondromatosis
 - Fibrous dysplasia

Anomaly in density and modeling

- Osteogenesis imperfecta
- Juvenile osteoporosis
- Osteopetrosis

- Osteopoikilosis
- Melorheostosis
- Diaphyseal dysplasia

Dysostosis

- Klippel Feil

Sprengel deformity

- Marfan syndrome
- Neurofibromatosis
- Chromosomal anomalies
- Turner
- Trisomy-21



MUSCULOSKELETAL PROCEDURE COMPETENCY CHECKLISTS

Instructions: All MSK forms for competency are to be completed by the end of the 3rd MSK rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Shoulder Arthrogram

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No__ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No __ Faculty sign off ____

Resident has completed the following required procedure:

(must complete 3 or more)

1. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



MUSCULOSKELETAL PROCEDURE COMPETENCY CHECKLISTS

Instructions: All MSK forms for competency are to be completed by the end of the 3rd MSK rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Elbow Arthrogram

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No ___ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No ___ Faculty sign off ____

Resident has completed the following required procedure:
(must complete 3 or more)

1. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



MUSCULOSKELETAL PROCEDURE COMPETENCY CHECKLISTS

Instructions: All MSK forms for competency are to be completed by the end of the 3rd MSK rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Wrist Arthrogram

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No ___ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No ___ Faculty sign off ____

Resident has completed the following required procedure:

(must complete 3 or more)

1. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



MUSCULOSKELETAL PROCEDURE COMPETENCY CHECKLISTS

Instructions: All MSK forms for competency are to be completed by the end of the 3rd MSK rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Hip Arthrogram

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No ___ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No ___ Faculty sign off ____

Resident has completed the following required procedure:

(must complete 3 or more)

1. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



MUSCULOSKELETAL PROCEDURE COMPETENCY CHECKLISTS

Instructions: All MSK forms for competency are to be completed by the end of the 3rd MSK rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Knee Arthrogram

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No ___ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No ___ Faculty sign off ____

Resident has completed the following required procedure:

(must complete 3 or more)

1. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



MUSCULOSKELETAL PROCEDURE COMPETENCY CHECKLISTS

Instructions: All MSK forms for competency are to be completed by the end of the 3rd MSK rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Ankle Arthrogram

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No__ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No __ Faculty sign off ____

Resident has completed the following required procedure:
(must complete 3 or more)

1. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient Name: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

ADVENTHEALTH ORLANDO DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAM

CONFIRMATION OF RECEIPT OF
MUSCULOSKELETAL RADIOLOGY GOALS AND OBJECTIVES

2018-2019

By signing this document, you are confirming that you have received and reviewed, with your preceptor, the musculoskeletal radiology goals and objectives for this academic year.

This receipt will be kept in your personal file.

Resident Name (please print) _____

Resident Signature _____
by signing this – you confirm that you have reviewed the G&O with your preceptor

Date _____

Preceptor Signature _____
by signing this – you confirm that you have reviewed the G&O with the resident

Date _____

AdventHealth Orlando Diagnostic Radiology Residency

Nuclear Medicine Goals and Objectives

Training Location: Orlando

Nuclear Medicine Curriculum

I. Introduction

The core of the Nuclear Medicine training is provided by daily interpretation of imaging studies under the direct supervision of the nuclear medicine faculty. This learning is supplemented by faculty lectures covering physics, radiation biology, radiation protection, protocols, imaging, and disease process. Additional training is acquired and reinforced by attending and presenting at conferences, studying of text books and journals, teaching and research. ACGME requires 700 hours of nuclear medicine during 4 years of Diagnostic Radiology Training.

II. Curriculum Content for 700 hours of training

Refer to: Appendix A

III. General ACGME six core competencies (6 categories) for 700 hours of Nuclear Medicine training

Refer to: Appendix B

IV. Resident responsibilities during Nuclear Medicine Rotations

Year 1

- 1) Learn radiotracer techniques and physiology, radionuclide pharmacology, radiation biology, radiation protection, decontamination procedures, ALARA, instrumentation, nuclear medicine instrumentation, imaging protocols, and biodistribution of isotopes.
- 2) Learn indications for, protocols of, imaging techniques of, and scintigraphic findings for the more commonly performed nuclear medicine procedures: Lung, bone, GI, and PET/CT.
- 3) Interpret studies under the guidance of nuclear medicine faculty.
- 4) Learn to use the dictation templates to provide an articulate and meaningful interpretation for referring physicians.
- 5) Acquire an appreciation for and knowledge of the operation of a Nuclear Medicine Department.
- 6) Develop the habit of always gathering appropriate clinical history and relevant anatomical studies in order to render a more useful interpretation.
- 7) Become familiar with ACR appropriateness criteria related to nuclear medicine.
- 8) Work in Nuclear Medicine pharmacy and hot lab in order to acquire knowledge and experience in the handling of radiopharmaceuticals (see appendices E,F,G)
- 9) Learn the procedures for and participate in treating patients using high-dose and low dose I-¹³¹. (see appendix D)
- 10) Observe in the imaging areas, the performance of selected nuclear medicine procedures.
- 11) At all times demonstrate respect and kindness for patients, their families, staff and peers: Patient and Professional needs supersede the self-interest.
- 12) Study Nuclear Medicine; Teaching files, cases, text books, journals.

Book: Essentials for Nuclear Medicine Imaging: F.A. Mettler and M.J. Guiberteau.

Year 2

- 1) Learn biodistribution of, production of, and characteristics of all diagnostic isotopes and radiopharmaceuticals.
- 2) Learn indications for, protocols of, imaging techniques of, and the scintigraphic findings for all nuclear medicine procedures.
- 3) Interpret studies under the guidance of nuclear medicine faculty.
- 4) Learn to use all of the nuclear medicine work stations and software.
- 5) Begin interactions with technologists helping them solve problems they encounter in performing studies.
- 6) Interact with referring physicians regarding the results of and implications of studies.
- 7) Continue to acquire experience in treating thyroid disease with low-dose and high-dose I-¹³¹.
- 8) Continue to observe the performance of selected nuclear medicine procedures.
- 9) At all times demonstrate respect and kindness for patients and their families, staff, and peers: Patient and Professional needs supersede self-interest.

10) Study Nuclear Medicine:

Book: Essentials for Nuclear Medicine Imaging: F.A. Mettler and M.J. Guiberteau.

Journals: JNMMI, EJNMMI, Clinical Nuclear Medicine

Years 3 & 4

- 1) Interpret studies with the guidance of nuclear medicine faculty.
- 2) Assume the role of the primary nuclear physician interacting with technologists and physicians to solve problems and obtain high quality studies.
- 3) Teach students and fellow residents.
- 4) Present cases at conference.
- 5) Complete I-¹³¹therapy requirements if needed.
- 6) Reinforce knowledge of nuclear medicine procedures by spending time in imaging areas, helping technologists studying the physics of instrumentation, interpreting studies, and teaching others.
- 7) Acquire knowledge of state and national regulations pertaining to the regulation of distribution of, use of, and administration of isotopes and radiopharmaceutical.
- 8) At all times demonstrate respect and kindness for patients and their families, staff, and peers. Patient and Professional needs supersede self-interest.
- 9) Study textbooks and journals.

Book: Nuclear medicine and PET/CT PE Christian and KM Waterstram-Rich

Book: PET and PET/CT: RL Wahl

V. Goals and Objectives of Nuclear Medicine Rotations

A. Year 1

- 1) Can completely use the nuclear medicine work stations
- 2) Utilize electric medical health record to gather patient information
- 3) Understands the fundamentals of nuclear medicine imaging
- 4) Knows biodistribution of isotopes
- 5) Provides appropriate interpretations using templates
- 6) Communicates well with physicians and staff
- 7) Responds appropriately to constructive criticism
- 8) Demonstrates appropriate professional behavior
- 9) Completes and submits to physicist the required information pertaining to the time spent in nuclear pharmacy and in the imaging areas

B. Year 2

- 1) Can competently use all nuclear medicine stations
- 2) Knows protocols of all nuclear medicine procedures
- 3) Knows production of, biodistribution of, and characteristics of diagnostic isotopes and the radiopharmaceuticals
- 4) Is able to assist technologists with problems they encounter in performing studies
- 5) Demonstrates appropriate professional behavior

C. Years 3 and 4

- 1) Can competently direct all nuclear studies and render an appropriate interpretation
- 2) Has completed all I-131 therapies
Documentation of:
 - Radiation physics and instrumentation
 - Radiation protection
 - Mathematics, statistics and computer sciences pertaining to the use and measurement of radioactivity
 - Radiation biology
 - Radiopharmaceutical chemistry
 - 3 of I-131 > 33 mCi*
 - 3 of I-131 < 33 mCi*
- 3) Has knowledge of nuclear medicine journals
- 4) Can competently discuss all aspects of nuclear medicine: physics, instrumentation, isotopes, imaging protocols, pathophysiology and radiation exposure.
- 5) Demonstrates appropriate professional behavior

NM APPENDIX A

Nuclear Medicine Curriculum based on the ABR Core Exam

1) Breast

- a) Benign neoplasm
 - i) Radiopharmaceuticals (f-18 fdg)
 - ii) Imaging techniques (pet)
 - iii) Indications: breast lesion
- b) Malignant neoplasm, primary
 - i) Radiopharmaceuticals (f-18 fdg)
 - ii) Imaging techniques (pet)
 - iii) Indications: breast lesion
- c) Malignant neoplasm, metastatic
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP; F-18 NaF, F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: staging disease, treatment strategy
- d) Lymphatic mapping/sentinel lymph node (SLN)
 - i) Radiopharmaceuticals (Tc-99m SC)
 - ii) Injection techniques
 - iii) Imaging and localization techniques (planar, SPECT, gamma probe)
 - iv) Indications: identification and localization of SLN for intraoperative gamma probe
- e) Infection & inflammation
 - i) Radiopharmaceuticals (Ga-67 citrate, In-111 WBCs; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: breast abscess, inflammation
- f) Normal & other
 - i) Radiopharmaceuticals (all of above)
 - ii) Imaging techniques (all of above)
 - iii) Indications: all of above, miscellaneous
- g) Artifacts & quality control
 - i) Patient issues: patient preparation, motion, positioning, contamination
 - ii) Radiopharmaceutical issues: dose preparation, dosing technique, altered biodistribution
 - iii) Technical issues: instrumentation, acquisition & processing, quantitation (SUV)

2) Cardiac

- a) Perfusion imaging, coronary artery disease
 - i) Stress protocols (exercise, pharmacologic)
 - ii) Radiopharmaceuticals (Tc-99m MIBI/tetrofosmin, Tl-201 chloride; Rb-82)

- iii) Imaging techniques (SPECT, ECG-gated SPECT; PET)
- iv) Quantitative analysis (LVEF, EDV, ESV, TID)
- v) Indications: perfusion, function, wall motion, ischemia vs. infarction
- b) Perfusion Imaging, non-Coronary Artery Disease
 - i) Radiopharmaceuticals (Tc-99m MIBI/tetrofosmin, Tl-201 chloride; Rb-82)
 - ii) Imaging techniques (SPECT, ECG-gated SPECT; PET)
 - iii) Quantitative analysis (LVEF, EDV, ESV)
 - iv) Indications: perfusion, function, wall motion, cardiomyopathy
- c) Metabolism & viability
 - i) Radiopharmaceuticals (Tl-201 chloride; F-18 FDG)
 - ii) Imaging techniques (SPECT; PET)
 - iii) Indications: hibernating myocardium, pre-operative evaluation
- d) Function: multigated acquisition (muga) & first-pass studies
 - i) Radiopharmaceuticals (Tc-99m RBCs, Tc-99m DTPA)
 - ii) Imaging techniques (ECG-gated planar)
 - iii) Quantitative analysis (LVEF)
 - iv) Indications: baseline function, cardiotoxicity, valvular disease (e.g., aortic insufficiency)
- e) Shunts
 - i) Radiopharmaceuticals (Tc-99m MAA, Tc-99m DTPA)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Quantitative analysis (QpQs)
 - iv) Indications: right-to-left shunt, left-to-right shunt
- f) Infection & inflammation
 - i) Radiopharmaceuticals (Ga-67 citrate, In-111 WBCs; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: pericarditis, myocardial/valvular abscess, sarcoidosis
- g) Normal & other
 - i) Radiopharmaceuticals (all of above)
 - ii) Imaging techniques (all of above)
 - iii) Indications: all of above, miscellaneous
- h) Artifacts & quality control
 - i) Patient issues: patient preparation, motion, positioning, contamination
 - ii) Radiopharmaceutical issues: dose preparation, dosing technique, altered biodistribution
 - iii) Technical issues: instrumentation, acquisition & processing, ECG-gating, quantitation (LVEF)

3) Gastrointestinal

- a) Liver & spleen
 - i) Radiopharmaceuticals (Tc-99m SC, damaged Tc-99m RBCs, Tc-99m MAA)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Indications: cirrhosis, hepatic masses (FNH), accessory spleen/splenosis, ascites shunt patency
- b) Biliary

- i) Radiopharmaceuticals (Tc-99m IDA)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Pharmacologic protocols (morphine, CCK)
 - iv) Quantitative analysis (GBEF)
 - v) Indications: acute cholecystitis, chronic acalculous cholecystitis, common bile duct obstruction, bile leak, postoperative complications, biliary ectasia
- c) Bowel: gastrointestinal bleeding
 - i) Radiopharmaceuticals (Tc-99m RBCs, Tc-99m pertechnetate)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Indications: active GI bleeding site, varices, Meckel diverticulum
- d) Bowel: gastrointestinal motility
 - i) Radiopharmaceuticals (Tc-99m SC solid meal/liquid meal)
 - ii) Imaging techniques (planar)
 - iii) Quantitative analysis (T 'A, geometric mean)
 - iv) Indications: gastroparesis, gastroesophageal reflux, aspiration
- e) Benign neoplasm
 - i) Radiopharmaceuticals (Tc-99m SC, Tc-99m IDA, Tc-99m RBCs; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: liver mass (FNH, cavernous hemangioma)
- f) Malignant neoplasm, primary
 - i) Radiopharmaceuticals (Ga-67 citrate; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: hepatocellular cancer, biliary/esophageal/gastric/pancreatic/colorectal cancer, GI stromal tumor
- g) Malignant neoplasm, metastatic
 - i) Radiopharmaceuticals (F-18 FDG)
 - ii) Imaging techniques (PET)
 - iii) Indications: staging disease, treatment strategy
- h) Infection & inflammation
 - i) Radiopharmaceuticals (Ga-67 citrate, In-111 WBCs, Tc-99m pertechnetate; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: abscess, inflammatory bowel disease, sialadenitis
 - iv) Non-imaging techniques (C-14 urea breath test for H. pylori)
- i) Normal & other
 - i) Radiopharmaceuticals (all of above)
 - ii) Imaging techniques (all of above)
 - iii) Indications: all of above, miscellaneous
- j) Artifacts & quality control
 - i) Patient issues: patient preparation, motion, positioning, contamination
 - ii) Radiopharmaceutical issues: dose preparation, dosing technique, altered biodistribution
 - iii) Technical issues: instrumentation, acquisition & processing, quantitation (GBEF, T 'A; SUV)

4) Musculoskeletal

- a) Benign neoplasm
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP; F-18 NaF, F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: osteoid osteoma, exostosis, other imaging
- b) Malignant neoplasm, primary
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP; F-18 NaF, F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: osteosarcoma, Ewing sarcoma, multiple myeloma
- c) Malignant neoplasm, metastatic
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP; F-18 NaF, F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: staging disease, monitoring therapeutic response
- d) Therapy
 - i) Radiopharmaceuticals (Sm-153, Sr-89)
 - ii) Patient preparation, consent & instructions
 - iii) Indications: painful metastases
- e) Tumor-like conditions
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP; F-18 NaF, F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: fibrous dysplasia
- f) Metabolic & vascular abnormalities
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP, Tc-99m SC; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: hyperparathyroidism (“superscan”/renal osteodystrophy), Paget disease, avascular necrosis, myelofibrosis
- g) Trauma
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Indications: stress fracture, heterotopic bone
- h) Infection & inflammation
 - i) Radiopharmaceuticals (Ga-67 citrate, In-111 WBCs; Tc-99m SC; F-18 FDG)
 - ii) Imaging techniques (three-phase, planar, SPECT; PET)
 - Indications: osteomyelitis, cellulitis, synovitis/septic joint, arthritis
 - i) Extra-skeletal processes
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Findings: benign (lung in hypercalcemia, myocardial infarction/ myocarditis/ pericarditis, cardiac amyloidosis) vs. malignant (breast carcinoma, liver metastases from colon cancer, pleural effusion in lung cancer), renal anomalies
- j) Bone mineral density (BMD) (dual-energy absorptiometry, DEXA)
 - i) Imaging techniques
 - ii) Quantitative analysis & pitfalls (T-score, Z-score, ROIs, artifacts)

- iii) Indications: osteoporosis vs. osteopenia, fracture risk, serial evaluations on medication
 - k) Normal & other
 - i) Radiopharmaceuticals (all of above)
 - ii) Imaging techniques (all of above)
 - iii) Indications: all of above, miscellaneous
 - l) Artifacts & quality control
 - i) Patient issues: patient preparation, motion, positioning, contamination
 - ii) Radiopharmaceutical issues: dose preparation, dosing technique, altered biodistribution
 - iii) Technical issues: instrumentation, acquisition & processing, quantitation (SUV; T-score)

5) Neuro

- a) Brain death
 - i) Radiopharmaceuticals (Tc-99m ECD/HMPAO, Tc-99m DTPA/GH)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Indications: confirmation of clinical brain death
- b) Dementias & behavioral disorders
 - i) Radiopharmaceuticals (Tc-99m ECD/HMPAO; F-18 FDG)
 - ii) Imaging techniques (SPECT; PET)
 - iii) Indications: Alzheimer disease, Lewy body-associated, Pick disease, multi-infarct, senility, depression
- c) Seizure
 - i) Radiopharmaceuticals (Tc-99m ECD/HMPAO; F-18 FDG)
 - ii) Imaging techniques (SPECT; PET)
 - iii) Stress protocols (injection during active seizure)
 - iv) Indications: localization of seizure focus, interictal vs. ictal study
- d) Stroke, cerebrovascular disease & vascular reserve
 - i) Radiopharmaceuticals (Tc-99m ECD/HMPAO; F-18 FDG)
 - ii) Imaging techniques (SPECT; PET)
 - iii) Stress protocols (Wada test, Diamox challenge, balloon occlusion)
 - iv) Indications: ischemia vs. infarct, vascular reserve
- e) Benign neoplasm
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: meningioma
- f) Malignant neoplasm, primary
 - i) Radiopharmaceuticals (Tc-99m MIBI, Tl-201 chloride; F-18 FDG)
 - ii) Imaging techniques (SPECT; PET)
 - iii) Indications: glioblastoma, astrocytoma, lymphoma
- g) Malignant neoplasm, metastatic
 - i) Radiopharmaceuticals (Tc-99m MIBI, Tl-201 chloride; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: staging disease, treatment strategy, tumor viability

- h) Infection & inflammation
 - i) Radiopharmaceuticals (Ga-67 citrate, In-111 WBCs; F-18 FDG)
 - ii) Imaging techniques (SPECT; PET)
 - iii) Indications: abscess, encephalitis, toxoplasmosis (immunocompromised), radionecrosis
- i) Cerebrospinal fluid (CSF)
 - i) Radiopharmaceuticals (In-111/Tc-99m DTPA)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Indications: normal pressure hydrocephalus, leak, V-P shunt patency
- j) Normal & other
 - i) Radiopharmaceuticals (all of above)
 - ii) Imaging techniques (all of above)
 - iii) Indications: all of above, miscellaneous
- k) Artifacts & quality control
 - i) Patient issues: patient preparation, motion, positioning, contamination
 - ii) Radiopharmaceutical issues: dose preparation, dosing technique, altered biodistribution
 - iii) Technical issues: instrumentation, acquisition & processing, quantitation (SUV)
- 6) Pediatrics**
 - a) Brain & cerebrospinal fluid (CSF)
 - i) Radiopharmaceuticals (Tc-99m ECD/HMPAO; F-18 FDG; In-111/Tc-99m DTPA)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: seizure, neoplasm, V-P shunt patency, hydrocephalus
 - b) Cardiac
 - i) Radiopharmaceuticals (Tc-99m RBCs, Tc-99m MIBI/tetrofosmin, Tl-201 chloride)
 - ii) Imaging techniques (ECG-gated planar, SPECT, ECG-gated SPECT)
 - iii) Quantitative analysis (LVEF, QpQs, RVEF)
 - iv) Indications: congenital heart disease, left-to-right shunt
 - c) Thoracic
 - i) Radiopharmaceuticals (Tc-99m MAA, Xe-133 gas, Tc-99m DTPA aerosol)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Indications: pulmonary artery atresia, right-to-left shunt, cystic fibrosis, Swyer-James
 - d) Gastrointestinal tract & hepatobiliary system
 - i) Radiopharmaceuticals (Tc-99m SC, Tc-99m IDA, Tc-99m pertechnetate)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Pharmacologic protocols (phenobarbital, cimetidine)
 - iv) Quantitative analysis (gastric emptying T 1/2)
 - v) Indications: biliary atresia, gastroesophageal reflux, aspiration, Meckeldiverticulum
 - e) Musculoskeletal
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: osteoid osteoma, fracture, avascular necrosis, osteomyelitis
 - f) Endocrine
 - i) Radiopharmaceuticals (I-123 NaI, Tc-99m pertechnetate)

- ii) Imaging techniques (planar)
- iii) Indications: lingual thyroid, agenesis, organification defect, hyperthyroidism
- g) Infection & inflammation
 - i) Radiopharmaceuticals (Ga-67 citrate, In-111 WBCs; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: osteomyelitis/septic joint, lung inflammation, inflammatory bowel disease, abscess
 - h) Neoplasm
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP, I-123 MIBG, I-131 NaI; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: osteosarcoma/Ewing sarcoma, histiocytosis/eosinophilic granuloma, neuroblastoma, thyroid cancer, lymphoma
 - i) Urinary tract
 - i) Radiopharmaceuticals (Tc-99m DMSA, Tc-99m MAG3, Tc-99m pertechnetate/SC)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Indications: multicystic dysplastic kidney, hydronephrosis, vesicoureteral reflux, anuria, pyelonephritis, pre-nephrectomy assessment
 - j) Normal & other
 - i) Radiopharmaceuticals (all of above)
 - ii) Imaging techniques (all of above)
 - iii) Indications: all of above, miscellaneous
 - k) Artifacts & quality control
 - i) Patient issues: patient preparation, motion, positioning, contamination; dosimetry
 - ii) Radiopharmaceutical issues: dose preparation, dosing technique, altered biodistribution
 - iii) Technical issues: instrumentation, acquisition & processing, quantitation (T1/2, SUV)
- 7) **Reproductive/endocrine**
 - a) Thyroid gland
 - i) Radiopharmaceuticals (I-123 NaI, Tc-99m pertechnetate)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Quantitative techniques (uptake probe for radioiodine uptake)
 - iv) Indications: goiter (in situ, substernal), benign thyroid nodules, thyroiditis, multinodular gland, Graves
 - b) Thyroid cancer
 - i) Radiopharmaceuticals (I-123/I-131 NaI, Tc-99m MIBI, Tl-201 chloride, In-111 OctreoScan; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: malignant thyroid nodules, thyroid bed remnant, staging disease/metastases for papillary, follicular & medullary cancers
 - c) Therapy
 - i) Radiopharmaceuticals (I-131 NaI), dose selection/calculation (benign vs. malignant)
 - ii) Preparation, patient consent & instructions (benign vs. malignant)
 - iii) Indications: hyperthyroidism, thyroid cancer (remnant vs. metastases)

- d) Adrenal
 - i) Radiopharmaceuticals (I-123 MIBG, In-111 OctreoScan)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Indications: pheochromocytoma, cortical adenoma
 - e) Neuroendocrine
 - i) Radiopharmaceuticals (In-111 OctreoScan)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Indications: carcinoid, islet cell tumors, medullary thyroid cancer, pheochromocytoma/ paraganglioma/neuroblastoma
 - f) Parathyroid gland
 - i) Radiopharmaceuticals (Tc-99m MIBI/pertechnetate, I-123 NaI)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Indications: hyperparathyroidism (adenoma, hyperplasia, ectopic)
 - g) Female reproductive system neoplasms
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: staging disease, treatment strategy
 - h) Pregnancy Issues
 - i) Special considerations in nuclear radiology: patient preparation, instructions & dosimetry; dose reduction; breastfeeding; occupational rules & policies
 - i) Male reproductive system neoplasms
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: staging disease, treatment strategy
 - j) Normal & other
 - i) Radiopharmaceuticals (all of above)
 - ii) Imaging techniques (all of above)
 - iii) Indications: all of above, miscellaneous
 - k) Artifacts & quality control
 - i) Patient issues: patient preparation, motion, positioning, contamination
 - ii) Radiopharmaceutical issues: dose preparation, dosing technique, altered biodistribution
 - iii) Technical issues: instrumentation, acquisition & processing, quantitation (uptake; SUV)
- 8) Thoracic**
- a) Thromboembolic disease
 - i) Radiopharmaceuticals (Tc-99m MAA, Xe-133 gas, Tc-99m DTPA aerosol)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Indications: acute or chronic pulmonary embolism
 - b) Non-thrombotic disease
 - i) Radiopharmaceuticals (Tc-99m MAA, Xe-133 gas, Tc-99m DTPA aerosol)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Quantitative techniques: regional/split lung function

- iv) Indications: fat emboli, hilar mass, vasculitis, pre-pulmonectomy & pulmonary transplant evaluation
- c) Chronic obstructive airways disease (COPD) & airways disease
 - i) Radiopharmaceuticals (Tc-99m MAA, Xe-133 gas, Tc-99m DTPA aerosol)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Quantitative techniques: regional/split lung function
 - iv) Indications: COPD, asthma, cystic fibrosis, mucus plug, pre-bullectomy evaluation
- d) Benign neoplasm/mass
 - i) Radiopharmaceuticals (F-18 FDG)
 - ii) Imaging techniques (PET)
 - iii) Indications: hamartoma, granuloma
- e) Malignant neoplasm, primary
 - i) Radiopharmaceuticals (Tc-99m MIBI, Tl-201 chloride, In-111 OctreoScan; F-18 FDG)
 - ii) Imaging techniques (SPECT; PET)
 - iii) Quantitative techniques (differential/split lung analysis)
 - iv) Indications: esophageal cancer, lung cancer, carcinoid, thymoma, mediastinal tumor, lymphoma
- f) Malignant neoplasm, metastatic
 - i) Radiopharmaceuticals (HDP/MDP; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: staging disease, treatment strategy
- g) Trauma
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP, Tc-99m MAA, Xe-133 gas, Tc-99m DTPA aerosol)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Indications: rib fractures, pneumothorax, hemothorax, bronchopleural fistula
- h) Infection & inflammation
 - i) Radiopharmaceuticals (Ga-67 citrate, In-111 WBCs; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: sarcoidosis, occupational lung disease, pneumonia, abscess, tuberculosis, MAI, pneumocystis pneumonia (PCP), histoplasmosis
- i) Normal & other
 - i) Radiopharmaceuticals (all of above)
 - ii) Imaging techniques (all of above)
 - iii) Indications: all of above, miscellaneous
- j) Artifacts & quality control
 - i) Patient issues: patient preparation, motion, positioning, contamination
 - ii) Radiopharmaceutical issues: dose preparation, dosing technique, altered biodistribution
 - iii) Technical issues: instrumentation, acquisition & processing, quantitation (split lung; SUV)

9) Urinary

- a) Perfusion & function

- i) Radiopharmaceuticals (Tc-99m MAG3)
 - ii) Imaging techniques (planar)
 - iii) Quantitative analysis (relative function: peak time, T 1/2, 2-3 minute activity)
 - iv) Indications: renal dysfunction/failure, renal artery occlusion, renal vein thrombosis
- b) Diuretic studies
 - i) Radiopharmaceuticals (Tc-99m MAG3)
 - ii) Imaging techniques (planar)
 - iii) Stress protocols (furosemide [Lasix])
- iv) Quantitative analysis (relative function, T 'A)
- v) Indications: obstructive vs. non-obstructive hydronephrosis, stent function
- c) Angiotensin converting enzyme inhibitor (ace-i) studies
 - i) Radiopharmaceuticals (Tc-99m MAG3)
 - ii) Imaging techniques (planar)
 - iii) Stress protocols (captopril, enalapril)
 - iv) Quantitative analysis (relative function, peak time, T 'A, compared with baseline)
 - v) Indications: renovascular hypertension/renal artery stenosis
- d) Cortical
 - i) Radiopharmaceuticals (Tc-99m DMSA/GH)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Indications: relative function, Column of Bertin, scarring, ectopia, horseshoe kidney
- e) Transplant
 - i) Radiopharmaceuticals (Tc-99m MAG3)
 - ii) Imaging techniques (planar)
 - iii) Quantitative analysis (peak time, T 'A)
 - iv) Indications: acute tubular necrosis, rejection, drug toxicity (cyclosporine), complications (obstruction, infection, infarction, lymphocele/urinoma)
- f) Leak
 - i) Radiopharmaceuticals (Tc-99m MAG3)
 - ii) Imaging techniques (planar, SPECT)
 - iii) Indications: urinoma, leak after transplant/other surgery, instrumentation, trauma
- g) Benign Neoplasm
 - i) Radiopharmaceuticals (F-18 FDG)
 - ii) Imaging techniques (PET)
 - iii) Indications: angiomyolipoma, complex cystic mass
- h) Malignant neoplasm, Primary
 - i) Radiopharmaceuticals (Ga-67 citrate; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: lymphoma, renal cell cancer
- i) Malignant neoplasm, metastatic
 - i) Radiopharmaceuticals (Tc-99m HDP/MDP; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: staging disease, treatment strategy
- j) Infection & inflammation
 - i) Radiopharmaceuticals (Tc-99m DMSA, Ga-67 citrate, In-111 WBCs; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)

- iii) Indications: pyelonephritis, abscess
- k) Normal & other
 - i) Radiopharmaceuticals (all of above)
 - ii) Imaging techniques (all of above)
 - iii) Indications: all of above, miscellaneous
- l) Artifacts & quality control
 - i) Patient issues: patient preparation, motion, positioning, contamination
 - ii) Radiopharmaceutical issues: dose preparation, dosing technique, altered biodistribution
 - iii) Technical issues: instrumentation, acquisition & processing quantitation (T 1/2; SUV)

10) Vascular

- a) Patency
 - i) Radiopharmaceuticals (Tc-99m pertechnetate, Tc-99m RBCs)
 - ii) Imaging techniques (planar)
 - iii) Indications: pre-operative evaluation, postoperative evaluation, deep venous thrombosis
- b) Malignant neoplasm, primary
 - i) Radiopharmaceuticals (F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: sarcoma
- c) Malignant neoplasm, metastatic
 - i) Radiopharmaceuticals (Tc-99m sulfur colloid; F-18 FDG)
 - ii) Imaging techniques (planar; PET)
 - iii) Indications: lymphatic mapping/sentinel lymph node (SLN); staging disease, treatment strategy
- d) Infection & inflammation
 - i) Radiopharmaceuticals (Ga-67 citrate, In-111 WBCs; F-18 FDG)
 - ii) Imaging techniques (planar, SPECT; PET)
 - iii) Indications: vasculitis, atherosclerotic disease, vascular graft infection, catheter/line infection
- e) Normal & other
 - i) Radiopharmaceuticals (all of above)
 - ii) Imaging techniques (all of above)
 - iii) Indications: all of above, miscellaneous
- f) Artifacts & Quality Control
 - i) Patient issues: patient preparation, motion, positioning, contamination
 - ii) Radiopharmaceutical issues: dose preparation, dosing technique, altered biodistribution
 - iii) Technical issues: instrumentation, acquisition & processing

NM APPENDIX B

ACGME SIX CORE COMPETENCIES FOR NUCLEAR MEDICINE
RESIDENCY PROGRAM FOR FOUR YEARS

1) Medical Knowledge:

Residents Must:

- Acquire knowledge of the physics, radiation safety, radiation biology, physiology, imaging equipment, imaging protocols, and disease processes pertaining to nuclear medicine and the relevant complimentary and competing modalities.
- Apply and reinforce this knowledge through the analysis of, interpretation of, and communication of results of nuclear studies.
- Apply and reinforce this knowledge through teaching others; presenting at conferences, meetings, journal clubs; and communicating with other members of the health and imaging teams.

2) Patient Care:

Residents Must:

- Provide compassionate, appropriate, and effective care and therapy for a patient's health problem.
- Communicate effectively and efficiently the results of imaging studies in a timely manner to physicians and other members of healthcare team.
- Provide imaging that is quality controlled,
- Ensure that diagnostic studies and procedures are safe for patient, adhering to best practices concerning radiation safety, administration of radiopharmaceuticals, and use of imaging equipment.
- Be able to perform and interpret all studies in nuclear medicine.
- Perform at least six therapies involving the oral administration of 1^{131} : three with amounts of 1^{131} equal to or less than 33 MCi, and three with amounts of 1^{111} greater than mG must be an advocate for patient safety and high quality patient care.
- Gather appropriate clinical and historical information about patient in order to maximize analysis of a study or to provide effective therapy.
- Communicate compassionately and appropriately with patient and families

3) Professionalism:

Residents Must:

- Recognize that patient and professional needs supersede self-interest.
- Demonstrate compassion, and respect for patients, staff, and colleagues.
- Demonstrate ability to maintain all of their professional responsibilities with respect to their colleagues, the hospital staff, their patients, and their community.
- Adhere to high ethical principles.
- Respect patient privacy and autonomy.
- Be accountable to patients, community, and profession.

- Be sensitive to the needs of a diverse population of patients, families, and professionals.
- Attend and participate in conferences, lectures, and meetings.
- Be actively available for helping technologists, colleagues, and referring physicians.

4) Practice-Based Learning and Improvement:

Residents Must:

- Demonstrate ability to acquire knowledge about their patient, utilize that knowledge to analyze a study or perform a procedure and render an appropriate interpretation.
- Demonstrate an ability to acquire, investigate, and critically assess new information to be able to improve care of patients.
- Demonstrate and develop habits of life-long learning.
- Demonstrate the ability to utilize current technology to optimize learning and provide optimal care. Be aware of the strengths and weaknesses of their own abilities and knowledge.
- Be willing to implement changes in their practice which will enhance patient care and outcome.

5) Systems-Based Practice:

Residents Must:

- Learn to work within and appreciate the components of the healthcare system at all levels, local and national.
- Be able to work effectively in various healthcare delivery systems. Participate in peer review and system error identification process. Participate in committees within radiology and the hospital. Be aware of health care costs at all levels.
- Have knowledge of the allocation of healthcare resources at all levels.

6) Interpersonal and Communication Skills:

Resident Must:

- Demonstrate appropriate and effective interpersonal and professional relationship skills.
- Be able to communicate effectively and to work cooperatively with colleagues, patients, families, and imaging team personnel.
- Learn to act in a consultative role. Demonstrate listening skills. Be able to accept criticism.



NM APPENDIX C

NUCLEAR MEDICINE I-131 CHECKLIST

Resident Name: _____

Instructions: During each Nuclear Medicine rotation at AdventHealth Orlando, the assigned resident must keep track of all nuclear therapies on the form below. Residents must complete:

3 of I-131 > 33 mCi

3 of I-131 < 33 mCi

Treatments to be board eligible. Completed log sheets must be placed in the residents' portfolio. This can be used in lieu of an excel worksheet.

Administering dosages of radioactive drugs to patients or human research subjects

3 of I-131 > 33 mCi

| | |
|------------------------|-------|
| _____ | _____ |
| Technologist/Attending | Date |
| _____ | _____ |
| Technologist/Attending | Date |
| _____ | _____ |
| Technologist/Attending | Date |

3 of I-131 < 33 mCi

| | |
|------------------------|-------|
| _____ | _____ |
| Technologist/Attending | Date |
| _____ | _____ |
| Technologist/Attending | Date |
| _____ | _____ |
| Technologist/Attending | Date |



Nuclear Medicine Laboratories Experience Form

1. Know isotopes used for imaging and therapy:
 - Production Half life
 - Decay Bio distribution
 - Energy
2. Know principles of generator and elution of isotopes
3. Safe handling of radionuclides
4. Radiation protection from isotope exposure
5. Operations of a nuclear pharmacy
6. Proper disposal of unused, decayed radionuclides/radiopharmaceuticals
7. Techniques for detailing with radiation spills
8. Formation of various radiopharmaceuticals
9. Use of calibration of equipment:
 - Well counter
 - Geiger counters
10. Quality control



Nuclear Medicine Laboratories Experience Form

Resident Name: _____

Documentation of your CLT – classroom & laboratory training in nuclear medicine – of 200 hours is required by the end of your third year. This receipt will be kept in your personal file.

Resident Name (please print) _____

| | |
|--|-----------|
| Radiation physics and instrumentation | 100 hours |
| Radiation protection | 30 hours |
| Mathematics, statistics and computer sciences pertaining to the use and measurement of radioactivity | 20 hours |
| Radiation biology | 20 hours |
| Radiopharmaceutical chemistry | 30 hours |

The hours listed for each of the subjects above are suggested values and should not be interpreted as specific requirements

Resident Signature _____
by signing this – you confirm that you have achieved your CLT requirement

Date _____

Preceptor Signature _____
by signing this – you are attesting this resident achieved his/her CLT requirement

Date _____

Training of General Radiology Resident for Nuclear Medicine

Routine Exams: Clinical indications, protocols, doses:

- Bone scan
 - WB
 - 3-phase
 - SPECT
- V/Q Scans
- Hepatobiliary with and without EF
- Thyroid uptake & scan
- MUGA
- Parathyroid
- Renal scans
- PET/CT
- Cardiac
- Gastric emptying
- Liver/spleen imaging
- White cell scans
- Lymphoscintigraphy

Exams generally performed as emergencies, between 5 pm to 7 am, on weekends:

Lung scans
Hepatobiliary scans
GI bleeding scans
Brain death studies, rarely

Exams performed infrequently:

Octreoscans
MIBG
Prostascints

Radioactive therapy: I^{131} x 3: date, Dx, dose

Thyroid evaluations: Palpation, Rx, Etc.

Radiopharmacy skills:

Calculate doses
Elevation of generator – $^{99}\text{Mo}/^{99}\text{Tc}$

- Long $\frac{1}{2}$ life
- Decay-growth curve
- Parent/daughter \rightarrow 5 hour half life

Volume concentration
Decay factors, curves
Quality control – camera
Probes
Calibrators
Kit preparation
Draw up doses
Lymphoscintigraphy infections
Wipe test

Molecular Imaging: fundamentals

NM physics:
Radioactivity
Decay
Attenuation

Instrumentation:

- v carnerus
- Geiger counters
- PET scanners
- Well counters
- SPECT camera
- Others

Quality Control:

Radiopharms
Instruments

Computers:

Radiation Safety:

Brodistribution
Quality control
Compo minding of radipharm
Prodition
Physical property of
Generator elution & quality control

Government Regulations:

ACGME Competency:

AC R appropriateness criteria:

ACR practice guidelines:

ACR/APDR initiative for Residents

ADVENTHEALTH ORLANDO DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAM

CONFIRMATION OF RECEIPT OF
NUCLEAR MEDICINE GOALS AND OBJECTIVES

2018-2019

By signing this document, you are confirming that you have received and reviewed, with your preceptor, the abdominal imaging goals and objectives for this academic year.

This receipt will be kept in your personal file.

Resident Name (please print) _____

Resident Signature _____
by signing this – you confirm that you have reviewed the G&O with your preceptor

Date _____

Preceptor Signature _____
by signing this – you confirm that you have reviewed the G&O with the resident

Date _____

AdventHealth Orlando Diagnostic Radiology Residency
Nuclear Medicine Rotation
Training Location: Orlando

The following activities which are mandated by the ACGME, ABR, NRC, and Agreement States requires that radiology residents, during their four years of residency, must have exposure to, and experience with, the following:

- 1) Ordering, receiving, and unpacking of radioactive materials
- 2) Performance of appropriate radiation surveys
- 3) Performance of quality control procedures on equipment used to detect and measure radiation
- 4) Calculating, measuring, and safely preparing patient or human research subject dosages.

To aid in the acquisition of this information and experience, the resident will spend time in each nuclear medicine imaging area working with the technologist, learning to handle radiopharmaceutical, administer doses, perform quality control on the equipment, and process studies. The time spent in the imaging areas and studying the associated reading material will involve a week of the nuclear medicine rotation, usually the 3rd or 4th week of PGY-2.

AdventHealth Orlando Diagnostic Radiology Residency

Nuclear Medicine Goals and Objectives
Training Location: Orlando

Nuclear Technologist Shadowing Curriculum

½ day in Nuclear Pharmacy
½ day in PET/CT imaging work area
⅔ day in Nuclear Cardiology
1 ½ days in general nuclear medicine work area

Curriculum, Goals, and Expectations:

- 1) Experience the flow of work in a radio pharmacy:
 - a. Receiving and handling of isotopes and radiopharmaceuticals
 - b. Recording of data required by regulatory agencies
 - c. Observing methods of radiation safety, radiation protection and disposal of hazard waste in a pharmacy handling large and small doses of radio pharmacy
- 2) Experience the flow of work in a nuclear medicine imaging department
- 3) Learn to perform quality control testing of nuclear medicine equipment
- 4) Learn methods of ordering, receiving, unpacking and administering radioisotopes
- 5) Learn techniques of radiation safety, hazard protection, waste disposal, and decontamination procedures
- 6) Learn to use various instruments that detect and measure radioactivity
- 7) Observe the performance by the technologists of various procedures to include PET/CT, general nuclear medicine and molecular cardiac rest/stress studies in order to appreciate the protocols for these procedures and the time involved in performing them.

Residents taking the American Board of Radiology (ABR) examination will have the option to be “authorized user (AU) eligible” in addition to becoming certified in diagnostic radiology. An “authorized user” is a person who may legally prescribe (through a “written directive”) nuclear byproduct material or radiation from byproduct material once they are listed on their institution’s radioactive materials (RAM) license). An example of a written directive by an authorized user is a written prescription for X mCi of I-131 for the treatment of a specific patient’s thyroid cancer. A resident may become “authorized user eligible” only if they fulfill minimum training requirements listed by the Nuclear Regulatory Commission (NRC), American College of Graduate Medical Education (ACGME), ABR, and in many cases the state in which they practice (if this state is an “agreement state”).

For radiology residents, the ABR is now recognized by the Nuclear Regulatory Commission as a certifying body able to grant AU status. If all the requirements, as described below, are met then a resident may request that their 4th year examination include questions that qualify for AU (Authorized User) status. If successful, the ABR certificate will have “AU eligible” included on it. Completion of this workbook and the I-131 case document found in your course objectives will be used as evidence of partial completion of the AU status requirements. **Paperwork for AU status must be submitted to the ABR by March, so this MUST be completed during third and early fourth year.**

Resources:

- 1) “Guide for Diagnostic Nuclear Medicine” published by the Society of Nuclear Medicine (SNM). www.nrc.gov/materials/miau/miau-reg-initiatives/guide_2002.pdf
- 2) The regulations of the NRC may be found online at www.nrc.gov. The easiest way to access is to search “10CFR”. The specific regulations are found in CFR Part 35.
- 3) Intranet.floridahospital.org. Click on “References” tab. Click on “AdventHealth Orlando Policy & Procedures” under “Other References Cont.” header. Click on “Radiology Services”
- 4) <https://radportal.floridahospital.org/content/> Specifically under the “Nuclear Medicine Forms, Guidelines & SOPs” link.
- 5) The Essential Physics of Medical Imaging by Bushberg et al.
- 6) Nuclear Medicine Physics: The Basics by Chandra

Requirements:

In addition to existing in the Code of Federal Regulations (CFR), these requirements may also be found on the ABR website and in the Guide for Diagnostic Nuclear Medicine on pages 20-21.

1) Requirement: 80 hours of didactic lecture in nuclear medicine

The classroom requirements are met by attendance and successful completion of the course in nuclear medicine physics given during medical physics lectures, nuclear medicine lectures, and by completion of the RSNA modules. For this reason it is important that you ensure that vacation days do not reduce your total time in nuclear medicine related lectures below the required 80 hours.

2) Requirement: 700 hours of clinical work in nuclear medicine

This is accomplished during your rotations in the nuclear medicine department. For this reason it is important that you ensure that vacation days do not reduce your total time in nuclear medicine below the required 700 hours. If you find that you have not or will not complete the required clinical work, then you are encouraged to use elective time to correct the deficiency.

3) Requirement: Performance of specific tasks

The ABR requires that tasks listed in 10CFR 35.390 be performed by candidates. The worksheets that follow cover the requirements of 10CFR35 and additional topics that are important to safe use of

radioactive materials in nuclear medicine. This workbook is to document that the specific tasks have been met. For each exercise, there are required readings, comments, and questions that highlight the legal requirements or usefulness of the task. Although these tasks are rarely, if ever, performed by the physician in routine clinical practice, as authorized user on the license you are ultimately responsible for ensuring that all requirements are met.

This workbook is for you to maintain. This documents performance of these tasks, necessary for obtaining a preceptors signature or to make available for review by the regulatory agency when applying for addition to a radioactive materials license. When this workbook is completed, a copy should be given to the Resident coordinator for inclusion in your file. This workbook does not have to be completed in order.

Please Note:

Many of the tasks will be performed under the supervision and guidance of the technologists or radiopharmacists. These technologists are helping you as a courtesy to the residency program and it is at the technologist's discretion when and if they will have time in the course of their clinical duties to supervise you (patient safety and care will always take precedence).

I also encourage you to take the time to understand the role of the technologist in the overall scheme of the radiology department and to use this time to work on communication skills with the technologists as such a "soft" skill will be invaluable in your future clinical practice.

IN PREPARATION OF YOUR ROTATION:

The order of the exercises follows the sections in the Guide for Diagnostic Nuclear Medicine, with additional topics at the end. This order does not need to be followed by the resident.

To start, please read the Guide for Diagnostic Nuclear Medicine, pp. 1-18.

For clinical activities:

- 1) The day before your rotation: Verify with the supervisor (e.g., technologist) what time you are to arrive.
- 2) **Arrive on time!** The technologists must keep to a schedule so that all tasks are completed by the time patients arrive. If you miss something then the technologist cannot sign off on it and you will be forced to find time to repeat it.

Wear your lab coat, closed toe shoes, your radiation badge, and ID badge.

Note that we do not issue ring badges for the limited exposure that you may receive in handling radioactive materials. If you were in a situation of routinely handling materials you would also have a ring badge.

The technologist with whom you are working has to keep to a schedule. Make note of questions that you have and ask them when that person has time.

Remember that no eating, drinking, cosmetics, or gum chewing is allowed around radioactive materials or in rooms labeled with radioactivity warning signs. Doing so is an infraction of the Det Norske Veritas (DNV) rules governing the hospital's accreditation as well as a personal danger to you.

There are several questions found in these forms that may require you to speak with a technologist, however, there are only a few tasks that require technologist supervision and verification of completion. Many tasks could be performed at either NM, PET, or Stress Lab. You should speak with the technologists if you are unsure whether you will be able to complete a specific task at a specific location. Unless otherwise stated, tasks need only be performed once and it does not matter whether the task is performed in PET, NM, or Stress Lab.

Tasks that require technologist verification:

- #4 (**Ordering and Receiving Radioactive Materials Packages**)
- #5 (**Performing Operation Checks of Survey Meters**)
- #6 (**Exposure and Contamination Surveys**) – Best performed at PET
- #9 (**Quality Control Testing**) – once each for SPECT, PET, and Stress Lab
- #10 (**Preparation of Patient Dosages**)
- #11 (**Waste Disposal**)
- #14 (**Patient Scanning**)

Oversight: Medical Physicist

TASK #1

Reading: Guide for Diagnostic Nuclear Medicine, pp. 25-28

Requirements: After completing the reading and questions, review with the medical physicist to receive the required signature.

Radiation Protection Program

This section is to refresh your understanding of the overall requirements for the radiation safety program and your responsibilities as an occupationally exposed worker. Remember that you may be overseeing the technologists in a department and also need to know what is required of them.

The following questions may be answered either by information within the reading or Part 35 or Part 20 in the Code of Federal Regulations

(The regulations of the NRC may be found online at www.nrc.gov. As noted above, search for 10CFR and choose Part 20 or Part 35 as noted)

- 1) Find a copy of the current radioactive materials license (Resource 4). What information is listed on the license?

- 2) How often must the overall program for safe use of radioactive materials be reviewed? (Guide for Diagnostic Nuclear Medicine Table 9.1 Item #14, p 26).

- 3) Is a Radiation Safety Committee required by Part 35? Do we have one here at AdventHealth Orlando? Who is the current head of the RSC and who is the Radiation Safety Officer (RSO?)

- 4) Give two techniques that are used to prevent or minimize contamination.

- 5) Where and how are our sealed sources (e.g., flood sources) stored? Is this adequate? Hint: Ask a technologist if you are unsure. (Guide for Diagnostic Nuclear Medicine Table 9.1 Item #10, p 26).

To be signed when all tasks/readings are completed:

Questions Completed and Discussed: _____ (Medical Physicist)

Date: _____

Oversight: Medical Physicist

TASK #2

Reading: Guide for Diagnostic Nuclear Medicine, pp. 28 – 39

Requirements: After completing the reading and questions, review with the medical physicist to receive the required signature.

Occupational and General Public Dose Limits

- 1) Who is required to be monitored for external occupational exposure?

- 2) Are most licensees required to measure the internal dose component?

- 3) What notification is required of a workers occupational dose?

- 4) What monitors are issued to nuclear medicine technologists and what doses are measured?

- 5) What are the annual occupational dose limits related to these monitors?

- 6) Where should a whole body badge be worn?

- 7) Where should a ring badge be worn?

- 8) What are the guidelines regarding an occupationally exposed worker who is pregnant? Must a woman who is pregnant “declare” her pregnancy? (i.e. put into effect the more restrictive dose limits) May a woman “un-declare” her pregnancy?

- 9) What is the dose limit to a member of the general public?

10) What does this limit exclude?

11) Refer to p. 37: give two examples of ways in which we ensure that a member of the general public will not receive in excess of 100 mrem due to nuclear medicine activities. (think types of shielding and securing sources)

Information Specific to AdventHealth Orlando (you may need to talk to radiation safety and do some internet searching to get the answers):

12) What is a typical monthly whole body dose for an occupational worker at AdventHealth Orlando? How does this compare with the maximum monthly whole body dose for occupationally exposed workers?

13) For the last three reports, what is the maximum ring (hand) dose?

14) Who provides the film and ring badges that we use? Do they meet the requirements of 10CFR20.1501 noted in Column 2, p 29? How do you know?

15) What was your last badge reading? What percent of the annual limits were you at?

To be signed when all tasks/readings are completed:

Questions Completed and Discussed: _____ (Medical Physicist)

Date: _____

Oversight: Medical Physicist

TASK #3

Reading: Guide for Diagnostic Nuclear Medicine, pp. 39-41; Resource 4

Requirements: After completing the reading and questions, review with the medical physicist to receive the required signature.

Emergency and Decontamination Procedures

Anyone handling radioactive material must be familiar with the measures to take if there is a radioactive spill or accident involving personnel. In some cases, there may be a medical emergency, requiring immediate attention. More commonly, working surfaces are contaminated, requiring that the activity be quickly secured and the area decontaminated.

- 1) A patient is to be injected with 22 mCi of Cardiolite. As the technologist attempts to administer it through an IV, the lock is bad and most of the activity squirts over the patient, tech, and you. Describe what should be done to minimize spread of activity and patient and personnel exposure.

- 2) How (if at all) would this change if the tracer was 3mCi of liquid I-131 instead?

- 3) Do we have a spill kit in NM? If so, where is it located?

To be signed when all tasks/readings are completed:

Questions Completed and Discussed: _____ (Med Phys or Tech)

Date: _____

Oversight: Technologist**Task #4****Reading: Guide for Diagnostic Nuclear Medicine, pp.41-43; Resource 4****Requirements: Observe the receipt of packages once and then perform the receipt at least once. You must also observe the ordering of the bulk doses/unit doses and discuss the procedure with the technologist. After completing the reading and questions, review with the medical physicist to receive the required signature.****Ordering and Receiving Radioactive Materials Packages**

A commercial radiopharmacy (Triad for NM and Cardinal Health for PET) is used for most of the doses, which are typically obtained as unit doses (doses prepared for a specific patient). Some radiopharmaceuticals are sometimes obtained in bulk, with the patient injection drawn up here. Kits are used to prepare the desired radiopharmaceutical from the bulk tracer.

Radioactive materials orders are called in to the radiopharmacy or the radiopharmaceutical company as needed.

- 1) Note the types and numbers of unit doses and any other radioactive material ordered:

- 2) What documentation is needed before calling in an order?

- 3) How does the person at the manufacturer/radiopharmacy know that it is OK to ship radioactive material to us? (Guide for Diagnostic Nuclear Medicine p.42 9.5.3.1(2))

- 4) How are packages delivered (i.e., where and when are they delivered? Do we check ID of the shipper? Is there a specific route they take through the hospital? Do they know the door lock codes to get into the NM area?)

- 5) How much activity is typically ordered and used per week? About how much does this cost?

- 6) What are the labels normally found on radioactive materials packages in our NM department and what do they indicate?

- 7) How soon do packages need to be surveyed (Guide for Diagnostic Nuclear Medicine, pp. 41-42)?

- 8) What are the requirements if the outside of the package is contaminated?

9) What do you need to do before the package can be returned to the radiopharmacy or discarded?

10) What method is used to maintain records of patient doses, both for the day and permanently?

11) Why is the door to the hot lab, kept locked? What NRC regulation covers this?

12) How do we maintain security of items outside the hot lab?

To be signed when all tasks/readings are completed:

Resident observed ordering: _____ (Technologist)

Date: _____

Resident received and logged package (NOT just observed):

_____ (Technologist)

Date: _____

Questions Completed and Discussed:

_____ (Med Phys or Tech)

Date: _____

Oversight: Technologist

TASK #5

Reading: Guide for Diagnostic Nuclear Medicine, pp. 43-46

Requirements: Observe and perform operation check of survey meter. Demonstrate proficiency with survey meter use. After completing the reading and questions, review with the medical physicist to receive the required signature.

Performing Operation Checks of Survey Meters

Before use of a survey meter, the proper operation of the meter should be checked. In most cases, this means checking the battery with the internal circuit and making a measurement against a reference source.

- 1) Identify which meter you are using: _____

- 2) When was it last calibrated: _____ Is this acceptable? _____ What is the regulation for calibration?

- 3) What is the check source reading for the meter? What is the percent difference between check source and reading?

- 4) Demonstrate to the technologist proper operation of the survey meter.

To be signed when all tasks/readings are completed:

Resident performed meter check: _____ (Technologist)

Date: _____

Resident demonstrated proper operation of the survey meter:

_____ (Technologist or Medical Physicist) Date: _____

Questions Completed and Discussed: _____ (Tech or Med Phys)

Date: _____

Oversight: Medical Physicist

TASK #7

Reading: Guide for Diagnostic Nuclear Medicine, pp 47-50

Requirements: After completing the reading and questions, review with the medical physicist to receive the required signature.

Posting and Labeling

- 1) Where in the department are there radiation signs posted?

- 2) Find where the posting is located to meet the requirements of 10 CFR 19.11. What is posted?

- 3) What are your rights as a radiation worker? (See <http://www.nrc.gov/about-nrc/radiation/health-effects/info.html>)

- 4) What labeling is provided on vials of bulk Tc-99m that we receive? Does this meet the requirements? What are the requirements?

- 5) What labeling is provided on syringes of unit doses that we receive? Does this meet the requirements? What are the requirements?

- 6) What must be done to the labels before being disposed of?

To be signed when all tasks/readings are completed:

Questions Completed and Discussed:: _____ (Medical Physicist)

Date: _____

Oversight: Medical Physicist at Triad Isotopes

Task #8

Reading: p 50-52

Requirements: Elute generator once. After completing the reading and questions, review with the medical physicist to receive the required signature.

ELUTING THE MO-99/TC-99M GENERATOR

During the time at Triad observe the process for eluting the generator and assaying the eluate. Once you have observed this procedure, and under the guidance of the radiopharmacist, elute one of the generators.

- 1) What must be done at the beginning of the day before the calibrator may be used?

- 2) What radiation safety measures are taken to minimize hand and body exposure during elution and assay?

- 3) What are the legal requirements for the Mo-99 assay (i.e., activity limits, frequency of assay, documentation). See 10CFR35.204

- 4) How does the user know that the Mo contamination level is acceptable?

Resident eluted generator: _____ (Med Phys or Radiopharmacist)

Date: _____

Oversight: Technologist

Task #9

Reading: Guide for Diagnostic Nuclear Medicine, pp 50-52

Requirements: Observe and perform the daily morning QA once each for NM (Gamma camera/SPECT and Radionuclide calibrator), PET, and Stress lab. After completing the reading and questions, review with the medical physicist to receive the required signature.

Quality Control Testing

Radionuclide calibrator (Nuclear Medicine):

- 1) Under what circumstances would a radionuclide calibrator not be required?
(<http://www.nrc.gov/reading-rm/doc-collections/cfr/part035/> Section 35.63)
- 2) What is checked with the constancy test?
- 3) What source is used for this test? What correction needs to be made for day to day measurements?
- 4) How much can a prescribed dose differ from the measured dose?
- 5) What other QC tests do technologists on a non-daily basis? What do they test?

On a separate paper describe all daily QC tests performed with the technologist, what quality they is tested and what the action limits are.

To be signed when all tasks/readings are completed:

Quality Control Test performed by Resident: _____ (NM Tech)

Date: _____

Quality Control Test performed by Resident: _____ (PET Tech)

Date: _____

Quality Control Test performed by Resident: _____ (Stress Tech)

Date: _____

Questions Completed and Discussed: _____ (Med Phys)

Date: _____

Oversight: Technologist or Medical Physicist/Triad Isotopes

Task #10

Reading: Guide for Diagnostic Nuclear Medicine, pp. 50-52

Requirements: Prepare a patient dose from a kit once. After completing the reading and questions, review with the medical physicist to receive the required signature.

Preparation of Patient Dosages

At Triad or with the technologist, observe the preparation of a number of patient doses.

Note the method by which the following are determined:

- 1) Identification of the radiopharmaceutical to be used.
- 2) Determination of the amount of activity to be used.
- 3) Determination of the volume of radiopharmaceutical to be administered.
- 4) Radiation safety precautions that are taken in preparing or assaying the patient's dose.
- 5) Method by which the amount of activity is confirmed.
- 6) Required documentation, including labeling of the syringe or its container.
- 7) What kit was prepared?
- 8) What study is it used for?
- 9) What would be a typical activity for the kit that was prepared?

To be signed when all tasks/readings are completed:

Kit prepared by resident: _____ (Med Phys/Pharmacist or Tech)

Date: _____

Questions Completed and Discussed: _____ (Med Phys)

Date: _____

Oversight: Medical Physicist/Technologist

TASK #11

Reading: Guide for Diagnostic Nuclear Medicine, pp. 53-54

Requirements: Arrange with the technologist or medical physicist to help with the survey and transfer of radioactive waste to the waste storage room. After completing the reading and questions, review with the medical physicist to receive the required signature.

Waste Disposal

Most radioactive materials used in Nuclear Medicine have a short half life. The Nuclear Regulatory Commission allows radioactive waste to be disposed of in four ways: decay in storage, incineration, release into sewer in small amounts, and burial. For most of the waste, decay in storage is the preferred and inexpensive method for disposal.

- 1) What is the half life below which decay in storage is allowed?

- 2) Are there any radioactive materials used in the department that do not meet this criterion?

- 3) How do we store radioactive waste within the department?

- 4) What do we do with sharps that are radioactive?

- 5) What records are there for the radioactive waste that is generated?

- 6) If you have materials that cannot be disposed of by decay in storage, then how do you dispose of them?

To be signed when all tasks/readings are completed:

Disposal Performed by Resident: _____ (Med Phys or Tech)

Date: _____

Questions Completed and Discussed: _____ (Technologist or Medical Physicist)

Date: _____

Oversight: Medical Physicist

TASK #12

Reading: Guide for Diagnostic Nuclear Medicine, pp. 60-61

Requirements: After completing the reading and questions, review with the medical physicist to receive the required signature.

Safety Instruction for Workers

Read the section in the Guide and note the sentence “Licensees are responsible for the acts and omissions of the supervised individual” What this means is that if you are the authorized user on the license and have technologists working under your “supervision” then you are the responsible party if a safety problem occurs. If only for this reason alone, as authorized user you need to make sure that technologists are trained and understand the items listed under “Compliance”. Practically, where there are multiple employees it is useful to have someone as supervisor who you are able to depend on.

- 1) Who must be instructed?

- 2) What must be included in the instruction?

To be signed when all tasks/readings are completed:

Questions Completed and Discussed: _____ (Medical Physicist)

Date: _____

Oversight: Medical Physicist

TASK #13

Reading: 10 CFR 35.3045

Requirements: After completing the reading and questions, review with the medical physicist to receive the required signature.

Medical Events

In addition there are a number of situations where an error occurs that is not considered a medical event, but which should be recognized, reviewed, and corrective action taken. In these cases, no response to the NRC is required, but an internal review should occur. These would include administration of the wrong radiopharmaceutical, wrong amount, to the wrong patient, or by the wrong route but where the dose does not exceed the limits set for a medical event.

To prevent an error in administration

- ..All studies must be appropriately ordered
- ..The radiopharmaceutical be the correct type and amount
- ..The radiopharmaceutical be assayed or the dose verified by review of assay paperwork just prior to administration
- ..Patient identification be verified.

- 1) Give our procedure for positively identifying a patient. Hint: Ask a technologist. What documentation of identification is done when a patient is to receive a therapeutic dose of radioactive material?

- 2) If the standard dose for a resting Cardiolite is 8 mCi and a technologist administers 30 mCi, what action should be taken? i.e. is this a medical event? (Use Bushberg and other sources to estimate patient doses)

- 3) Give three things that must be correctly noted to prevent an incorrect administration.

To be signed when all tasks/readings are completed:

Questions Completed and Discussed: _____ (Med Phys or Tech)

Date: _____

Oversight: Technologist

TASK #14

Reading: None

Purpose: Gain insight into performing a nuclear medicine study from beginning to completion of data processing

Requirements:

A. Assist Technologist in performing at least one patient scan from beginning to completion of data processing in PET/CT, General Nuclear Medicine, and Cardio Stress Lab.

1. Finding the patient in the schedule and worklist
2. Drawing/verifying the dose in the hot lab
3. Confirming patient identification
4. Review of any pertinent patient information
5. Assisting in patient positioning
6. Observing injection of radionuclide
7. Setting up and running scan on the machine
8. Any post scan patient procedures
9. Post-processing images
10. Uploading images onto PACS

B. Learn the protocols and procedures for the following studies by observing them being performed or by having the technologist give through explanation of the protocol and the process they have to go through to perform the study.

| Scan | Technologist Signature | Date |
|-----------------------------------|-------------------------------|-------------|
| Any Sedation or anesthesia | | |
| Any SPECT/CT study | | |
| Brain SPECT | | |
| MUGA | | |
| Cardiac Rest/Stress | | |
| Hepatobiliary Scan with EF | | |
| V/Q Scan | | |
| Renal Scan | | |
| WBC | | |
| Thyroid uptake and Scan | | |
| Lymphoscintigraphy | | |
| PET/CT Scan | | |
| WB Bone Scan | | |
| Three Phase Bone Scan | | |
| GI Bleeding Scan | | |

In an Excel sheet list the following for each scan and attach to this booklet: What isotope and how much? What functional information is gained? What is "normal range"? What is one alternative to the radioisotope scan for the same suspected condition (list advantages and disadvantages)?

To be signed when all tasks/readings are completed:

Questions Completed and Discussed: _____ (Med Phys or Tech)

Date: _____

Workbook Completion Form

I affirm that the resident has completed all task specific requirements required for AU eligible status by the ABR.

Authorized User: _____ **Name (Print):** _____

Residency Director: _____ **Name (Print):** _____

Acknowledgements:

This manual is based on a template provided by Marleen Moore, M.S. at Fletcher Allen Healthcare to the American Association of Physicists in Medicine in 2012.

AdventHealth Orlando Diagnostic Radiology Residency

Nuclear Medicine Goals and Objectives
Training Location: Orlando

Nuclear Medicine Pathway

<https://www.theabr.org/diagnostic-radiology/subspecialties/nuclear-radiology/requirements-registration>

16-Month Pathway to Dual Certification in Diagnostic Radiology and Nuclear Radiology

The ABR has approved conditions and requirements for a pathway leading to eligibility for both primary certification in diagnostic radiology and subspecialty certification in nuclear radiology.

A resident who has 16 months of experience in nuclear radiology or nuclear medicine **during the 48-month diagnostic radiology residency** may qualify for the **ABR's subspecialty certificate in nuclear radiology**.

To qualify for this pathway to subspecialty certification, all 16 months of experience must be in an ACGME-accredited diagnostic radiology program; **there is no requirement for a nuclear medicine residency or nuclear radiology fellowship program**.

The 16 months may be completed at any time during diagnostic radiology residency training; **there is no requirement for consecutive months**.

Up to two months of experience in nuclear radiology or nuclear medicine during the PGY1 clinical year may be counted if completed at an institution with an ACGME-accredited diagnostic radiology residency program.

Four months are required of every resident in diagnostic radiology, and count toward the 16-month pathway.

At the discretion of the diagnostic radiology program director, **up to four months of training may be in a nuclear radiology-related, nuclear medicine-related, and/or molecular imaging-related field** (e.g., head and neck, neuroradiology, MRI, PET/MR, interventional radiology, to name only a few.)

The application form is located at: <https://form.jotformpro.com/70243494028959>

AdventHealth Orlando Diagnostic Radiology Residency

Pediatric & Fetal Imaging Goals and Objectives

Training Locations: Orlando

Many of the goals and objectives apply to all rotations and are listed below. Those goals that are more specific to a particular rotation are listed separately.

Pediatric and Fetal Imaging Curriculum

The educational curriculum in Pediatric and Fetal Imaging is comprised primarily of the rotations through the Pediatric Imaging Section at AdventHealth Orlando where the Faculty provides direct training and supervision; as well as a comprehensive series of lectures and conferences in Pediatric and Fetal Imaging. Correlation is made on a case-by-case basis with other imaging modalities, facilitated by the PACs system. A series of interdepartmental conferences, grand rounds, Journal Clubs, meetings and other venues are expected to enhance the residents' knowledge of Pediatric and Fetal Imaging.

Because a full outline of disease entities and conditions is provided under each organ system elsewhere in the Radiology Residency Curriculum, a summarized curriculum for the Pediatric Imaging Section follows:

- A review of the principles of physics and instrumentation/technology
- A review of the normal anatomy, physiology, pathology and clinical conditions that are evaluated
- The indications, limitations, contraindications and optimal protocols for the various studies, diseases, conditions, as well as, the optimal sequencing of various imaging studies is reviewed.
- The ACR appropriateness criteria and the economic implications for the health care system and patient of various diagnostic pathways are reviewed as appropriate.

Training using the ACGME Six-Core Competencies:

Year 1: Pediatric and Fetal Imaging General Imaging and Emergent Conditions

1) **Patient Care:** By the end of the rotation, you should be able to:

- Perform fluoroscopic studies using low dose techniques and meticulous technique.
- Perform basic fluoroscopic studies with indirect attending radiologist oversight including: VCUG and upper GI series.
- Recognize and manage complications of these basic procedures.
- Protocol pediatric CT scans with attending oversight.
- Perform ultrasound studies with indirect supervision by the sonographer or radiology attending.
- Access Electronic Health Record to obtain relevant clinical information

Education:

- Attend Disney Pavilion On-boarding Session
- Utilize the *Image Gently* website for updated information on low dose pediatric imaging <http://www.pedrad.org/associations/5364/ig/>
- Visit the website above and take the *Image Gently Pledge*

- Utilize established imaging guidelines such as ACR *Appropriateness Criteria*
- Required readings – see Medical Knowledge section below
- Online Modules (<https://www.cchs.net/onlinelearning/default.asp?>) see Medical Knowledge section below

Milestones included in the above educational plan:

- Use of established evidence based guidelines such as ACR appropriateness criteria
- Appropriate use of the electronic health record to obtain relevant clinical information
- Competent performance of basic fluoroscopy studies under indirect supervision
- Recognition and management of complications of basic procedures

2) **Medical Knowledge:** By the end of the rotation, you should be able to:

- Differentiate normal from abnormal in imaging of the fetus, infant and child.
- Make core observations and formulate differential diagnoses on cases interpreted.
- Discuss radiation reduction techniques used in pediatric and pregnant patients.
- Select appropriate protocol and contrast agent for basic fluoroscopy imaging studies including: VCUG, UGI, contrast enema.
- Understand appropriate protocol for pediatric and fetal ultrasound studies.
- Correctly identify position and malposition of lines and catheters in the newborn.
- Discuss the correct work-up of pediatric patients who present with the following clinical signs or symptoms:
 - Vomiting infant
 - Vomiting child
 - Urinary tract infection
 - Urinary tract obstruction
 - Right lower quadrant pain
 - Acute scrotal pain
 - Acute pelvic pain
- Discuss the correct work-up of pregnant patients in the first trimester who present with the following clinical signs or symptoms:
 - Pelvic pain or bleeding
 - Confirmation of viability
- Recognize the imaging characteristics of common and emergent pediatric conditions including:
 - Misplaced supportive equipment
 - Pneumothorax
 - Pneumomediastinum
 - Pneumoperitoneum
 - Pneumonia
 - Appendicitis
 - Malrotation and midgut volvulus
 - Necrotizing enterocolitis
 - Testicular torsion
 - Ovarian torsion
 - Fractures
- Recognize the imaging characteristics of common and emergent first trimester conditions including:
 - Normal findings of intrauterine gestational sac
 - Multiple gestations (chorionicity and amnionicity)
 - Failed first trimester pregnancy

- Subchorionic hematoma
- Ectopic pregnancy, including unusual ectopic pregnancy
- Gestational trophoblastic disease

Education:

- **Required** readings:
 - Week 1-4:
 - Read *Pediatric Imaging: the Fundamentals* by L. Donnelly
 - Read *Ultrasound: the Requisites*, 2nd ed. By Middleton, Chapters 12-14
- **Required** Exam:
 - Complete Weekly RADPrimer Exam
- **Required** NetLearning Module:
 - *Fetal Heart 4-CH and Outflow Tract Review CBL on NetLearning.*
- **Required** Online Modules (<https://www.cchs.net/onlinelearning/default.asp?>):
 - Go to Recommended Courses Tab Junior Radiology Curriculum and complete one module per day :
 - Introduction to the Pediatric Knowledge Techniques
 - [Lines and Catheters](#)
 - [Radiation Safety](#)
 - ACGME General Competencies
 - [Patient Care](#)
 - Chest
 - [Childhood Pneumonia](#)
 - [Neonatal Chest](#)
 - [Pulmonary Edema](#)
 - Esophagus and Airway
 - [Esophageal Atresia](#)
 - [Esophageal Foreign Body](#)
 - [Gastroesophageal Reflux](#)
 - GI
 - [Congenital Duodenal Obstruction](#)
 - [Hypertrophic Pyloric Stenosis](#)
 - [Intussusception](#)
 - [Malrotation and Midgut Volvulus](#)
 - [Pneumoperitoneum](#)
 - GU
 - [Duplication of the Collecting System/Ureters](#)
 - [Posterior Urethral Valves](#)
 - [Ureteropelvic Junction Obstruction](#)
 - [Vesicoureteral Reflux](#)
 - Musculoskeletal
 - [Childhood Fractures](#)
 - Neuroradiology
 - [Newborn Cranial Ultrasound](#)
 - **Complete Lines and Catheters, Radiation Safety & Patient Care as soon as possible**
 - **Submit certificate of completion to Program Coordinator for all 20 modules at the completion of the rotation.**

- Optional Cases:
 - Complete all “Opening Round” cases (pgs 1-93) in *the Pediatric Imaging: Case Review Series*.
 - Complete all “Opening Round” cases (1-104) in *the Obstetric and Gynecologic Ultrasound: Case Review Series*.
 -
- Participation in Journal Club

Milestones included in the above educational plan:

- Selection of appropriate protocol and contrast agent/dose for basic fluoroscopy and CT procedures
- Making core observations
- Formulating differential diagnoses
- Recognizing critical findings
- Differentiating normal from abnormal

3) Practice-Based Learning and Improvement: By the end of the rotation, you should be able to:

- Review all cases and dictate a preliminary report. Then review your interpretation with faculty and then correct report as needed before sending it to the faculty members report queue
- Share good learning cases and missed diagnosis with others in the department
- Recognize and manage contrast reactions
- Understand the risks of radiation.
- Understand the ALARA principle of decreasing radiation dose.
- Understand the risks of MRI.
- Develop an annual learning plan.

Education:

- Participate in Journal Club, clinical conferences, and independent learning
- Active participation in quality control and quality assurance activities
- Training in research design and statistical methods

Milestones included in the above educational plan:

- Recognizing and managing contrast reactions
- Describing the mechanism of radiation injury and the ALARA concept
- Documenting training in critical thinking skills and research design

4) Interpersonal and Communication Skills: By the end of the rotation, you should be able to:

- Provide a clear and accurate report
- Provide direct communication to referring physicians or their appropriate representative, and in routine, uncomplicated circumstances and documents communication in report for emergent or important unexpected findings.
- Demonstrate the verbal and non-verbal skills necessary for face to face communication with physicians, families, and support personnel

Education:

- Participation as an active member of the radiology team by communicating with clinicians face to face, providing consults, answering phones, problem solving and decision-making
- Practical experience in dictating radiological reports

Milestones included in the above educational plan:

- Communicating information about imaging and examination results in routine, uncomplicated cases

- Obtaining informed consent
- Adhering to transfer of care policies
- Generating accurate reports with appropriate elements for coding
- Communicating urgent and unexpected findings according to RSF policy

5) Professionalism: By the end of the rotation, you should be able to:

- Recognize limitations in personal knowledge and skills, being careful to not make decisions beyond the level of personal competence
- Demonstrate altruism
- Demonstrate compassion (be understanding and respectful of patient, their families, and medical colleagues)
- Demonstrate excellence: perform responsibilities at the highest level and continue active learning throughout one's career
- Demonstrate honesty with patients and staff
- Demonstrate honor and integrity: avoid conflict of interests when accepting gifts from patients and vendors
- Demonstrate sensitivity without prejudice 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
- Demonstrate positive work habits, including punctuality and professional appearance
- Demonstrate the broad principles of biomedical ethics
- Demonstrate principles of confidentiality with all information transmitted during a patient encounter
- Demonstrate ability to teach medical students
- Respond appropriately to constructive criticism

Education:

- Completion of the Professionalism online module – see Medical Knowledge section above
- Discussion of above issues during daily clinical work

Milestones included in the above educational plan:

- Recognizing the importance and priority of patient care and advocating for patient interests
- Fulfilling work related responsibilities
- Recognizing personal limitations and seeking help when appropriate
- Responding appropriately to constructive criticism
- Maintaining patient confidentiality
- Attending required meetings

6) Systems-Based Practice: By the end of the rotation, you should be able to:

- Demonstrate ability to design cost-effective care plans
- Describe departmental QI initiatives
- Describe the departmental QA reporting system.
- Describe the mechanism for reimbursement, including payor types.

Education:

- Required readings
- Discussions with faculty about cost-effective care plans and regulation
- ACR/APDR Initiative for Residents in Diagnostic Radiology Modules

Milestones included in the above educational plan:

- Demonstrate ability to design cost-effective care plans
- Describe departmental QI initiatives

- Describe the departmental QA reporting system.
- Describe the mechanism for reimbursement, including payor types.

Year 2: Pediatric and Fetal Imaging
Pediatric: Chest, Airway, GI, GU, and MSK Imaging
Fetal: 2nd and 3rd Trimester Imaging

1) **Patient Care:** By the end of the rotation, you should be able to:

- Perform fluoroscopic studies using low dose techniques
- Perform basic and intermediate fluoroscopic studies with graduated independence using meticulous technique including: VCUG, contrast enema, upper GI series, esophogram, fistulogram.
- Recognize and manage complications of intermediate procedures.
- Perform ultrasound studies with graduated independence.
- Protocol pediatric CT scans and MRI with graduated independence.
- Recommend appropriate imaging of common conditions independently.

Education:

- **Required** Daily Reading Minimum
 - a. On all rotations, it is recommended that residents read at least 25 cases per day
- **Required** readings – see Medical Knowledge section below
- Online Modules (<https://www.cchs.net/onlinelearning/default.asp?>) see Medical Knowledge section below

Milestones included in the above educational plan:

- Recommending appropriate imaging of common conditions independently
- Competently performing intermediate procedures (as noted above)
- Recognizing and managing complications of intermediate procedures

2) **Medical Knowledge:** By the end of the rotation, you should be able to:

- Select appropriate protocol and contrast for CT scans.
- Make secondary observations, narrow differential diagnosis, and describe management options for cases interpreted.
- Discuss the correct method for image guided reduction of intussusceptions.
- Understand the normal sequence of osseous development.
- Discuss the correct work-up of pediatric patients who present with the following clinical signs or symptoms:
 - Acute shortness of breath
 - Acute onset of wheezing
 - Respiratory distress in the newborn
 - Neonatal chest mass
 - Bilious vomiting
 - Projectile vomiting
 - Newborn bowel obstruction
 - Newborn abdominal mass
 - Newborn jaundice
 - Childhood bowel obstruction
 - Prenatal hydronephrosis
 - Neonatal adrenal mass
 - Urinary tract infection
 - Bladder outlet obstruction
 - Pelvic mass
 - Stridor
 - Limp
 - Hip Pain

- Discuss the correct work-up of pregnant patients in the second and third trimester who are referred for imaging based on the following clinical scenario:
 - Small for gestational age
 - Large for gestational age
 - Elevated AFP

Education:

- Create age-related differential diagnoses related to pediatric diseases of the chest, airway, GI, GU, and MSK systems including:
 - Pulmonary mass
 - Mediastinal mass
 - Chest wall mass
 - Liver mass
 - Renal mass
 - Adrenal mass
 - Scrotal mass
 - Ovarian mass
 - Mesenteric mass
 - Childhood intestinal obstruction
 - High intestinal obstruction of newborn
 - Low intestinal obstruction of newborn
 - Aggressive bone lesions
 - Non-aggressive bone lesions
 - Metabolic disease of bone
 - Airway obstruction
 - Soft-tissue masses
 - Aggressive bone lesions
 - Non-aggressive bone lesions
 - Metabolic disease of bone
 - Joint centered processes
- Understand the imaging characteristics of pediatric conditions of the chest, airway, GI, GU, and MSK systems including:
 - Pneumonia
 - Pulmonary edema
 - Cystic fibrosis
 - Acute chest syndrome
 - Chest trauma
 - Esophageal atresia and TEF
 - Appendicitis
 - Hypertrophic pyloric stenosis
 - Intussusception
 - Bowel atresia
 - Liver masses
 - Necrotizing enterocolitis
 - Blunt abdominal trauma
 - Hypovolemic shock
 - UPJ obstruction
 - Vesicoureteral reflux
 - Duplication of the renal collecting system
 - MCDK
 - Polycystic kidney disease
 - Renal masses

- Neuroblastoma
 - Adrenal hemorrhage
 - Posterior urethral valves
 - Urachal anomalies
 - Sacrococcygeal teratoma
 - Fractures
 - Aspirated foreign body
 - Clubfoot
 - Non-accidental trauma
 - DDH
 - Perthes disease
 - Osteomyelitis
 - Juvenile arthritis
 - Metabolic diseases of bone
 - Common skeletal dysplasias
 - Osseous tumors
 - Soft-tissue masses
- Understand imaging of the normal and abnormal second and third trimester fetus, placenta and other supporting structures
 - Normal findings
 - Normal fetal anatomy/situs/development
 - Placenta
 - Biometry
 - Amniotic fluid volume
 - Multiple gestations
 - Common congenital anomalies
 - Recognition of fetal abnormalities that require high-risk obstetrics referral
 - Intrauterine growth retardation
 - Hydrops
 - Holoprosencephaly
 - Hydrocephalus
 - Neural tube defects
 - Multicystic dysplastic kidney
 - Hydronephrosis
 - Anencephaly
 - Chromosomal abnormalities and syndromes
 - Hydrops
 - Congenital infections
 - Chest masses
 - Cardiac malformations and arrhythmias
 - Diaphragmatic hernia
 - Abdominal wall defects
 - Abdominal masses
 - Gastrointestinal tract obstruction/abnormalities
 - Ascites
 - Skeletal dysplasias
 - Cleft lip/palate
 - Complications of twin pregnancy
 - Hydranencephaly
 - Oligohydramnios

- Polyhydramnios
- Placental abnormalities
- Cervical appearance and length, cervical incompetence
- Umbilical cord abnormalities and doppler assessment

Education:

- **Required** Readings:
 - Week 1-4:
 - Read the Pediatric Section of *Core Radiology* by Jacob Mandel
 - Read *Ultrasound: the Requisites*, 2nd ed. By Middleton, Chapters 15-21
- **Required Online Modules** (<https://www.cchs.net/onlinelearning/default.asp?>):
 - Go to Recommended Courses Tab □ Junior Radiology Curriculum and Senior Radiology Curriculum. Complete one module per day:
 - GI
 - [Appendicitis](#)
 - [Blunt Abdominal Trauma](#)
 - [Jejunal and Ileal Stenosis/Atresia](#)
 - [Newborn Low Intestinal Obstruction](#)
 - [Omphalocele, Gastroschisis & Diaphragmatic Hernia](#)
 - GU
 - [Multicystic Dysplastic Kidney](#)
 - [Testicular Torsion](#)
 - Musculoskeletal
 - [Child Abuse: Skeletal Trauma](#)
 - [Legg-Calvé-Perthes Disease](#)
 - [Septic Arthritis and Toxic Synovitis](#)
 - [Slipped Capital Femoral Epiphysis](#)
 - Neuroradiology
 - [Child Abuse: Cerebral Trauma](#)
 - Introduction to the Pediatric Knowledge Techniques
 - [Radiation Safety](#)
 - Chest
 - [Bronchopulmonary Foregut Malformations](#)
 - [Mediastinal Masses](#)
 - GU
 - [Neuroblastoma, Ganglioneuroblastoma, Ganglioneuroma](#)
 - [Scrotal Neoplasms](#)
 - [Wilms and Other Renal Tumors](#)
 - Musculoskeletal
 - [Child Abuse: Skeletal Trauma](#)
 - [Developmental Dysplasia of the Hip](#)
 - **Submit certificate of completion for all 20 modules to Program Coordinator at the completion of the rotation.**
- Optional Cases:
 - Complete all “Fair Game” cases in *the Pediatric Imaging: Case Review Series*.
 - Complete all “Fair Game” cases in *the Obstetric and Gynecologic Ultrasound: Case Review Series*.
- Required Exam: Complete RADPrimer Exam
- Participation in Journal Club

Milestones included in the above educational plan:

- Selecting appropriate protocols and contrast agent/dose for intermediate imaging like basic MR
- Making secondary observations
- Narrowing differential diagnosis
- Describing management options

3) Practice-Based Learning and Improvement: By the end of the rotation, you should be able to:

- Review all cases and dictate a preliminary report. Then review your interpretation with faculty and then correct report as needed before sending it to the faculty members report queue
- Share good learning cases and missed diagnosis with others in the department
- Demonstrate recognition and management of contrast reactions.
- Access exam specific radiation doses.
- Access resources to determine safety of implanted devices and retained metal in MRI
- Continue refining the individual learning plan
- Work with faculty to identify scholarly projects

Education

- Participate in Journal Club, clinical conferences, and independent learning
- Active participation in quality control and quality assurance activities

Milestones included in the above educational plan:

- Re-demonstrating recognition and management of contrast reactions
- Accessing resources to determine exam specific average radiation dose info
- Accessing resources to determine safety of implanted devices and retained metal
- Working with faculty mentors to identify potential scholarly projects

4) Interpersonal and Communication: By the end of the rotation, you should be able to:

- Provide a clear and accurate report that does not require substantive correction by faculty in routine cases.
- Provide clear and concise communication to referring physicians or their appropriate representative in challenging circumstances with direct supervision.
- Communicate difficult information such as errors, complications, etc under direct supervision.
- Documents communication in report for emergent or important unexpected findings
- Demonstrate the verbal and non-verbal skills necessary for face to face communication with physicians, families, and support personnel

Education:

- Participation as an active member of the radiology team by communicating with clinicians face to face, providing consults, answering phones, problem solving and decision-making
- Practical experience in dictating radiological reports

Milestones included in the above educational plan:

- Communicating under direct supervision in challenging circumstances
- Communicating under direct supervision difficult information such as errors, complications, adverse events, and bad news
- Efficiently generating clear and concise reports that do not require substantive faculty member correction on routine cases
- Communicating findings and recommendations clearly and concisely

5) Professionalism: By the end of the rotation, you should be able to:

- Recognize limitations in personal knowledge and skills, being careful to not make decisions beyond the level of personal competence
- Demonstrate altruism

- Demonstrate compassion (be understanding and respectful of patient, their families, and medical colleagues)
- Demonstrate excellence: perform responsibilities at the highest level and continue active learning throughout one's career
- Demonstrate honesty with patients and staff
- Demonstrate honor and integrity: avoid conflict of interests when accepting gifts from patients and vendors
- Demonstrate sensitivity without prejudice 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
- Demonstrate positive work habits, including punctuality and professional appearance
- Demonstrate the broad principles of biomedical ethics
- Demonstrate principles of confidentiality with all information transmitted during a patient encounter
- Demonstrate ability to teach medical students
- Act as an effective health care team member.

Education:

- Discussion of above issues during daily clinical work

Milestones included in the above educational plan:

- Becoming an effective health care team member
- Continuing to demonstrate professional behaviors described under year 1

6) Systems-Based Practice: By the end of the rotation, you should be able to:

- Demonstrate ability to design cost-effective care plans
- Incorporate QI into clinical practice.
- Participate in departmental QA process.
- State relative costs of common procedures.

Education:

- Required readings
- Discussions with faculty about cost-effective care plans and regulation
- ACR/APDR Initiative for Residents in Diagnostic Radiology Modules

Milestones included in the above educational plan:

- Demonstrate ability to design cost-effective care plans
- Incorporate QI into clinical practice.
- Participate in departmental QA process.
- State relative costs of common procedures.

Year 3 (and 4): Pediatric and Fetal Imaging
Pediatric: Cardiac, Neurologic, Spine, and Head and Neck Imaging
Fetal: MR Imaging

1) Patient Care: By the end of the rotation, you should be able to:

- Perform fluoroscopic studies using low dose techniques
- Perform intermediate and advanced fluoroscopic studies with graduated independence using meticulous technique including: esophogram, fistulogram, and therapeutic reduction enema.
- Recognize and manage complication of advanced procedures, particularly complications of therapeutic reduction enema.
- Perform pediatric ultrasound studies independently.
- Protocol pediatric CT scans and MRI independently.

- Protocol fetal MRI scans with assistance.
- Discuss the use of contrast agents in Fetal MRI.
- Discuss fetal safety related to MRI.
- Discuss the potential indications for Fetal CT.
- Assume primary responsibility for cases in the department, with appropriate guidance and assistance from the Pediatric Radiologist for more complex or unusual cases.
- Recommend appropriate imaging in uncommon conditions independently.
- Integrate approach to imaging recommendations using current research and guidelines, with consideration of cost effectiveness and risk-benefit analysis.

Education

- Required readings – see Medical Knowledge section below
- Online Modules (<https://www.cchs.net/onlinelearning/default.asp?>) see Medical Knowledge section below

Milestones included in the above educational plan:

- Recommending appropriate imaging of uncommon conditions independently
- Integrating current research and literature with guidelines, taking into consideration cost effectiveness and risk benefit analysis, to recommend imaging
- Competently performing advanced procedures
- Recognizing and managing complications of advanced procedures
- Independently performing fluoroscopy studies

2) **Medical Knowledge:** By the end of the rotation, you should be able to:

- Select appropriate protocol and contrast agent for pediatric MRI.
- Modify imaging protocols according to clinical circumstance.
- Apply principles to optimize image quality.
- Provide accurate and focused interpretations.
- Prioritize differential diagnoses and recommend management.
- Integrate current research with guidelines to recommend management.
- Understand the normal myelination patterns of the developing brain.
- Understand the common surgical procedures for congenital cardiac disease.
- Discuss the correct work-up of pediatric patients who present with the following clinical signs or symptoms:
 - Cyanosis
 - Cardiac murmur
 - Macrocrania
 - Sacral dimple
 - Seizure
- Create age-related differential diagnoses related to diseases of the cardiac, neurologic, spine, and head and neck systems including:
 - Cyanotic heart disease
 - Acyanotic heart disease
 - Vasculitis
 - Cardiac masses
 - Masses of the neurologic system
 - Neurologic cysts
 - Head and neck masses
 - Brain malformations
 - Hydrocephalus
- Understand the imaging characteristics of conditions of the cardiac, neurologic, spine, and head and neck systems including:

- Congenital cardiac disease
- Coarctation of the aorta
- Scoliosis
- Tethered cord
- Developmental abnormalities of the brain
- Neurocutaneous syndromes
- Intracranial infection
- CNS tumors
- Head and neck masses
- Head and neck infection
- Intracranial trauma
- Spinal masses
- Discuss the indications for fetal MRI

Education:

- **Required** Daily Reading Minimum
 - On all rotations, it is recommended that residents read at least 25 cases per day
- **Required** readings:
 - Week 1-4 pediatric:
 - Review:
 - *Pediatric Imaging: the Fundamentals* by L. Donnelly
 - The Pediatric Section of *Core Radiology* by Jacob Mandel
 - Week 1-4 Fetal: *Fundamental and Advanced Fetal Imaging* by Kline-Fath: Chapter 6 and any additional sections that pertain to cases encountered on service
- **Required Online Modules** (<https://www.cchs.net/onlinelearning/default.asp?>):
 - Go to Recommended Courses Tab Senior Radiology Curriculum. Complete one module per day :
 - GI
 - [Newborn Jaundice](#)
 - Musculoskeletal
 - [Ewings Sarcoma](#)
 - [Langerhans Cell Histiocytosis](#)
 - [Osteogenic Sarcoma](#)
 - [Rickets](#)
 - Cardiac
 - [Acyanotic Congenital Heart Disease](#)
 - [Coarctation of the Aorta and Hypoplastic Left Heart](#)
 - [Cyanotic Congenital Heart Disease](#)
 - Neuroradiology
 - [Chiari Malformations](#)
 - [Child Abuse: Cerebral Trauma](#)
 - [Childhood Stroke](#)
 - [Congenital Anomalies of the Pediatric Face](#)
 - [Hydrocephalus](#)
 - [Malformations of Cortical Development](#)
 - [Pediatric Brain Tumors](#)
 - [Pediatric Neck Masses](#)
 - [Spine: The Sacral Dimple](#)
 - [The Holoprosencephalies](#)
 - [The Orbit](#)
 - [TORCH Infections](#)

- Syndrome
 - [Trisomy 21](#)
- Systemic Conditions
 - [Leukemia and Lymphoma](#)
 - [Sickle Cell Disease](#)
- **Submit certificate of completion for all 20 modules to Program Coordinator at the completion of the rotation.**
- Optional Cases:
 - Complete all “Challenge” cases (pgs 1-93) in *the Pediatric Imaging: Case Review Series*.
 - Complete all “Challenge” cases (1-104) in *the Obstetric and Gynecologic Ultrasound: Case Review Series*.
- Required Exam: Complete RADPrimer Exam

Milestones included in the above educational plan:

- Selecting appropriate protocols and contrast agent/dose for advanced imaging, especially pediatric and fetal MRI
- Demonstrating knowledge of physical principles to optimize imaging quality
- Independently modifying protocols as determined by clinical circumstances
- Providing accurate, focused, and efficient interpretations
- Prioritizing differential diagnoses and recommends management
- Making subtle observations
- Suggesting a single diagnosis when appropriate
- Integrating current research and literature with guidelines to recommend management
- Describe measurements of productivity (RVUs)

3) Practice-Based Learning and Improvement: By the end of the rotation, you should be able to:

- Review all cases and dictate a preliminary report. Then review your interpretation with faculty and then correct report as needed before sending it to the faculty members report queue
- Share good learning cases and missed diagnosis with others in the department
- Recognize and manage contrast reactions.
- Communicate risk of radiation exposure and MR safety of common implants and foreign bodies to patients and practitioners.
- Apply principles of *Image Gently* to decrease radiation dose.
- Apply principles of MR safety including adherence to zones and screening.
- Begin a scholarly project to be completed and presented by the end of training.

Education

- Participate in Journal Club, clinical conferences, and independent learning
- Active participation in quality control and quality assurance activities

Milestones included in the above educational plan:

- Re-demonstrating recognition and management of contrast reactions
- Communicating the relative risk of exam specific radiation exposure to patients and practitioners, applying principles of Image Gently.
- Communicating MR safety of common implants and retained foreign bodies to patients and practitioners

4) Interpersonal and Communication Skills: By the end of the rotation, you should be able to:

- Provide a clear and accurate report that does not require substantive correction by faculty.
- Communicate effectively and professionally in all situations.

- Provide direct communication to referring physicians or their appropriate representative in challenging circumstances with indirect supervision.
- Communicate difficult information such as errors, complications, etc under indirect supervision.
- Documents communication in report for emergent or important unexpected findings.
- Demonstrate the verbal and non-verbal skills necessary for face to face communication with physicians, families, and support personnel.

Education

- Participation as an active member of the radiology team by communicating with clinicians face to face, providing consults, answering phones, problem solving and decision-making
- Practical experience in dictating radiological reports

Milestones included in the above educational plan:

- Communicating without supervision in challenging circumstances
- Efficiently generating clear and concise reports that do not require substantive faculty member correction
- Communicating appropriately under stressful situations

5) Professionalism: By the end of the rotation, you should be able to:

- Recognize limitations in personal knowledge and skills, being careful to not make decisions beyond the level of personal competence
- Demonstrate altruism
- Demonstrate compassion (be understanding and respectful of patient, their families, and medical colleagues)
- Demonstrate excellence: perform responsibilities at the highest level and continue active learning throughout one's career
- Demonstrate honesty with patients and staff
- Demonstrate honor and integrity: avoid conflict of interests when accepting gifts from patients and vendors
- Demonstrate sensitivity without prejudice 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
- Demonstrate positive work habits, including punctuality and professional appearance
- Demonstrate the broad principles of biomedical ethics
- Demonstrate principles of confidentiality with all information transmitted during a patient encounter
- Demonstrate ability to teach medical students
- Act as an effective health care team leader.
- Serve as a role model for professional behavior.

Education

- Discussion of above issues during daily clinical work

Milestones included in the above educational plan:

- Acting as an effective team leader promoting patient welfare, patient autonomy, and social justice
- Serving as a role model for professional behavior

6) Systems-Based Practice: By the end of the rotation, you should be able to:

- Identify and begin a systems based practice project incorporating QI methods, completing the project by the end of training as required by the ACGME.
- Identify national radiology quality programs.
- Describe technical and professional components of imaging costs.

- Describe measurements of productivity (RVUs)

Education

- Identify and begin a systems based practice project incorporating QI methods, completing the project by the end of training as required by the ACGME.
- Identify national radiology quality programs.
- Describe technical and professional components of imaging costs.
- Describe measurements of productivity (RVUs)

Milestones included in the above educational plan:

- Identify and begin a systems based practice project incorporating QI methods, completing the project by the end of training as required by the ACGME.
- Identify national radiology quality programs.
- Describe technical and professional components of imaging costs.

Assessment Tools for all Pediatric Radiology Rotations:

- Global Competency ratings by faculty
- 360 degree review by supervisory technologists
- ACR in-service exam
- Transcript of completed Cleveland Clinics online courses
- Results of RADPrimer online examinations
- Resident performance discussing unknown cases in conference
- Placing cases in teaching file
- Conference attendance logs
- Fluoroscopy time log submitted by physicist to Program Director
- Evaluation of teaching by medical students

Cleveland Clinic Modules Log In:

Directions to login to Cleveland Clinic Modules:

Go to <https://www.cchs.net/onlinelearning/default.htm>

Click on “Portals” on the left hand side of the screen. Then “Pediatric Radiology Portal”

Click “New User Registration” on the right hand side of the screen. Fill in the form with your information. You will get a confirmation email.

Then go back to <https://www.cchs.net/onlinelearning/default.htm>

Click on “Comet” at the upper right hand side of the screen. Log in with the username and password you just created.

The required modules are outlined in the curriculum.

Pediatric Imaging Curriculum based off the ABR Core Exam

1) General Pediatric Imaging: Basic Knowledge/Competency with:

- i) National patient safety goals as they apply to pediatric imaging
- ii) Contrast reactions in children (features, prevention, and treatment)
- iii) General knowledge of practice-based imaging guidelines and appropriateness criteria (ACR Appropriateness Criteria and Practice Guidelines and Technical Standards)
- iv) ALARA principles (e.g., Image Gently Campaign) for modalities using ionizing radiation
- v) Age-related development and normal anatomy
- vi) Appropriate appearance of surgical devices and support apparatus
- vii) Communication of
 - urgent/emergent findings (1)
 - List of urgent/emergent findings in children
- viii) Unique considerations for modalities:
 - (1) Indications
 - (a) General for each
 - (b) US
 - (i) Hips (effusion, CHD)
 - (ii) Spine
 - (iii) Brain
 - (iv) Chest/mediastinum
 - (v) Neck
 - (vi) Imperforate anus (level of pouch)
 - (vii) Intussusceptions
 - (viii) Appendicitis
 - (ix) Pyloric stenosis
 - (x) Diaphragm motion (infant)
 - (xi) Interventional guidance
 - (c) CT urography
 - (d) MR urography, MRCP
 - (2) Limitations
 - (3) General techniques
 - (a) Radiography
 - (i) Collimation
 - (ii) Settings
 - (iii) Numbers of views
 - (b) Fluoroscopy/angiography
 - (i) Pulsed fluoroscopy

- (ii) Other fluoroscopy settings
- (iii) Shielding
- (iv) Dose reduction techniques
- (c) Special contrast use/considerations CT: dose reduction techniques, contrast doses
- (d) MRI: coil optimization; contrast types and dose
- (e) RNI: see nuclear medicine study guide
- (4) Risks

2) Brain, Head and Neck, Spine

- a) Skull
 - i) Congenital
 - (1) Synostoses
 - (2) Congenital dermal sinus
 - (3) Dermoid/epidermoid
 - ii) Inflammatory
 - (1) Osteomyelitis
 - iii) Trauma
 - (1) Caput succedaneum
 - (2) Subgaleal hemorrhage
 - (3) Cephalohematoma
 - (4) Fractures (especially non-accidental injury/abuse)
 - iv) Basic temporal bone anatomy
 - (a) Mondini malformation
 - (b) Michele malformation
 - v) Inflammatory disorders
 - (1) Cholesteatoma
 - (2) Mastoiditis
 - vi) Variants
 - (1) Lückenschädel
 - (2) Wormian bones
 - (3) Parietal foramina
- b) Vertebral column
 - i) Congenital
 - (1) Absence or hypoplasia of odontoid
 - (2) Os odontoideum
 - (3) Segmentation anomalies
 - (4) Klippel-Feil anatomy
 - (5) Sprengel deformity
 - (6) butterfly vertebra
 - (7) Spinal dysraphism
 - (8) Diastematomyelia

- (9) Sacral agenesis (including caudal regression syndrome)
- (10) Partial absence (including Currarino triad/ASP)
 - ii) Inflammatory
 - (1) Discitis
 - (2) Infectious spondylitis (TB)
 - iii) Neoplasms
 - (1) Ewing sarcoma
 - (2) Aneurysmal bone cyst
 - (3) Osteblastoma
 - (4) Osteoid osteoma
 - (5) Langerhans cell histiocytosis
 - (6) Metastases (including leukemia and lymphoma)
 - iv) Trauma
 - (1) Fractures/dislocations
 - (2) Atlanto-dens and atlanto-occipital injuries
 - (3) Spondylolysis/spondylolisthesis
 - (4) Insufficiency fracture (and etiologies)
 - v) Miscellaneous
 - vi) Dysplasia/syndromes
 - (1) Mucopolysaccharidoses
 - (2) Spondylometaphyseal dysplasia
 - vii) Scheuermann disease
 - viii) Scoliosis (repair and hardware complications)
- c) Brain
 - i) Congenital
 - (1) Migrational disorders
 - (2) Lissencephaly
 - (3) Pachygyria
 - (4) Schizencephaly
 - (5) Heterotopic gray matter
 - (6) Polymicrogyria
 - (7) Holoprosencephaly
 - (8) Anomalies of corpus callosum
 - (9) Hydranencephaly
 - (10) Dandy-Walker malformations
 - (11) Chiari malformation types I and II
 - (12) Cephalocele
 - (13) Neurocutaneous syndromes
 - (14) Vein of Galen malformation
 - (15) Causes of hydrocephalus
 - Aqueductal stenosis
 - Syndromic
 - Masses

- ii) Inflammatory
 - (1) Bacterial infections
 - Meningitis
 - Cerebritis
 - Abscess
 - (2) Tuberculosis infections
 - (3) Viral infections (encephalitis) (a) TORCH infections
- iii) Neoplasms
- iv) Posterior fossa
 - (1) Medulloblastoma
 - (2) Ependymoma
 - (3) Brainstem glioma
 - (4) Astrocytoma
- v) Supratentorial
 - (1) Pineal region tumors
 - (2) Craniopharyngioma
 - (3) Astrocytoma
 - (4) Oligodendroglioma
 - (5) PNET
 - (6) Choroid plexus tumors
- vi) Cerebral infarction/ischemia
 - (1) Childhood infarcts
 - (2) Arteritis
 - (3) Sickle cell (including moyamoya)
 - (4) Carotid occlusion
 - (5) Venous sinus thrombosis
 - (6) Intracranial hemorrhage
 - (7) Neonatal hypoxic ischemic injury
 - (a) vascular borderzone infarctions
 - (b) multicystic encephalomalacia
- vii) Trauma (including nonaccidental injuries)
 - (1) Cerebral injury (including shearing injuries and concussion)
 - (2) Subdural hematoma
 - (3) Epidural hematoma
 - (4) Subarachnoid hemorrhage
- viii) Syndromic/systemic
 - (1) Neurocutaneous syndromes
 - (2) Chiari malformation types I and II
- ix) Vascular
 - (1) AV malformations, congenital “aneurysms” (vein of Galen)
- x) Metabolic brain disorders

(1) Leukodystrophies

d) Spinal cord

i) Congenital

- (1) Myelomeningocele/meningocele
- (2) Lipomyelomeningocele
- (3) Diastatomyelia
- (4) Tethered cord
- (5) Dermal sinus
- (6) Intradural lipoma
- (7) Hydrosyringomyelia
- (8) Neurenteric cysts

ii) Tumors

- (1) Neurofibroma
- (2) Astrocytoma
- (3) Ependymoma
- (4) Metastases
- (5) Neuroblastoma, ganglioneuroblastoma, ganglioglioma

iii) Sacrococcygeal masses

- (1) Germ cell tumors (i.e., teratoma)
- (2) Neuroblastoma
- (3) Lymphoma
- (4) Rhabdomyosarcoma

iv) Other

- (1) Infections
- (2) Demyelinating disorders
- (3) Trauma
- (4) Vascular malformations

e) Neck

i) Congenital

- (1) Fibromatosis colli
- (2) Lymphatic malformations
- (3) Branchial cleft cysts
- (4) Thyroglossal duct cysts

ii) Neoplasms

- (1) Lymphoma
- (2) Neuroblastoma
- (3) Rhabdomyosarcoma
- (4) Nasopharyngeal carcinoma
- (5) Hemangiomas

iii) Infectious/inflammatory

- (1) Adenitis

- (2) Retropharyngeal abscess
- iv) Thyroid disorders
 - (1) Absence/hypoplasia/ectopic
 - (2) Thyroiditis
 - (3) Thyroid masses
 - (4) Goiter
- f) Head/face
 - i) Congenital
 - (1) Vascular malformations
 - (2) PHPV
 - (3) Coloboma
 - ii) Inflammatory
 - (1) Orbital masses
 - (2) Ocular masses
 - (3) Orbital cellulitis
 - (4) Sinusitis
 - iii) Neoplastic/mass like
 - (1) Retinoblastoma
 - (2) Nasopharyngeal masses
 - (3) Carcinoma
 - (4) Juvenile angiofibroma
 - (5) Sinus masses
 - iv) Trauma
 - (1) Facial fracture (Le Fort classification)

3) Chest and Airway

- a) Upper Airway
 - i) Congenital
 - (1) Tracheomalacia/bronchomalacia/laryngomalacia
 - (2) Laryngeal stenosis, web, cleft
 - (3) Choanal atresia
 - (4) Masses: hemangioma
 - ii) Inflammatory
 - (1) Tonsillar enlargement/adenoidal hypertrophy
 - (2) Croup
 - (3) Epiglottitis
 - (4) Tracheitis
 - (5) Retropharyngeal abscess
 - iii) Neoplasm
 - (1) Juvenile angiofibroma
 - (2) Subglottic hemangioma
 - (3) Laryngeal papilloma
 - iv) Trauma

- (1) Foreign body
- (2) Acquired subglottic stenosis
- b) Chest
 - i) Congenital
 - (1) Agenesis/hypoplasia
 - (2) Venolobar syndrome
 - (3) Bronchial atresia
 - (4) Bronchopulmonary foregut malformations
 - (a) Sequestration
 - (b) Bronchogenic cyst
 - (c) Congenital pulmonary airway malformation (CPAM)/cystic adenomatoid malformation (CCAM)
 - (d) Congenital lobar emphysema
 - (e) Hybrid lesions
 - (5) Tracheal bronchus
 - (6) Tracheoesophageal fistula
 - (7) Lymphangiectasia
 - ii) Inflammatory
 - (1) Infections
 - (a) Bacterial pneumonia
 - (i) Streptococcus
 - (ii) Staphylococcus
 - (iii) Pertussis
 - (iv) Chlamydia
 - (v) Mycoplasma
 - (vi) H. influenza
 - (vii) Round pneumonia
 - (viii) Abscess
 - (ix) Complications
 - 1. Necrosis
 - 2. Abscess
 - 3. Fistulae
 - 4. Empyema
 - 5. Pneumatocele
 - (b) Viral pneumonia
 - RSV
 - Varicella
 - Measles
 - (c) Tuberculosis
 - (d) Fungal infections
 - (e) Other opportunistic infections

- (f) Plasma cell granuloma/inflammatory pseudotumor, myofibroblastic inflammatory tumor
- (2) Small airways disease
 - (a) Reactive airways disease
 - (b) Viral pneumonia
 - (3) Bronchiectasis: causes
 - (a) Cystic fibrosis
 - (b) Immotile cilia syndrome
 - (c) Chronic infection (primary immune disorders)
 - (d) Foreign body
 - (e) Aspiration
- iii) Neoplasms /mass-like lesions (1) Mediastinal masses
 - (a) Anterior
 - (i) Lymphoma/leukemia
 - (ii) Germ cell tumors
 - (iii) Thymoma/carcinoma
 - (iv) Other masses: thymic cysts, bronchogenic cysts
 - (v) Normal prominent thymus and thymic rebound
 - (b) Middle
 - (i) Adenopathy (lymphoma/mets)
 - (ii) Congenital masses: bronchogenic cysts, esophageal duplication cyst, neurenteric cyst
 - (iii) Neurogenic tumors
 - (c) Posterior
 - (i) Neurogenic tumors
 - (ii) Other masses: bronchogenic cyst, infection, hematoma, adenopathy
- (2) Primary lung tumors
 - (a) Adenoma/carcinoid tumor
 - (b) Hamartoma
 - (c) Hemangioma
 - (d) Mesenchymal sarcoma (and its association with developmental cystic lesions of lung)
 - (e) Metastatic lung lesions
- (3) Chest wall neoplasms/masses
 - (a) Ewing sarcoma family (including Askin tumor)
 - (b) Benign rib and spine neoplasms
 - (c) Vascular malformations
 - (d) Infections
- iv) Trauma
 - (1) Contusion
 - (2) Air leak
 - (a) Pneumothorax

- (b) Pneumomediastinum
- (c) Bronchopleural fistula
- (3) Fracture of tracheobronchial tree
- (4) Airway foreign body
- (5) Post-traumatic bronchial stenosis
- (6) Post-traumatic diaphragmatic hernia
- v) Vascular
 - (1) Pulmonary thromboembolic disease
 - (2) Other venous thrombosis or occlusion, anomalous vessels
 - (3) AV malformations
- vi) Unique chest problems in neonate
 - (1) Hyaline membrane disease
 - (2) Transient tachypnea of newborn
 - (3) Neonatal pneumonia
 - (4) Congenital diaphragmatic hernia
 - (5) Chronic lung disease of infancy (bronchopulmonary dysplasia)
 - (6) Meconium aspiration syndrome
 - (7) Persistent fetal circulation
 - (8) ECMO therapy and its complications
 - (9) Air leak in the neonate
 - (a) Including pulmonary interstitial emphysema
- vii) Miscellaneous: includes chest manifestations of systemic disorders
 - (1) Idiopathic pulmonary hemosiderosis
 - (2) Alveolar proteinosis
 - (3) Collagen vascular diseases
 - (4) Spontaneous pneumothorax and pneumomediastinum
 - (5) Cardiogenic and noncardiogenic pulmonary edema
 - (6) Histiocytosis
 - (7) Vasculitis (Wegener disease)

4) Cardiovascular: Cardiac

- a) Congenital heart disease
 - i) Segmental approach to imaging of congenital heart disease
 - (1) Normal segmental anatomy
 - (2) Anomalies of visceratrial situs
 - Asplenia
 - Polysplenia
 - Situs inversus
 - ii) Left-to-right shunts
 - (1) Ventricular septal defect
 - (2) Patent ductus arteriosus

- (3) Atrial septal defect
- (4) Endocardial cushion defect
- (5) Aortopulmonary window
- (6) Partial anomalous pulmonary venous return
- iii) Intermixing (admixture) states with increased pulmonary blood flow
 - (1) Total anomalous pulmonary venous connection (TAPVC) without obstruction
 - (2) D-transposition of the great arteries
 - (3) Truncus arteriosus
 - (4) Single ventricle
- iv) Intermixing (admixture) states with decreased pulmonary blood flow
 - (1) Tetralogy of Fallot
 - (2) Pulmonary atresia with VSD
 - (3) Single ventricle with RVOT obstruction
- v) Left-sided obstruction
 - (1) Coarctation
 - (2) Hypoplastic left heart syndrome
 - (3) Cor triatriatum
 - (4) Obstructed TAPVC
- vi) Other congenital heart disease
 - (1) Pulmonary valve stenosis
 - (2) L-transposition of great arteries
 - (3) Pulmonary atresia with intact ventricular septum
 - (4) Ebstein anomaly
 - (5) Congenital absence of the pericardium
- vii) Vascular rings and slings
 - (1) Right aortic arch with aberrant left subclavian artery
 - (2) Double aortic arch and variants
 - (3) Circumflex aortic arch
 - (4) Pulmonary sling
- viii) Anomalous coronary artery origins
 - (1) Anomalous right coronary artery from the left sinus of Valsalva
 - (2) Anomalous left coronary artery from the right sinus of Valsalva
 - (3) Anomalous left coronary artery from the pulmonary artery
- ix) Systemic venous variants
 - (1) Left SVC
 - (2) Interrupted IVC with azygos continuation
- x) Late or adult presentations of CHD
 - (1) Bicuspid aortic valve, aortic valve stenosis and aortic root dilatation
- b) Cardiac masses
 - i) Rhabdomyoma, fibroma

- ii) Thrombus
- c) Trauma
 - i) Hemopericardium
- d) Syndromes with congenital heart disease or vascular disease
 - i) Marfan syndrome
 - ii) Loeys-Dietz syndrome
 - iii) Ehlers-Danlos syndrome
 - iv) Williams syndrome
 - v) Alagille syndrome
 - vi) Neurofibromatosis 1
 - vii) Down syndrome
 - viii) Holt Oram syndrome
 - ix) Turner syndrome
 - x) PHACE syndrome
- e) Acquired cardiac disease
 - i) Infectious/inflammatory
 - (1) Pericarditis
 - (2) Myocarditis
 - (3) Kawasaki disease
 - ii) Cardiomyopathies
 - (1) Hypertrophic
 - (2) Dilated
 - (3) Restrictive
 - (4) ARVD
- f) Cardiac operations
 - i) Postoperative cross-sectional imaging assessment of the following procedures:
 - (1) Atrial switch for transposition of great arteries (Senning and Mustard procedures)
 - (2) Arterial switch for transposition of great arteries (Jatene arterial switch and Lecompte maneuver)
 - (3) Single ventricle repair: Norwood 1 and Dames-Kaye Stansel anastomosis
 - (4) Superior cavopulmonary connection, including the bidirectional Glenn procedure
 - (5) Total cavopulmonary connection: Fontan procedure
 - (6) Pulmonary blood flow augmentation as initial palliation for CHD, including Blalock-Taussig, Waterston, and Pott's shunts

5) Cardiovascular: Vascular

- a) Congenital
 - i) Vascular malformations

b) Variants: Caval anomalies (e.g., left SVC, absent hepatic IVC)

c) Trauma

- i) Acute traumatic aortic injury
- ii) Arterial contrast extravasation
- iii) Pseudoaneurysm
- iv) AVfistulae
- v) Hypoperfusion complex

d) Inflammatory/infectious

- i) Aortitis
- ii) Vasculitides
 - (1) Takayasu disease, Kawasaki disease

e) Syndromic/systemic vascular diseases

i) Syndromes

- (1) Ehlers-Danlos
- (2) Marfan
- (3) NF—and other causes of mid-aortic syndrome
- (4) Williams

f) Idiopathic

- i) Fibromuscular dysplasia
- ii) Mid-aortic syndrome

g) Thrombotic

- i) Deep venous thrombosis
- ii) Catheter-related thrombosis and evaluation

6) Gastrointestinal tract a) System biliary system

- i) Congenital
- ii) Biliary atresia
- iii) Neonatal hepatitis
- iv) Choledochal cyst (classification)
- v) Acquired miscellaneous
 - (1) Cholelithiasis
 - (2) Hydrops of gallbladder
 - (3) Cholangitis
- vi) Cholecystitis

b) Liver

- i) Infection
 - (1) Abscess
 - (2) Hepatitis
- ii) Tumors and tumor-like conditions
 - (1) Benign
 - (a) Mesenchymal hamartoma
 - (b) Hemangioendothelioma

- (2) Malignant
 - (a) Hepatoblastoma
 - (b) Hepatoma
 - (c) Metastases
- iii) Trauma
 - (1) Lacerations
 - (2) Subcapsular hematoma
 - (3) Contusion
- iv) Vascular
 - (1) Portal vein thrombosis (a) Cavernous transformation
 - (2) Portal hypertension
 - (3) Budd Chiari
- v) Transplant complications
- vi) Other: systemic conditions involving liver
 - (1) Glycogen storage disease
 - (2) Beckwith Wiedemann
- c) Spleen
 - i) Congenital
 - (1) Abnormal viscerotrial situs
 - (2) Wandering spleen
 - ii) Neoplasms
 - (1) Infection
 - (a) Fungal abscesses
 - (2) Benign
 - (a) Lymphangioma
 - (3) Malignant
 - (a) Lymphoma/leukemia
 - (4) Trauma
 - (a) Laceration
 - (b) Contusion
 - (c) Subcapsular hematoma
 - (5) Splenic infarction (a) Sickle cell disease
 - (6) Etiologies for splenomegaly
- d) Pancreas
 - i) Congenital
 - (1) Pancreas divisum
 - (2) Cystic fibrosis
 - ii) Pancreatitis (and pseudocyst)
 - (1) Trauma
 - (a) Non-accidental trauma
 - (2) Choledochal cyst
 - (3) Familial pancreatitis

- (4) Iatrogenic
- iii) Fatty replacement (1) CF
- e) Aerodigestive track
 - i) Pharynx and esophagus
 - (1) Congenital and developmental anomalies
 - (a) Esophageal atresia and TE fistula (classification)
 - (2) Inflammatory lesions
 - (a) Retropharyngeal abscess/cellulitis
 - (b) Infectious esophagitis
 - (3) Trauma
 - (a) Foreign bodies
 - (b) Iatrogenic perforation
 - (4) Esophageal stricture (etiologies)
 - (5) GEReflux
 - ii) Stomach
 - (1) Congenital
 - (a) Duplications
 - (b) Antral webs
 - (c) Volvulus
 - (2) Gastric outlet obstruction (a) Acquired
 - (i) Hypertrophic pyloric stenosis
 - (ii) Inflammatory
 - (iii) Corrosive ingestion
 - (iv) Chronic granulomatous disease
 - (3) Inflammatory
 - (a) Eosinophilic enteritis
 - (b) Peptic diseases
 - (c) Chronic granulomatous disease
 - (4) Miscellaneous
 - (a) Bezoars
 - (b) Foreign bodies
 - (c) Spontaneous rupture of stomach
 - iii) Small Bowel
 - (1) Congenital
 - (a) Duodenal webs, stenosis, and other obstructions
 - (b) Malrotation with/without midgut volvulus
 - (c) Duodenal, jejunal, and ileal stenosis and/or atresia
 - (d) Post-inflammatory/infectious or iatrogenic strictures
 - (e) Meconium ileus
 - (f) Meconium peritonitis
 - (g) Mesenteric and omental cysts
 - (h) Duplication cysts

- (i) Meckel diverticula (including other omphalomesenteric anomalies)
 - (j) Abdominal wall defects
- (i) Omphalocele, gastroschisis
- (ii) Hernias
- (2) Neoplasms
 - (a) Benign
 - (i) Polyps, leiomyomas
 - (b) Malignant (i) Lymphoma
- (3) Malabsorption (a) CF
- (4) Trauma
 - (a) Blunt abdominal trauma
 - (b) Transplant
- (5) Miscellaneous
 - (a) Necrotizing enterocolitis
 - (b) Ischemic bowel
 - (c) Intussusception
 - (d) Henoch-Scholein purpura
 - (e) Graft vs host disease
- (6) Cause of small bowel obstruction
- iv) Colon
 - (1) Congenital
 - (a) Imperforate anus /anorectal malformation
 - (b) Duplications
 - (c) Colonic atresia
 - (d) Hirschsprung disease
 - (e) Meconium plug/neonatal small left colon syndrome
 - (2) Infectious/inflammatory
 - (a) Appendicitis
 - (b) Infectious colitis/typhlitis
 - (3) Neoplasms
 - (a) Benign: polyps, leiomyoma
 - (b) Malignant (i) Lymphoma
 - (4) Trauma
- v) Other
 - (1) Mesenteric adenitis

7) Genitourinary system

- a) Growth and development/normal variants: kidney (echogenic pyramids, lobulation)
- b) Kidneys
 - i) Congenital anomalies
 - (1) UPJ
 - (2) Duplication

- (3) Multicystic dysplasia
- (4) Agenesis
- (5) Hypoplastic kidney
- (6) Horseshoe kidney
- (7) Ectopia
 - (a) Ptosis
 - (b) Pelvic
 - (c) Crossed ectopia
- (8) Relationship of congenital renal anomalies with other congenital anomalies (VATER association, spinal dysraphism, etc.)

ii) Cystic renal disease

- (1) Autosomal recessive
- (2) Autosomal dominant
- (3) Cysts associated with syndromes
- (4) Associated liver disease (fibrosis)

iii) Inflammatory

- (1) Acute pyelonephritis
- (2) Abscess
- (3) Reflux nephropathy

iv) Neoplasms

- (1) Wilms tumor and variants
- (2) Nephrogenic rests
- (3) Mesoblastic nephroma
- (4) Multilocular cystic nephroma
- (5) Leukemia/lymphoma

v) Trauma

- (1) Subcapsular hematoma
- (2) Laceration (including those communicating with collecting system)
- (3) Contusion
- (4) Avulsion of vascular pedicle

UPJ avulsion or laceration

vi) Vascular

- (1) Arterial stenosis
- (2) Renal vein thrombosis
- (3) Tumor thrombus

vii) Involvement by systemic disorders

- (1) Tuberous sclerosis
- (2) Von Hippel Lindau

viii) Miscellaneous

- (1) Urolithiasis/nephrocalcinosis

- (2) Renal transplantation
- c) Adrenal gland
 - i) Neoplasms
 - (1) Neuroblastoma
 - (2) Adrenocortical carcinoma
 - ii) Congenital adrenal hyperplasia
 - iii) Trauma
 - (1) Hemorrhage (neonatal) and adrenal calcification
- d) Bladder, Ureters, and Urethra
 - i) Congenital
 - (1) Posterior urethral valves
 - (2) Ureterovesical junction obstruction
 - (3) Primary megaureter
 - (4) Bladder diverticula
 - (5) Ureteral duplication
 - (6) Ureterocele
 - (7) Urachal abnormalities
 - (8) Hypospadias
 - (9) Epispadias/exstrophy
 - (10) Prune belly syndrome
 - (11) Urologic sequela of anorectal anomalies
 - ii) Infectious/inflammatory
 - (1) Urinary tract infection
 - (2) Viral cystitis
 - (3) Hemorrhagic cystitis
 - iii) Trauma
 - (1) Extravasation
 - iv) Neoplasms
 - (1) Rhabdomyosarcoma
 - v) Miscellaneous
 - (1) Vesicoureteral reflux
 - (2) Neurogenic bladder
 - (3) Dysfunctional voiding
- e) Male Genital Tract: scrotal
 - i) Testicular torsion
 - ii) Infectious/inflammatory (1) Epididymitis/orchitis
 - iii) Differential for scrotal fluid collections
 - iv) Hernia
 - v) Undescended testis
 - vi) Microlithiasis
 - vii) Neoplasms
 - (1) Germ cell tumors

- (2) Stroma cell tumors
- (3) Metastases
- (4) Leukemia f) Female genital tracts
- i) Congenital
 - (1) Cloacal anomalies
- ii) Ovaries
 - (1) Torsion
 - (2) Ovarian cysts (including neonatal physiologic)
 - (3) Germ cell tumors
 - (4) Cystic neoplasms
 - (5) Polycystic ovarian disease
- iii) Uterus and vagina
 - (1) Congenital anomalies: vaginal occlusion (hydrometrocolpos, etc.)
 - (2) Fusion anomalies of the müllerian duct (uterus didelphys, etc.)
 - (3) Masses
 - Rhabdomyosarcoma
 - Clear cell adenocarcinoma
- iv) Intersex states
 - (1) Differential diagnosis
 - (2) Work-up
- v) Other
 - (1) Prune belly syndrome

8) Musculoskeletal imaging

- a) Normal growth and development/variants
- b) Congenital
 - i) Bone dysplasias osteochondrodysplasias affecting growth of tubular bones and spine (identifiable at birth)
 - (1) Thanatophoric dysplasia
 - (2) Chondrodysplasia punctata
 - (3) Achondroplasia
 - (4) Asphyxiating thoracic dystrophy
 - ii) Osteochondrodysplasias affecting growth of tubular bones and spine (identifiable in later life)
 - (1) Metaphyseal chondrodysplasia
 - (2) Multiple epiphyseal dysplasia
 - iii) Osteochondrodysplasias with disorganized development of cartilage and fibrous components of the skeleton
 - (1) Multiple cartilaginous exostoses
 - (2) Enchondromatosis
 - (3) Polyostotic fibrous dysplasia
 - (4) Neurofibromatosis

- iv) Abnormalities of density of cortical diaphyseal structure and metaphyseal modeling
 - (1) Osteogenesis imperfecta
 - (2) Osteopetrosis
 - (3) Pycnodysostosis
 - (4) Diaphyseal dysplasia
 - (5) Metaphyseal dysplasia
- v) Limb reduction anomalies (including proximal focal femoral deficiency and radial ray anomalies)
- vi) Amniotic band syndrome
- vii) Congenital bowing deformities and pseudoarthroses
- viii) Congenital foot deformities
 - (1) Tarsal coalition
 - (2) Pes planus
 - (3) Talipes equinovarus
 - (4) Pescavus
 - (5) Metatarsus adductus
- ix) Skeletal abnormalities associated with syndromes (1) Trisomy 21, Marfan, neurofibromatosis
- x) Skeletal abnormalities associated with metabolic disorders
 - (1) Mucopolysaccharidoses and mucopolipidoses
- xi) Developmental dysplasia of hip
- xii) Skeletal abnormalities associated with neuromuscular diseases
 - (1) Meningomyelocele
 - (2) Cerebral palsy
 - (3) Muscular dystrophy
- c) Infectious inflammatory
 - i) Pyogenic osteomyelitis
 - ii) Septic arthritis
 - iii) Toxic synovitis of the hip
 - iv) Tuberculosis
 - v) Caffey disease
 - vi) Multifocal osteomyelitis
 - vii) Dermatomyositis/polymyositis and other inflammatory myopathies
 - viii) Arthropathies
 - (1) Juvenile rheumatoid arthritis (juvenile idiopathic arthritis)
- d) Hemophilic arthropathy
- e) Neoplasm

i) Benign

- (1) Osteochondroma
- (2) Unicameral bone cyst
- (3) Aneurysmal bone cyst
- (4) Nonossifying fibroma/fibrous cortical defect
- (5) Fibrous dysplasia
- (6) Langerhans cell histiocytosis
- (7) Osteoid osteoma
- (8) Osteoblastoma
- (9) Chondroblastoma
- (10) Chondromyxoid fibroma

ii) Malignant

- (a) Ewing sarcoma
- (b) Osteogenic sarcoma
- (c) Metastases (including leukemia/lymphoma)

iii) Vascular

- (1) Vascular malformations

iv) Trauma

(1) Fractures

- (a) Accidental trauma (including Salter-Harris, greenstick-bowing, and buckle fractures)
- (b) Non-accidental trauma (battered child syndrome)

v) Growth arrest/bone bar and non union

vi) Toddler's fracture

vii) Slipped capital femoral epiphysis

f) Endocrine/Metabolic

- i) Rickets
- ii) Renal osteodystrophy
- iii) Hyperparathyroidism
- iv) Hypoparathyroidism
- v) Hypophosphatasia
- vi) Scurvy
- vii) Bone age determination

g) Osteochondroses

- i) Legg-Perthes disease
- ii) Kohler disease
- iii) Freiberg disease
- iv) Osteochondritis dissecans
- v) Blount disease and physiologic bowing

9) Select general/multiorgan system syndromes with salient imaging findings

- a) Neurocutaneous syndrome
- b) Sturge Weber
- c) Trisomy 21
- d) CHARGE
- e) Marfan
- f) Beckwith Wiedemann
- g) Turner's
- h) Ehlers-Danlos
- i) DiGeorge
- j) Klippel-Trenaunay-Weber

10) Multisystemic disorders/processes

- a) SLE, other systemic vasculitides
- b) JIA
- c) Wegener disease
- d) Primary immune deficiencies (SCIDS, chronic granulomatous disease, DiGeorge)
- e) Sickle cell anemia
- f) Child abuse
- g) Immunocompromised host (transplant immune suppression, antibiotics, steroids, chemotherapy)
Includes post-transplant lymphoproliferative syndrome
- h) VATER/VACTERYL
- i) Retained surgical material
- j) VP shunt complications

11) Interventional

- a) Abscess drainage/aspiration
- b) Solid organ soft tissue mass biopsy
Thyroid, liver, kidney, bone, lymph node, nodule
- c) Thoracentesis/thoracostomy tube placement
- d) Paracentesis
- e) Hip aspirations
- f) Arthrography (diagnostic, therapeutic)

Fetal Imaging Curriculum based off the ABR Core Exam

i) First trimester

- (1) Normal findings of intrauterine gestational sac
 - (a) Size
 - (b) Gestational sac growth
 - (c) Yolk sac
 - (d) Embryo
 - (e) Cardiac activity, including normal embryonic heart rate
 - (f) Amnion
 - (g) Chorion
 - (h) Chorionic villus sampling (CVS)/Amniocentesis
 - (i) Normal early fetal anatomy/growth
 - (j) Crown-rump length measurement
 - (k) Correlation with β -hCG levels and menstrual dates
- (2) Multiple gestations (chorionicity and amnionicity)
- (3) Failed early pregnancy
 - (a) Spontaneous complete/incomplete abortion
 - (b) Anembryonic gestation
 - (c) Embryonic demise
 - (d) Subchorionic hematoma
- (4) Ectopic pregnancy, including unusual ectopic pregnancy
 - (a) Interstitial
 - (b) Cervical
 - (c) Ovarian
 - (d) Scar (Caesarian delivery)
 - (e) Abdominal
 - (f) Rudimentary horn
- (5) Gestational trophoblastic disease
- (6) Nuchal translucency
- (7) Embryonic structural abnormalities, anencephaly

ii) Second and third trimester

- (1) Normal findings
 - (a) Normal fetal anatomy/situs/development
 - (b) Placenta
 - (c) Biometry
 - (d) Amniotic fluid volume
- (2) Multiple gestations
- (3) Common congenital anomalies
- (4) Recognition of fetal abnormalities that require high-risk obstetrics referral
 - (a) Intrauterine growth retardation
 - (b) Hydrops
 - (c) Holoprosencephaly
 - (d) Hydrocephalus
 - (e) Neural tube defects
 - (f) Multicystic dysplastic kidney
 - (g) Hydronephrosis
 - (h) Anencephaly

- (i) Chromosomal abnormalities and syndromes
 - (i) Down syndrome
 - (ii) Turner syndrome
 - (j) Hydrops
- (k) Congenital infections
- (l) Chest masses
- (m) Cardiac malformations and arrhythmias
- (n) Diaphragmatic hernia
- (o) Abdominal wall defects
- (p) Abdominal masses
- (q) Gastrointestinal tract obstruction/abnormalities
- (r) Ascites
- (s) Skeletal dysplasias
- (t) Cleft lip/palate
- (u) Complications of twin pregnancy
- (v) Hydranencephaly
- (5) Borderline findings
 - (a) Nuchal thickening
 - (b) Choroid plexus cyst
 - (c) Echogenic cardiac focus
 - (d) Echogenic bowel
 - (e) Borderline hydrocephalus
- (6) Oligohydramnios
 - (a) Spontaneous premature rupture of membranes
 - (b) Renal disease
 - (c) Fetal death
 - (d) Intrauterine growth retardation
 - (e) Infection
- (7) Polyhydramnios
- (8) Placenta
 - (a) Placenta previa
 - (b) Vasa previa
 - (c) Abruption
 - (d) Percreta-, increta- and accreta
 - (e) Placental masses
 - (f) Succenturiate placenta
- (9) Cervical appearance and length, cervical incompetence
- (10) Umbilical cord
 - (a) Two-vessel umbilical cord
 - (b) Cord masses
 - (c) Placental cord insertion site
 - (d) Velamentous cord insertion
 - (e) Cord prolapse
 - (f) Umbilical cord Doppler
 - (g) Fetal cranial Doppler
 - (h) Biophysical profile

- (i) Guidance for amniocentesis
- (j) Retained products of conception

ADVENTHEALTH ORLANDO DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAM

CONFIRMATION OF RECEIPT OF
PEDIATRIC GOALS AND OBJECTIVES

2018-2019

By signing this document, you are confirming that you have received and reviewed, with your preceptor, the pediatric imaging goals and objectives for this academic year.

This receipt will be kept in your personal file.

Resident Name (please print) _____

Resident Signature _____
by signing this – you confirm that you have reviewed the G&O with your preceptor

Date _____

Preceptor Signature _____
by signing this – you confirm that you have reviewed the G&O with the resident

Date _____

AdventHealth Orlando Diagnostic Radiology Residency

Ultrasound Goals and Objectives

Training Location: Orlando

Many of the goals and objectives apply to all rotations and are listed below. Those goals that are more specific to a particular rotation are listed separately.

Ultrasound Imaging Curriculum

The educational curriculum in Ultrasound Imaging is comprised primarily of the rotations through the Ultrasound Imaging Section at AdventHealth Orlando where the Faculty provide direct training and supervision; as well as, a comprehensive series of lectures and conferences in Ultrasound Imaging. Correlation is made on a case-by-case basis with other imaging modalities, facilitated by the PACs system. A series of interdepartmental conferences, grand rounds, Journal Clubs, meetings and other venues are expected to enhance the residents' knowledge of Ultrasound Imaging. Because a full outline of disease entities and conditions is provided under each organ system elsewhere in the Radiology Residency Curriculum, a summarized curriculum for the Ultrasound Imaging Section follows:

- The resident should understand the importance of clinical ultrasound protocols. Published protocols/standards from the American College of Radiology (ACR) or the American Institute of Ultrasound in Medicine (AIUM) with or without local modification are acceptable frames of reference. Residents should also be familiar with ACR appropriateness criteria as a guide for appropriate clinical use of ultrasound and other imaging modalities.
- The resident should gain a general understanding of both the clinical uses and limitations of ultrasound as well as the appropriate integration of other complementary cross-sectional imaging studies, particularly CT and MRI.
- The resident should understand the importance of documentation and reporting skills/requirements, including the electronic applications in their institution.
- The resident should understand the importance of clinical quality assurance, including radiologic-pathologic correlation, as well as sonographer-physician discrepancies.
- Call backs should only be made after reviewing and approval by the attending physician

Shadowing an Ultrasound Technician

1st year residents will spend their third week in ultrasound with an ultrasound technician. The resident will be required to fill out the Ultrasound Experience Form (found at the end of the Goals and Objectives) and turn into the Program Coordinator for the residents' file.

2nd-4th year residents may spend at least half a day each week when on rotation with an Ultrasound Technician. This can be scheduled ahead of time or when the reading list allows it. The purpose is to ensure the residents gain more scanning experience.

At the conclusion of the 3rd year, Dr. Gonzalez will schedule with each of the residents and grade them on their knowledge of scanning. The residents will be given the Ultrasound Competency List ahead of time to prepare. The results of this competency list will be given to the Program Coordinator for the residents' file.

Training using the ACGME Six-Core Competencies:

Year 1: Ultrasound Imaging

1) Patient Care: Residents should be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.

- Gather essential and accurate clinical and radiologic information about patients relevant to the interpretation of the ultrasound examination
- Communicate effectively and demonstrate caring, respectful behavior when interacting with patients and their families, answering their questions and helping them to understand the ultrasound procedure as well as its clinical significance
- Use information technology to support patient care decisions

Milestones include:

- Using established evidence based guidelines such as ACR appropriateness criteria
- Appropriately use the electronic health record to obtain relevant clinical information
- Competently perform basic ultrasound studies under indirect supervision
- Recognize and manage complications of basic procedures

2) Medical Knowledge: By the end of each level of training, the resident should be able to do hands-on scanning of:

- Gallbladder (gallstones/acute cholecystitis)
- Liver (masses)
- Kidney (hydronephrosis, stones)
- Transabdominal/transvaginal pelvis (mass/cyst/free fluid)
- Lower extremity (deep vein thrombosis)
- Abdominal aorta (aneurysm)
- Pleural effusion and ascites
- Pregnancy (normal early intrauterine pregnancy)

The resident should understand the basic principles of physics that form the foundation of clinical ultrasound.

- Define ultrasound, including the relationship of sound waves used in imaging
- Straight narrow sound beams, simple reflection, constant sound speed
- Beam shape: linear, sector, curved array
- Probes: transabdominal, endocavitary
- Endocavitary imaging: transvaginal, transrectal, endoscopic, laparoscopic
- Display: Gray scale, M-mode, pulsed wave Doppler, color and power Doppler
- Image orientation: standard images in different planes
- Image optimization: power output, gain, time gain compensation
- Image recording options: electronic (digital), film, paper
- Acoustic properties of fluid, cyst, calcification, complex fluid and solid structures
- Tissue characteristics: acoustic shadowing and enhancement
- Focal zone

The resident should understand the importance of clinical quality assurance, including radiologic-pathologic correlation, as well as sonographer-physician discrepancies

Abdominal

- Liver: normal echotexture, size, and shape (including anatomic variants), diffuse disease, (fatty infiltration, acute and chronic hepatitis, cirrhosis, edema), focal masses, metastases, granuloma
- Gallbladder: normal appearance, wall thickening, gallstones, including supine, decubitus and erect positions, sludge, acute cholecystitis (calculous/acalculous), sonographic Murphy's sign, other etiologies of wall thickening, polyp
- Bile ducts: normal intra- and extrahepatic bile duct diameters and dilatation
- Pancreas: normal anatomy, pancreatic duct, mass
- Spleen: normal echotexture, size and shape (including anatomic variants), focal masses (cystic versus solid), lymphoma, abscess, infarction, granuloma
- Peritoneal cavity: ascites, fluid localization/quantification (free/loculated)
- Pleural effusion

Kidneys, Urinary Bladder and Prostate

- Normal renal cortical echotexture, size and shape, glomerulointerstitial renal disease, simple renal cyst
- Ureters: hydronephrosis, pyonephrosis
- Urinary bladder: calculi, wall thickening, ureteral jets, bladder volume, including post-void residual

Gynecology/Obstetrics

- Uterus: normal size, shape, position, echogenicity, fibroid identification
- Endometrium: normal appearance during phases of menstrual cycle and thickness measurement (pre-menopausal, post-menopausal, effects of hormone replacement), intrauterine device, fluid

Ovary: normal size, shape, echogenicity, physiologic variation during phases of menstrual cycle (follicles, corpus luteum, hemorrhagic ovarian cyst)

- Free pelvic fluid

First Trimester

- Normal findings: gestational sac appearance, size, gestational sac growth, yolk sac, embryo, cardiac activity including normal embryonic heart rate, amnion, chorion, normal early fetal anatomy/growth, crown-rump length measurement, correlation with BHCG levels and menstrual dates

Second and Third Trimester

- Normal findings: normal fetal anatomy/situs/development, placenta, biometry, amniotic fluid volume, multiple gestations
- Anencephaly
- Oligohydramnios (spontaneous premature rupture of membranes, renal disease, fetal death, intrauterine growth retardation, infection)
- Polyhydramnios, placenta previa
- Cervical appearance and length

Thyroid/Neck

- Normal thyroid echotexture, size and shape
- Thyroid disease: diffuse and focal disease
- Multinodular thyroid

Vascular/Doppler

- Abdominal aorta: normal appearance and measurement, aneurysm
- Inferior vena cava: normal appearance, thrombosis
- Lower extremity deep vein thrombosis
- Hematoma
- Iatrogenic pseudoaneurysm

Scrotum

- Testes: normal echotexture, shape and size
- Epididymes
- Testicular Mass
- Hydrocele

Medical Training:

- Setup & Positioning of patients
- Actively use software/machine to perform scanning
- Perform Prescan interview to ensure safe scanning and adhere to protocol

Expected Reading List:

- Fundamentals of Diagnostic Radiology, By Brandt and Helms – Ultrasound Chapters
- Obstetrics and Gynecologic Ultrasound – Case Review Series
- Ultrasound – A Pattern Approach
- The Requisites – Ultrasound

Milestones include:

- Selecting appropriate protocol and ultrasound probe for basic ultrasound procedures
- Makes core observations
- Formulate differential diagnoses
- Recognize critical findings
- Differentiate normal from abnormal

3) Practice-Based Learning and Improvement: Residents must demonstrate skills to:

- Shows evidence of independent study using textbooks from expected reading list.
- Demonstrates appropriate follow up of interesting cases.
- Prepares teaching file of interesting cases.

Milestones include:

- Use information technology to manage information, to access on-line medical information, and for self learning
- Documents training in critical thinking skills and research design

4) Interpersonal and Communication Skills: Residents must demonstrate skills to:

- Dictate prompt, accurate and concise radiologic reports for basic ultrasound studies using available electronic software applications
- Develop effective communication skills with patients, patients' families, physicians and other members of the health care team
- Promptly communicate urgent, critical or unexpected ultrasound findings to residents, referring physicians or clinicians and document the communication in the radiological report

Milestones include:

- Communicating information about imaging and examination results in routine, uncomplicated cases
- Obtains informed consent
- Adhere to transfer of care policies
- Generates accurate reports with appropriate elements for coding
- Communicates urgent and unexpected findings according to RSF policy

5) Professionalism: Resident should:

- Demonstrate honor, integrity, respect and compassion to patients, other physicians and other health care professionals
- Demonstrate positive work habits, including punctuality and professional appearance

Milestones include:

- Recognizing the importance and priority of patient care and advocates for patient interests
- Fulfills work related responsibilities
- Recognizes personal limitations and seeks help when appropriate
- Responds appropriately to constructive criticism
- Maintains patient confidentiality

- Attends required meetings

6) Systems-Based Practice: Residents must demonstrate skills to:

- Understand how medical decisions affect patient care within the larger system
- Shows ability to interact with clinicians regarding cost effective and streamlined patient evaluation for differing clinical entities.
- Able and willing to participate in clinical conferences in which imaging studies used to guide patient care/evaluation.

Milestones include:

- Describes departmental QI initiatives
- Describes the departmental QA system

Year 2: Ultrasound Imaging

1) Patient Care: At the end of the rotation, the resident should be able to:

- Screen and supervise more complex ultrasound studies
- Understand the importance of the physician/patient interaction during an ultrasound examination

Milestones include:

- Recommends appropriate imaging of common conditions independently
- Competently performs intermediate procedures (HSG, thyroid biopsy, etc)
- Recognizes and manages complications of intermediate procedures

2) Medical Knowledge: At the end of the rotation, the resident should do hands-on scanning of:

- Pancreas (pancreatitis, mass)
- Biliary (common bile duct, biliary ductal dilatation)
- Abdominal mass/adenopathy
- Kidney (mass/cyst)
- Basic Doppler (portal vein, pseudoaneurysm, arteriovenous fistula)
- Pregnancy (first trimester, failed pregnancy, ectopic pregnancy)
- Adnexal mass (ovarian and non-ovarian)
- Testis (pain and masses)
- Basics obstetrics (basic fetal biometry, basic second/third trimester fetal anatomy, placental localization, amniotic fluid volume)
- Neonatal brain

The resident should understand the basic principles of physics that form the foundation of clinical ultrasound.

- Transducer choice: curvilinear, linear, sector, vector
- Frequency, sound speed, wavelength, intensity, decibels, beam width, Fresnel zone, Fraunhofer zone
- Interaction of sound waves with tissues: reflection, attenuation, scattering, refraction, absorption, acoustic impedance pulse-echo principles
- Generation/detection of ultrasound waves
- Doppler phenomenon, Doppler formula
- Beam formation/focusing
- Gray scale, M-mode, pulsed wave Doppler, color Doppler imaging, power Doppler imaging

Abdominal

- Liver: hematoma, biloma, abscess
- Post-liver transplantation collections: hematoma, biloma, abscess (see vascular section)
- Gallbladder: hyperplastic cholecystoses, carcinoma
- Bile ducts: bile duct stones, inflammatory disease, cholangitis, pneumobilia
- Pancreas: neoplasm, cysts

Kidneys, Urinary Bladder, and Prostate

- Abscess/pyelonephritis, perinephric fluid
- Post-renal transplant collections: hematoma, urinoma, abscess, lymphocele (see vascular section)
- Complex renal cyst, adult polycystic disease and acquired renal cystic disease, renal cell carcinoma, angiomyolipoma
- Urinary bladder: mass, infection, hemorrhage, wall thickening, bladder outlet obstruction, diverticula, ureterocele
- Transabdominal prostate
- Ureters: hydroureter

Gynecology/Obstetrics

- Uterus: congenital anomalies, endometrial polyp, endometrial hyperplasia, endometrial carcinoma, endometritis, pyometrium, fibroid localization (submucous, intramural, subserosal), adenomyosis
 - Ovarian cyst: hemorrhagic/ruptured cyst, endometrioma, polycystic ovarian disease, ovarian hyperstimulation syndrome
 - Ovarian neoplasm: cystic/solid adnexal masses, cystadenoma/carcinoma, dermoid, fibroma, germ cell tumor, Doppler evaluation
 - Ovarian torsion
 - Pelvic inflammatory disease, tubo-ovarian abscess
 - Cervix: mass, stenosis, endometrial obstruction
 - Fallopian tube: hydrosalpinx, pyosalpinx
 - Post-hysterectomy

First Trimester

- Multiple gestations (chorionicity and amnionicity), failed early pregnancy, spontaneous complete/incomplete abortion, ectopic pregnancy, blighted ovum, embryonic death, subchorionic hematoma, gestational trophoblastic disease, gross embryonic structural abnormalities, anencephaly

Second and Third Trimester

- Recognition of fetal abnormalities that require high risk obstetrics referral, including intrauterine growth retardation, hydrops, holoprosencephaly, hydrocephalus, neural tube defects, multicystic dysplastic kidney, hydronephrosis
- Placental abruption, placental masses, two-vessel umbilical cord, cord masses, retained products of conception

Thyroid/Neck

- Thyroid nodule characterization: echotexture, calcifications including microcalcifications, margins, recommendations for fine needle aspiration biopsy
- Hashimoto's thyroiditis/Graves' disease

Vascular/Doppler

- Peripheral vascular aneurysm, including iliac and popliteal arteries
- Hepatic vasculature: pulsed Doppler and color Doppler imaging of the portal veins, splenic vein, hepatic arteries and hepatic veins, including normal direction of flow
- Hemodynamics of cirrhosis, portal hypertension and varices, portal vein thrombosis
- Upper extremity venous thrombosis: subclavian and internal jugular vein thrombosis, axillary and brachial vein thrombosis
- Carotid artery: normal, atherosclerotic plaque, carotid artery stenosis and occlusion
- Renal vein thrombosis
- Iatrogenic arteriovenous fistula
- Pre-graft vein mapping

Scrotum

- Epididymitis, orchitis
- Testicular torsion
- Testicular mass characterization: microlithiasis, germ cell tumor, lymphoma, metastasis
- Cystic ectasia of rete testis
- Extratesticular masses/cysts, spermatocele, adenomatoid tumor, epididymal head cyst
- Varicocele
- Trauma

Medical Training:

- Setup & Positioning of patients
- Actively use software/machine to perform scanning
- Perform Prescan interview to ensure safe scanning and adhere to protocol

Expected Reading List:

- Diagnostic Ultrasound – 2 volume set
- Gynecologic Imaging
- Genitourinary Imaging – Cases
- Genitourinary Imaging – The Requisites

Milestones include:

- Selects appropriate protocols and appropriate probe for intermediate imaging
- Makes secondary observations
- Narrows differential diagnosis
- Describes management options

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Demonstrate knowledge of principles of research methods, statistical methods, study design and their implementation
- Demonstrate critical assessment of the scientific literature
- Demonstrate knowledge and application of the principles of evidence-based medicine in practice

Milestones include:

- Works with faculty mentors to identify potential scholarly projects
- Participate in Journal Club and Lectures

4) Interpersonal and Communication Skills: Residents must demonstrate skills to:

- Interact with residents and attending physicians in consultation when clinical-radiologic correlation is necessary
- Dictate accurate and concise radiologic reports for more complex ultrasound studies with concise impression including diagnosis and/or differential diagnoses

Milestones include:

- Communicates under direct supervision in challenging circumstances
- Communicates under direct supervision difficult information such as errors, complications, adverse events, and bad news
- Efficiently generates clear and concise reports that do not require substantive faculty member correction on routine cases
- Communicates findings and recommendations clearly and concisely

5) Professionalism: At the end of the rotation, the resident should be able to:

- Demonstrate a commitment to the ethical principles pertaining to confidentiality of patient information
- Demonstrate responsiveness to the needs of patients that supercedes self-interest (altruism)

Milestones include:

- Becomes an effective health care team member
- Continues to demonstrates professional behaviors described under year 1

6) Systems-Based Practice: At the end of the rotation, the resident should be able to:

- Know how types of ultrasound practice and delivery systems differ from one another
- Effectively prioritize patients requiring ultrasound studies

Milestones include:

- Incorporating QI into clinical practice
- Participates in the QA department process
- States relative cost of common procedures

Year 3 and 4: Ultrasound Imaging

1) Patient Care: At the end of the rotation, the resident should be able to:

- Screen and supervise, with increasing level of responsibility, most ultrasound studies Understand the bioeffects and safety issues in diagnostic ultrasound
- Provide emergent provisional interpretation as needed.
- Be able to direct the choice of imaging modality and protocol emergent studies.
- Understand when referral or other imaging modalities is necessary.

- Become a more autonomous consultant and teacher.

Milestones include:

- Recommends appropriate imaging of uncommon conditions independently
- Integrates current research and literature with guidelines, taking into consideration cost effectiveness and risk benefit analysis, to recommend imaging
- Competently performs advanced procedures
- Recognizes and manages complications of advanced procedures
- Independently performs ultrasound guided body procedures

2) Medical Knowledge: At the end of the rotation, the resident should be able to do hands-on scanning of:

- Advanced obstetrics (comprehensive second/third trimester)
- Pediatrics (abdomen, spine, hips)
- Ultrasound-guided interventional procedures
- Parathyroid
- Carotid artery
- Advanced abdominal Doppler (visceral organs, organ transplants)
- Peripheral vessels (arterial bypass grafts, upper extremity veins)

The resident should understand the basic principles of physics that form the foundation of clinical ultrasound.

- Beamwidth, sidelobe, slice thickness artifacts
- Multiple reflection artifacts - mirror image/reverberation
- Refractive artifacts
- Doppler artifacts- pulse wave, color imaging, including aliasing
- Gray scale versus Doppler (trade-off of penetration and resolution)
- 3-D volumetric imaging
- Thermal/non-thermal effects on tissue: biological health risks
- Image optimization
- Harmonic imaging
- Ultrasound contrast agents
- Equipment quality assurance: phantoms, spatial/contrast

Abdominal

- Liver: trauma
- Bile ducts: neoplasm (cholangiocarcinoma)
- Spleen: trauma
- Chest: pericardial effusion, mass, atelectasis/pneumonia
- Organ transplants: see vascular section
- Gastrointestinal tract: normal gut ultrasound signature, acute appendicitis, diverticulitis, Crohn's disease
- Peritoneal cavity: free air
- Abdominal wall hernia, inguinal hernia

Kidneys, Urinary Bladder, and Prostate

- Kidneys: xanthogranulomatous pyelonephritis, emphysematous pyelonephritis, congenital anomalies, pelvic kidney (see pediatrics section), medullary nephrocalcinosis

- Adrenal glands: mass
- Retroperitoneum: adenopathy, mass
- Ureters: ureteral stone
- Urinary bladder: ectopic ureterocele
- Renal artery stenosis, renal vein thrombosis (see vascular section section)
- Transrectal prostate

Gynecology/Obstetrics

- Peritoneal inclusion cyst
- Ovarian
- Cancer staging
- Saline
- Hysterosonography

First Trimester

- Unusual ectopic pregnancy: interstitial, cervical, ovarian, scar, abdominal, rudimentary horn
- Nuchal translucency
- Chorionic villous sampling

Second and Third Trimester

- Recognition of fetal abnormalities that require high risk obstetrics referral, including congenital anomalies/chromosomal abnormalities and syndromes such as Down's syndrome and Turner's syndrome, hydrops, congenital infections, chest masses, cardiac malformations and arrhythmias, diaphragmatic hernia, abdominal wall defects, abdominal masses, gastrointestinal tract obstruction/abnormalities, ascites, skeletal dysplasias, cleft lip/palate, complications of twin pregnancy, hydrancephaly
- Borderline findings: nuchal thickening, choroid plexus cyst, echogenic cardiac focus, echogenic bowel, borderline hydrocephalus
- Placental cord insertion site/vasa previa, velamentous cord insertion, cord prolapse, succenturiate placenta, cervical incompetence
- Umbilical cord Doppler, fetal cranial Doppler, biophysical profile
- Guidance for amniocentesis
- Placenta accreta, percreta, increta

Thyroid/Neck

- Parathyroid mass: adenoma
- Congenital cysts: branchial cleft
- Lymph nodes: benign and malignant characterization
- Post-thyroidectomy recurrence
- Submandibular and parotid glands: normal and abnormal

Vascular/Doppler

- Renal transplant: arterial resistive index (rejection, acute tubular necrosis), transplant vein thrombosis, renal infarction, post-biopsy complications, renal arterial stenosis
- Liver transplants, including hepatic artery stenosis or thrombosis (resistive index), portal vein thrombosis, post-biopsy complications, inferior vena cava stenosis
- Pancreas transplant: arterial and venous anastomosis, patency and stenosis
- TIPS evaluation and complications
- Lower extremities: chronic venous insufficiency
- Arterial bypass graft
- Hemodialysis graft/fistula
- Carotid artery: waveform analysis, stenosis, dissection, pseudoaneurysm, stent
- Vertebral artery: subclavian steal syndrome
- Mesenteric ischemia
- Renal artery stenosis
- Pseudoaneurysm management: contraindications and technique of non-surgical treatment with ultrasound-guided compression repair versus thrombin injection
- Intraoperative ultrasound guidance

Scrotum

- Hernia
- Non-descended testis
- Fournier's gangrene

Expected Reading List:

- Diagnostic Imaging: Obstetrics
- Expertddx: Ultrasound

Milestones include:

- Selects appropriate protocols and probes for advanced imaging
- Demonstrates knowledge of physical principles to optimize imaging quality
- Independently modifies protocols as determined by clinical circumstances
- Provides accurate, focused, and efficient interpretations
- Prioritizes differential diagnoses and recommends management
- Makes subtle observations
- Suggests a single diagnosis when appropriate
- Integrates current research and literature with guidelines to recommend management

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Facilitate teaching of medical students, sonographers, other residents and other health care professionals
- Participate in quality assurance programs for sonographers and physicians
- Be aware of equipment quality assurance programs
- Apply basic knowledge of study design and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness

Milestones include:

- Communicates the relative risk of ultrasound exam to patients and practitioners.
- Able to lead tumor board conference

- Selects appropriate sedation agent and dose of conscious sedation
- Able to recognize studies for QA/QI

4) Interpersonal Skills: Residents must demonstrate skills to:

- Dictate accurate and concise reports for the most complex ultrasound studies with concise impression including diagnosis and/or differential diagnoses as well as recommendations for further imaging and/or management, when appropriate
- Consult effectively with senior residents and attending physician in most aspects of ultrasound

Milestones include:

- Communicates without supervision in challenging circumstances
- Efficiently generates clear and concise reports that do not require substantive faculty member correction on all cases
- Communicates appropriately under stressful situations

5) Professionalism: Residents must demonstrate skills to:

- Demonstrate accountability to patients, society and the profession
- Is perceived as a role model for radiology from both within and outside the department.

Milestones include

- Is an effective team leader promoting patient welfare, patient autonomy, and social justice
- Serves as a role model for professional behavior

6) Systems-Based Practice: Residents must demonstrate skills to:

- Practice cost-effective evaluation of patients requiring ultrasound studies that does not compromise the quality of care
- Shows ability to interact with clinicians regarding cost effective and streamlined patient evaluation for differing clinical entities.
- Able and willing to participate in clinical conferences in which imaging studies used to guide patient care/evaluation.
- Is able and willing to organize and present case conferences/didactic sessions as directed and supervised by radiology staff.
- Is able and willing to participate in activities at the local/national level under staff supervision.

Milestones include:

- Identifying and completing a systems based practice project

Assessment tools for all Ultrasound Rotations:

- Reviewing rotation curriculum, goals and objectives, as a benchmark for progress of resident, and success of faculty, is educating the resident. Discussion regarding the specifics of the document is encouraged to promote improvement of the resident's learning and the program's teaching. Positive points and deficiencies and unfulfilled goals and objectives should be discussed by the residents and faculty
- Global ratings by faculty including rotation evaluation sheet
- Resident's performance discussing unknown cases in conference (one of the metrics on Global Evaluation sheet is particularly important)
- Placing cases in teaching file (one of the metrics on Global Evaluation)
- Conference attendance logs
- In-service examination
- 360 degree evaluations – supervisory technologists in radiology core
- Fluoroscopy time log submitted by physicist to Program Director

- Self-assessment based on Rad Primer quizzes
- Future plans: evaluation of teaching by medical students

Required Documentation of Case & Procedure Logs:

Pancreas Transverse

IVC Longitudinal

Aorta Longitudinal

Left Liver Lobe

Right Liver Lobe

Porta Hepatis

Hepatic Veins

Gallbladder

CBD

Right Kidney Mid Longitudinal

Right Kidney Mid Transverse

Left Kidney Mid Longitudinal

Left Kidney Mid Transverse

Spleen

Bladder

Ultrasound Imaging Curriculum based off the ABR Core Exam

1) Medical knowledge

- a) “Hands-on” scanning: recognize the normal appearance of the following, as well as the most common pathology
 - i) Pleural space (effusion)
 - ii) Peritoneal space
 - (1) Ascites
 - (2) hemorrhage
 - iii) Gallbladder
 - (1) Gallstones
 - (2) Acute cholecystitis
 - iv) Biliary
 - (1) Common bile duct
 - (2) Biliary ductal dilatation
 - v) Liver
 - (1) Masses
 - (2) Steatosis
 - (3) Cirrhosis
 - vi) Kidney
 - (1) Hydronephrosis
 - (2) Stones
 - (3) Mass/cyst
 - vii) Pancreas
 - (1) Pancreatitis
 - (2) Mass/cyst
 - viii) Retroperitoneal
 - (1) Abdominal mass
 - (2) Cyst
 - (3) Adenopathy
 - ix) Alimentary tract
 - (1) Pain
 - (2) Appendicitis
 - (3) Intussusception
 - x) Thyroid
 - (1) Nodules
 - (2) Diffuse disease
 - xi) Parathyroid
 - (1) Adenoma
 - (2) Hyperplasia
 - xii) Testis
 - (1) Mass/cyst
 - (2) Torsion
 - (3) Trauma

- (4) Infection
 - xiii) Transabdominal/transvaginal pelvis
 - (1) Uterus – measurement
 - (2) Fibroids
 - (3) Adenomyosis
 - (4) Endometrial stripe
 - (5) Adnexal mass/cyst
 - (6) Free fluid
 - xiv) Pregnancy
 - (1) Normal
 - (2) Failed early intrauterine pregnancy
 - (3) Ectopic pregnancy
 - xv) Obstetrics
 - (1) Basic fetal biometry
 - (2) Basic second/third trimester fetal anatomy
 - (3) Placental localization
 - (4) Amniotic fluid volume
 - (5) Comprehensive second/third trimester
 - xvi) Neonatal brain
 - (1) Normal
 - (2) Hemorrhage
 - (3) Hydrocephalus
 - xvii) Pediatrics
 - (1) Abdomen
 - (2) Spine
 - (3) Hips
 - xviii) Breast
 - (1) Solid mass/cyst
 - (2) Lymph nodes
 - (3) Breast cancer staging
 - xix) Lower and upper extremity venous (deep vein thrombosis)
 - xx) Lower and upper extremity arterial
 - (1) Pseudoaneurysm
 - (2) Arteriovenous fistula
 - (3) Claudication/stenosis/occlusion
 - (4) Bypass grafts
 - (5) Dialysis fistula/grafts
 - xxi) Carotid and vertebral arteries
 - xxii) Abdominal aorta (aneurysm, including how to measure)
 - xxiii) Abdominal Doppler
 - (1) Hepatic vessel stenosis/thrombosis/occlusion
 - (2) Renal vessel stenosis/thrombosis/occlusion
 - (3) IVC

(4) Hepatic and renal transplants

xxiv) MSK

- (1) Tendons
 - (2) Mass/cyst
- xxv) US guidance
- (1) Aspiration
 - (2) FNA
 - (3) Biopsy
 - (4) Line placement

b) Comprehensive knowledge

i) Physics/instrumentation: The resident should understand the basic principles of physics that form the foundation of clinical ultrasound.

- (1) Range of US frequencies used in generating diagnostic images
- (2) Transducer type: curvilinear, linear, sector, vector, endoluminal
- (3) Transducer selection for various clinical applications
- (4) Transducer components and beam characteristics
- (5) Beam formation/focusing
- (6) Frequency, sound speed, wavelength, intensity, decibels, beam width
- (7) Trade-off of frequency in terms of depth vs. resolution
- (8) Mode: grayscale, M-mode, pulsed wave Doppler, color and power Doppler
- (9) Image orientation
- (10) Frame rate
- (11) Grayscale image optimization
 - (a) Focal zone
 - (b) Power output
 - (c) Gain
 - (d) Time gain compensation
 - (e) Line density
 - (f) Transmit frequency
 - (g) Dynamic range
- (12) Acoustic properties of matter
 - (a) Fluid
 - (b) Cyst
 - (c) Calcification
 - (d) Complex fluid and solid structures, gas, metal, fat
- (13) Interaction of sound waves with tissues:
 - (a) Reflection
 - (b) Attenuation
 - (c) Scattering
 - (d) Refraction
 - (e) Absorption
 - (f) Acoustic impedance
 - (g) Pulse-echo principles

- (14) Thermal and non-thermal effects on tissue
 - (a) **Biological** health risks
 - (b) Mechanical index
 - (c) Cavitation
 - (d) Relative risks for different scan modes
 - (e) Thermal and mechanical indices
- (15) Doppler phenomenon, Doppler equation
- (16) Grayscale vs Doppler (trade off of penetration and resolution)
- (17) Optimization of Doppler parameters
 - (a) Color box – size, shape and angle
 - (b) Transmit frequency
 - (c) Doppler angle
 - (d) Wall filter
 - (e) Pulse repetition frequency
 - (f) Scale, gain
 - (g) Color write priority
 - (h) Sample volume size
- (18) Artifacts
 - (a) Beam width
 - (b) Side lobe
 - (c) Slice thickness
- (19) Multiple reflection artifacts - mirror image/reverberation
- (20) Refractive artifacts, misregistration
 - (a) Ring down
 - (b) acoustic shadowing and enhancement
 - (c) speed propagation artifact
 - (d) anisotropy
- (21) Doppler artifacts
 - (a) Pulse wave
 - (b) Color imaging, including aliasing
 - (c) Color blooming
 - (d) Soft tissue vibration
 - (e) Flash
 - (f) Motion
- (22) 3-D/4-D volumetric imaging
- (23) Harmonic imaging
- (24) Spatial compounding
- (25) Ultrasound contrast agents
- (26) Elastography
- (27) Equipment quality assurance
 - (a) Phantoms
 - (b) Spatial/contrast resolution
 - (c) Care of probes

(i) Cleaning/disinfection (ii) Infection control

2) Clinical applications

a) General

- i) Understand the importance of clinical ultrasound protocols. Published guidelines from the American College of Radiology (ACR) with or without local modification are acceptable frames of reference. Residents should also be familiar with ACR appropriateness criteria as a guide for appropriate clinical use of ultrasound and other imaging modalities.
- ii) Understand the clinical uses and limitations of ultrasound, as well as the appropriate integration of other complementary cross-sectional imaging studies, particularly CT and MRI.
- iii) Understand the importance of documentation, reporting, communication and reporting of critical findings.
- iv) Understand the importance of clinical quality assurance, including radiologic-pathologic correlation, as well as sonographer-physician discrepancies.

b) Abdominal

i) Liver

- (1) Normal echotexture/echogenicity/size/shape
- (2) Normal variants
- (3) Diffuse disease

- (a) Steatosis, including focal steatosis and focal sparing
- (b) Acute and chronic hepatitis
- (c) Cirrhosis
- (d) Edema

(4) Focal masses

- (a) Cysts
- (b) Cavernous hemangiomas
- (c) Focal nodular hyperplasia
- (d) Adenoma
- (e) Metastases
- (f) Hepatocellular carcinoma
- (g) Lymphoma
- (h) Cholangiocarcinoma
- (i) Granuloma
- (j) Hematoma
- (k) Biloma
- (l) Pyogenic abscess
- (m) Echinococcal abscess
- (n) Amebic abscess
- (o) Post-liver transplantation collections
 - (i) Hematoma
 - (ii) Biloma

- (iii) Abscess
- (iv) Trauma
- ii) Gallbladder
 - (1) Normal size/shape/wall
 - (2) Gallstones
 - (3) Sludge
 - (4) Acute cholecystitis
 - (a) Calculous/acalculous/gangrenous/perforated/emphysematous
 - (5) Other etiologies of wall thickening
 - (a) Polyp
 - (b) Hyperplastic cholecystosis
 - (c) Carcinoma
 - (d) Porcelain gallbladder
- iii) Bile ducts
 - (1) Normal intra- and extrahepatic bile duct appearance/size
 - (2) Normal variants
 - (3) Bile duct stones
 - (4) Cholangitis
 - (a) Primary sclerosing
 - (b) Pyogenic
 - (c) Recurrent pyogenic
 - (d) AIDS
 - (5) Caroli disease
 - (6) Choledochal cysts
 - (7) Pneumobilia
 - (8) Cholangiocarcinoma
- iv) Pancreas
 - (1) Normal echotexture/echogenicity/size/shape
 - (2) Normal variants
 - (3) Pancreatic duct
 - (4) Mass
 - (a) Cyst
 - (b) Pseudocysts
 - (c) Cystic neoplasms
 - (d) Cancer
 - (e) Metastases
 - (f) Lymphoma
 - (g) Islet cell tumor
 - (h) IPMN
 - (5) Pancreatitis
 - (a) Abscess
 - (b) Pseudocyst
 - (c) Pseudoaneurysm
 - (d) Chronic pancreatitis
- v) Spleen
 - (1) Normal echotexture/echogenicity/size/shape
 - (2) Normal variants

(3) Focal masses

- (a) Cyst
- (b) Lymphoma
- (c) Metastases
- (d) Abscess
- (e) Infarct
- (f) Granuloma

(4) Varices

(5) Trauma

vi) Peritoneal cavity

- (1) Normal anatomy
- (2) Ascites
- (3) Fluid localization/quantification (free/loculated)
- (4) Abscess
- (5) Hemorrhage
- (6) Omental/peritoneal metastasis
- (7) Carcinomatosis
- (8) Free air
- (9) Mesothelioma
- (10) Omental infarct

vii) Gastrointestinal tract

- (1) Normal gut ultrasound signature
- (2) Acute appendicitis
- (3) Diverticulitis
- (4) Crohn disease
- (5) Colitis
- (6) Small bowel obstruction
- (7) Cancer
- (8) Lymphoma
- (9) GIST

viii) Abdominal wall

- (1) Normal echogenicity/echotexture
- (2) Hematoma
- (3) Abscess
- (4) Hernia
- (5) Primary tumor
- (6) Metastasis
- (7) Lymphoma
- (8) Desmoids
- (9) Lipoma
- (10) Endometriosis

ix) Organ transplants: see vascular section c) Kidneys, urinary bladder, and prostate i)

Kidney

- (1) Normal echotexture/echogenicity/size/shape
- (2) Normal variants/congenital anomalies

- (3) Calculi
- (4) Hydronephrosis
- (5) Glomerular interstitial renal disease
- (6) Cysts
 - (a) Simple
 - (b) Complex
 - (c) Peripelvic
 - (d) Adult polycystic disease
 - (e) Acquired renal cystic disease
- (7) Abscess/pyelonephritis
- (8) Perinephric fluid
- (9) Angiomyolipoma
- (10) Oncocytoma
- (11) Multilocular cystic nephroma
- (12) Renal cell carcinoma
- (13) Transitional cell carcinoma
- (14) Lymphoma
- (15) Metastases
- (16) Pyelonephritis
- (17) Xanthogranulomatous pyelonephritis
- (18) Emphysematous pyelonephritis
- (19) Medullary nephrocalcinosis
- (20) Infiltrative disease
- (21) Post-renal transplant collections
 - (a) Hematoma
 - (b) Urinoma
 - (c) Peri-nephric abscess
 - (d) Lymphocele (see vascular section)
- ii) Adrenal glands
 - (1) Normal echotexture/echogenicity/size/shape
 - (2) Cyst/mass
 - (a) Adenoma
 - (b) Pheochromocytoma
 - (c) Myelolipoma
 - (d) Metastasis
 - (e) Lymphoma
 - (f) Cancer
 - (g) Hemorrhage
- iii) Ureters
 - (1) Dilatation of the collecting system
 - (2) Pyonephrosis
 - (3) Megaureter

- (4) Ureterocele
- (5) Ectopic ureterocele
- (6) Ureteral stone
- (7) Clot in collecting system
- (8) Transitional cell cancer
- (9) Stents
- iv) Urinary bladder
 - (1) Normal size/shape/wall
 - (2) Calculi
 - (3) Wall thickening
 - (4) Ureteral jets
 - (5) Bladder volume, including post-void residual
 - (6) Solid mass
 - (a) Transitional cell carcinoma
 - (b) Pheochromocytoma
 - (c) Endometriosis
 - (7) Cystitis
 - (8) Emphysematous cystitis
 - (9) Hemorrhage
 - (10) Wall thickening
 - (11) Bladder outlet obstruction
 - (12) Diverticula
 - (13) Ureterocele
 - (14) Ectopic ureterocele
 - (15) UVJ stone
 - (16) Fungus balls
- v) Transabdominal and transrectal prostate
 - (1) Normal echotexture/echogenicity/size/shape
 - (2) Benign prostatic hypertrophy
 - (3) Cancer
 - (4) Prostatitis
 - (5) Abscess
- vi) Retroperitoneum
 - (1) Adenopathy
 - (2) Primary sarcoma
 - (3) Hemorrhage
 - (4) Abscess
- d) Gynecology
 - i) Uterus
 - (1) Normal echotexture/echogenicity/size/shape
 - (a) Endometrium
 - (i) Normal appearance during phases of menstrual cycle
 - (ii) Thickness measurement
 - 1. Premenopausal
 - 2. Postmenopausal
 - 3. Effects of hormone replacement

- (iii) Normal variants/congenital anomalies
- (iv) Intrauterine device
 1. Normal location
 2. Displaced
 3. Extruded
- (v) Endometrial fluid
- (vi) Endometrial polyp
- (vii) Endometrial hyperplasia
- (viii) Endometrial carcinoma
- (ix) Endometritis
- (x) Pyometrium
- (2) Fibroids
 - (a) Submucous
 - (b) Intramural
 - (c) Subserosal
- (3) Adenomyosis
- ii) Ovary
 - (1) Normal echotexture/echogenicity/size/shape, including physiologic variation during phases of menstrual cycle
 - (a) Follicles
 - (b) Corpus luteum
 - (c) Hemorrhagic ovarian cyst
 - (2) Simple/hemorrhagic/ruptured ovarian cysts
 - (3) Endometrioma
 - (4) Polycystic ovarian disease
 - (5) Ovarian hyperstimulation syndrome
 - (6) Cystadenoma/carcinoma
 - (7) Dermoid
 - (8) Fibroma
 - (9) Germ cell tumor
 - (10) Ovarian torsion
 - (11) Pelvic inflammatory disease
 - (12) Tubo-ovarian abscess
 - (13) Ovarian cancer, including staging
- iii) Cervix
 - (1) Normal echotexture/echogenicity
 - (2) Stenosis
 - (3) Endometrial obstruction
 - (4) Cancer
- iv) Fallopian tube
 - Hydrosalpinx
 - Pyosalpinx
- v) Post-hysterectomy appearance of pelvis
- vi) Free pelvic fluid

- vii) Peritoneal inclusion cyst
- viii) Saline hysterosonography
- e) Obstetrics, first trimester
 - i) Normal findings of intrauterine gestational sac
 - (1) Size
 - (2) Gestational sac growth
 - (3) Yolk sac
 - (4) Embryo
 - (5) Cardiac activity, including normal embryonic heart rate
 - (6) Amnion
 - (7) Chorion
 - (8) Normal early fetal anatomy/growth
 - (9) Crown-rump length measurement
 - (10) Correlation with BHCG levels and menstrual dates
 - ii) Multiple gestations (chronicity and amnionicity)
 - iii) Failed early pregnancy
 - (1) Spontaneous complete/incomplete abortion
 - (2) Anembryonic gestation
 - (3) Embryonic demise
 - (4) Subchorionic hematoma
 - iv) Ectopic pregnancy, including unusual ectopic pregnancy
 - (1) Interstitial
 - (2) Cervical
 - (3) Ovarian
 - (4) Scar
 - (5) Abdominal
 - (6) Rudimentary horn
 - v) Gestational trophoblastic disease
 - vi) Nuchal translucency
 - vii) Embryonic structural abnormalities, anencephaly
 - viii) Chorionic villous sampling
- f) Obstetrics, second and third trimester
 - i) Normal findings
 - (1) Normal fetal anatomy/situs/development
 - (2) Placenta
 - (3) Biometry
 - (4) Amniotic fluid volume
 - ii) Multiple gestations
 - iii) Common congenital anomalies
 - iv) Recognition of fetal abnormalities that require high-risk obstetrics referral
 - (1) Intrauterine growth retardation
 - (2) Hydrops
 - (3) Holoprosencephaly

- (4) Hydrocephalus
- (5) Neural tube defects
- (6) Multicystic dysplastic kidney
- (7) Hydronephrosis
- (8) Anencephaly
- (9) Chromosomal abnormalities and syndromes
 - (a) Down syndrome
 - (b) Turner syndrome
- (10) Hydrops
- (11) Congenital infections
- (12) Chest masses
- (13) Cardiac malformations and arrhythmias
- (14) Diaphragmatic hernia
- (15) Abdominal wall defects
- (16) Abdominal masses
- (17) Gastrointestinal tract obstruction/abnormalities
- (18) Ascites
- (19) Skeletal dysplasias
- (20) Cleft lip/palate
- (21) Complications of twin pregnancy
- (22) Hydrencephaly
- v) Borderline findings
 - (1) Nuchal thickening
 - (2) Choroid plexus cyst
 - (3) Echogenic cardiac focus
 - (4) Echogenic bowel
 - (5) Borderline hydrocephalus
- vi) Oligohydramnios
 - (1) Spontaneous premature rupture of membranes
 - (2) Renal disease
 - (3) Fetal death
 - (4) Intrauterine growth retardation
 - (5) Infection
- vii) Polyhydramnios
- viii) Placenta
 - (1) Placenta previa
 - (2) Vasa previa
 - (3) Abruption
 - (4) Per-, in- and accrete
 - (5) Placental masses
 - (6) Succenturiate placenta
- ix) Cervical appearance and length, cervical incompetence
- x) Cord
 - (1) Two-vessel umbilical cord

- (2) Cord masses
- (3) Placental cord insertion site
- (4) Velamentous cord insertion
- (5) Cord prolapse
- xi) Retained products of conception
- xii) Umbilical cord Doppler
- xiii) Fetal cranial Doppler
- xiv) Biophysical profile
- xv) Guidance for amniocentesis g) Thyroid/neck
 - i) Thyroid
 - (1) Normal echotexture/echogenicity/size/shape
 - (2) Hashimoto thyroiditis
 - (3) Graves disease
 - (4) Subacute thyroiditis
 - (5) Characterization of thyroid nodules
 - (a) Benign nodules
 - (i) Colloid cysts
 - (ii) Nodular hyperplasia
 - (b) Malignant nodules
 - (i) Papillary
 - (ii) Follicular
 - (iii) Medullary
 - (iv) Anaplastic
 - (v) Lymphoma
 - (vi) Metastasis
 - (c) Multinodular goiter
 - (6) National consensus guidelines for performing FNA
 - (7) Post-thyroidectomy neck surveillance for recurrence of papillary thyroid cancer – role of US
 - ii) Parathyroid
 - (1) Normal
 - (2) Adenoma
 - (3) Carcinoma
 - (4) Hyperplasia
 - iii) Congenital cysts
 - (1) Branchial cleft
 - (2) Thyroglossal duct
 - iv) Lymph nodes
 - (1) Normal echotexture/echogenicity/size/shape
 - (2) Benign reactive
 - (3) Metastasis (including surveillance for papillary thyroid cancer)
 - v) Salivary glands
 - (1) Normal echotexture/echogenicity/size/shape
 - (2) Benign and malignant neoplasms

- (a) Pleomorphic adenoma
- (b) Warthin tumor
- (c) Adenoid cystic carcinoma
- (d) Mucoepidermoid carcinoma
- (3) Infection
- (4) Inflammation

h) CHEST

- i) Normal anatomy
- ii) Pleural effusion
- iii) Atelectasis
- iv) Pneumonia
- v) Lung cancer
- vi) Lung metastasis
- vii) Pleural metastasis
- viii) Adenopathy

- (1) Mediastinal and axillary
- (2) Metastasis
- (3) Lymphoma
- (4) Reactive

ix) Mediastinal tumors

x) Chest wall

- (1) Hematoma
- (2) Abscess
- (3) Primary tumor
- (4) Metastasis
- (5) Lymphoma
- (6) Lipoma

i) Vascular/Doppler

i) Aorta and branches

- (1) Normal size/appearance/Doppler waveform
- (2) Normal variants
- (3) Aneurysm
- (4) Thrombosis
- (5) S/p stent graft placement including endoleak
- (6) S/p surgery
- (7) Coarctation
- (8) Stenosis
- (9) Normal measurements
- (10) Mesenteric ischemia
- (11) Mesenteric aneurysms
- (12) Pseudoaneurysms (4)Lymphoma
- (13) Mesenteric venous thrombosis

ii) Spleen

- (1) Normal artery and vein size/appearance/Doppler waveform

- (2) Normal variants
- (3) Artery
 - (a) Thrombosis
 - (b) Stenosis
- (4) Vein
 - (a) Thrombosis
 - (b) Stenosis
- (5) Infarction
- (6) Aneurysm
- iii) Lower and upper extremity arterial
 - (1) Normal appearance and Doppler waveforms
 - (2) Stenosis
 - (3) Occlusion
 - (4) Arterial bypass graft
 - (a) Normal and abnormal
 - (b) Peripheral vascular aneurysm
 - (i) Iliac artery
 - (ii) Popliteal artery
- iv) Renal artery
 - (1) Normal appearance and Doppler waveform
 - (2) Stenosis
 - (3) Occlusion
 - (4) Bypass grafts
 - (5) Stent
 - (6) Aneurysm
 - (7) Arteriovenous fistula/malformation
 - (8) Fibromuscular dysplasia
 - (9) Infarction
- v) Renal vein
 - (1) Normal appearance and Doppler waveform
 - (2) Thrombosis (bland and tumor)
 - (3) Arteriovenous fistula/malformation
 - (4) Pseudoaneurysm
- vi) Carotid artery
 - Normal appearance and Doppler waveforms
 - Atherosclerotic plaque
 - Stenosis
 - Occlusion
 - Waveform analysis
 - Dissection
 - Arteriovenous fistula
 - (8) Aneurysm
 - (9) Pseudoaneurysm
 - (10) Carotid endarterectomy
 - (a) Normal

- (b) Restenosis
- (c) Stent
- vii) Vertebral artery
 - (1) Normal appearance and Doppler waveforms
 - (2) Normal variants
 - (3) Stenosis
 - (4) Subclavian steal syndrome
- viii) Hemodialysis graft/fistula
 - (1) Normal appearance and Doppler waveforms
 - (2) Stenosis
 - (3) Occlusion
 - (4) Lack of maturation
 - (5) Fluid collections
 - (6) Pseudoaneurysms
- ix) Inferior vena cava
 - (1) Normal appearance and Doppler waveform
 - (2) Thrombosis (bland and tumor)
- x) Lower and upper extremity venous
 - (1) Normal appearance and Doppler waveform
 - (2) Deep vein thrombosis
 - (3) Hematoma
 - (4) Arteriovenous fistula
 - (5) Obstruction
 - (6) Tricuspid regurgitation
 - (7) Chronic venous insufficiency
 - (8) Pre-graft/dialysis access vein mapping
- xi) Hepatic vasculature
 - (1) Normal hepatic artery, portal vein and hepatic vein size/appearance/Doppler waveform
 - (2) Normal variants
 - (3) Portal vein
 - (a) Bland thrombosis
 - (b) Tumor thrombus
 - (c) Stenosis
 - (4) Hepatic artery
 - (a) Thrombosis
 - (b) Stenosis
 - (c) Aneurysm
 - (d) Pseudoaneurysm
 - (e) RI measurements
 - (5) Hepatic vein
 - (a) Bland thrombosis
 - (b) Tumor thrombus
 - (c) Budd Chiari syndrome
 - (d) Stenosis
 - (6) Infarction

xii) Hemodynamics of cirrhosis, portal hypertension, and varices

xiii) TIPS evaluation

(1) Normal appearance and Doppler waveforms

(2) Stenosis

(3) Occlusion

(4) Complications

xiv) Renal transplant

(1) Normal appearance and Doppler arterial and venous waveforms

(a) Causes of elevation of arterial resistive index

(i) Rejection

(ii) Acute tubular necrosis

(iii) Page kidney

(iv) Hydronephrosis

(v) Renal vein thrombosis

(b) Transplant vein thrombosis

(c) Renal infarction

(d) Post-biopsy complications

(i) Hematoma

(ii) Pseudoaneurysm

(iii) Arteriovenous fistula

(e) Renal arterial stenosis

(f) Renal artery occlusion

(g) Fluid collections

(h) Post transplant lymphoproliferative disorder

(i) Pyelonephritis

(j) clot/pus in the collecting system

xv) Liver transplants

(1) Normal appearance and Doppler arterial and venous waveforms

(2) Hepatic artery stenosis or thrombosis

(3) Resistive index

(4) Portal vein thrombosis/stenosis

(5) Hepatic vein thrombosis/stenosis

(6) Post-biopsy complications

(a) Hematoma

(b) Pseudoaneurysm

(c) Arteriovenous fistula

(7) Inferior vena cava stenosis/thrombosis

(8) Fluid collections

(a) Peri-hepatic

(b) Infarct

(c) Biloma

(d) Abscess

(9) Post-transplant lymphoproliferative disorder

(10) Abnormalities of the biliary tree xvi) Pancreas transplant

- (1) Arterial and venous anastomosis
- (2) Patency
- (3) Stenosis j) Scrotum
 - i) Testes
 - (1) Normal echotexture/echogenicity/size/shape
 - (2) Orchitis
 - (3) Abscess
 - (4) Testicular cyst
 - (5) Tunica cyst
 - (6) Cystic ectasia of rete testis
 - (7) Torsion
 - (8) Detorsion
 - (9) Microlithiasis
 - (10) Germ cell tumor
 - (11) Lymphoma
 - (12) Metastasis
 - (13) Stromal tumor
 - (14) Epidermoid cyst
 - (15) Hematoma
 - (16) Focal atrophy/fibrosis
 - (17) Sarcoidosis
 - (18) Tuberculosis
 - (19) Trauma
 - (20) Non-descended testis
 - ii) Epididymis
 - (1) Normal echotexture/echogenicity/size/shape
 - (2) Epididymitis
 - (3) Spermatocele
 - (4) Adenomatoid tumor
 - (5) Cyst
 - iii) Other
 - (1) Hydrocele
 - (2) Pyocele
 - (3) Hematocele
 - (4) Varicocele
 - (5) Hernia
 - (6) Scrotal edema
 - (7) Fournier's gangrene
 - (8) Non-descended testis k) Pediatrics
- i) Normal anatomy
 - (1) Abdomen
 - (2) Kidney
 - (3) Brain
 - (4) neck
- ii) Brain

- (1) Intracranial hemorrhage and complications
 - (a) Periventricular leukomalacia
 - (b) Hydrocephalus
- (2) Shunt evaluation
- (3) Congenital brain malformations
 - (a) Agenesis of corpus callosum
 - (b) Vein of galen aneurysm
 - (c) Dandy Walker Malformation
 - (d) Aqueductal stenosis
- iii) Neonatal spine
 - (1) Tethered cord
 - (2) Intraspinial mass
- iv) Kidneys
 - (1) Hydronephrosis
 - (2) Stones
 - (3) Hydroureters
 - (4) Anomalies of position and fusion
 - (5) Renal scarring
 - (6) Masses
 - (7) Cystic disease
- v) Adrenal
 - (1) Hemorrhage
 - (2) Masses (neuroblastoma)
- vi) Liver
 - (1) Cirrhosis
 - (2) Choledochal cysts
 - (3) Liver masses
 - (4) Hepatitis/biliary atresia
- vii) Gallbladder
 - (1) Gallstones
 - (2) Biliary stones
 - (3) Hydrops
- viii) Pancreas: acute pancreatitis
- ix) Spleen
 - Polysplenia
 - Asplenia
- x) Hip
 - (1) Normal
 - (2) Congenital dislocation
 - (3) Effusion
- xi) Alimentary tract
 - (1) Intussusceptions
 - (2) Acute appendicitis
 - (3) Hypertrophic pyloric stenosis
- xii) Scrotal

- (1) Torsion
- (2) Epididymitis
- (3) Orchitis
- (4) Masses
- (5) Undescended testis
- (6) Mass
- xiii) Ovary
 - (1) Solid and cystic masses
 - (2) Ovarian torsion
- xiv) Uterus
 - (1) Normal appearance and size
 - (2) Imperforate hymen
 - (3) Uterine anomalies
- xv) Neck masses
- xvi) Deep vein thrombosis of upper and lower extremities
- xvii) Hepatic and renal organ transplants
- xviii) Liver & renal Doppler 1) Musculoskeletal
 - i) Normal anatomy
 - (1) Tendon
 - (2) Muscle
 - (3) Ligament
 - (4) Cartilage
 - (5) Bone
 - (6) Nerve
 - ii) Tendon
 - (1) Tear (partial and full thickness)
 - (2) Tendinopathy/tendinosis
 - (3) Tenosynovitis
 - iii) Muscle
 - (1) Tear
 - (2) Hematoma
 - (3) Abscess
 - (4) Neoplasm
- iv) Nerve
 - (1) Compression syndromes
 - (2) Neuroma
 - (3) Tumor
- v) Bone
 - (1) Fracture
 - (2) Tumor
 - (3) Osteomyelitis
- vi) Ligaments
 - (1) Plantar fasciitis
 - (2) Plantar fibroma
 - (3) Pulley rupture

- (1)
- (2)
- (3)

- vii) Soft tissues/joints
 - (1) Baker cyst
 - (2) Ganglion cyst
 - (3) Lipoma
 - (4) Foreign body
 - (5) Hematoma
 - (6) Cellulitis, abscess
 - (7) Necrotizing fasciitis (soft tissue gas)
 - (8) Joint effusion
 - (9) Synovitis
 - (10) Primary neoplasm
 - (11) Metastasis
 - (12) Lymphoma m) Breast
- i) Sono-mammographic anatomy
- ii) Cystic versus solid mass
- iii) Mastitis/abscess
- iv) Characterization of cysts
- v) Lymph node characterization
 - (1) Axillary
 - (2) Supraclavicular
 - (3) Intramammary
- vi) Characterization of solid masses (1) Benign versus malignant
 - (a) Cyst
 - (b) Fibroadenoma
 - (c) Hamartoma
 - (d) Abscess
 - (e) Hematoma
 - (f) Phyllodes tumor
 - (g) Ductal/lobular carcinoma
 - (h) Carcinoma in situ
 - (i) Metastasis
 - (j) Lymphoma
- vii) Architectural distortion
- viii) Intraductal masses/abnormalities, galactocele
- ix) Screening
- x) Multifocal malignancy
- xi) Elastography
- xii) Role of IV contrast n) Interventional
 - i) Pre-procedural evaluation
 - (1) Coagulation laboratory studies
 - (2) Anticoagulation medication
 - (3) Stratification of risk for percutaneous procedures
 - ii) Informed consent
 - iii) Sterile technique
 - iv) Techniques for ultrasound-guided invasive procedures: understanding important landmarks and pitfalls of percutaneous procedures, including recognition of critical structures to be avoided

- v) Localization of fluid for paracentesis or thoracentesis to be performed by another service
- vi) Ultrasound-guided paracentesis
- vii) Ultrasound-guided thoracentesis
- viii) Aspiration of fluid collections, cysts
- ix) Biopsy of soft tissue masses
- x) Fine needle biopsy versus core biopsy in specific applications
 - (1) Focal liver mass
 - (2) Renal mass
 - (3) Thyroid/parathyroid mass
 - (4) Lymphadenopathy
- xi) Random core liver biopsy
- xii) Random core renal biopsy
- xiii) Catheter placement for abscess and fluid drainage (pleural, peritoneal, and other spaces)
- xiv) Post-procedural evaluation
 - (1) Radiographic studies
 - (2) Patient monitoring
 - (3) Management of complications
- xv) Pseudoaneurysm management: contraindications and technique of non-surgical treatment with ultrasound-guided compression repair versus thrombin injection
- xvi) Intraoperative ultrasound guidance

Urinary Imaging

- 1) Kidneys
 - a) Malignant tumors
 - i) Primary
 - ii) Secondary
 - b) Benign tumors
 - c) Endocrine tumors
 - d) Cystic disease
 - e) Complicated cysts
 - f) Granulomatous diseases
 - g) Infection/inflammation
 - h) Hemorrhage
 - i) Infarction and ischemia
 - j) Trauma/iatrogenic
 - k) Congenital anomalies
 - l) Medical renal disease
 - m) Inherited diseases involving the kidneys (including transplantation)
- 2) Ureter
 - a) Malignant tumors
 - b) Benign tumors
 - c) Infection/inflammation

- d) Hemorrhage
- e) Trauma/iatrogenic
- f) Congenital anomalies
- g) Stricture
- h) Filling Defects
- 3) Bladder and neobladder
 - a) Malignant tumors
 - b) Benign tumors
 - c) Infection/inflammation
 - d) Hemorrhage
 - e) Trauma/iatrogenic
 - f) Congenital anomalies
- 4) Prostate gland and seminal vesicles
 - a) Malignant tumors
 - b) Benign tumors and hyperplasia
 - c) Infection/inflammation
 - d) Trauma/iatrogenic
 - e) Congenital anomalies
- 5) Urethra and penis
 - a) Malignant tumors
 - b) Benign tumors
 - c) Infection/inflammation
 - d) Trauma/iatrogenic
 - e) Congenital anomalies
 - f) Stricture
- 6) Retroperitoneum
 - a) Malignant tumors
 - i) Primary
 - ii) Secondary
 - b) Benign tumors
 - c) Hemorrhage
 - d) Trauma/iatrogenic
 - e) Congenital anomalies
 - f) Aortic aneurysm
 - g) Retroperitoneal fibrosis
 - h) Pelvic lipomatosis
 - i) Venous anomalies
 - j) Fournier gangrene
- 7) Vascular diseases affecting the genitourinary tract
 - a) Aneurysms
 - b) Stenoses
 - c) Malformations
 - d) Fistulae
 - e) Occlusions
 - f) Congenital anomalies
- 8) Intravascular contrast media
 - a) Extravasation
 - b) Physiology
 - c) Adverse reactions (idiosyncratic and non-idiosyncratic)

- d) Prevention and treatment of adverse reactions
- 9) Urolithiasis (including kidney, ureter, bladder)
- 10) Techniques
 - a) Excretory urography
 - b) Cystography
 - c) Urethrography (including antegrade and retrograde)
 - d) Computed tomography (including CT urography, CT angiography)
 - e) Magnetic resonance imaging (including MR urography, MR angiography)
 - f) Ultrasound (including Doppler and Color Flow)
 - g) Hysterosalpingography

Ultrasound Experience Form

Instructions: During the first Ultrasound rotation, the assigned resident must meet with the Ultrasound technologist and perform the following actions. Completed form must be placed in the residents' portfolio.

Name of Resident: _____

1. Review all ultrasound protocols on the AdventHealth Orlando Intranet at <https://radportal.floridahospital.org/content/ultrasound-protocols>
The protocol are broken down into subcategory on the bottom left of this webpage. Each subcategory contains protocols for several exams. Please review all categories and exams in that category.

Technologist Date

2. Locate Power Button.

Technologist Date

3. Know how to select a patient from the worklist.

Technologist Date

4. Know how to Freeze/unfreeze.

Technologist Date

5. Locate the image capture button.

Technologist Date

6. Know how to change probes and activate them on the probe menu.

Technologist Date

7. Know how to change the presets based on type of exam.

Technologist Date

8. Know how to change your sector width.

Technologist

Date

9. Know how to turn on/off color.

Technologist

Date

10. Know how to turn on harmonics.

Technologist

Date

11. Know how to move your focal zones.

Technologist

Date

12. Know how to adjust the depth.

Technologist

Date

13. Know how to adjust overall gain and TGC's.

Technologist

Date

14. Know how to measure.

Technologist

Date

15. Know how to turn on Spectra Doppler and optimize waveform

Technologist

Date

ROTATION 1

Please include the MRI and Date on the line provided.

Name:

Week of:

| Abdomen/RUQ | Observed | Performed with help | Performed Alone |
|-------------------------------|----------|---------------------|-----------------|
| Adult Exams Only | | | |
| Pancreas Transverse | | | |
| IVC Longitudinal | | | |
| Aorta Longitudinal | | | |
| Left Liver Lobe | | | |
| Right Liver Lobe | | | |
| Porta Hepatis | | | |
| Hepatic Veins | | | |
| Gallbladder | | | |
| CBD | | | |
| Right Kidney Mid Longitudinal | | | |
| Right Kidney Mid Transverse | | | |
| Left Kidney Mid Longitudinal | | | |
| Left Kidney Mid Transverse | | | |
| Spleen | | | |
| Bladder | | | |

REMINDER: Be sure to have sonographer put exam in "Trainee Dictate" status in PACS, so you can read it in the afternoon with a radiologist.

Completed forms must be placed in the residents' portfolio.

ADVENTHEALTH ORLANDO DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAM

CONFIRMATION OF RECEIPT OF
ULTRASOUND GOALS AND OBJECTIVES

2018-2019

By signing this document, you are confirming that you have received and reviewed, with your preceptor, the Ultrasound goals and objectives for this academic year.

This receipt will be kept in your personal file.

Resident Name (please print) _____

Resident Signature _____
by signing this – you confirm that you have reviewed the G&O with your preceptor

Date _____

Preceptor Signature _____
by signing this – you confirm that you have reviewed the G&O with the resident

Date _____

AdventHealth Orlando Diagnostic Radiology Residency

Vascular and Interventional Radiology Goals and Objectives

Training Location: Orlando

Many of the goals and objectives apply to all rotations and are listed below. Those goals that are more specific to a particular rotation are listed separately.

Vascular and Interventional Radiology Curriculum

The educational curriculum in Vascular and Interventional Radiology is comprised primarily of the rotations through the IR Section at AdventHealth Orlando where the Faculty provides direct training and supervision; as well as, a comprehensive series of lectures and conferences in Vascular and Interventional Radiology. Correlation is made on a case-by-case basis with other imaging modalities, facilitated by the PACs system. A series of interdepartmental conferences, grand rounds, Journal Clubs, meetings and other venues are expected to enhance the residents' knowledge of Vascular and Interventional Radiology.

Because a full outline of disease entities and conditions is provided under each organ system elsewhere in the Radiology Residency Curriculum, a summarized curriculum for the IR Section follows:

- A review of the principles of physics and instrumentation/technology.
- A review of the normal anatomy, physiology, pathology and clinical conditions.
- The indications, limitations, contraindications and optimal protocols for the various studies, diseases, conditions, as well as, the optimal sequencing of various imaging studies is reviewed.
- The use of delivery systems, timing and dosages of medications, appropriate patient preparation, as well as indications and contraindications of procedures will be reviewed.
- The ACR appropriateness criteria and the economic implications for the health care system and patient of various diagnostic pathways are reviewed as appropriate.

IR Orientation

The Friday before your rotation starts, it is your responsibility to meet with the IR Supervisor, Jackie Bochter, to receive pre-order training. Jackie can be reached in her office by the IR department or by calling 407-303-8178.

Following the meeting with the IR Supervisor, it is your responsibility to meet with the IR Chief of Resident Education, Dr. Francisco Contreras, to receive a brief orientation to the Interventional Radiology Department as well as to discuss the goals, learning objectives, and milestones that are expected to be achieved during your IR rotation.

Training using the ACGME Six-Core Competencies:

Year 1: Vascular and Interventional Radiology

1) **Patient Care:** At the end of the rotation, the resident should be able to:

- Perform appropriate history and physical and write a complete pre-procedure note
- Take an informed consent from patient for angiography/interventional procedures
- Learn to order and interpret appropriate labs, abnormal lab values, and correct abnormal lab values
- Learn to adequately assess and follow patients' post-procedure course
- Know the AdventHealth Orlando minimal standards for ordering medications

Milestones include:

- Using established evidence based guidelines such as ACR appropriateness criteria
- Appropriately use the electronic health record to obtain relevant clinical information
- Competently perform basic fluoro studies under indirect supervision
- Recognize and manage complications of basic procedures

2) **Medical Knowledge:** At the end of the rotation, the resident should be able to:

- Know the H&P of every patient for the day
- Sterile technique
- Informed consent
- Learn to operate angiography table and controls
- Learn how to set up and use angiography sterile tray
- Learn sterile techniques, including pre-procedure scrub and patient preparation and dressing
- Learn basic anatomy (external and fluoroscopic) for standard procedures
- Learn peripheral venous and arterial access techniques including Seldinger technique
- Hemostasis with manual compression techniques
- Learn from the nurses how to operate infusion pumps and how to solve the problems when their alarms indicate a problem
- Learn cardiac and great vessel anatomy so that you can recognize the location of a catheter with respect to the cardiac chambers, tricuspid valve, pulmonary artery and its branches, and aortic valve and great vessels arising from the aortic arch
- Learn the indications, techniques, and contraindications for image-guided fine needle aspiration and biopsy
- Localization of fluid for paracentesis or thoracentesis to be performed by another service
- Ultrasound-guided paracentesis

Medical Training:

- First day of rotation – meet with Jackie Bochter and then shadow the IR Radiologist for the first day
- First week of rotation - go over order sets with IR manager (Jackie)
- Biopsy rotations - starts at 8 am immediately after lecture
- Angio rotations – starts at 6:30 am PROMPT. Excused for morning lecture.
- IR call rotation – starts at 12 noon – 8 pm. Phone CALL after 8 pm
- Enter the orders for every patient – the night before
- You are responsible for reading off of the IR worklist
- Carry your IR Handbook with you at all times while on IR
- Transition of care must be performed at the beginning and end of every day, face to face, with your attending
- Mandatory attendance at the IR quarterly staff meeting if occurring during your rotation

Expected Reading List:

- Fundamentals of Diagnostic Radiology (Brant & Helms) – Interventional Chapters
- Vascular and Interventional Radiology: The Requisites

Milestones include:

- Selecting appropriate protocols
- Makes core observations
- Formulate differential diagnoses
- Recognize critical findings
- Differentiate normal from abnormal

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Review studies and interpretation of procedures performed by other members of the department during your rotation
- Watch and study the technique used by more experienced radiologists during your rotation to learn from them
- Review any complications or poor outcomes that occurred in the division during your rotation to learn the root cause of the problem and develop and implement mechanisms to avoid the complications or poor outcomes in the future

Milestones include:

- Recognizes and manages contrast reactions
- Describes the mechanism of radiation injury and the ALARA concept
- Documents training in critical thinking skills and research design

4) Interpersonal and Communication Skills: At the end of the rotation, the resident should be able to:

- Learn dictation format
- Review surgical charge sheet and review ICD-9 and ICD-10 codes
- Begin to dictate basic cases at end of rotation
- Notify referring practitioner of results and immediately notify appropriate personnel of complications or poor outcome of procedure or of results requiring emergent care

Milestones include:

- Communicating information about imaging and examination results in routine, uncomplicated cases
- Obtains informed consent
- Adhere to transfer of care policies
- Generates accurate reports with appropriate elements for coding
- Communicates urgent and unexpected findings according to RSF policy

5) Professionalism: Residents must:

- Be on time for all rotations. Residents are excused from morning lectures (not Physics lectures) while on IR rotation
- Demonstrate compassion and respect for the patient, be punctual, have a professional appearance
- Understand patient's rights including, but not limited to, informed consent, advanced directives, do not resuscitate orders, HIPPA and patient privacy. Pain control, keeping patients draped to minimize patient exposure, appropriate patient clothing and covering during transportation, etc
- Treat technologists, nurses, and other staff with respect and protect them from radiation or biological hazards
- Teach patients about their conditions and care

Milestones include:

- Recognizing the importance and priority of patient care and advocates for patient interests

- Fulfills work related responsibilities
- Recognizes personal limitations and seeks help when appropriate
- Responds appropriately to constructive criticism
- Maintains patient confidentiality
- Attends required meetings

6) Systems-Based Practice: Residents must:

- Confirm that you have the correct patient with two identifiers before starting a procedure.
- Confirm that you are about to perform procedure on the correct side before starting procedure
- Use hospital information system to obtain laboratory data needed prior to study
- Ensure that the personnel caring for the patients on the clinical units are aware of special orders or other preparation needed prior to study, e.g. infusing platelets
- For telephone orders, have appropriate personnel write down orders and read it back to you.
- Be certain that arrangements have been made to have patient transported to the special procedures suite
- Be sure that outpatients have necessary insurance authorization
- Be certain that the personal caring for the patients on clinical units are aware of needed follow-up care
- Maintain procedure log of all procedures in which you participated in the performance, interpretation, and reporting of the procedure for accreditation, credentialing, evaluation and possible program improvement. Record medical record number, date, type of procedure, supervising radiology attending, and any complication
- Understand the role of Patient and Guest Relations in assisting patients to protect their rights and a source of patient information for staff
- Understand the role of the Institutional Ethics Committee to help patients, family, and staff resolve ethical dilemmas

Milestones include:

- Describes departmental QI initiatives
- Describes the departmental QA system

Year 2: Vascular and Interventional Radiology

1) Patient Care: At the end of the rotation, the resident should be able to:

- Refine pre-procedure workup and post-procedure care
- Interact more with referring physicians on initial consultation and follow-up
- Participate in daily patient rounds
- Understand when referral or other imaging modalities is necessary
- Refine interpretive skills with complex pathology

Milestones include:

- Recommends appropriate imaging of common conditions independently
- Competently performs intermediate procedures
- Recognizes and manages complications of intermediate procedures

2) Medical Knowledge: At the end of the rotation, the resident should be able to:

- Learn selective catheterization techniques
- Learn various catheter shapes and sizes available
- Learn various wire shapes, sizes, and consistency available
- Learn relatively common vascular anatomy variants

- Learn cardiac and great vessel physiology so that you can recognize the pressure tracings obtained from the pulmonary catheter when it is located in the cardiac chambers and pulmonary artery and its branches and their significance during the procedure. It is optional, but recommended, that you review your Advanced Cardiac Life Support certification. It is required that you maintain Basic Life Support certification
- Learn the variants in the anatomy of the great vessels of the aortic arch
- Perform image-guided fine needle aspiration biopsy with minimal assistance
- Learn the indications, contraindications, and techniques of abscess or fluid collection drainage
- Pre-procedural evaluation: coagulation laboratory studies, anticoagulation medication
- Stratification of risk for percutaneous procedures
- Techniques for ultrasound-guided invasive procedures: understanding important landmarks and pitfalls of percutaneous procedures, including recognition of critical structures to be avoided
- Biopsy of soft tissue masses with minimal assistance
- Random core liver biopsy with minimal assistance
- Aspiration of fluid collections, cysts and catheter placement for abscess and fluid drainage (pleura, peritoneal and other spaces) with minimal assistance
- Ultrasound-guided thoracentesis with minimal assistance
- Post-procedural evaluation: radiographic studies, patient monitoring, management of complications

Medical Training:

- PGY 3 & 4 Rotate in the Neuroscience Institute with Dr. Michael Bellow*, 1 week during your IR rotation (**coordinate with his assistant Day 1 of your rotation and let your Preceptor and Program Coordinator know which week you will be with Dr. Bellow*)

Expected Reading List:

- Interventional Radiology Procedures
- Teaching Atlas of Interventional Radiology

Milestones include:

- Selects appropriate protocols
- Makes secondary observations
- Narrows differential diagnosis
- Describes management options

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Attend intradepartmental conferences that meet with the Interventional Radiology faculty to learn from our practice's experience
- Consider involvement in ongoing research project or publication with faculty and possibly also with the Interventional Radiology staff and interested medical students

Milestones include:

- Re-demonstrates recognition and management of contrast reactions
- Accesses resources to determine exam specific average radiation dose info
- Accesses resources to determine safety of implanted devices and retained metal
- Works with faculty mentors to identify potential scholarly projects

4) Interpersonal and Communication Skills: At the end of the rotation, the resident should be able to:

- Take an active role in dictating more complicated cases
- Interact with x-ray technologists, medical students, fellow residents, and attending radiologists.
- Interact with clinicians when reviewing cases involving IR imaging studies.
- Can participate in administrative and scholarly committees when asked.

- Can serve as a liaison between our department with both other radiology departments and other specialty groups in our institution.

5) Professionalism: Residents should:

- Be on time for all rotations. Residents are excused from morning lectures (not Physics lectures) while on IR rotation
- Teach Medical Students and more junior radiology residents about Interventional Radiology topics
- Residents must demonstrate ability to interact with patient/patient's family/clinician
- Is perceived as a role model for radiology from both within and outside the department.

Milestones include:

- Becomes an effective health care team member
- Continues to demonstrate professional behaviors described under year 1

6) Systems-Based Practice: At the end of the rotation, the resident should be able to:

- Regarding research or publication projects, understand the requirements and procedures for Institutional Review Board approval of research
- Be aware of the American College of Radiology Appropriateness criteria and Practice Guidelines and Technical Standards for Interventional Radiology (www.acr.org)

Milestones include:

- Incorporating QI into clinical practice
- Participates in the QA department process
- States relative cost of common procedures

Year 3: Vascular and Interventional Radiology

1) Patient Care: At the end of the rotation, the resident should be able to:

- Refine pre-procedure workup and post-procedure care
- Be the initial liaison with referring physicians on consultation and follow-up
- Present patients in daily morning rounds
- Demonstrate interpretive skills with complex pathology

Milestones include:

- Recommends appropriate imaging of common conditions independently
- Competently performs advanced procedures with minimal assistance
- Recognizes and manages complications of advanced procedures

2) Medical Knowledge: At the end of the rotation, the resident should be able to:

- Refine selective catheterization techniques
- Learn complex and uncommon vascular anatomy variants
- It is optional, but recommended, that you review your Advanced Cardiac Life Support certification. It is required that you maintain Basic Life Support certification
- Teach the variants in the anatomy of the great vessels of the aortic arch to medical students and more junior residents
- Perform complex image-guided fine needle aspiration biopsy
- Teach the indications, contraindications, and techniques of abscess or fluid collection drainage to medical students and more junior residents
- Refine pre-procedural evaluation: coagulation laboratory studies, anticoagulation medication
- Stratification of risk for percutaneous procedures

- Teach techniques for ultrasound-guided invasive procedures: understanding important landmarks and pitfalls of percutaneous procedures, including recognition of critical structures to be avoided to medical students and more junior residents
- Perform complex biopsies of soft tissue masses
- Refine post-procedural evaluation: radiographic studies, patient monitoring, management of complications

Medical Training:

- PGY 3 & 4 can rotate in the Neuroscience Institute with Dr. Michael Bellow*, 1 week during your IR rotation (**coordinate with his assistant Day 1 of your rotation and let your Preceptor and Program Coordinator know which week you will be with Dr. Bellow*)

Expected Reading List:

- Handbook of Interventional Radiologic Procedures
- The Teaching Files: Interventional

Milestones include:

- Create appropriate protocols
- Refines secondary observations
- Concise and accurate differential diagnosis
- Recommends management options

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Run intradepartmental conferences that meet with the Interventional Radiology faculty to learn from our practice's experience
- Become involved in ongoing research project or publication with faculty and possibly also with the Interventional Radiology staff and interested medical students

Milestones include:

- Re-demonstrates recognition and management of contrast reactions
- Implements safety measures to decrease average radiation dose to patients
- Works with faculty mentors to identify potential scholarly projects

4) Interpersonal and Communication Skills: At the end of the rotation, the resident should be able to:

- Dictate complicated cases
- Perform pre-procedure planning with x-ray technologists, medical students, fellow residents, and attending radiologists.
- Interact with clinicians when reviewing cases involving IR imaging studies.
- Participate in administrative and scholarly committees when asked.
- Serve as a liaison between our department with both other radiology departments and other specialty groups in our institution.

5) Professionalism: Residents should:

- Be on time for all rotations. Residents are excused from morning lectures (not Physics lectures) while on IR rotation
- Teach Medical Students and more junior radiology residents about Interventional Radiology topics
- Residents must demonstrate ability to interact with patient/patient's family/clinician
- Is perceived as a role model for radiology from both within and outside the department.

Milestones include:

- Becomes an effective health care team member and mentor more junior residents
- Demonstrates professional behaviors described under year 1 and 2

- 6) **Systems-Based Practice:** At the end of the rotation, the resident should be able to:
- Submit research or publication projects, understand the requirements and procedures for Institutional Review Board approval of research
 - Be aware of the American College of Radiology Appropriateness criteria and Practice Guidelines and Technical Standards for Interventional Radiology (www.acr.org)
 - Be aware of the Society of Interventional Radiology Clinical Practice Guidelines (www.sirweb.org)

Milestones include:

- Incorporating QI into clinical practice
- Participates in the QA department process
- States relative cost of common procedures

Year 4: Vascular and Interventional Radiology

1) **Patient Care:** At the end of the rotation, the resident should be able to:

- Knowledge of catheter maintenance and follow-up care (includes dressing changes, flushing, input and output, when to change and remove)
- Provide emergent provisional interpretation as needed.
- Be able to direct the choice of imaging modality and protocol emergent studies.
- Understand when referral or other imaging modalities is necessary.
- Become a more autonomous consultant and teacher.

Milestones include:

- Recommends appropriate imaging of uncommon conditions independently
- Integrates current research and literature with guidelines, taking into consideration cost effectiveness and risk benefit analysis, to recommend imaging
- Competently performs advanced procedures
- Recognizes and manages complications of advanced procedures
- Independently performs studies and image guided procedures

2) **Medical Knowledge:** At the end of the rotation, the resident should be able to:

- Be able to complete basic diagnostic angiogram as primary operator
- Be able to complete key components of interventional procedures as primary operator
- Review cardiac arrhythmias, their physiology and their appearance on cardiac monitors and the emergent treatment of serious arrhythmias. It is optional but recommended that you renew your Advanced Cardiac Life Support certification. It is required that you maintain Basic Life Support certification
- Understand the pathologic basis of various disease entities and how that correlates with their angiographic appearance
- Develop more confidence in performing image-guided fine needle aspiration biopsy
- Perform abscess or fluid collection drainage
- Fine needle biopsy versus core biopsy in specific application, such as focal liver mass, renal mass, thyroid/parathyroid mass, retroperitoneal lymphadenopathy

Medical Training:

- Optional rotation in the Neuroscience Institute with Dr. Michael Bellow*, 1 week during your IR rotation (**coordinate with his assistant Day 1 of your rotation and let your Preceptor and Program Coordinator know which week you will be with Dr. Bellow*)

Expected Reading list:

- Teaching Files Interventional Radiology

- Updates in Interventional Radiology
- Vascular and Interventional Imaging
- Abrams Angiography Interventional Radiology

Milestones include:

- Selects appropriate protocols and contrast agent/dose for advanced imaging
- Demonstrates knowledge of physical principles to optimize imaging quality
- Independently modifies protocols as determined by clinical circumstances
- Provides accurate, focused, and efficient interpretations
- Prioritizes differential diagnoses and recommends management
- Makes subtle observations
- Suggests a single diagnosis when appropriate
- Integrates current research and literature with guidelines to recommend management

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Shows evidence of independent study using textbooks from expected reading list.
- Demonstrates appropriate follow up of interesting cases.
- Prepares teaching file of interesting cases.
- Is able and willing to make detailed presentations of IR studies at both intra- and inter-departmental conferences.
- Upon request, participates in educational courses for clinicians, medical students, and fellow residents.
- Upon request, participates in educational activities at the local/national level.

Milestones include:

- Re-demonstrates recognition and management of contrast reactions
- Communicates the relative risk of exam specific radiation exposure to patients and practitioners. Applies principles of image Gently and Wisely
- Communicates MR safety of common implants and retained foreign bodies to patients and practitioners
- Selects appropriate sedation agent and dose of conscious sedation

4) Interpersonal and Communication Skills: At the end of the rotation, the resident should be able to:

- Dictate, select ICD-9 and ICD-10 codes and generate surgical codes and all basic angiography and interventional cases
- Take an active role in presenting interesting interventional radiology cases in conferences to other radiologists and, when appropriate, to members of other departments

Milestones include:

- Communicates without supervision in challenging circumstances
- Efficiently generates clear and concise reports that do not require substantive faculty member correction on all cases
- Communicates appropriately under stressful situations

5) Professionalism: Resident should:

- Be on time for all rotations. Residents are excused from morning lectures (not Physics lectures) while on IR rotation
- Teach nursing staff, other Interventional Radiology staff, and residents from other departments, as well as, medical students and more junior radiology residents about topics in Interventional Radiology

Milestones include:

- Is an effective team leader promoting patient welfare, patient autonomy, and social justice
- Serves as a role model for professional behavior

6) Systems-Based Practice: At the end of the rotation, the resident should be able to:

- Understand the requirements and procedures of the Institutional Review Board regarding approval of research and publication projects
- Be aware of Society of Interventional Radiology (www.sirweb.org) resources including its online Clinical Practice Guidelines, Quality Improvement documents, consensus documents, credentialing statements, policy and position statements, technical assessment documents, and coding information

Milestones include:

- Identifying and completing a systems based practice project

Assessment tools for all Vascular and Interventional Rotations:

- Reviewing rotation curriculum, goals and objectives, as a benchmark for progress of resident, and success of faculty, is educating the resident. Discussion regarding the specifics of the document is encouraged to promote improvement of the resident's learning and the program's teaching. Positive points and deficiencies and unfulfilled goals and objectives should be discussed by the residents and faculty
- Global ratings by faculty including rotation evaluation sheet
- Resident's performance discussing unknown cases in conference (one of the metrics on Global Evaluation sheet is particularly important)
- Placing cases in teaching file (one of the metrics on Global Evaluation)
- Conference attendance logs
- In-service examination
- 360 degree evaluations – supervisory technologists in radiology core
- Invasive Procedure Log submitted to Program Director
- Self assessment based on Rad Primer quizzes
- Future plans: evaluation of teaching by medical students

ACGME Required Documentation of Case & Procedure Logs:

- Thoracentesis – ultrasound guided
- Paracentesis – ultrasound guided
- PICC line placement
- Diagnostic lumbar puncture
- Lung Biopsy
- Solid Organ Liver/Kidney Biopsy
- Non-tunneled central venous access
- Abscess drainage – CT guided
- Femoral artery or venous access
- Chest tube placement or removal
- Tunneled central venous catheter removal

Angio-Interventional Imaging Curriculum based off the ABR Core Exam

1) Basic Procedures

Questions will assess whether the candidate possesses the knowledge, skills, and abilities needed for safe and effective care before, during, and after the procedure. Candidates are expected to have a detailed knowledge of the procedure itself, as well as pre- and post-procedure care.

- a) Biopsies– for example, but not limited to: neck, chest, abdomen, pelvis, and extremities, including thyroid, lung, chest wall, liver, pancreas, renal, retroperitoneal, pelvic, extremity. Note: breast biopsies will be covered in the mammography section. Bone biopsies will be covered in the musculoskeletal section.
- b) Aspirations – for example, but not limited to: neck, chest, abdomen, pelvis, and extremities, including thyroid, pleural, peritoneal, abdominal/pelvic/extremity cysts. Note that lumbar puncture and myelography will be covered in the neuroradiology section.
- c) Central venous access – for example, but not limited to: PICCs and uncomplicated non-tunneled catheters
- d) Abscess drainage – for example, but not limited to: uncomplicated chest, abdomen, pelvic, and superficial abscesses
- e) Extremity venography
- f) Catheter injections – for example, but not limited to: cholangiography, abscessogram, nephrostograms, and feeding tube checks

2) Complex Procedures

These procedures are typically performed by radiologists with more specialized training. Core Exam candidates are not expected to possess the knowledge, skills, and abilities required to perform these procedures. However, candidates are responsible for a general knowledge of these procedures. Test items will also cover pre- and post-procedure care in more detail since general radiologists are often the first to encounter patients whose clinical presentation and imaging findings warrant these complex interventions. Candidates are also expected to correctly distinguish between expected and unexpected clinical and imaging findings following these procedures.

- a) Arteriography and arterial interventions, including angioplasty, stent placement, stent graft placement, lysis, embolization, thrombectomy, therapeutic infusion
- b) Central venography and venous interventions, including IVC filter placement, IVC filter retrieval, angioplasty, stent placement, lysis, thrombectomy, sclerosis, tunneled/implanted catheter placement, dialysis interventions, and TIPS
- c) Biliary interventions, including PTC, internal/external drainage, stent placement, stone removal, percutaneous cholecystostomy
- d) Nephrostomy and ureteral stent placement, manipulation, exchange

- e) Tumor ablation (radiofrequency, cryoablation, bland embolization, chemoembolization, radioembolization)
 - f) Feeding tube placement, manipulation, exchange
 - g) Complicated drainages, including transrectal drainage, tunneled catheter placement for pleural/peritoneal collections, and pediatric procedures
- 3) Physics knowledge needed to safely perform these procedures
- a) Optimal use of radiation
 - b) Imaging artifacts



INTERVENTIONAL RADIOLOGY PROCEDURE COMPETENCY CHECKLISTS

Instructions: All IR forms for competency are to be completed by the end of the 3rd IR rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Lung Biopsy – CT – guided

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No ___ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No ___ Faculty sign off ____

Resident has completed the following required procedure: Lung Biopsy – CT-guided
(must complete 3 or more)

1. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



INTERVENTIONAL RADIOLOGY PROCEDURE COMPETENCY CHECKLISTS

Instructions: All IR forms for competency are to be completed by the end of the 3rd IR rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Solid Organ (liver/kidney) Biopsy

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No__ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No __ Faculty sign off ____

Resident has completed the following required procedure: Solid organ (liver/kidney) CT-guided or ultrasound-guided biopsy (must complete 3 or more)

1. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



INTERVENTIONAL RADIOLOGY PROCEDURE COMPETENCY CHECKLISTS

Instructions: All IR forms for competency are to be completed by the end of the 3rd IR rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Paracentesis – Ultrasound-guided

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No__ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No __ Faculty sign off ____

Resident has completed the following required procedure: Paracentesis – ultrasound-guided
(must complete 3 or more)

1. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



INTERVENTIONAL RADIOLOGY PROCEDURE COMPETENCY CHECKLISTS

Instructions: All IR forms for competency are to be completed by the end of the 3rd IR rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Thoracentesis – Ultrasound-guided

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No ___ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No ___ Faculty sign off ____

Resident has completed the following required procedure: Thoracentesis – ultrasound-guided
(must complete 3 or more)

1. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



INTERVENTIONAL RADIOLOGY PROCEDURE COMPETENCY CHECKLISTS

Instructions: All IR forms for competency are to be completed by the end of the 3rd IR rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Diagnostic Lumbar Puncture

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No__ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No __ Faculty sign off ____

Resident has completed the following required procedure: *Diagnostic Lumbar Puncture*
(must complete 3 or more)

1. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



INTERVENTIONAL RADIOLOGY PROCEDURE COMPETENCY CHECKLISTS

Instructions: All IR forms for competency are to be completed by the end of the 3rd IR rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

PICC Line Placement

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No__ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No __ Faculty sign off ____

Resident has completed the following required procedure: PICC Line Placement
(must complete 3 or more)

1. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



INTERVENTIONAL RADIOLOGY PROCEDURE COMPETENCY CHECKLISTS

Instructions: All IR forms for competency are to be completed by the end of the 3rd IR rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Non-tunneled Central Venous Access

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No ___ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No ___ Faculty sign off ____

Resident has completed the following required procedure: Non-tunneled central venous access
(must complete 3 or more)

1. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



INTERVENTIONAL RADIOLOGY PROCEDURE COMPETENCY CHECKLISTS

Instructions: All IR forms for competency are to be completed by the end of the 3rd IR rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Abscess Drainage – CT-guided

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No__ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No __ Faculty sign off ____

Resident has completed the following required procedure: Abscess drainage – CT-guided
(must complete 3 or more)

1. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



INTERVENTIONAL RADIOLOGY PROCEDURE COMPETENCY CHECKLISTS

Instructions: All IR forms for competency are to be completed by the end of the 3rd IR rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Femoral Arterial or Venous Access

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No__ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No __ Faculty sign off ____

Resident has completed the following required procedure: *Femoral arterial or venous access*
(must complete 3 or more)

1. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



INTERVENTIONAL RADIOLOGY PROCEDURE COMPETENCY CHECKLISTS

Instructions: All IR forms for competency are to be completed by the end of the 3rd IR rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Chest Tube Placement or Removal

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No__ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No __ Faculty sign off ____

Resident has completed the following required procedure: Chest tube placement or removal
(must complete 3 or more)

1. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____



INTERVENTIONAL RADIOLOGY PROCEDURE COMPETENCY CHECKLISTS

Instructions: All IR forms for competency are to be completed by the end of the 3rd IR rotation. At the end of each 1 month rotation, residents should place these forms in their portfolio. At the beginning of the month a new set of forms may be completed and the data compiled to as to meet all competencies by the end of the 3rd rotation.

Tunneled Central Venous Catheter Removal

Name of Resident: _____ Rotation 1 ____ 2 ____ 3 ____ 4 ____

Resident demonstrates ability to obtain informed consent: Yes ___ No__ Faculty sign off ____

Resident demonstrates ability to use sterile technique: Yes ___ No __ Faculty sign off ____

Resident has completed the following required procedure: *Tunneled central venous catheter removal*
(must complete 3 or more)

1. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

2. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

3. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

4. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

5. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

6. Patient MRN: _____ Date of Birth: _____ Procedure Date: _____

Outcome: _____ Faculty Sign Off: _____

ADVENTHEALTH ORLANDO DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAM

CONFIRMATION OF RECEIPT OF

VASCULAR AND INTERVENTIONAL RADIOLOGY GOALS AND OBJECTIVES

2018-2019

By signing this document, you are confirming that you have received and reviewed, with your preceptor, the vascular and interventional radiology goals and objectives for this academic year.

This receipt will be kept in your personal file.

Resident Name (please print) _____

Resident Signature _____
by signing this – you confirm that you have reviewed the G&O with your preceptor

Date _____

Preceptor Signature _____
by signing this – you confirm that you have reviewed the G&O with the resident

Date _____

AdventHealth Orlando Diagnostic Radiology Residency

Women's (Breast) Imaging Goals and Objectives

Training Location: FRI (Florida Radiology Imaging) Princeton

Many of the goals and objectives apply to all rotations and are listed below. Those goals that are more specific to a particular rotation are listed separately.

Women's Imaging Curriculum

The educational curriculum in Women's Imaging is comprised primarily of the rotations through the Women's Imaging Section at AdventHealth Orlando *and* FRI Princeton where the Faculty provide direct training and supervision; as well as, a comprehensive series of lectures and conferences in Women's Imaging. Correlation is made on a case-by-case basis with other imaging modalities, facilitated by the PACs system. A series of interdepartmental conferences, grand rounds, Journal Clubs, meetings and other venues are expected to enhance the residents' knowledge of Women's Imaging.

The residents will participate in the day-to-day interpretation of diagnostic and screening mammography, as well as problem solving involving Breast US and Breast MRI. They will be exposed to and have opportunities to review cases which utilize advanced technology in interpretation such as Computer Aided Detection in mammography and MRI, Automated Breast Ultrasound and Digital Breast Tomosynthesis. The resident will become familiar with the fundamentals of Mammographic positioning, technique, and quality control, and will use MQSA-approved BI-RADS lexicon in generating reports. They will receive hands-on training in breast US and it is expected that the resident will participate directly in scanning patients.

The resident will be trained in and expected to perform a variety of interventional breast procedures, including Stereotactic guided Core Needle Biopsy, Mammographically guided Needle Localization, Mammographically guided Radioactive Seed Localization, Ultrasound guided Cyst Aspiration, Ultrasound guided Core Needle Biopsy, MRI guided Core Biopsy and both Radioactive Seed and Needle Localization guided by US.

Residents are expected to participate in all the clinical activities of the Breast Imaging Service, including the real-time monitoring of studies, previewing images for procedures, obtaining informed consent from patients, case review with breast surgeons and referring physicians as well as preparation for and attendance at the breast multi-disciplinary conferences for the upperclassmen. The upper-class resident will have the primary responsibility of presenting cases at the conference. This will enrich the resident's understanding of the clinical, pathologic, and therapeutic issues of breast imaging.

Screening Mammogram cases – 1st through 3rd year residents are encouraged to read approximately 10 screens per day while on service. 4th year residents are encouraged to read 25-30 screening mammograms per day. This is to meet the ACR requirement of 240 mammograms read within the final 2 years of training.

A summarized curriculum for the Women's Imaging Section follows:

Epidemiology

- Risk factors
- Staging in survival rates

Breast anatomy, pathology, and physiology

- Breast development
- Normal and developmental breast anatomy and histology; alteration with the age, pregnancy, menstrual cycle, and hormonal effects
- Mammographic appearance, pathologic correlation and clinical significance of benign breast conditions, such as fibroadenoma, cysts, papilloma, hamartoma, lipoma, ductal ectasia, radial scar, and fat necrosis
- Atypical ductal hyperplasia, lobular neoplasia, and other histologic risk factors
- Pathologic and mammographic appearance, clinical features, significance, and prognosis of ductal carcinoma in situ and lobular carcinoma in situ
- Pathologic and mammographic appearance, clinical features and prognosis of invasive carcinoma, including invasive ductal carcinoma not otherwise specified, mucinous, medullary, papillary, tubular subtypes, and invasive lobular carcinoma
- Other manifestations of breast cancer, such as Paget's disease and inflammatory carcinoma
- Histologic grading
- Pathologic staging
- Multi-focal and multicentric carcinoma
- Margin analysis for specimens containing ductal carcinoma in situ

Mammographic Equipment and Technique

- Features of mammographic equipment units including target, filtration, automatic exposure control, and grids
- Equipment requirements for American College of Radiology accreditation and Mammography Quality Standards Act (MQSA) certification
- Familiarity with American College of Radiology recommended specifications for new mammography equipment
- Characteristics of mammographic film screen systems and Full Field Digital Mammography
- Positioning technique for craniocaudal and mediolateral oblique views
- View box (Digital Display) criteria for assessment of positioning, compression, exposure, contrast, sharpness, and noise
- Rationale for breast compression
- Selection of technical factors, including effects of milliamperere seconds (mAs), kilovolt peak (KVP) and density settings on image quality
- Film processing, Digital Acquisition
- Factors affecting exposure contrast, noise, and sharpness
- Need for dedicated high intensity view boxes, or high resolution digital monitors, view box masking, and magnifying glass and digital tools
- Standardized labeling of images
- Principles of Digital Breast Tomosynthesis

Mammography Quality Control

- Purpose and frequency of performance of those quality control tests performed by technologist including phantom images and processor densitometry
- Appearance and causes of artifacts, such as roller marks, grid lines, motion unsharpness, dust, poor screen-film contrast, pickoff, and scratches
- Requirements and standards for American College of Radiology Mammography Accreditation and the Food and Drug Administration MQSA certification
- Familiarity with the American College of Radiology mammography quality control manual

Mammographic interpretation

- Normal mammographic anatomy and parenchymal patterns
- Mammographic features of typically benign calcifications, such as those caused by sclerosing adenosis, fibroadenoma, fat necrosis, secretory disease, sebaceous gland calcification, dystrophic calcification and dermal calcifications
- Mammographic features of calcifications of intermediate concern and those having a higher probability of malignancy
- Significance of distribution of calcifications
- Mammographic features of benign masses and densities, such as asymmetric breast tissue, radial scar, hematoma, abscess, cysts, fibroadenoma, intramammary lymph node, hormonal replacement therapy, phylloides tumor, hamartoma, gynecomastia, lipoma, fat necrosis, edema, ductal ectasia, intracystic papilloma, and Mondor's disease
- Mammographic appearance of malignant masses, densities and architectural distortion caused by in situ and invasive ductal carcinoma, invasive lobular carcinoma, and metastases to the breast
- Knowledge of the ACR BI-RADS Lexicon

Problem Solving Mammography

- ACR practice standard for the performance of diagnostic mammography
- Technique, value, and indications for supplementary mammographic views, such as tangential, 90 degree mediolateral, spot compression, exaggerated rotated craniocaudal, cleavage; blind areas of the breast
- Technique for documentation of clustered skin calcifications
- Criteria and methods for distinguishing focal asymmetric densities, asymmetric breast tissue, and breast masses
- Technique for evaluation of implants, and implant rupture
- Masses: criteria and methods for assessment by mammography and sonography: likelihood of malignancy
- Calcification: criteria for mammographic assessment
- Magnification mammography: advantages and disadvantages, technique, doses, and indications
- Localization of lesions seen on only one view; triangulation
- Criteria for biopsy and follow-up of masse, calcifications, and soft tissue densities
- Ability to perform breast physical examination
- Evaluation and management of a palpable mass with no mammographic findings

Breast Ultrasound

- Equipment and physical principles
- Technique
- Hands-on experience
- Indications
- Normal sonographic anatomy
- Features of cysts
- Differential features of benign and malignant solid masses
- Limitations: detection and differentiation of microcalcifications:
- Need for correlation with mammography
- Criteria and reliability for evaluation of implant rupture
- ACR standard for the performance of breast ultrasound

Interventional Procedures

- Principles, indications, and contraindications, equipment, technique, advantages, disadvantages, accuracy, preparation, and follow-up for the following

- Needle wire localization (mammographically, sonographically, stereotactically and MRI guided)
- Radioactive seed localization (as above)
- Stereotactic core biopsy
- Ultrasound guided core biopsy and FNA
- MRI guided core biopsy
- Ultrasound guided cyst aspiration
- Galactography/Ductography
- Pneumocystography
- Specimen radiography, including paraffin block radiography
- Clinical Management: importance of correlation of pathologic findings with history, mammographic and sonographic findings in determining patient management
- ACR standard for the performance of stereotactically guided breasts interventional procedures
- ACR standard for the performance of ultrasound guided percutaneous breast interventional procedures

Mammographic Reporting and Medical Legal Aspects of Mammography

- American College of Radiology BI-RADS terms for the following:
 - Categorization of breast composition
 - Lesion location
 - Mass: shape, margins, and density
 - Typically benign, intermediate concern and higher probability of malignancy calcifications
 - Distribution modifiers for calcification
 - Associated findings
 - Final assessment categories
- Medical legal aspects of screening, problem solving mammography, and interventional procedures

Screening Mammography

- ACR practice standards for screening mammography
- Knowledge of practical aspects of performance and interpretation of screening mammography
- Mammographic audit: definition and desirable goals for positive predictive value, percentage stage at the zero or stage one tumors, minimal carcinomas, note positivity, prevalent and incident cancer rates, recall rates, sensitivity, specificity, and false negative rate
- Relative efficacy of physical examination, breast self-examination, and mammography
- Screening theory: lead time bias, length bias, selection bias, survival rates, prevalence versus incidence screening, definition of lead time, and interval cancer rate
- Value of double reading
- Radiation risk versus screening benefit
- Cost effectiveness of screening
- Randomized clinical trials, case control studies, and follow-up studies: purpose, methods, and results
- Controversies regarding screening
- Screening guidelines of the American College of Radiology, American Cancer Society, National Cancer Institute

Breast MRI

- Indications
- Technique
- Dynamic Enhancement Kinetics
- Characteristics of benign and malignant breast masses
- Architectural Distortion, Scar versus recurrence
- Cysts, Skin Thickening, Lymphadenopathy and other associated findings
- Implant Integrity

Therapeutic consideration

- Role of breast imaging in selection and monitoring of breast cancer treatment and post-treatment follow-up
- Basic understanding of breast cancer treatment options
- ACR standard for diagnosis and management of invasive breast carcinoma therapy
- ACR standard for diagnosis and management of ductal carcinoma in situ

Patient Management Principles

- Patient interaction and communication
- Informed consent for invasive procedures
- Follow-up procedures for positive findings

Training using the ACGME Six-Core Competencies:

Year 1: Breast Imaging Curriculum

1) **Patient Care:** At the end of the rotation, the resident should be able to:

- Assess and reinforce utilization of patient history, clinical exam and lab tests as basis of image interpretation and breast interventional procedure performance- e.g. Residents should review clinical and radiological history before performing procedure.
- Assess and reinforce development of image strategy to assess clinical problem/question, develop customized breast imaging workup and ability to recommend and choose appropriate imaging procedure; e.g. When to perform breast ultrasound versus MRI, when to recommend surgical consultation versus image guided biopsy versus close interval surveillance?
- Assess and reinforce resident respectful communication with and counseling of patients during performance of breast interventional procedures; e.g., appropriate discussion of informed consent. Residents should be closely monitored during patient interaction in procedure room.
- Assess and reinforce working knowledge of levels/risks of ionizing radiation as well as safety procedures pertaining to Mammographic imaging, demonstrate exam specific radiation dose and ALARA
- Assess and reinforce appropriate, competent and safe performance of breast interventional procedures such as ultrasound guided cyst aspiration, image guided breast biopsy, image guided wire localization and radioactive seed localization; e.g. hands on direct supervision of complex procedures. Reinforce need to follow up with patient and laboratory for patient wellbeing and histopathologic results.
- Assess and reinforce use of BIRADS lexicon in creating a clear report and facilitate direct communication with (and documentation of) referring physicians as indicated.

Milestones include:

- Using established evidence based guidelines such as ACR appropriateness criteria
- Appropriately use the electronic health record to obtain relevant clinical information
- Competently perform basic decision making for studies under indirect supervision
- Recognize and manage complications of basic procedures

2) **Medical Knowledge:** At the end of the rotation, the resident should be able to:

- Assess and reinforce knowledge of normal and developmental anatomy, histology and pathology of the breast during image interpretation and when in breast interventional procedures
- Assess and reinforce resident use of recommended breast imaging texts and websites and correct use of ACR BIRADS lexicon. Encourage participation in journal club, radiation safety lectures and in preparation of multidisciplinary conference.
- Assess and reinforce common breast clinical and scientific concepts such as imaging in differentiation of benign versus malignant neoplasia, differentiation of in situ versus invasive breast neoplasia, solitary versus multifocal versus multicentric disease and staging of breast carcinoma.
- Assess and reinforce resident's ability to apply these concepts in image interpretation and performance of breast interventional procedures.

Expected Reading List:

- Fundamentals of Diagnostic Radiology (Brant & Helm) – Women's Imaging Chapter
- Breast Imaging (Kopans)
- Breast Imaging - Companion
- Breast Imaging – The Requisites
- Breast MRI Textbook
- Clinical Breast Imaging

Milestones include:

- Selecting appropriate study and modality to evaluate breast pathology
- Makes core observations
- Formulate differential diagnoses
- Recognize critical findings
- Differentiate normal from abnormal

3) Practice Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Assess and reinforce resident ability to analyze practice experience and performance of practice based improvement activities using systematic methodology. Are residents participating in QA and applying knowledge gained?
- Assess and reinforce resident location, appraisal and assimilation of evidence from scientific studies related to relevant issues raised during image interpretation. Are residents reading appropriate breast imaging literature and bringing that knowledge to the view box?
- -assess and reinforce application of knowledge of study design and statistical methods as well as information on diagnostic and therapeutic effectiveness
- Assess and reinforce use of appropriate information technology to manage information and to support their education. Are residents using PACs efficiently and do they know all tools relevant to breast interpretation?
- Assess and reinforce resident education of other medical professionals and students. Are residents assisting in student education at breast image interpretation?

Milestones include:

- Demonstrates appropriate follow up of interesting cases
- Demonstrates knowledge gained from independent study as applied to relevant cases
- Describes the mechanism of radiation injury and the ALARA concept as it applies to Breast imaging
- Documents training in critical thinking skills and research design

4) Interpersonal and Communication: At the end of the rotation, the resident should be able to:

- Assess and reinforce resident creation of therapeutic and ethical sound relationship with patients.
- Assess and reinforce resident effective listening skills and ability to elicit and provide information. Assess during informed consent before breast interventional procedures.
- Assess and reinforce resident ability to work effectively with others as team leader or member. Are residents team focused in the breast interventional procedural areas?

Milestones include:

- Communicating information about imaging and examination results in routine, uncomplicated cases
- Obtains informed consent
- Adhere to transfer of care policies
- Generates accurate reports with appropriate elements for coding
- Communicates urgent and unexpected findings according to RSF policy

5) Professionalism: At the end of the rotation, the resident should be able to:

- Respect patient confidentiality at all times
- Demonstrate altruism
- Demonstrate compassion (be understanding and respectful of patient, their families, and medical colleagues)
- Demonstrate excellence: perform responsibilities at the highest level and continue active learning throughout one's career
- Demonstrate honesty with patients and staff

- Demonstrate honor and integrity: avoid conflict of interest when accepting gifts from patients and vendors
- Demonstrate sensitivity without prejudice 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
- Demonstrate positive work habits, including punctuality and professional appearance
- Demonstrate the broad principles of biomedical ethics

Milestones include:

- Recognizing the importance and priority of patient care and advocates for patient interests
- Fulfills work related responsibilities
- Recognizes personal limitations and seeks help when appropriate
- Responds appropriately to constructive criticism
- Maintains patient confidentiality
- Attends required meetings

6) Systems Based Practice: At the end of the rotation, the resident should be able to:

- Assess and reinforce resident knowledge of types of medical practice and delivery systems, including methods of cost control and resource allocation. For example, are image recommendations in breast reports cost conscious?
- Assess and reinforce use of cost effective health care that does not compromise quality of care. For example; are we ordering extra views which are not necessary? will a more expensive examination change the management of the patient or do we have enough information to make recommendation without it? Is there excessive wasting of needles or catheters during procedures?
- Assess and reinforce advocacy for quality patient care and assisting patients dealing with system complexity. Understanding funding sources and insurance limitations.
- Assess and reinforce resident partnering with health care managers and other providers to assess and coordinate proper care. For example, during procedures monitor interaction with technologists, nursing staff
- Assess and encourage membership in and participation in local and national radiologic societies.

Milestones include:

- Describes departmental QI initiatives
- Describes the departmental QA system

Year 2: Breast Imaging Curriculum

1) Patient Care: At the end of the rotation, the resident should be able to:

- Gather clinical and radiographic data on patients with breast lesions
- Develop diagnostic plan based on the clinical presentation and prior imaging
- Oversee customized breast imaging workups
- Counsel patients concerning exam preparations
- Demonstrate Basic understanding of mammographic report tracking
- Perform exams responsibly and safely, assuring that the correct exam is ordered and performed
- Demonstrate understanding of exam specific radiation doses and ALARA

Milestones include:

- Recommends appropriate imaging of common presentations independently
- Competently performs intermediate procedures (needle localizations, ultrasound guided needle localizations, radioactive seed localization, ultrasound guided cyst aspiration)
- Recognizes and manages complications of intermediate procedures

2) Medical Knowledge: At the end of the rotation, the resident should be able to:

- Demonstrate sufficient knowledge of breast disease and its proper application to generate meaningful differential diagnoses
- Demonstrate progress during subsequent rotations
- Demonstrate understanding of the principles of research project design and implementation
- Demonstrate a clinically appropriate diagnostic treatment plan
- Demonstrate the ability to use all relevant information resources to acquire evidence based data
- Demonstrate the proper use of radiological equipment
- Mammographic equipment and techniques
- Mammographic reporting and medical legal aspects of mammography
- Patient management principles
- How to perform needle localizations
- How to perform US guided cyst aspirations
- How to perform US guided needle localizations and radioactive seed localization

Expected Reading List:

- Breast Imaging (Kopans)
- Breast Imaging - Companion
- Breast Imaging – The Requisites
- Breast MRI Textbook
- Clinical Breast Imaging

Milestones include:

- Selects appropriate supplemental imaging after review of history and imaging
- Makes secondary observations
- Narrows differential diagnosis
- Describes management options

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Analyze and develop improvement plans in the clinical practice, including knowledge, observation, and procedural skills
- Demonstrate knowledge of and apply the principles of evidence-based medicine in practice
- Help teaching of medical students, peers and other health care professionals

Milestones include:

- Utilizes ACR criteria for determining imaging and treatment decision
- Accesses resources to determine exam specific average radiation dose info
- Accesses resources to determine safety of implanted devices & retained metal prior to MRI
- Works with faculty mentors to identify potential scholarly projects

4) Interpersonal and Communication Skills: Residents must demonstrate skills to:

- Provide a clear report based on BI-RADS Lexicon
- Provide direct communication to referring physicians, and documenting communication in report
- Demonstrate skills in obtaining informed consent, including effective communication to patients of the procedure, alternatives, and possible complications
- Demonstrate the verbal and non-verbal skills necessary for face to face listening and speaking to physicians, families, and support personnel

Milestones include:

- Communicates under direct supervision in challenging circumstances

- Communicates under direct supervision difficult information such as errors, complications, adverse events, and bad news
- Efficiently generates clear and concise reports that do not require substantive faculty member correction on routine cases
- Communicates findings and recommendations clearly and concisely

5) Professionalism: At the end of the rotation, the resident should be able to:

- Demonstrate altruism
- Demonstrate compassion (be understanding and respectful of patient, their families, and medical colleagues)
- Demonstrate excellence: perform responsibilities at the highest level and continue active learning throughout one's career
- Demonstrate honesty with patients and staff
- Demonstrate honor and integrity: avoid conflict of interest when accepting gifts from patients and vendors
- Demonstrate sensitivity without prejudice 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
- Demonstrate positive work habits, including punctuality and professional appearance
- Demonstrate the broad principles of biomedical ethics
- Demonstrate principles of confidentiality with all information transmitted during a patient encounter

Milestones include:

- Becomes an effective health care team member
- Continues to demonstrate professional behaviors described under year 1

6) Systems-Based Practice: At the end of the rotation, the resident should be able to:

- Demonstrate ability to design cost-effective care plans
- Demonstrate knowledge of funding sources
- Demonstrate knowledge of reimbursement methods
- Demonstrate knowledge of the regulatory environment
- Demonstrate knowledge of basic management principles such as budgeting, record keeping, medical records, and the recruitment, hiring, supervision and management of staff

Milestones include:

- Incorporating QI into clinical practice
- Participates in the QA department process
- States relative cost of common procedures

Year 3: Breast Imaging Curriculum

1) Patient Care: At the end of the rotation, the resident should be able to:

- Gather clinical and radiographic data on patients with breast lesions
- Develop diagnostic plan based on the clinical presentation and prior imaging
- Oversee customized breast imaging workups
- Counsel patients concerning exam preparations
- Demonstrate basic knowledge of Breast report tracking, **MQSA** requirements
- Perform exams responsibly and safely, assuring that the correct exam is ordered and performed
- Demonstrate exam specific radiation doses and ALARA

Milestones include:

- Recommends appropriate imaging of uncommon conditions independently

- Integrates current research and literature with guidelines, taking into consideration cost effectiveness and risk benefit analysis, to recommend imaging
- Competently performs advanced procedures
- Recognizes and manages complications of advanced procedures
- Independently performs image guided breast procedures with supervision

2) Medical Knowledge: At the end of the rotation, the resident should be able to:

- Demonstrate sufficient knowledge of medicine and its proper application to generate meaningful differential diagnoses
- Demonstrate progress during subsequent rotations
- Demonstrate understanding of the principles of research project design and implementation
- Demonstrate a clinically appropriate diagnostic treatment plan
- Demonstrate the ability to use all relevant information resources to acquire evidence based data
- Demonstrate the proper use of radiological equipment
- Mammographic quality control
- Learning principles of interpretation in Breast MRI
- Therapeutic Consideration
- How to perform US guided FNA
- How to perform galactograms
- How to perform pneumocystograms
- How to perform stereotactic core biopsy
- How to perform US guided core biopsy
- How to perform MRI guided core biopsy

Expected Reading List:

- Breast Imaging (Kopans)
- Breast Imaging - Companion
- Breast Imaging – The Requisites
- Breast MRI Textbook
- Clinical Breast Imaging

Milestones include:

- Selects appropriate protocols and contrast agent/dose for advanced imaging
- Demonstrates knowledge of physical principles to optimize imaging quality
- Independently modifies protocols as determined by clinical circumstances
- Provides accurate, focused, and efficient interpretations
- Prioritizes differential diagnoses and recommends management
- Makes subtle observations
- Suggests a single diagnosis when appropriate
- Integrates current research and literature with guidelines to recommend management

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Analyze and develop improvement plans in the clinical practice, including knowledge, observation, and procedural skills
- Demonstrate knowledge of and apply the principles of evidence-based medicine in practice
- Prepare and present cases to multidisciplinary case conference / Tumor Board

Milestones include:

- Communicates the relative risk of exam specific radiation exposure to patients and practitioners. Applies principles of image Gently and Wisely
- Communicates MR safety of common implants and retained foreign bodies to patients and practitioners

4) Interpersonal Skills: Residents must demonstrate skills to:

- Provide a clear report. Based on BI-RADS Lexicon
- Provide direct communication to referring physicians, and documenting communication in report
- Demonstrate skills in obtaining informed consent, including effective communication to patients of the procedure, alternatives, and possible complications
- Demonstrate the verbal and non-verbal skills necessary for face to face listening and speaking to physicians, families, and support personnel

Milestones include:

- Communicates without supervision in challenging circumstances
- Efficiently generates clear and concise reports that do not require substantive faculty member correction on all cases
- Communicates appropriately under stressful situations

5) Professionalism: Residents must demonstrate skills to:

- Demonstrate altruism
- Demonstrate compassion (be understanding and respectful of patient, their families, and medical colleagues)
- Demonstrate excellence: perform responsibilities at the highest level and continue active learning throughout one's career
- Demonstrate honesty with patients and staff
- Demonstrate honor and integrity: avoid conflict of interest when accepting gifts from patients and vendors
- Demonstrate sensitivity without prejudice 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
- Demonstrate positive work habits, including punctuality and professional appearance
- Demonstrate the broad principles of biomedical ethics
- Demonstrate principles of confidentiality with all information transmitted during a patient encounter

Milestones include:

- Is an effective team leader promoting patient welfare, patient autonomy, and social justice
- Serves as a role model for professional behavior

6) Systems-Based Practice: Residents must demonstrate skills to:

- Demonstrate ability to design cost-effective care plans
- Demonstrate knowledge of funding sources
- Demonstrate knowledge of reimbursement methods
- Demonstrate knowledge of the regulatory environment
- Demonstrate knowledge of basic management principles such as budgeting, record keeping, medical records, and the recruitment, hiring, supervision and management of staff

Milestones include:

- Identifying and completing a system based practice project

Year 4: Breast Imaging Curriculum

- 4th year residents will read in Orlando, at an approved mammo reading station.
- 1st-3rd year residents will read at Princeton. If there is no 1st-3rd year on rotation, the 4th year will read at Princeton.

- Breast biopsies/localizations at Princeton will be shared by the residents on service.
- Read screens off the Orlando list, to be read out with Turner/Landrieu at Pensacola
- Read screens from East Division, read out with the Princeton attending
- Readout of screens with the IR Float attending may occur.
- Be the first in-line to receive off-site diagnostic mammograms from Lake Nona, Winter Garden, and/or other facilities, which are distributed by phone to the Women's Rads by the RFs.
- 4th years should work-up the patient as independently as possible (additional views, US, patient history assessment, etc.), receiving telephone guidance/oversight from a Women's rad.

1) Patient Care: At the end of the rotation, the resident should be able to:

- Gather clinical and radiographic data on patients with breast lesions
- Independently develop diagnostic plan based on the clinical presentation and prior imaging
- Oversee customized breast imaging workups
- Perform exams responsibly and safely, assuring that the correct exam is ordered and performed
- Counsel patients concerning exam preparations
- Demonstrate knowledge of Breast report tracking, **MQSA** requirements
- Understands exam specific radiation doses and ALARA

Milestones include:

- Independently recommends appropriate imaging of uncommon conditions
- Integrates current research and literature with guidelines, taking into consideration cost effectiveness and risk benefit analysis, to recommend imaging
- Independently performs image guided breast procedures
- Recognizes and manages complications of breast procedures

2) Medical Knowledge: At the end of the rotation, the resident should be able to:

- Demonstrate advanced knowledge of medicine and its proper application to generate meaningful differential diagnoses
- Demonstrate advanced depth of knowledge of breast conditions and appropriate management, including a clinically appropriate diagnostic treatment plan
- Demonstrate understanding of the principles of research project design and implementation
- Demonstrate the ability to use all relevant information resources to acquire evidence based data
- Demonstrate the proper use of radiological equipment
- Mammographic quality control
- Advanced evaluation and interpretation of breast MRI and appropriate recommendations
- Mastery of performance of US guided FNA
- Mastery of performance of galactograms
- Mastery of performance of stereotactic core biopsy
- Mastery of performance of US guided core biopsy
- Mastery of performance of MRI guided core biopsy

Expected Reading List:

- Breast Imaging (Kopans)
- Breast Imaging - Companion
- Breast Imaging – The Requisites
- Breast MRI textbook
- Clinical Breast Imaging

Milestones include:

- Selects appropriate protocols and contrast agent/dose for advanced imaging
- Demonstrates advanced knowledge of physical principles to optimize imaging quality

- Independently modifies protocols as determined by clinical circumstances
- Provides accurate, focused, and efficient interpretations independently
- Prioritizes differential diagnoses and recommends management
- Makes subtle observations
- Suggests a single diagnosis when appropriate
- Integrates current research and literature with guidelines to recommend management

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Analyze and develop improvement plans in the clinical practice, including knowledge, observation, and procedural skills
- Demonstrate advanced knowledge of and apply the principles of evidence-based medicine in practice
- Prepare and present cases to multidisciplinary case conference / Tumor Board
- Teaching of medical students, peers and other health care professionals

Milestones include:

- Communicates the relative risk of exam specific radiation exposure to patients and practitioners. Applies principles of image Gently and Wisely
- Communicates MR safety of common implants and retained foreign bodies to patients and practitioners

4) Interpersonal Skills: Residents must demonstrate skills to:

- Provide a clear report based on BI-RADS Lexicon
- Provide direct communication to referring physicians, and documenting communication in report
- Demonstrate skills in obtaining informed consent, including effective communication to patients of the procedure, alternatives, and possible complications
- Demonstrate the verbal and non-verbal skills necessary for face to face listening and speaking to physicians, families, and support personnel

Milestones include:

- Communicates without supervision in challenging circumstances
- Efficiently generates clear and concise reports that do not require substantive faculty member correction on all cases
- Communicates appropriately under stressful situations

5) Professionalism: Residents must demonstrate skills to:

- Demonstrate altruism
- Demonstrate compassion (be understanding and respectful of patient, their families, and medical colleagues)
- Demonstrate excellence: perform responsibilities at the highest level and continue active learning throughout one's career
- Demonstrate honesty with patients and staff
- Demonstrate honor and integrity: avoid conflict of interest when accepting gifts from patients and vendors
- Demonstrate sensitivity without prejudice 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
- Demonstrate positive work habits, including punctuality and professional appearance
- Demonstrate the broad principles of biomedical ethics
- Demonstrate principles of confidentiality with all information transmitted during a patient encounter

Milestones include:

- Is an effective team leader promoting patient welfare, patient autonomy, and social justice

- Serves as a role model for professional behavior

6) Systems-Based Practice: Residents must demonstrate skills to:

- Demonstrate ability to design cost-effective care plans
- Demonstrate knowledge of funding sources
- Demonstrate knowledge of reimbursement methods
- Demonstrate knowledge of the regulatory environment
- Demonstrate knowledge of basic management principles such as budgeting, record keeping, medical records, and the recruitment, hiring, supervision and management of staff

Milestones include:

- Identifying and completing a systems based practice project

Assessment tools for all Women's Imaging Rotations:

- Reviewing rotation curriculum and the goals and objectives, as a benchmark for monitoring the progress of the resident, as well as the evaluating the success of faculty in educating the resident. Discussion regarding the specifics of the document is encouraged to promote improvement of the resident's learning and the program's teaching. Positive points and deficiencies and unfulfilled goals and objectives should be discussed by the residents and faculty
- Global ratings by faculty including rotation evaluation sheet
- Resident's performance discussing unknown cases in conference (one of the metrics on Global Evaluation sheet)
- Placing cases in teaching file (one of the metrics on Global Evaluation)
- Conference attendance logs
- In-service examination
- 360 degree evaluations – supervisory technologists in radiology core
Self-assessment based on Rad Primer quizzes
- Evaluation of teaching by medical students

ACGME Required Documentation of Case & Procedure Logs:

- Mammography (300)
- Imaging Guided Bx (25 total)

**The Mammography Quality Standards Act (MQSA)
Breast Imaging Experience Requirements**

Starting with the medical residency graduating classes of 2014, the American Board of Radiology (ABR) will require each resident to demonstrate proficiency across all of diagnostic radiology by completing a Comprehensive Core Examination after 36 months of residency training. This examination will be followed

by a Final Certifying Examination administered 15 months after the resident graduates from the medical residency program. Graduates will no longer have the opportunity to become board certified by the ABR during the medical residency.

In order to immediately begin independent interpretation of mammograms following a residency program, medical residency graduates of 2014 or later must:

Have interpreted 240 mammographic examinations under direct supervision within any 6-month period during the last two years of the medical residency. (That is, for newly graduating medical residents, the interpretation of the 240 exams may be during any 6-month period during the last 2 years of the residency program, as opposed to the last six months of the residency program, as was previously required.)

Have completed 3 months of formal training in the interpretation of mammograms and in topics related to mammography (including instruction in radiation physics specific to mammography, radiation effects, and radiation protection).

Have completed a minimum of 60 category I hours of documented medical education in mammography (including instruction in the interpretation of mammograms, basic breast anatomy, pathology, physiology, technical aspects of mammography, and quality assurance and quality control in mammography), with at least 15 of the category I hours having been acquired within the 3 years immediately prior to the date that the physician qualified as an interpreting physician.

A new residency letter template is available on the [MQSA webpage](#). The new residency letter template is applicable only for residents who graduate in June 2014 or later. All former residency letter templates and initial interpreting physician qualification requirements are still applicable to the time periods that they were previously used for.

Alternate pathways are available for those who are unable to become board certified ([refer to www.FDA.gov for these MQSA regulations](#)).

Women's Imaging Curriculum based off the ABR Core Exam

1) Regulatory/Standards of Care

- a) Components and desired goals of the medical audit for breast cancer detection
- b) Appropriate application of the Breast Imaging Reporting and Data System (BI-RADS) terminology and assessment categories
- c) Mammography Quality Standards Act (MQSA) requirements
- d) Quality determinants of mammography, breast ultrasound, and breast MR, including positioning, image processing, artifacts, optimal technique, and equipment

2) Screening

- a) Indications
- b) Normal anatomy (mammography, ultrasound, MR)
- c) Lesion detection and localization
- d) Computer-aided detection
- e) Breast cancer risk factors, including the identification and management of women at high risk for breast cancer

3) Diagnostic Breast Imaging

- a) Appropriate mammographic views for work-up of a breast lesion
- b) Evaluate and manage women and men with breast symptoms
 - i) Palpable masses
 - ii) Breast thickening
 - iii) Nipple discharge
 - iv) Nipple retraction
 - v) Skin changes
- c) Appearance and management of inflammatory processes in the breast
 - i) Benign
 - ii) Malignant
- d) Role of imaging in surgical staging and surgical planning in women with recently diagnosed breast cancer
- e) Normal and abnormal appearance after surgical procedures
 - i) Breast implants
 - ii) Breast augmentation
 - iii) Breast reduction
 - iv) Breast reconstruction
 - v) Normal and abnormal appearance of breast-conserving therapy

4) Pathology

- a) Appearance and management of benign breast lesions, high-risk lesions, ductal carcinoma in situ, invasive ductal carcinoma, and other special types of breast carcinoma
- b) Appearance and causes of benign and malignant male breast disease

5) Imaging findings

- a) Characteristics of benign and malignant breast calcifications

- b) Characteristics of benign and malignant breast masses
 - c) Identify and appropriately manage imaging findings
 - i) Mammography
 - (1) Abnormal calcifications
 - (2) Masses
 - (3) Asymmetries
 - (4) Architectural distortion
 - ii) Ultrasound
 - iii) Breast MR
 - (1) Masses
 - (2) Non-mass findings
 - d) Identify and understand the causes of abnormal lymph nodes on mammography, ultrasound, or MRI
- 6) Breast Intervention**
- a) Percutaneous breast biopsy techniques
 - i) Wire localization
 - ii) Core biopsy
 - iii) Vacuum-assisted biopsy
 - iv) Fine needle aspiration
 - v) Galactography/Ductography
 - vi) Cyst aspiration
 - b) Specimen radiography
 - c) Concordant versus discordant percutaneous biopsy results for imaging appearance of a breast abnormality and appropriate management
 - d) Patient safety
- 7) Physics**
- a) Mechanism of obtaining and optimizing film-screen or digital mammograms
 - i) Target/filter combinations
 - ii) Use of a grid
 - iii) Reduction of scatter
 - iv) Radiation dose
 - b) Adjustment of mammography techniques for special cases, including thin breasts
 - c) Mechanism of obtaining and optimizing breast US images
 - d) Mechanism of obtaining and optimizing breast MR images
 - e) Recognition, understanding, and correction of artifacts in breast imaging, including mammography, US, and MR imaging
 - f) Workstation display of digital mammograms
 - i) Required equipment parameters
 - ii) Image processing
- Computer-assisted display software for breast MRI, including the role of dynamic enhancement characteristics

ADVENTHEALTH ORLANDO DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAM

CONFIRMATION OF RECEIPT OF

WOMEN'S (BREAST) IMAGING GOALS AND OBJECTIVES

2018-2019

By signing this document, you are confirming that you have received and reviewed, with your preceptor, the Women's imaging goals and objectives for this academic year.

This receipt will be kept in your personal file.

Resident Name (please print) _____

Resident Signature _____
by signing this – you confirm that you have reviewed the G&O with your preceptor

Date _____

Preceptor Signature _____
by signing this – you confirm that you have reviewed the G&O with the resident

Date _____

AdventHealth Orlando Diagnostic Radiology Residency

Physics Goals and Objectives

Goals and objectives are based on recommendations and requirements from the AAPM, RSNA, NRC, FL DOH, and ACGME

Module 1: Basic Physics and Interactions

YEAR 1:

1. Understand terminology, units of measure, and basic concepts of medical physics.
2. List the components of the atom and describe its structure
3. Identify the different categories and properties of particulate radiation
4. Describe types of photon interactions and their energy deposition
5. Define attenuation, absorption, and scatter.
6. Describe the SI and Classical units for measuring the radiology related quantities (e.g., KERMA, dose, activity, energy, etc.)

YEAR 2:

1. Describe how nuclear structure influences whether an atom decays and what radiation it emits
2. Perform calculations regarding decay and half-life
3. Describe relationships between energy, wavelength, frequency, and velocity
4. Describe how charged and uncharged particles interact with matter and how properties such as density and atomic number alter the probability of a specific interaction
5. Describe and perform calculations with attenuation and half-value layer
6. Describe why a contrast agent is radio-opaque
7. Describe appropriate x-ray beam energies to be used when iodine and barium contrast agents are used
8. Identify which photon interactions are dominant for each modality and therapy in radiology
9. Describe how image quality and patient dose are affected by interactions of radiation with matter
10. Describe the purpose of adding Cu filters in vascular imaging
11. Describe how particulate radiation properties alter our approaches to safety
12. Discuss the appropriate use or applicability of radiation quantities in the health care applications of imaging, therapy, and safety

YEAR 3:

1. Be able to explain basic physics and interactions of ionizing radiation with matter to a layperson

YEAR 4:

1. Implement concepts of medical physics into clinical workflow. This includes, but is not limited to, troubleshooting, quality improvement and interaction with site physicists.

Module 2: Fundamental Image Science and Informatics

YEAR 1:

1. Understand terminology, metrics, and technology associated with image science and informatics
2. Describe basic statistical quantities related to central tendency and dispersion
3. Explain different image quality metrics
4. Explain binary and how it relates to digital images

5. Describe basic informatics infrastructure (PACS, LAN, WAN, etc.)
6. Describe the purpose of IHE, DICOM and HL7
7. Explain display components and metrics related to display and the display environment
8. Describe basic image processing

YEAR 2:

1. Calculate how uncertainties propagate (e.g., $x \pm \sigma_x + y \pm \sigma_y = ?$)
2. Illustrate how the properties of the imaging system can be used to select the best system for a specific task
3. Calculate storage requirements for various images
4. Describe the different methods for representing image data, and identify the attributes used to assess the quality of the data acquired or an imaging system
5. Review the methods and technology used to display image data accurately and consistently (e.g., LCD, Luminance, Illuminance, etc.)
6. Give examples of what is required to optimize a display system and its associated environment in viewing images for different applications
7. Trace the information associated with a patient exam through the HIS and RIS to the PACS
8. Explain ROC Analysis
9. Describe the different processes used to convert the acquired raw data into a final image used for interpretation
10. Associate the characteristics of the human visual system with the task of viewing image data and the metrics used to assess an observer's response to the data
11. Determine how changes in image processing impact the final image produced
12. Evaluate how these changes affect the image of different objects or body parts and their associated views
13. Choose the appropriate image processing to be used for a specific exam
14. Describe FROC analysis
15. A series of portable chest x-ray images show blurring in the lung parenchyma. Explain possible causes for this occurrence
- 16.

YEAR 3:

1. Be able to explain basic physics and interactions of ionizing radiation with matter to a layperson

YEAR 4:

1. Implement concepts of medical physics into clinical workflow. This includes, but is not limited to, critically assessing statistics and methodology of published literature and optimizing one's own work environment (e.g., ambient lighting).

Module 3: X-ray Production and Projection Imaging Concepts

YEAR 1:

1. Understand terminology, basic functioning, and components, of x-ray production and projection imaging.
2. Describe the two mechanisms by which energetic electrons produce x-rays and the energy distribution for each mechanism of x-ray production
3. Describe the function of the cathode and anode of an x-ray tube and how variations in their design influence x-ray production
4. Define the attributes of an x-ray beam including of filtration and spectrum of energies produced

5. Identify common artifacts
- 6.

YEAR 2:

1. Describe the detector types used to acquire an x-ray imaging
2. Describe how distance to the patient and detector affect patient dose
3. Describe the heel effect and how it can be used to improve clinical radiographs
4. Analyze how changes in the x-ray system components change the image quality and dose for different procedures
5. Discuss image quality and dose differences between CR and DR systems
1. Describe how the controls of an x-ray system affect the technique factors used in diagnostic imaging
2. Describe how the x-ray tube design, target material, beam filtration, and focal spot size are optimized for a specific imaging task (e.g., mammography, interventional imaging, CT)
3. Give examples of how each detector type performs in imaging a specific body part or view, and describe how the attributes of each detector type influence the resulting image
6. Calculate magnification factors

YEAR 3:

4. Be able to explain basic physics surrounding x-ray production and projection imaging to a layperson

YEAR 4:

1. Implement concepts of medical physics into clinical workflow. This includes, but is not limited to, troubleshooting and quality improvement

Module 4: General Radiography

YEAR 1:

1. Understand terminology, units of measure, and basic concepts of radiography.
2. Describe the components of a radiographic imaging system
3. List and describe the factors affecting radiographic image quality
4. Define entrance skin exposure, EI, and DI
5. Describe scatter and scatter factor

YEAR 2:

1. Describe the different types of acquisition systems used in general radiography
2. Give examples of appropriate technique factors used in common radiographic procedures
3. Differentiate among the imaging acquisition parameters used in various clinical applications
4. Differentiate mobile from fixed systems
5. Explain how the geometric features of a general radiographic system affect the resulting image
6. Distinguish among the basic imaging requirements for specific body part or views acquired in general radiography
7. Describe how to reduce patient dose
8. Analyze the radiation dose from a medical procedure, and be able to communicate the benefits and risks to the referring physician

YEAR 3:

1. Be able to explain basic physics and interactions of ionizing radiation with matter to a layperson

YEAR 4:

1. Implement concepts of general radiography into clinical workflow. This may include, but is not limited to, assessing image quality and dose with follow up to site physicists and/or troubleshooting

Module 5: Mammography, Tomosynthesis, and Breast Biopsy

YEAR 1:

1. Understand terminology, units of measure, and basic concepts of mammography, tomosynthesis, and breast biopsy
2. Describe unique features of mammography, tomosynthesis and breast biopsy systems
3. Define AGD
4. Understand basic regulatory issues
5. Describe the BIRADS system

YEAR 2:

1. Associate image quality changes with radiation dose changes
2. Explain compression benefits
3. Explain magnification techniques.
4. Discuss possible image artifacts in mammography and corrective methods that could be used to reduce them
5. Describe AGD and breast radiation dosimetry
6. Discuss MQSA (Mammography Quality Standards Act) and its effect on mammography image quality and dose
7. Describe appropriate uses of the different targets and filters available in mammography systems
8. Describe QA
9. Identify factors influencing image contrast and detail as they relate to the visualization of lesions in mammography

YEAR 3:

1. Be able to explain basic physics of mammography, tomosynthesis, and breast biopsy to a layperson

YEAR 4:

1. Implement concepts of medical physics into clinical workflow. This may include, but is not limited to, troubleshooting, quality improvement, and interaction with site physicists.

Module 6: Fluoroscopy and Interventional Radiography (IR)

YEAR 1:

1. Understand terminology, units of measure, and basic concepts of fluoroscopy and interventional radiology
2. Describe and identify the basic components of a fluoroscopic system
3. Explain the features and functions of image intensifier (II) systems used for fluoroscopy
4. Explain the features and functions of flat panel detector systems used for fluoroscopy
5. Describe the different operating modes used in fluoroscopy imaging
6. Name the factors that affect patient dose during a fluoroscopic or interventional procedure
7. Explain cumulative dose, exposure, interventional reference point, and dose-area product
8. Describe where the operator should stand to minimize personnel dose when performing an interventional fluoroscopy procedure
9. Describe the geometric factors that affect operator dose during an interventional fluoroscopy procedure

YEAR 2:

1. Explain how the geometric features of a fluoroscopic system contribute to the resulting image
2. Identify the components that determine image quality in a fluoroscopy system and the causes of image degradation
3. Describe how patient radiation dose is estimated in fluoroscopy and interventional procedures
4. Discuss the artifacts that can occur with image intensified and flat-panel fluoroscopy systems
5. Discuss basic image processing methods used in fluoroscopy and describe how they are used clinically
6. Review the various application requirements for fluoroscopy and interventional radiology systems
7. Differentiate among the various image acquisition parameters used in specific clinical applications of fluoroscopy and interventional radiology
8. Describe the geometric and clinical equipment settings which can be implemented to minimize patient peak skin dose in fluoroscopy and interventional radiology

YEAR 3:

9. Be able to explain basic physics and functioning of fluoroscopy and interventional radiography units to a layperson

YEAR 4:

1. Implement concepts of medical physics into fluoroscopic and interventional clinical workflow. This may include, but is not limited to, troubleshooting, quality improvement and interaction with site physicists.

Module 7: Computed Tomography (CT)

YEAR 1:

1. Understand terminology, units of measure, and basic concepts of computed tomography.
2. Identify the major components of a CT system
3. Define the Hounsfield unit, and describe how a CT image is formed
4. Describe the concepts of CT Dose Index (CTDI), Dose-Length Product (DLP), Effective Dose, Organ Dose, and Size-Specific Dose Estimate (SSDE)
5. List typical CT numbers for tissues such as air, water, fat, blood, brain, and bone

YEAR 2:

1. Understand how the reconstruction kernel (i.e., software filter) selected affects image quality
2. Describe common artifacts and their causes
3. Describe the relationship between contrast resolution and radiation dose and the effect of imaging parameters on both
4. Explain over-beaming and over-ranging and how each affects patient dose
5. Compare image characteristics of CT to other modalities such as digital radiography
6. Explain how dose modulation affects patient dose
7. Describe QA
8. Describe the differences between sequential and helical scanning
9. Explain the difference between reconstructing and reformatting an image
10. List the image acquisition parameters, and explain how each affects the CT image quality
11. Describe the concepts of CT Dose Index (CTDI), Dose-Length Product (DLP), Effective Dose and Organ Dose
12. Identify the sources of CT image artifacts, and describe how those artifacts may be eliminated or reduced

13. Explain why pre-set window width and levels are selected for viewing images
14. Discuss the use of breast shields and lead shielding in CT
 1. Discuss appropriate protocols for pediatric CT
 2. Specify the image acquisition parameters that affect patient radiation dose, and describe how dose can be minimized
15. Review the considerations necessary when a CT scan needs to be performed on a pregnant patient

YEAR 3:

3. Be able to explain basic physics and technology of CT to a layperson

YEAR 4:

1. Implement concepts of medical physics into clinical workflow. This may include, but is not limited to, troubleshooting, quality improvement and interaction with site physicists.

Module 8: Nuclear Medicine

YEAR 1:

1. Understand terminology, units of measure, and basic concepts of Nuclear Medicine
2. Describe the modes of radioactive decay, particle and photon emissions, and interactions of radiation with matter
3. Describe the instrumentation, major components, and principles of operation for instruments commonly used for detecting, measuring, and imaging radioactivity
4. Explain MIRD
5. Describe the methods of determining organ dose and whole body dose to patients and care givers
6. Describe probability distributions, nuclear counting statistics and statistics applicable to nuclear imaging
7. Review regulations related to radioactive materials
8. Describe common therapies performed in radiology
9. Describe basic methods to prevent contamination and reduce exposure
10. Understand the role and workings of a hot lab

YEAR 2:

1. Explain how to determine the radiopharmaceutical activity administered to adults and pediatric patients for various imaging procedures
2. Describe common artifacts
3. Discuss the impact that contrast agents used in non-nuclear imaging procedures have on the nuclear medicine image
4. Describe the factors that affect image quality
5. Describe instrumentation and software QC tests
6. Describe radionuclide production and the principles of radiochemistry
7. Identify established radiopharmaceuticals, the indications for use and appropriate adult and pediatric dosages
8. Describe radiopharmaceutical QC tests
9. Explain how various disease processes (e.g., malignant, metabolic, infectious, etc.) can be evaluated by each imaging agent
10. Identify established radiopharmaceuticals, the indications for use and appropriate adult and pediatric dosages

11. Demonstrate a working knowledge of computational image-processing, quality control of image acquisition and processing
12. Explain and discuss for each organ system the advantages, disadvantages, indications and contraindications for each radiopharmaceutical used in imaging and therapeutic procedures
13. Determine the period of time a lactating patient should be instructed to cease breastfeeding following a radioisotope imaging or therapeutic procedure
14. Evaluate the risk of performing a nuclear imaging procedure on a pregnant patient

YEAR 3:

15. Be able to explain basic physics and instrumentation found in nuclear medicine to a layperson

YEAR 4:

1. Implement concepts of medical physics into clinical workflow. This may include, but is not limited to, troubleshooting, quality improvement and interaction with site physicists.

Module 9: Magnetic Resonance Imaging (MRI)

YEAR 1:

1. Understand terminology, units of measure, and basic concepts of MRI
2. Describe the properties of magnetism and how materials react to and interact with magnetic fields
3. Describe how the magnetic resonance signal is created
4. Describe magnet designs and typical magnetic field strengths employed for clinical imaging
5. Define the physical properties of a material that determine the MR signal
6. List the components of an MR system and how they are used
7. Describe how spatial localization is achieved in MRI
8. Describe how T1, T2, proton density and T2* contrast can be achieved in MRI
9. Review the safety and bioeffects of concern in MR systems
10. Describe the risks and benefits when MR imaging is used on a pregnant patient
11. Discuss clinical situations in which MRI procedures are contra-indicated

YEAR 2:

1. Describe the contrast agents use in MR
2. Describe the concept of partial saturation and how it affects the signal acquired
3. Identify the source and appearance of MRI artifacts
4. Compare the basic pulse sequences used to produce contrast between tissues in MRI
5. Review the principles of k-space generation and describe how to “fill k-space” to optimize signal strength (signal-to-noise ratio) or acquisition time
6. Explain how secondary tissue properties like diffusion, perfusion and flow can be distinguished in MRI
7. Describe parallel imaging and its impact on SNR and acquisition time
8. Review the important concepts of functional MRI
9. Review the important concepts of MR spectroscopy
10. Estimate how the installation of different hardware (e.g., different field strength system) might change the acquisition parameters and image quality in MRI
11. Analyze how a change in the acquisition parameters affects the resulting MR image
12. Describe QA
13. Identify the most appropriate pulse sequences for a specific diagnostic task
14. Discuss clinical situations in which MRI should be requested over alternative diagnostic

YEAR 3:

1. Be able to explain basic physics, safety, and instrumentation of MRI to a layperson

YEAR 4:

2. Implement concepts of medical physics into clinical workflow. This may include, but is not limited to, troubleshooting, quality improvement and interaction with site physicists.

Module 10: Ultrasound (US)

YEAR 1:

1. Understand terminology, units of measure, and basic concepts of ultrasound
2. Identify common terms of sound wave propagation and ultrasound interactions with matter
3. Describe the basic design of ultrasound transducers, and explain the principles of beam formation
4. Describe the different types of array transducers
5. Understand the definitions of axial, lateral and elevational resolution.
6. Describe the Doppler principle and its applications in various Doppler imaging modes
7. Delineate the mechanisms for producing ultrasound bioeffects and describe the significance of the parameters MI and TI.

YEAR 2:

1. Describe the factors affecting spatial and temporal resolution, including multiple focal zones
2. Identify common artifacts seen in ultrasound.
3. Explain aliasing and other Doppler-related artifacts
4. Understand the principles of advanced ultrasound technologies, such as harmonic imaging, extended field of view, compound imaging, 3D/4D ultrasound and ultrasound contrast agents
5. Describe how scanner settings affect the clinical image and how to adjust the scan parameters to optimize image quality for different clinical applications
6. Explain how to improve image quality during ultrasound imaging
7. Explain the causes of ultrasound imaging artifacts and Doppler aliasing. Discuss how to reduce such artifacts, and explain how to use imaging effects and artifacts for diagnosis
1. Describe appropriate indications when advanced ultrasound technologies, such as harmonic imaging, should be used in clinical imaging.
2. Describe the ultrasound parameters related to ultrasound bioeffects and safety

YEAR 3:

3. Be able to explain basic physics and instrumentation of ultrasound to a layperson

YEAR 4:

1. Implement concepts of medical physics into clinical workflow. This may include, but is not limited to, troubleshooting, quality improvement and interaction with site physicists.

Module 11: Radiation Biology

YEAR 1:

1. Understand terminology, units of measure, and basic concepts of radiobiology
2. Describe R's of radiobiology
3. Discuss the probability of cell survival for low-LET radiations
4. Describe stages of ARS from whole body irradiation
5. Understand the thresholds for deterministic effects, including cutaneous radiation injury, cataracts and sterility
6. Explain the risk of carcinogenesis due to radiation

7. Understand the latencies for different cancers
8. Describe the effect of radiation on mutagenesis and teratogenesis
9. List the most probable in utero radiation effects at different stages of gestation
10. Define the principles of how radiation deposits energy that can cause biological effects
11. Explain the difference between direct and indirect effects, how radiation affects DNA and how radiation damage can be repaired

YEAR 2:

1. Compare the radiosensitivities of different organs in the body
2. Recognize the risk vs. benefit in radiation uses, and recognize the information sources that can be used to assist in assessing these risks
3. Describe the different dose response models for radiation effects
4. Understand the risks to patients from high-dose fluoroscopy regarding deterministic effects, such as cutaneous radiation injury and cataractogenesis, and the importance of applying radiation protection principles in clinical protocols to avoid damage
5. Understand the risks to the female breast, especially in girls, from repeated imaging for scoliosis, from mobile chest radiography and CT scans; and the importance of applying radiation protection principles in clinical protocols to minimize future harm
6. Explain radiation risks to pregnant technologists assisting in fluoroscopic procedures
7. Explain radiation risks to pregnant nurses who are incidentally exposed in mobile radiography (“portables”)
8. Understand the best use of gonad shielding and breast shields

YEAR 3:

1. Plan an interventional procedure to minimize the risk of deterministic effects
2. Select the most appropriate radiological exam for a pregnant patient
3. Determine the risk vs. benefit for a new procedure shown at a conference
4. Read BEIR and UNSCEAR reports

YEAR 4:

1. Be able to explain all topics of radiation biology to a layperson

Module 12: Radiation Protection

YEAR 1:

1. Understand terminology, units of measure, and basic concepts of radiation protection
2. Identify the sources of background radiation, and describe the magnitude of each source
3. State the radiation limits to the public and radiation workers (Maximum Permissible Dose Equivalent limits)
4. Define the principles of time, distance and shielding in radiation protection
5. Define ALARA and its application in radiation protection
6. Identify the methods used to monitor occupational exposure
7. Understand the differences among advisory bodies, accrediting organizations and regulatory organizations for radioactive materials and radiation-generating equipment, and recognize their respective roles

YEAR 2:

1. Describe the fundamental methods used to determine patient and fetal doses.
2. List the steps in managing radiological emergencies

3. Discuss the contributions of medical sources to the collective effective dose
4. Describe the use of personnel radiation protection equipment
5. Discriminate between workers in an area who are occupationally exposed and those who are treated as members of the general public
6. Discuss the factors that determine dose to a pregnant person seated next to a patient injected with a radionuclide for a diagnostic or therapeutic procedure
7. Discuss appropriate equipment used to monitor radiation areas or areas of possible exposure or contamination
8. Define the responsibilities and qualifications of an authorized user (all categories) and the radiation safety officer
9. Describe the training and experience requirements for using sealed and unsealed sources of radioactive material
10. Describe the appropriate equipment for wipe tests and contamination surveys
11. Provide information to the public concerning radon
12. Describe what must be done before administering a radioactive material in a patient
13. Describe what is required to have a person listed on a facility's Nuclear Materials license as an Authorized User
14. Explain the basic principles for designing radiation shielding
15. Describe the steps used in applying appropriateness criteria

YEAR 3:

1. Be able to explain and justify basics of radiation protection to a layperson

YEAR 4:

1. Implement concepts of radiation protection into clinical workflow. This may include, but is not limited to, troubleshooting, quality improvement and interaction with site physicists.

Module 11: Patient Case and Technical Skills (ACGME PCTS1) – Use of Physics

YEAR 1:

1. Understand the place of the ACR Appropriateness Criteria

YEAR 2:

N/A

YEAR 3:

1. Integrate current research and literature with guidelines, taking into consideration cost effectiveness and risk-benefit analysis, to recommend imaging

YEAR 4:

1. Participate in research, development, and implementation of imaging guidelines

Module 11: Protocol Selection and Optimization of Images (ACGME MK1) – Use of Physics

YEAR 1:

1. Recognize sub-optimal imaging

YEAR 2:

1. Demonstrates knowledge of physical principles to optimize image quality

YEAR 3:

1. Applies physical principles to optimize image quality

YEAR 4:

1. Teach and/or write imaging protocols

Module 12: Patient Safety: Contrast Agents; Radiation Safety; MR safety; Sedation (ACGME PBLI1) – Use of Physics

YEAR 1:

1. Radiation safety: Describes the mechanisms of radiation injury and the ALARA concept
2. MR Safety: Describes risks of MRI

YEAR 2:

1. Radiation safety: Accesses resources to determine exam-specific average radiation dose information
2. Describes risks of MRI: Accesses resources to determine the safety of implanted devices and retained metal

YEAR 3:

1. Communicates the relative risk of exam-specific radiation exposure to patients and practitioners
2. Describes risks of MRI: Communicates MR safety of common implants and retained foreign bodies to patients and practitioners

YEAR 4:

1. Apply principles of Image Gently and Image Wisely
2. Applies principles of MR safety including safety zones and pre-MR screening

Module 13: AAPM/RSNA Physics Modules (45 modules total as of 5/3/2018)

YEAR 1:

N/A

YEAR 2:

Complete all modules

YEAR 3:

N/A

YEAR 4:

N/A

Module 13: Work Experience

YEAR 1:

1. I-131: Participate in room prep/breakdown and nurse education review
2. Technologist Shadowing: Begin shadowing
3. Nuclear Medicine AU Training: Visit nuclear pharmacy and elute generator

YEAR 2

1. I-131: Begin taking part in administration of I-131
2. Technologist Shadowing: Continue shadowing

3. Nuclear Medicine AU Training: Continue tracking experience for AU

YEAR 3:

1. I-131: Complete 3 high dose and 3 low dose cases
2. Technologist Shadowing: Continue shadowing technologists as necessary

YEAR 4:

1. Technologist Shadowing: Complete all shadowing requirements

ADVENTHEALTH ORLANDO DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAM

CONFIRMATION OF RECEIPT OF

PHYSICS CURRICULUM

2018-2019

By signing this document, you are confirming that you have received and reviewed, with your preceptor, the physics curriculum for this academic year.

This receipt will be kept in your personal file.

Resident Name (please print) _____

Resident Signature _____
by signing this – you confirm that you have reviewed the curriculum with your preceptor

Date _____

Preceptor Signature _____
by signing this – you confirm that you have reviewed the curriculum with the resident

Date _____



AdventHealth Orlando Diagnostic Radiology Residency

ABR/NRC AU Requirements

Completion of this log ensures that you will be designated "AU eligible" on your ABR certificate after successfully completing the ABR examination. (ABR/NRC AU requirements)

Resident's Name _____

General Requirement

Date, print supervisor's last name (printed), supervisor's signature

- 1) 700 hours of training and experience in imaging and localization studies (including didactic component)

Date: _____ Supervisor (Printed): _____ Signature: _____

Didactic Component

Date, print supervisor's last name (printed), supervisor's signature

- 2) 80 hours of didactic and laboratory training in the areas of:
 - a. Radiation physics and instrumentation
 - b. Radiation protection
 - c. Mathematics pertaining to the use and measurement of radioactivity
 - d. Chemistry of byproduct material for medical use
 - e. Radiation biology

Date: _____ Supervisor (Printed): _____ Signature: _____

Work Experience for I-131

Date, print supervisor's last name (printed), supervisor's signature

- 1) Ordering, receiving, and unpacking radioactive materials safely and performing the related radiation surveys.

Date: _____ Supervisor (Printed): _____ Signature: _____

- 2) Performing quality control procedures on instruments used to determine the activity of dosages and performing checks for proper operation of survey meters.

Date: _____ Supervisor (Printed): _____ Signature: _____

- 3) Calculating, measuring, and safely preparing patient or human research subject dosages.

Date: _____ Supervisor (Printed): _____ Signature: _____

- 4) Using administrative controls to prevent a medical event involving the use of unsealed byproduct materials.

Date: _____ Supervisor (Printed): _____ Signature: _____

- 5) Using procedures to safely contain spilled radioactive material and using proper decontamination procedures.

Date: _____ Supervisor (Printed): _____ Signature: _____

- 6) Administer doses to patients or human research subjects that include at least three cases involving the oral administration of $\leq 33\text{mCi}$ of sodium iodide I-131.

(Listed in separate log – no signature necessary here.)

- 7) Administer doses to patients or human research subjects that include at least three cases involving the oral administration of $>33\text{mCi}$ of sodium iodide I-131 requiring a written directive.

For non I-131 radiopharmaceuticals (e.g., Tc-99m)

Date, print supervisor's last name (printed), supervisor's signature

- 1) Ordering, receiving, and unpacking radioactive materials safely and performing the related radiation surveys.

Date: _____ Supervisor (Printed): _____ Signature: _____

- 2) Performing quality control procedures on instruments used to determine the activity of dosages and performing checks for proper operation of survey meters.

Date: _____ Supervisor (Printed): _____ Signature: _____

- 3) Calculating, measuring, and safely preparing patient or human research subject dosages.

Date: _____ Supervisor (Printed): _____ Signature: _____

- 4) Using administrative controls to prevent a medical event involving the use of unsealed byproduct materials.

Date: _____ Supervisor (Printed): _____ Signature: _____

- 5) Using procedures to safely contain spilled radioactive material and using proper decontamination procedures.

Date: _____ Supervisor (Printed): _____ Signature: _____

- 6) Administering dosages of radioactive drugs to patients or human research subjects

Date: _____ Supervisor (Printed): _____ Signature: _____

- 7) Eluting generator systems appropriate for preparation of radioactive drugs for imaging and localization studies, measuring and testing the eluate for radionuclidic purity, and processing the eluate with reagent kits to prepare labeled radioactive drugs

Date: _____ Supervisor (Printed): _____ Signature: _____

AUTHORIZED USER TRAINING AND EXPERIENCE AND PRECEPTOR ATTESTATION (continued)

3. Training and Experience for Proposed Authorized User (continued)

c. Supervised Clinical Experience for 10 CFR 35.491

| Description of Experience | Location of Experience/License or Permit Number of Facility | Clock Hours | Dates of Experience ⁴ |
|---|---|--|----------------------------------|
| Use of strontium-90 for ophthalmic treatment, including: examination of each individual to be treated; calculation of the dose to be administered; administration of the dose; and follow up and review of each individual's case history | | | |
| Supervising Individual | | License/Permit Number listing supervising individual as an Authorized User | |

d. Supervised Work and Clinical Experience for 10 CFR 35.690

- Remote afterloader unit(s)
 Teletherapy unit(s)
 Gamma stereotactic radiosurgery unit(s)

| Supervised Work Experience | | Total Hours of Experience: | |
|--|---|---|---------------------|
| Description of Experience Must include: | Location of Experience/License or Permit Number of Facility | | Dates of Experience |
| Reviewing full calibration measurements and periodic spot-checks | | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Preparing treatment plans and calculating treatment doses and times | | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Using administrative controls to prevent a medical event involving the use of byproduct material | | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Implementing emergency procedures to be followed in the event of the abnormal operation of the medical unit or console | | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Checking and using survey meters | <input type="checkbox"/> | <input type="checkbox"/> No | |
| Selecting the proper dose and how it is to be administered | | <input type="checkbox"/> Yes <input type="checkbox"/> No | |



American Board of Radiology — Program Director Attestation

COMPLIANCE WITH NRC TRAINING AND EXPERIENCE REQUIREMENTS

More information can be found at the following link:

<http://www.nrc.gov/reading-rm/doc-collections/cfr/part035/part035-0290.html>

| _____ Resident Name | _____ Program | _____ Program # | YES | NO |
|---|------------------|--------------------|--------------------------|--------------------------|
| By the time of the ABR oral examination, this applicant will have successfully completed the hours of training and experience as outlined in 10 CFR 35.290, 35.392, and 35.394..... | | | <input type="checkbox"/> | <input type="checkbox"/> |
| This applicant has taken part in ≥ 3 cases of oral administration of I-131 therapy ≤ 33mCi..... | | | <input type="checkbox"/> | <input type="checkbox"/> |
| This applicant has taken part in ≥ 3 cases of oral administration of I-131 therapy >33 mCi..... | | | <input type="checkbox"/> | <input type="checkbox"/> |
| The resident's log of these therapy experiences (date, dose, and preceptor attestation) is attached..... | | | <input type="checkbox"/> | <input type="checkbox"/> |
| The work experience cited above for § 35.290 was obtained under the supervision of an Authorized User (AU) who meets the requirements under relevant sections of § 35.290 or equivalent Agreement State requirements..... | | | <input type="checkbox"/> | <input type="checkbox"/> |
| The work experience cited above for § 35.392 was obtained under the supervision of an Authorized User (AU) who meets the requirements under § 35.390, 35.392 or 35.394 or equivalent Agreement State requirements..... | | | <input type="checkbox"/> | <input type="checkbox"/> |
| The work experience cited above for § 35.394 was obtained under the supervision of an Authorized User (AU) who meets the requirements under § 35.390 or 35.394 or equivalent Agreement State requirements..... | | | <input type="checkbox"/> | <input type="checkbox"/> |

Residency Program Director
(Print Name)

Program Director
(Signature)

Date

I-131 Therapy Experience Log

| <u>Resident Name</u> | | <u>Program & Number</u> |
|----------------------|--------------------------|---|
| <u>Date</u> | <u>Dose Administered</u> | <u>Preceptor (AU) Print & Sign Name</u> |
| ≤ 33mCi | | |
| 1. _____ | _____ | _____ Print Name |
| | | _____ Sign Name |
| 2. _____ | _____ | _____ Print Name |
| | | _____ Sign Name |
| 3. _____ | _____ | _____ Print Name |
| | | _____ Sign Name |
| <u>Date</u> | <u>Dose Administered</u> | <u>Preceptor (AU) Print & Sign Name</u> |
| >33 mCi | | |
| 1. _____ | _____ | _____ Print Name |
| | | _____ Sign Name |
| 2. _____ | _____ | _____ Print Name |
| | | _____ Sign Name |
| 3. _____ | _____ | _____ Print Name |
| | | _____ Sign Name |

The preceding ABR forms do not have to be completed for a resident to take the ABR exam, including the Nuclear Medicine section of the exam. Completing the forms documents the required training and work experience, and allows the candidate to receive authorized user (AU)-eligible designation on his/her certificate.

Candidates who fulfill all the requirements, listed on Form A and Form B, and who pass all their ABR exams will receive an ABR certificate that contains the additional designation "AU-eligible." This means that the person is eligible through the ABR pathway to be approved by the NRC or Agreement State as an AU of medical radionuclides for imaging and localization studies and for oral administration of sodium iodide 1-131. NRC approval is obtained upon written application to the NRC/Agreement State and also requires submission of an NRC preceptor form which has been completed and signed by the preceptor who must be an AU. The forms are available on the NRC web site.

Quality Improvement (QI) Rotation Goals and Objectives

Diagnostic Radiology Residents will be given one week in their third year to be dedicated to a research project. The resident is to work with their faculty mentor to decide on a QI project. The resident will be required to:

- Send the APD & selected mentor the name of project at least two weeks before meeting to formalize the project
- Meet with the Program Director on the Friday of the QI week to review the project.
- Present at Morning Conference to the Radiology Residents immediately following the QI week.

Goals:

1. To be familiar with American Board of Radiology (ABR) Maintenance of Certification (MOC) Practice Quality Improvement (PQI) Process
2. To produce at least one presentation or manuscript worthy of publication in a peer reviewed journal at the end of the rotation that improves the quality of care delivered, reduces errors, and improves safety for our patients at AdventHealth Orlando.

Objectives:

1. Review the content on the ABR MOC PQI website (<https://www.theabr.org/diagnostic-radiology/maintenance-of-certification>)
2. Choose a topic of interest that encompasses patient safety, accuracy of interpretation, report timeliness, practice parameters and technical standards or referring physician surveys.
3. Work under the guidance and mentoring of a staff radiologist during the entire rotation
4. Maintain the confidentiality of patient information at all times during the research process
5. Formulate the presentation/manuscript with guidance from staff for structure, clarity and any necessary revisions

Additional Information:

1. Complete QI Week Form and submit to Associate Program Director prior to finalizing your QI Days Request.

ADVENTHEALTH ORLANDO DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAM

CONFIRMATION OF RECEIPT OF
QUALITY IMPROVEMENT CURRICULUM

2018-2019

By signing this document, you are confirming that you have received and reviewed, with your preceptor, the QI curriculum for this academic year.

This receipt will be kept in your personal file.

Resident Name (please print): _____

Resident Signature: _____
by signing this – you confirm that you have reviewed the curriculum with your preceptor

Date: _____

Preceptor Signature: _____
by signing this – you confirm that you have reviewed the curriculum with the resident

Date: _____



AdventHealth Orlando Diagnostic Radiology Residency

External Rotations

Triad Isotopes and Cardinal Health

To complement the resident experience, two external rotations have been established to compliment the physics & nuclear medicine training at AdventHealth Orlando. Both are mandatory and will take place within the first year of training. These institutions have a status of affiliated institutions for the purpose of residency training.

GOALS & OBJECTIVES – TRIAD ISOTOPES

Required hands-on experience for visiting AdventHealth Orlando Radiology Residents

1. Eluting generator systems appropriate for preparation of radioactive drugs for imaging and localization studies.
2. Measuring and testing the eluate for radionuclidic purity - Quality Control (QC).
3. Processing the eluate with reagent kits to prepare labeled radioactive drugs.

Please note that students must perform these tasks. Observation alone is not sufficient to fulfill Nuclear Regulatory Commission (NRC) requirements.

Required didactic component for visiting AdventHealth Orlando Radiology Residents

1. Brief tour of the facility highlighting work flow, safety, and elements of the facility designed for radiation protection.
2. Brief explanations of all performed tasks. These explanations should include acceptable ranges for QC tests and rationale for the procedure as well as placing the procedure into context with the entire manufacturing process.
3. A brief review of shipping, labeling, and survey requirements.

Away Elective Rotations

A resident is allowed to do an Away Rotation ONLY if the rotation you are attending is not offered here at one of our facilities. A Request for an Away Elective Rotation must be submitted and approved.

FLORIDA HOSPITAL GME

REQUEST FOR AN AWAY ELECTIVE ROTATION

The Florida Hospital GME acknowledges that there may be a legitimate need for off-site clinical or research elective in cases where housestaff cannot obtain training in a specific area of interest within our facilities. Away electives put more pressure on the current house staff and lead to loss of clinic days; therefore, it is essential that certain criteria be met before approval of such an elective can be granted.

Away electives must be of value as a training experience. **Observerships** not involving direct, meaningful patient care and responsibility are of little value and **will not be permitted**.

Residents wishing to apply for an away elective, must **submit this completed form to the Program Coordinator at least 90 days prior** to the elective rotation. Reasons why this experience cannot be obtained in a Florida Hospital facility must be specified.

A copy of this completed form, and letter of acceptance from away program, must be sent to GME at least 45 days prior to rotation start date, **in order to** execute proper affiliation agreement/program letter of agreement.

Resident Section:

Resident: _____ FL License Number: _____

Rotation Start Date: _____ End Date: _____

Rotation: _____ Program: _____

Institution: _____ Address/State: _____

Program Contact: _____ Phone: _____

Contact Email: _____

Brief Description of Rotation: _____

Reasons for training at a non-Florida Hospital Facility:

Resident Signature: _____ Date: _____

FH Program Director Approval:

Approved Not Approved: _____

Signature: _____ Date: _____

.....|



AdventHealth Orlando Diagnostic Radiology Residency

Pathology/AIRP Goals and Objectives

AIRP Course: Attendance and the 4-week long American Institute of Radiologic Pathology (AIRP) Radiology Pathology Course is a requirement of our training program. Under normal circumstances, the tuition and a stipend are funded institutionally. Details of course instruction and requirements can be found at www.airp.org.

This course meets ACGME program requirements for training in radiology pathology.

Noninterpretive Skills

Noninterpretive skills are incorporated into resident independent and directed reading and learning throughout the residency. The ABR Core and Certifying Examinations will test on this material, and the study guide can be found on the ABR website at:

www.theabr.org/sites/all/themes/abr-media/pdf/Noninterpretive%20Skills%20Domain%20Specification%20%26%20Resource%20Guide.pdf

RadioGraphics ABR Diagnostic Radiology Core Exam Study Guide

The ABR Diagnostic Radiology Core Exam Study Guide is published and maintained by the ABR and is used here with permission.

<http://pubs.rsna.org/page/radiographics/abr-core-exam-study-guide>

AdventHealth Orlando Diagnostic Radiology Residency

Fluoroscopy / Body Imaging Goals and Objectives

Training Locations: Orlando/FRI Princeton

Many of the goals and objectives apply to all rotations and are listed below. Those goals that are more specific to a rotation are listed separately.

Fluoroscopy Curriculum

The educational curriculum in Fluoroscopy is comprised primarily of the rotations through the Body Imaging Section at AdventHealth Orlando and FRI Princeton where the Faculty provide direct training and supervision; as well as, a comprehensive series of lectures and conferences in Body Imaging. Correlation is made on a case-by-case basis with other imaging modalities, facilitated by the PACs system. A series of interdepartmental conferences, grand rounds, Journal Clubs, meetings and other venues are expected to enhance the residents' knowledge of Body Imaging.

Because a full outline of disease entities and conditions is provided under each organ system elsewhere in the Radiology Residency Curriculum, a summarized curriculum for the Fluoroscopy Section follows:

- A review of the principles of physics and instrumentation/technology that underlie CT, GI/GU, and MRI imaging.
- A review of the normal anatomy, physiology, pathology and clinical conditions that are evaluated by CT, GI/GU, and MRI.
- The indications, limitations, contraindications and optimal protocols for the various studies, diseases, conditions, as well as, the optimal sequencing of various imaging studies is reviewed.
- The use, delivery systems, timing and dosages of intracavitary and intravenous contrast material is reviewed including any appropriate patient preparation, indications, contraindications, and the physiology and pathophysiology of contrast materials. The recognition and treatment of any allergic, chemotoxic reactions, or other adverse reactions is reviewed. The characteristic appearance of contrast during imaging in various normal and pathologic conditions is reviewed.
- The ACR appropriateness criteria and the economic implications for the health care system and patient of various diagnostic pathways are reviewed as appropriate.

Daily Required Worklists

Assigned Worklists

Fluoro Rotation – Fluoro and read from Body Worklist

Body/Orlando Rotation – Oncology/Body Worklist

ER Rotation (4 pm-12 pm) – ER worklist

On-Call (11p-7a) – ER worklist

Training using the ACGME Six-Core Competencies:

Year 1: Body Imaging

1) Patient Care: Residents should be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.

- Shows ability to interact with clinicians when reviewing GI/GU studies.
- Shows ability to recommend additional imaging studies as appropriate to better assess
- GI/GU studies (e.g. CT/US/MRI).
- Shows ability to use PACS and hospital information systems.

Milestones include:

- Using established evidence based guidelines such as ACR appropriateness criteria
- Appropriately use the electronic health record to obtain relevant clinical information
- Competently perform basic fluoro studies under indirect supervision
- Recognize and manage complications of basic procedures

2) Medical Knowledge: At the end of the rotation, the resident should be able to:

- Demonstrates knowledge of normal/abnormal anatomy as seen on GI/GU studies including fluoro, CT and plain films.
- Shows ability to recognize and describe common medical conditions as depicted on GI/GU imaging studies.
- Discuss the proper clinical and radiological indications for the following studies:
 - 1) Video swallowing study
 - 2) Barium swallow
 - 3) Upper GI series
 - 4) Single-contrast barium enema
 - 5) Air-contrast barium enema
 - 6) Small bowel follow-through
 - 7) Cystogram
- State the physiologic properties, proper concentrations and proper indications for the use of the following contrast media:
 - 1) Ionic intravenous contrast media
 - 2) Non-ionic contrast media
 - 3) Standard barium mixtures
- List the risk factors for allergic reaction to intravenous contrast media.
- State the proper assessment and treatment for allergic reactions to contrast media.
- Begin reviewing the core curriculum for GI and GU at the end of this document.

Medical Training:

- Setup & Positioning of patients
- Actively use software/machine to perform scanning
- Perform Prescan interview to ensure safe scanning and adhere to protocol regarding contract, metal (MRI, etc)

Expected Reading List:

- Fundamentals of Diagnostic Radiology, By Brandt and Helms – GI/GU Chapters

- Practical Fluoroscopy of the GI and GU Tracts by Marc Levine
- Fundamentals of Body CT by Richard Webb, William Brandt, and Nancy Major
- Case Review Series GI Imaging
- Case Review Series GU Imaging

Milestones include:

- Selecting appropriate protocol and contrast agent/dose for basic fluoro and CT procedures
- Makes core observations
- Formulate differential diagnoses
- Recognize critical findings
- Differentiate normal from abnormal

3) Practice-Based Learning and Improvement: Residents must demonstrate skills to:

- Shows evidence of independent study using textbooks from expected reading list.
- Demonstrates appropriate follow up of interesting cases.
- Prepares teaching file of interesting cases.

Milestones include:

- Recognizes and manages contrast reactions
- Describes the mechanism of radiation injury and the ALARA concept
- Documents training in critical thinking skills and research design

4) Interpersonal and Communication Skills: Residents must demonstrate skills to:

- Interact with x-ray technologists, medical students, fellow residents, and attending radiologists.
- Interact with clinicians when reviewing cases involving GI/GU imaging studies.

Milestones include:

- Communicating information about imaging and examination results in routine, uncomplicated cases
- Obtains informed consent
- Adhere to transfer of care policies
- Generates accurate reports with appropriate elements for coding
- Communicates urgent and unexpected findings according to RSF policy

5) Professionalism: Residents must demonstrate ability to interact with patient/patient's family/clinician when discussing significance of x-ray findings and their impact on patient care including what imaging studies may or may not be appropriate.

Milestones include:

- Recognizing the importance and priority of patient care and advocates for patient interests
- Fulfills work related responsibilities
- Recognizes personal limitations and seeks help when appropriate
- Responds appropriately to constructive criticism
- Maintains patient confidentiality
- Attends required meetings

6) Systems-Based Practice: Residents must demonstrate skills to:

- Shows ability to interact with clinicians regarding cost effective and streamlined patient evaluation for differing clinical entities.
- Able and willing to participate in clinical conferences in which imaging studies used to guide patient care/evaluation.

Milestones include:

- Describes departmental QI initiatives
- Describes the departmental QA system

Year 2: Body Imaging

1) Patient Care: At the end of the rotation, the resident should be able to:

- Refine interpretive skills with complex pathology
- Better perform the GI/GU studies listed in the first rotation
- Identify the abnormality at fluoroscopy and modify the technique or change the patient's position or obtain special views or perform special maneuvers to obtain diagnostic fluoroscopic spot films
- Decreasing fluoroscopic time needed to perform a study without compromising diagnostic acumen
- Demonstrate more confidence when evaluating and integrating data from other studies (CT, MRI, sonography and nuclear medicine) of the GI/GU tract to make recommendations to the referring physician about more appropriate or additional diagnostic studies needed for evaluation of the patient's abnormality
- Be able to direct the choice of imaging modality and protocol emergent studies
- Understand when referral or other imaging modalities is necessary
- Understand the basic physics of MR including TR, TE, T1W, Spin echo, Gradient Recall Echo imaging, and Inversion Recovery
- Learn the basic principles of contrast distribution, particularly as applied to arterial and venous phase scanning
- Protocol and monitor MR studies. Modify protocols when appropriate
- Understand the principle of a saline chaser
- Learn to recognize and treat contract reactions
- Develop skills in interpretation of basic MR pathology
- Learn the appropriate format for dictation of MR reports

Milestones include:

- Recommends appropriate imaging of common conditions independently
- Competently performs intermediate procedures (HSG, thyroid biopsy, etc)
- Recognizes and manages complications of intermediate procedures

2) Medical Knowledge: At the end of the rotation, the resident should be able to:

- Demonstrate review and/or retention of knowledge requirements set forth for the first year rotations.
- Learn the basic concepts of surgical procedures, their indications, their normal radiographic appearance, and finally the radiographic appearance of their complications. In addition to the traditional surgical procedures, this would include new procedures such as new laparoscopic GI and GU procedures.
- Describe and/or discuss GI/GU tract pathology in specific detail.
- Reviewed the entire core curriculum for GI and GU imaging at the end of this document.
- Learn the radiographic appearance of specific diseases on the following procedures:
 - i) Barium swallow
 - j) Upper gastrointestinal series (UGI)
 - k) BE
 - l) ACBE
 - m) Small bowel follow through (SBFT)
 - n) Fistulograms
 - o) Cystogram
 - p) HSG
- Understand the basic physics of MR including TR, TE, T1W, Spin echo, Gradient Recall Echo imaging, and Inversion Recovery.

- Learn the basic principles of contrast distribution, particularly as applied to arterial and venous phase scanning.
- Protocol and monitor MR studies. Modify protocols when appropriate.
- Understand the principle of a saline chaser.
- Develop skills in interpretation of basic MR pathology.
- Learn the appropriate format for dictation of MR reports.

Medical Training:

- Setup & Positioning of patients
- Actively use software/machine to perform scanning
- Perform Prescan interview to ensure safe scanning and adhere to protocol regarding contrast, metal (MRI, etc)

Expected Reading List:

- Textbook of Uroradiology by Dunnick
- Body MRI by Evan Siegelman
- CT and MRI of the Abdomen and Pelvis by Pablo Ross and Koenraad Mortele

Milestones include:

- Selects appropriate protocols and contrast agent/dose for intermediate imaging like basic abdominal MRI
- Makes secondary observations
- Narrows differential diagnosis
- Describes management options

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Shows evidence of independent study using textbooks from expected reading list.
- Demonstrates appropriate follow up of interesting cases.
- Prepares teaching file of interesting cases.
- Is able and willing to make detailed presentations of GI/GU studies at both intra and interdepartmental conferences.
- Upon request, participates in educational courses for clinicians, medical students, and fellow residents.

Milestones include:

- Re-demonstrates recognition and management of contrast reactions
- Accesses resources to determine exam specific average radiation dose info
- Accesses resources to determine safety of implanted devices and retained metal
- Works with faculty mentors to identify potential scholarly projects

4) Interpersonal and Communication Skills: Residents must demonstrate skills to:

- Interact with x-ray technologists, medical students, fellow residents, and attending radiologists.
- Interact with clinicians when reviewing cases involving GI/GU studies.
- Participate in administrative and scholarly committees when asked.

Milestones include:

- Communicates under direct supervision in challenging circumstances
- Communicates under direct supervision difficult information such as errors, complications, adverse events, and bad news
- Efficiently generates clear and concise reports that do not require substantive faculty member correction on routine cases
- Communicates findings and recommendations clearly and concisely

5) Professionalism: At the end of the rotation, the resident should be able to:
Residents must demonstrate ability to interact with patient/patient's family/clinician when discussing significance of GI/GU findings and their impact on patient care including what imaging studies may or may not be appropriate.

Milestones include:

- Becomes an effective health care team member
- Continues to demonstrate professional behaviors described under year 1

6) Systems-Based Practice: At the end of the rotation, the resident should be able to:

- Shows ability to interact with clinicians regarding cost effective and streamlined patient evaluation for differing clinical entities.
- Able and willing to participate in clinical conferences in which imaging studies used to guide patient care/evaluation.
- Is able and willing to organize and present case conferences/didactic sessions as directed and supervised by radiology staff.

Milestones include:

- Incorporating QI into clinical practice
- Participates in the QA department process
- States relative cost of common procedures

Year 3 and 4: Body Imaging

1) Patient Care: At the end of the rotation, the resident should be able to:

- Perform, interpret, and dictate the GI/GU studies with sufficient competence to be able to practice independently.
- Continue to expand the knowledge of CT anatomy and pathology begun in the first two rotations.
- Assist technical staff in the performance of CT angiography and its interpretation.
- Refine MRI interpretive skills with complex pathology.
- Understand the principles of magnetic resonance angiography.
- Be able to identify life-threatening findings, particular with aortic aneurysm and grafts.
- Provide emergent provisional interpretation as needed.
- Be able to direct the choice of imaging modality and protocol emergent studies.
- Understand when referral or other imaging modalities is necessary.
- Become a more autonomous consultant and teacher.

Milestones include:

- Recommends appropriate imaging of uncommon conditions independently
- Integrates current research and literature with guidelines, taking into consideration cost effectiveness and risk benefit analysis, to recommend imaging
- Competently performs advanced procedures
- Recognizes and manages complications of advanced procedures
- Independently performs fluoro studies and image guided body procedures

2) Medical Knowledge: At the end of the rotation, the resident should be able to:

- Demonstrate review and/or retention of knowledge requirements set forth for the first two years.
- Understand the role and basic principles of newly evolving and potential future new examinations such as CT urography, MR angiography, CT/PET, and molecular imaging in the evaluation of GI/GU disease.
- Understand the uses, interpretation, and limitation of techniques that have been replaced e.g. oral cholecystogram and intravenous cholangiogram.

- Assist in preparation and presentation of interdepartmental case conferences.

Expected Reading List:

- CT Urography by Stuart Silveraman and Richard Cohan
- Mayo Clinic GI Imaging Review by Dainel Johnson and Grant Schmit
- Abdominal and Pelvic MRI by Richard Semelka

Milestones include:

- Selects appropriate protocols and contrast agent/dose for advanced imaging
- Demonstrates knowledge of physical principles to optimize imaging quality
- Independently modifies protocols as determined by clinical circumstances
- Provides accurate, focused, and efficient interpretations
- Prioritizes differential diagnoses and recommends management
- Makes subtle observations
- Suggests a single diagnosis when appropriate
- Integrates current research and literature with guidelines to recommend management

3) Practice-Based Learning and Improvement: At the end of the rotation, the resident should be able to:

- Shows evidence of independent study using textbooks from expected reading list.
- Demonstrates appropriate follow up of interesting cases.
- Prepares teaching file of interesting cases.
- Is able and willing to make detailed presentations of GI/GU studies at both intra and interdepartmental conferences.
- Upon request, participates in educational courses for clinicians, medical students, and fellow residents.
- Upon request, participates in educational activities at the local/national level.

Milestones include:

- Re demonstrates recognition and management of contrast reactions
- Communicates the relative risk of exam specific radiation exposure to patients and practitioners. Applies principles of image Gently and Wisely
- Communicates MR safety of common implants and retained foreign bodies to patients and practitioners
- Selects appropriate sedation agent and dose of conscious sedation

4) Interpersonal Skills: Residents must demonstrate skills to:

- Interact with x-ray technologists, medical students, fellow residents, and attending radiologists.
- Interact with clinicians when reviewing cases involving GI/GU imaging studies.
- Can participate in administrative and scholarly committees when asked.
- Can serve as a liaison between our department with both other radiology departments and other specialty groups in our institution.

Milestones include:

- Communicates without supervision in challenging circumstances
- Efficiently generates clear and concise reports that do not require substantive faculty member correction on all cases
- Communicates appropriately under stressful situations

5) Professionalism: Residents must demonstrate skills to:

- Residents must demonstrate ability to interact with patient/patient's family/clinician when discussing significance of x-ray findings and their impact on patient care including what imaging studies may or may not be appropriate.

- Can participate in activities relative to the role of GI/GU imaging both to the medical community and the general public.
- Is perceived as a role model for radiology from both within and outside the department.

Milestones include:

- Is an effective team leader promoting patient welfare, patient autonomy, and social justice
- Serves as a role model for professional behavior

6) Systems-Based Practice: Residents must demonstrate skills to:

- Shows ability to interact with clinicians regarding cost effective and streamlined patient evaluation for differing clinical entities.
- Able and willing to participate in clinical conferences in which imaging studies used to guide patient care/evaluation.
- Is able and willing to organize and present case conferences/didactic sessions as directed and supervised by radiology staff.
- Is able and willing to participate in activities at the local/national level under staff supervision.

Milestones include:

- Identifying and completing a systems based practice project

Assessment tools for all Body Rotations:

- Reviewing rotation curriculum, goals and objectives, as a benchmark for progress of resident, and success of faculty, is educating the resident. Discussion regarding the specifics of the document is encouraged to promote improvement of the resident's learning and the program's teaching. Positive points and deficiencies and unfulfilled goals and objectives should be discussed by the residents and faculty
- Global ratings by faculty including rotation evaluation sheet
- Resident's performance discussing unknown cases in conference (one of the metrics on Global Evaluation sheet is particularly important)
- Placing cases in teaching file (one of the metrics on Global Evaluation)
- Conference attendance logs
- In-service examination
- 360 degree evaluations – supervisory technologists in radiology core
- Fluoroscopy time log submitted by physicist to Program Director
- Self assessment based on Rad Primer quizzes
- Future plans: evaluation of teaching by medical students

Gastrointestinal Imaging Curriculum based off the ABR Core Exam

- 1) Pharynx
 - a) Benign diseases
 - i) Zenker diverticulum
 - ii) Foreign bodies
 - iii) Trauma
 - b) Motility disorders
- 2) Esophagus
 - a) Benign diseases
 - i) Diverticula
 - ii) Trauma
 - iii) Esophagitis
 - (1) Reflux
 - (2) Infectious
 - (3) Caustic
 - (4) Drug-induced
 - iv) Barrett's esophagus
 - v) Rings, webs, strictures
 - vi) Varices
 - vii) Benign tumors and tumor-like conditions
 - viii) Extrinsic processes affecting the esophagus
 - 1) Pulmonary lesions
 - (2) Mediastinal structures
 - ix) Hiatal hernia (types, significance)
 - b) Malignant tumors
 - i) Squamous
 - ii) Adenocarcinomas
 - iii) Other malignant tumors
 - (1) Lymphoma
 - (2) Kaposi
 - (3) Metastases (lymphatic and hematogenous)
 - c) Motility disorders
 - i) Primary motility disorders
 - ii) Secondary motility disorders
 - d) The postoperative esophagus
- 3) Stomach
 - a) Benign diseases
 - i) Diverticula
 - ii) Gastritis
 - (1) Erosive
 - (2) Atrophic
 - (3) Infectious
 - (4) Other
 - (a) Crohn's disease
 - iii) Peptic ulcer disease
 - iv) Hypertrophic gastropathy
 - v) Varices
 - vi) Volvulus
 - vii) Entrapment after diaphragmatic injury
 - b) Malignant diseases
 - i) Primary

- (1) Adenocarcinoma
 - (2) Lymphoma
 - (3) GI stromal tumors
 - (4) Carcinoid
 - ii) Metastatic
 - c) The postoperative stomach
 - i) Expected surgical appearance
 - (1) Bariatric, including gastric banding
 - (2) Nissen and other funduplications
 - (3) Whipple
 - (4) Billroth procedures
 - d) Complications
- 4) Duodenum
 - a) Benign diseases
 - i) Congenital abnormalities
 - ii) Diverticula
 - iii) Trauma
 - iv) Inflammation
 - (1) Duodenitis
 - (2) Ulcer disease
 - (3) Crohn's disease
 - v) Aortoduodenal fistula
 - vi) Benign tumors
 - b) Malignant diseases
 - i) Adenocarcinoma
 - ii) Lymphoma
 - iii) Metastatic disease
- 5) Small Intestine
 - a) Benign diseases
 - i) Congenital disorders
 - ii) Diverticula
 - iii) Trauma
 - iv) Vascular diseases
 - (1) Intestinal ischemia and infarction
 - (2) Radiation enteritis
 - (3) Scleroderma
 - (4) Vasculitides
 - (a) Henoch-Schönlein purpura
 - (b) Polyarteritis nodosa
 - (c) Systemic lupus erythematosus
 - v) Malabsorption
 - (1) Sprue
 - (2) Lymphangiectasia
 - vi) Inflammatory diseases
 - (1) Crohn's disease
 - (2) Infectious and parasitic diseases
 - vii) Benign tumors
 - (1) Sporadic
 - (2) Associated with polyposis syndromes
 - viii) Malrotation/Volvulus
 - ix) Obstruction
 - x) Hemorrhage

- xi) Other
 - (1) S/p Bone Marrow Transplant
 - (2) Drug effects
 - (a) NSAIDS enteritis
 - (b) ACE inhibitors
 - b) Malignant tumors
 - i) Adenocarcinoma
 - ii) Lymphoma
 - iii) Carcinoid
 - iv) GI stromal tumors
 - v) Metastases
- 6) Colon and Appendix
- a) Benign disease
 - i) Congenital abnormalities
 - ii) Diverticular disease
 - iii) Inflammatory diseases
 - (1) Crohn's disease
 - (2) Ulcerative colitis
 - (3) Infectious colitis
 - (a) Pseudomembranous
 - (b) Viral
 - (c) Bacterial
 - (d) Colitis in AIDS
 - (4) Appendicitis
 - iv) Ischemic colitis
 - v) Benign neoplasms
 - (1) Adenoma
 - (2) Mesenchymal tumors
 - (3) Polyposis syndromes
 - b) Malignant diseases
 - i) Adenocarcinoma
 - ii) Other malignant tumors
 - (1) Lymphoma
 - (2) Carcinoid
 - (3) Melanoma
 - (4) Squamous (anal)
 - (5) Metastases
- 7) Pancreas
- a) Congenital abnormalities and variants
 - b) Pancreatitis
 - i) Acute
 - ii) Chronic
 - iii) Complications
 - iv) Autoimmune
 - c) Pancreatic neoplasms
 - i) Duct cell adenocarcinoma
 - ii) Cystic pancreatic neoplasms
 - (1) IPMN
 - (2) Mucinous cystadenomas
 - (3) Serous cystadenomas
 - iii) Islet cell tumors
 - iv) Lymphoma

v) Metastases

8) Liver

- a) Normal anatomy
- b) Diffuse diseases of the liver
 - i) Cirrhosis
 - ii) Diseases associated with infiltration
 - (1) Fatty infiltration/NASH/NAFLD
 - (2) Hemochromatosis
 - (3) Storage diseases
 - iii) Vascular diseases
 - (1) Portal hypertension
 - (2) Portal vein occlusion
 - (3) Hepatic venous hypertension/Budd Chiari, nutmeg liver
- c) Focal diseases of the liver
 - i) Benign
 - (1) Cavernous hemangioma
 - (2) Liver cell adenoma
 - (3) Focal nodular hyperplasia
 - ii) Malignant
 - (1) Hepatocellular carcinoma
 - (2) Metastases
 - (3) Other malignant liver lesions
- d) Liver transplantation
 - (1) Surgical candidates
 - (2) Expected postoperative appearance
 - (3) Complications

9) Spleen

- a) Splenomegaly
- b) Focal lesions
 - i) Cysts
 - ii) Hemangioma
 - iii) Infarction
 - iv) Abscess/microabscesses
 - v) Granulomatous disease
- c) Trauma

10) Bile Ducts and Gallbladder

- i) Congenital abnormalities and variants
 - (1) Choledochal cysts
 - (2) Caroli disease
- ii) Inflammatory diseases
 - (1) Gallbladder
 - (a) Acute cholecystitis
 - (b) Emphysematous cholecystitis
 - (c) Porcelain bladder
 - (2) Biliary ducts
 - (a) Primary sclerosing cholangitis
 - (b) Ascending cholangitis
 - (c) Recurrent pyogenic cholangitis
 - (d) AIDS cholangiopathy
 - (e) Ischemic injury
 - (f) Surgical injury

- (g) Stone disease
 - iii) Tumors
 - (1) Gallbladder cancer
 - (2) Cholangiocarcinoma
 - (3) Metastases
- 11) Peritoneal Spaces
- a) Normal anatomy
 - b) Fluid collections
 - c) Diseases of the peritoneum
 - i) Inflammatory diseases
 - (1) Bacterial peritonitis
 - (2) TB
 - (3) Other
 - ii) Primary tumors
 - iii) Metastatic tumors
 - d) Mesenteries
 - i) Normal anatomy
 - ii) Pathologic conditions
 - (1) Sclerosing mesenteritis/misty mesentery
 - (2) Mesenteric fibromatosis
 - e) Retroperitoneum
 - i) Normal anatomy
 - ii) Retroperitoneal spaces
 - iii) Benign diseases
 - (1) Fibrosis
 - (2) Inflammatory diseases
 - iv) Malignant tumors
- 12) Multisystem Disorders
- a) Acute abdomen
 - b) Trauma to the abdomen
 - c) Syndromes involving the gastrointestinal tract
 - d) Hernias, including internal hernias
 - e) All obstruction

GU Imaging Curriculum based off the ABR Core Exam

- 1) Kidneys
- a) Malignant tumors
 - i) Primary
 - ii) Secondary
 - b) Benign tumors
 - c) Endocrine tumors
 - d) Cystic disease
 - e) Complicated cysts
 - f) Granulomatous diseases
 - g) Infection/inflammation
 - h) Hemorrhage
 - i) Infarction and ischemia
 - j) Trauma/iatrogenic
 - k) Congenital anomalies
 - l) Medical renal disease
 - m) Inherited diseases involving the kidneys (including transplantation)

- 2) Ureter
 - a) Malignant tumors
 - b) Benign tumors
 - c) Infection/inflammation
 - d) Hemorrhage
 - e) Trauma/iatrogenic
 - f) Congenital anomalies
 - g) Stricture
 - h) Filling Defects

- 3) Bladder and Neobladder
 - a) Malignant tumors
 - b) Benign tumors
 - c) Infection/inflammation
 - d) Hemorrhage
 - e) Trauma/iatrogenic
 - f) Congenital anomalies

- 4) Prostate Gland and Seminal Vesicles
 - a) Malignant tumors
 - b) Benign tumors and hyperplasia
 - c) Infection/inflammation
 - d) Trauma/iatrogenic
 - e) Congenital anomalies

- 5) Urethra and Penis
 - a) Malignant tumors
 - b) Benign tumors
 - c) Infection/inflammation
 - d) Trauma/iatrogenic
 - e) Congenital anomalies
 - f) Stricture

- 6) Retroperitoneum
 - a) Malignant tumors
 - i) Primary
 - ii) Secondary
 - b) Benign tumors
 - c) Hemorrhage
 - d) Trauma/iatrogenic
 - e) Congenital anomalies
 - f) Aortic aneurysm
 - g) Retroperitoneal fibrosis
 - h) Pelvic lipomatosis
 - i) Venous anomalies
 - j) Fournier gangrene

- 7) Vascular Diseases Affecting the Genitourinary Tract
 - a) Aneurysms
 - b) Stenoses
 - c) Malformations
 - d) Fistulae
 - e) Occlusions

- f) Congenital anomalies
- 8) Intravascular Contrast Media
 - a) Extravasation
 - b) Physiology
 - c) Adverse reactions (idiosyncratic and non-idiosyncratic)
 - d) Prevention and treatment of adverse reactions
- 9) Urolithiasis (Including Kidney, Ureter, Bladder)
- 10) Adrenal
 - a) Congenital abnormalities
 - b) Benign masses
 - c) Malignant primary and secondary neoplasms
 - d) Endocrine disorders
 - e) Acquired diseases and conditions
 - i) Infection
 - ii) Inflammatory conditions
 - iii) Hemorrhage
- 11) Female genitourinary tract
 - a) Congenital abnormalities
 - b) Infertility
 - c) Menopause
 - d) Uterus and cervix
 - i) Benign and malignant masses
 - ii) Acquired conditions (infection, hemorrhage)
 - e) Ovaries and fallopian tubes
 - i) Benign and malignant masses
 - (1) Cysts and cystic lesions
 - ii) Acquired conditions (infection, hemorrhage)
 - (1) Infections
 - (a) Pelvic inflammatory disease
 - (2) Torsion
 - (3) Ovarian failure
 - f) Vulva and vagina
 - i) Benign and malignant masses
 - (1) Cysts and cystic lesions
- 12) Techniques
 - a) Excretory urography
 - b) Cystography
 - c) Urethrography (including antegrade and retrograde)
 - d) Computed tomography (including CT urography, CT angiography)
 - e) Magnetic resonance imaging (including MR urography, MR angiography)
 - f) Ultrasound (including Doppler and color flow)
 - g) Hysterosalpingography

AdventHealth Orlando Radiology Residency Technologist Shadowing Log

Modality (please circle): CT MR Fluoroscopy X-Ray Portable X-Ray
Resident's Name: _____

General Requirement

Date, print supervisor's last name (printed), supervisor's signature

7) The resident has helped perform (not only observed) the daily QA

Date: _____ Supervisor (Printed): _____ Signature: _____

8) The resident has helped perform (not only observed) the weekly QA (as applicable by modality)

Date: _____ Supervisor (Printed): _____ Signature: _____

9) The resident has helped perform (not only observed) the quarterly QA (as applicable by modality)

Date: _____ Supervisor (Printed): _____ Signature: _____

10) The resident has aided (not only observed) in the setup/positioning of at least 5 patients

Date: _____ Supervisor (Printed): _____ Signature: _____

11) The resident has actively used the software/machine to perform the scanning of at least 5 patients

Date: _____ Supervisor (Printed): _____ Signature: _____

12) The resident has performed the a "prescan" interview (as applicable by modality) with at least 3 patients to ensure that it is safe to scan the patient with the current protocol in regards to contrast, metal (MRI), etc.

Date: _____ Supervisor (Printed): _____ Signature: _____

Date: _____ Supervisor (Printed): _____ Signature: _____

Date: _____ Supervisor (Printed): _____ Signature: _____

ADVENTHEALTH ORLANDO DIAGNOSTIC RADIOLOGY RESIDENCY PROGRAM

CONFIRMATION OF RECEIPT OF
FLUOROSCOPY GOALS AND OBJECTIVES

2018-2019

By signing this document, you are confirming that you have received and reviewed, with your preceptor, the Abdominal imaging goals and objectives for this academic year.

This receipt will be kept in your personal file.

Resident Name (please print) _____

Resident Signature _____
by signing this - you confirm that you have reviewed the G&O with your preceptor

Date _____

Preceptor Signature _____
by signing this - you confirm that you have reviewed the G&O with the resident

Date _____

Radiology Residency Library & Reference Book List

Abdominal - Pelvic MRI - 2 volume set
Abrams Angiography Interventional Radiology
Achieving Excellence in Med Education
A Practical Guide - ACGME Core Competencies
Atlas of Anatomy
Atlas of Anatomy: General Anatomy & MSK
Atlas of Anatomy: Head and Neuroanatomy
Atlas of Anatomy: Neck and Internal Organs
Atlas of Fetal and Postnatal Brain MR
Atlas of Gated SPECT on CD Rom
Atlas of Head and Neuroanatomy
Atlas of Human Anatomy
Atlas of Normal Roentgen Variants
Atlas of Neck and Internal Organs
Atlas of Nuclear Cardiology
Atlas of Sectional Radiological Anatomy
Atlas of SPECT-CT (Fanti)
Aunt Minnie's Atlas and Imaging Specific Diagnosis
Basic Sciences of Nuclear Medicine
Body MRI
Brain Imaging - Case Review Series
Brain: Imaging, Pathology, and Anatomy
Breast Imaging (Kopans)
Breast Imaging - Case Review Series
Breast Imaging Companion
Breast Imaging - The Requisites
Breast MRI
Caffey's Pediatric Diagnostic Imaging - 2 volume set
Cardiac CT, PET, MR
Cardiac Imaging - Case Review Series
Cardiac Imaging Cases
Cardiac Imaging - The Requisites
Cardiovascular Magnetic Resonance
Cardiovascular MRI: Physical Principles to Protocols
Chest Imaging Cases
Chest Radiology: Radiographs Patterns and Different Diagnosis
Clinical Breast Imaging
Clinical Gastrointestinal Endoscopy
Clinical Nuclear Cardiology - State of Art & Future
CPT 2012 Express Reference Coding Card
CT and MRI of the Abdomen and Pelvis

CT & MRI of the Whole Body - 2 volume set
CT Urography
Diagnostic and Surgical Imaging Anatomy - Brain, etc.
Diagnostic Cerebral Angiography
Diagnostic Imaging: Abdomen
Diagnostic Imaging: Cardiovascular
Diagnostic Imaging: Oncology
Diagnostic Imaging: Brain
Diagnostic Imaging: Head and Neck
Diagnostic Imaging of the Head and Neck
Diagnostic Imaging: MSK Non-Traumatic Disease
Diagnostic Imaging: Musculoskeletal Trauma
Diagnostic Imaging: Obstetrics
Diagnostic Imaging: Pediatric Neuroradiology
Diagnostic Imaging: Pediatrics
Diagnostic Imaging: Spine
Diagnostic Nuclear Medicine
Diagnostic Ultrasound - 2 volume set
Diagnostic Ultrasound - 2 volume set
Differential Diagnosis in Computed Tomography
Diseases of the Brain, Head, and Neck
Emergency Radiology - Case Review Series
Emergency Radiology - The Requisites
Expertddx: Abdomen
Expertddx: Brain and Spine
Expertddx: Chest
Expertddx: Head and Neck
Expertddx: Musculoskeletal
Expertddx: Obstetrics
Expertddx: Pediatrics
Expertddx: Ultrasound
Essentials of Nuclear Medicine Imaging
Fetal MRI
Functional Neuroradiology
Fundamentals of Body CT
Fundamentals of Body MRI
Fundamentals of Diagnostic Radiology (4book set)
Fundamental of High Resolution Lung CT
Fundamentals of Nuclear Pharmacy
Gastrointestinal Imaging - Case Review Series
Gastrointestinal Imaging - The Requisites
General and Vascular Ultrasound - Case Review Series
Genitourinary Imaging - Cases

Genitourinary Imaging - The Requisites
Gynecologic Imaging
Handbook of Nuclear Medicine and Molecular
Handbook of Interventional Radiologic Procedures
Handbook of Patient Care in Vascular Disease
Head and Neck Imaging - 2 volume set
Head and Neck Imaging - Case Review
High Resolution CT of the Lung
High Resolution CT of the Chest: Comp Atlas
Hybrid/PET CT and SPECT/CT
Imaging of Bone Tumors and Tumor-Like Lesions
Imaging of Diseases of the Chest
Imaging of Orthopedic Fixation Devices & Ortho
Imaging of the Temporal Bone
Interventional Radiology
Interventional Radiology Procedures
Interventional Radiology a Survival Guide
Introduction to Vascular Ultrasonography
Jeckel's Epidemiology, Biology
Magnetic Resonance Imaging
Mayo Clinic Gastrointestinal Imaging
Medical Effects of Ionizing Radiation
Medical Imaging Physics
Merrill's Atlas of Radiographic Positioning volume 1
Merrill's Atlas of Radiographic Positioning volume 2
Merrill's Atlas of Radiographic Positioning volume 3
MRI in Practice
MRI Made Easy
Musculoskeletal Imaging - Case Review Series
Musculoskeletal Imaging - The Requisites
Neuroimaging Clinics of North America
Neuroradiology Companion, Methods, etc
Neuroradiology - The Requisites
Nuclear Cardiology: The Basics
Nuclear Medicine - Case Review Series
Nuclear Medicine Imaging
Nuclear Medicine Physics: The Basics (2011)
Nuclear Medicine in PET/CT: Technology & Techniques
Nuclear Medicine - The Requisites
Obstetric and Gynecologic Ultrasound - Case Review Series
Oral and Maxillofacial Radiology
Oral Radiology: Principles & Interpret
Patient Care in Vascular and Interventional Rad

Pearls and Pitfalls in Abdominal Imaging
Pediatric Imaging - Case Review Series
Pediatric Imaging: The Fundamentals
Pediatric Neuroimaging
Pediatric Radiology - The Requisites
Pediatric Sonography
Peripheral Vascular Interventions
Peripheral Vascular Sonography
PET in the Evaluation of Alzheimer's
PET/CT: Oncologic Imaging
PET-CT: Rare Findings and Diseases
Physics and Radiobiology of Nuclear Medicine
Physics in Nuclear Medicine
Practical Differential Diagnosis for CT
Practical Guide to Abdominal & Pelvic MRI
Practical Guide of GI & GU Tracts
Preparing & Delivering Presentations
Presenting in Medical Meetings
Primer of Diagnostic Imaging
Principles and Practice PET/CT
Radiology Business Practice
Radiology of Syndromes, Metabolic Disorders, etc.
Radiology Review Manual
Radiology Review: Radiologic Physics
RAPHEX 2012-2016
Review of Radiologic Physics
Sonography Principles & Instruments
Spine Imaging - Case Review Series
Squires Fundamentals of Radiology
Teaching Atlas of Interventional Radiology
Teaching Atlas of Vascular and Nonvascular IR Radiology
Teaching Files Brain and Spine
Teaching Files Interventional Radiology
Temporal Bone Imaging
Textbook of Uroradiology
The Essential Physics in of Medical Imaging
The Requisites - Neuroradiology
The Requisites - Ultrasound
The Teaching Files: Brain & Spinal
The Teaching Files: Interventional
Thoracic Imaging - Case Review Series
Thoracic Imaging: Pulmonary & Cardiovascular Rad
Thoracic Radiology - The Requisites

Thyroid Cancer in Clinical Practice
Top 3 Differentials in Radiology
Ultrasound - A Pattern Approach
Ultrasound - The Requisites
Updates in Interventional Radiology
Vascular and Interventional Imaging

Contact List

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AdventHealth Orlando Diagnostic Radiology Residency

Miscellaneous

ACR Contrast Reaction Manual Card



CODE BLUE #: _____

Committee on Drugs and Contrast Media 12/19/2017 (Adult algorithm)

Document reaction & monitor for return of reaction post-treatment

EXAMPLE PREMEDICATION REGIMENS

Methylprednisolone 32 mg PO 12, 2 hrs prior
+/- Benadryl 50 mg PO 1 hr prior.

OR

Prednisone 50 mg PO 13, 7, 1 hours prior
+/- Benadryl 50 mg PO 1 hr prior.

OR

Hydrocortisone 200 mg IV 5 hrs and 1 hr prior
and Benadryl 50 mg IV 1 hr prior.
(urgent, NPO only, ER, inpatient)

CONTRAST EXTRAVASATION

Elevate arm, cool compress, remove rings.
Observe. Consider surgical consultation for
decreased perfusion, sensation, strength,
active range of motion, or increasing pain.

HIVES/DIFFUSE ERYTHEMA

1. Observation; monitor vitals q 15 min.
Preserve IV access
2. If associated with hypotension or
respiratory distress then considered
Anaphylaxis:
 - O2 6-10 L/min by face mask
 - IVF 0.9% NS wide open; elevate legs > 60°
 - Epinephrine 0.3 cc of 1:1000 IM (or auto-injector) OR Epi 1 cc of 1:10,000 IV with slow flush or IV fluids
 - Call 911 or CODE BLUE
3. If *ONLY* skin findings but severe or
progressive may consider Benadryl 50
mg PO, IM, IV but may cause or worsen
hypotension

HYPOTENSION WITH TACHYCARDIA

1. Preserve IV access, monitor vitals q 15m
2. O2 6-10 L/min by face mask
3. Elevate legs > 60 degrees
4. IVF 0.9% NS wide open
5. Epinephrine 0.3 cc of 1:1000 IM (or auto-injector) OR Epi 1 cc of 1:10,000 IV with slow flush or IV fluids
6. Call 911 or CODE BLUE

HYPOTENSION WITH BRADYCARDIA

1. Preserve IV access; monitor vitals
2. O2 6-10 L/min by face mask
3. Elevate legs > 60 degrees
4. IVF 0.9% NS wide open
5. Atropine 0.6-1.0 mg IV if refractory

LARYNGEAL EDEMA (INSPIRATORY STRIDOR)

1. Preserve IV access, monitor vitals
2. O2 6-10 L/min by face mask
3. Epinephrine 0.3 cc of 1:1000 IM (or auto-injector) OR Epi 1 cc of 1:10,000 IV with slow flush or IV fluids
4. Call 911 or CODE BLUE

BRONCHOSPASM (EXPIRATORY WHEEZES)

1. Preserve IV access, monitor vitals
2. O2 6-10 L/min by face mask
3. B2 agonist inhaler 2 puffs; repeat x 3
4. If not responding or severe, then use Epinephrine 0.3 cc of 1:1000 IM (or auto-injector) OR Epi 1 cc of 1:10,000 IV with slow flush or IV fluids
5. Call 911 or CODE BLUE

The content of this card is for reference purposes only and is not intended to substitute for the judgment and expertise of the physician or other user. User is responsible for verifying currency and applicability of content to clinical situation and assumes all risk of use.

www.acr.org/contrast



Committee on Drugs and Contrast Media 12/19/2017 (Adult algorithm)

CODE BLUE #: _____

EXAMPLE PREMEDICATION REGIMENS

Methylprednisolone 32 mg PO 12, 2 hrs prior +/- Benadryl 50 mg PO 1 hr prior.

OR

Prednisone 50 mg PO 13, 7, 1 hours prior +/- Benadryl 50 mg PO 1 hr prior.

OR

Hydrocortisone 200 mg IV 5 hrs and 1 hr prior and Benadryl 50 mg IV 1 hr prior. (urgent, NPO only, ER, inpatient)

CONTRAST EXTRAVASATION

Elevate arm, cool compress, remove rings. Observe. Consider surgical consultation for decreased perfusion, sensation, strength, active range of motion, or increasing pain.

Document reaction & monitor for return of reaction post-treatment

HIVES/DIFFUSE ERYTHEMA

1. Observation; monitor vitals q 15 min. Preserve IV access
2. If associated with hypotension or respiratory distress then considered **Anaphylaxis**:
 - O2 6-10 L/min by face mask
 - IVF 0.9% NS wide open; elevate legs > 60°
 - Epinephrine 0.3 cc of 1:1000 IM (or auto-injector) OR Epi 1 cc of 1:10,000 IV with slow flush or IV fluids
 - Call 911 or CODE BLUE
3. If **ONLY** skin findings but severe or progressive may consider Benadryl 50 mg PO, IM, IV but may cause or worsen hypotension

HYPOTENSION WITH TACHYCARDIA

1. Preserve IV access, monitor vitals q 15m
2. O2 6-10 L/min by face mask
3. Elevate legs > 60 degrees
4. IVF 0.9% NS wide open
5. Epinephrine 0.3 cc of 1:1000 IM (or auto-injector) OR Epi 1 cc of 1:10,000 IV with slow flush or IV fluids
6. Call 911 or CODE BLUE

HYPOTENSION WITH BRADYCARDIA

1. Preserve IV access; monitor vitals
2. O2 6-10 L/min by face mask
3. Elevate legs > 60 degrees
4. IVF 0.9% NS wide open
5. Atropine 0.6-1.0 mg IV if refractory

LARYNGEAL EDEMA (INSPIRATORY STRIDOR)

1. Preserve IV access, monitor vitals
2. O2 6-10 L/min by face mask
3. Epinephrine 0.3 cc of 1:1000 IM (or auto-injector) OR Epi 1 cc of 1:10,000 IV with slow flush or IV fluids
4. Call 911 or CODE BLUE

BRONCHOSPASM (EXPIRATORY WHEEZES)

1. Preserve IV access, monitor vitals
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3. B2 agonist inhaler 2 puffs; repeat x 3
4. If not responding or severe, then use Epinephrine 0.3 cc of 1:1000 IM (or auto-injector) OR Epi 1 cc of 1:10,000 IV with slow flush or IV fluids
5. Call 911 or CODE BLUE

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www.acr.org/contrast

AdventHealth Orlando Diagnostic Radiology Residency

Code of Professional Conduct

As a resident physician, I understand that the practice of medicine is a unique and noble profession dedicated to the competent and compassionate care of patients. For these reasons, I strive to maintain the highest standards of conduct and commit myself to uphold the following professional code:

In relating to Myself, I will:

- Maintain integrity, honesty, compassion and trustworthiness
- Adhere to highest ethical standards in all areas
- Accept the personal risks associated with patient care
- Seek to balance my personal wellbeing and work demands
- Abstain from substance abuse
- Take responsibility when I make mistakes

In relating to my Superiors, I will:

- Perform assigned duties in a timely manner
- Participate actively during rounds and group encounters
- Seek to convey all information accurately
- Ensure thoroughness and attention to detail
- Show a willingness to learn through input from others
 - Respond to feedback by changing behavior as appropriate
- Request help at appropriate times
- Maintain appropriate boundaries
- Excel in all general competencies and evaluations

In relating to my Peers, I will:

- Model professionalism and compassion
- Strive to build team spirit
- Establish appropriate interpersonal relationships
- Be an advocate for my colleagues when appropriate
- Be willing to share knowledge and skills
- Provide support especially in times of personal or work-related distress
- Be willing to confront inappropriate behavior or performance

In relating to Patients, I will:

- Be a patient advocate
- Deliver whole person care with sensitivity and understanding
- Incorporate the patient's values, customs and beliefs into my management plan
- Collaborate with patients in the decision-making process
- Safeguard patient comfort and privacy during consultation and examination
- Maintain confidentiality at all times
- Adapt my style of communication to the patient's level of understanding
- Be compassionate in all interactions and sharing of bad news
- Seek to maintain my composure no matter how difficult the situation
- Avoid conflicts of interest and maintain appropriate boundaries

Take steps to prevent repetition of errors
Demonstrate respect in all comments about or to patients

In relating to the Institution, I will:

Uphold the mission and values of the institution
Adhere to institutional policies and procedures
Be punctual with my clinical responsibilities
Respond to my calls and pages in a timely fashion
Fulfill non-clinical responsibilities and patient charting promptly
Intervene immediately when others face harm or danger
Seek assistance readily when I need it
Maintain attention to detail
Strive to use resources effectively, efficiently, and without bias
Seek to ameliorate quality of environment and service whenever appropriate



AdventHealth Orlando Diagnostic Radiology Residency

**Confirmation of Receipt of the Code of Professional
Conduct**

Academic Year 2018-2019

By signing this document you are confirming that you have received and reviewed AdventHealth Orlando's Code of Professional Conduct for this academic year. This receipt will be kept in your personal file.

Resident Name (please print) _____

Resident Signature _____

Date _____

Coordinator Initials _____

Date _____



AdventHealth Orlando Diagnostic Radiology Residency

Confirmation of Receipt of Your Program Policy
Manual

Academic Year 2018-2019

By signing this document you are confirming that you have received and reviewed your Program Policy Manual for this academic year. This policy manual contains policies and procedures pertinent to your training program. This receipt will be kept in your personal file.

Resident Name (please print) _____

Resident Signature _____

Date _____

Coordinator Initials _____

Date _____