

Rotation 1: Clinical Rotation Schedule and Objectives

Rotation 1: Workflow, Equipment, and Dosimetry

Introduction to radiation and workplace safety

Introduction to professionalism and ethics

Introduction to the radiation oncology workflow

Introduction to equipment and QA

Dosimeters and dosimetry systems

Chief Mentor: Tripp Jones

Rotation Assistants: David Thomas, David Westerly

Duration: July through August (2 months)

Rotation Presentation with Q&A: Theory and Operation of Radiation Detectors

The resident will complete orientation through the university and within the department. The resident will be given a resident binder containing the necessary information and introduction to the department as well as a checklist of initial items the resident needs to complete. After orientation, the next two weeks of this rotation are spent participating in treatment simulation and delivery in the clinic. The goal is for the resident to become familiar with the daily activities and the treatment flow of the clinic. The rest of the rotation is spent participating in QA activities to become familiar with the operation and performance of radiation generating equipment and radiation measurement systems within the department.

The resident shall attend the required educational conferences, lectures, and departmental meetings. Attendance of these courses and conferences occur throughout the resident's two-year training.

Some rare clinical procedures or commissioning tasks happen on a less frequent basis. The resident will participate in these types of activities throughout the resident's two-year training.

Learning Objectives:

1. Become oriented with the university, department, and workflow and complete all necessary items for working in the department
2. Review hospital workplace safety fundamentals by completing the following University of Colorado online training modules via the UCD Access website
 - a. Radiation Safety Initial Training
 - b. Bloodborne Pathogens
 - c. HIPAA Regulations
 - d. Information Security and Privacy Awareness
 - e. Discrimination and Sexual Harassment

3. Gain the knowledge and skills for professional and ethical behavior in the hospital setting by completing the introductory curriculum.
4. Learn about the role of the radiation oncology physicist. Learn about professional societies, regulating bodies, and how the physicist interacts with these groups in various clinical situations.
5. Become familiar with the department workflow by observing the process of patient care, simulation, planning, and treatment. Learn the basic concepts of treatment planning and gain operational knowledge of the Eclipse treatment planning system.
6. Participate in monthly QA and IMRT QA activities. This will familiarize the resident with the operations and performances of common equipment in radiation oncology.
7. Learn the practical use and theory of dosimeters and in vivo dosimetry, including ion chambers, diodes, and TLDs

Primary clinical responsibilities:

1. Perform monthly QA with supervision on the Truebeam 1, Truebeam 2 and CT simulators by the end of the rotation.
2. Perform IMRT QA with supervision on the linear accelerators within the department by the end of the rotation.
3. Perform OSLD in vivo readouts, calibration, and system maintenance. During this rotation, the resident should also be present in the treatment room during the placement of OSLDs whenever physics is needed. The resident will read out the measurements and determine expected doses. Under supervision of the clinical primary physicist, the resident will email and follow up with the physicians by the end of the rotation. This will continue through the resident's first year.
4. Assist staff physicists in the management of detector ADCL calibrations.
5. Participate in machine troubleshooting, repair and maintenance with physics staff as the opportunity arises. This will continue throughout the resident's two year training.

Required Reading:

Profession

1. Professional Societies, presentation
2. AAPM Report 109: Code of Ethics for the American Association of Physicists in Medicine, 2019.

Simulation

3. Dieterich, et al, Practical Radiation Oncology Physics Chapter 13: Simulation for Radiotherapy Treatment Planning, 1st ed, Elsevier, 2015.
4. Dieterich, et al, Practical Radiation Oncology Physics Chapter 7: Immobilization Techniques in Radiotherapy, 1st ed, Elsevier, 2015.

5. Treatment Planning in Radiation Oncology. 2nd Edition, F. M. Khan, 2007, Chapter 1, Chapter 5.
6. The Physics of Radiation Therapy. 4th Edition, F. M. Khan, 2010, Chapter 6.
7. Handbook of Radiotherapy Physics Theory and Practice. Mayles 2007, Chapter 15
8. Handbook of Radiotherapy Physics Theory and Practice. Mayles 2007, Chapter 16
9. The Essential Physics of Medical Imaging, 2nd Edition, J.T. Bushberg, pp. 157-163 or Christensen's Physics of Diagnostic Radiology, 4th Edition, Curry et al, 1990, Chapters 10-11.

Detectors

10. Dieterich, et al, Practical Radiation Oncology Physics Chapter 3: In Vivo Dosimetry, 1st ed, Elsevier, 2015.
11. AAPM TG 191: Clinical use of luminescent dosimeters: TLDs and OSLDs, 2019.

Recommended Reading:

1. Introduction to Radiological Physics and Radiation Dosimetry. F.H.Attix, 1986, Chapter 12.
2. AAPM Report 56 (TG-35): Medical Accelerator Safety Considerations, 1993.
3. AAPM Report 142 (TG-142): Quality assurance of medical accelerators, 2009.
4. AAPM Report 46 (TG-40): Comprehensive QA for Radiation Oncology, 1994.
5. AAPM Report 218 (TG-218): Tolerance Limits and Methodologies for IMRT Measurement-Based Verification QA, 2018.
6. AAPM Report 233 (TG-233): Performance Evaluation of Computed Tomography Systems, 2019.

**University of Colorado
Medical Physics Residency Program**

ROTATION 1: MASTER TASK LIST	DATE COMPLETED
KNOWLEDGE	
Become aware of the roles of physicists, professional societies, and regulating bodies by reviewing relevant required readings and discussing with rotation mentor	
SKILLS	
Operational knowledge of the CT simulators and linacs	
Independently perform OSLD in vivo dosimetry readouts and system management. Complete the in vivo dosimetry competency form.	
Independently perform IMRT QA. Complete the IMRT QA competency form.	
Independently perform monthly QA on the Truebeam 1 and Truebeam 2	
ASSIGNMENTS / CLINICAL CASES	
Complete the New Resident Orientation and Checklist (located in the Resident Binder)	
Complete the introductory professionalism and ethics curriculum	
Complete introductory workplace safety training	
Complete the departmental radiation detectors scavenger hunt. Participate in the shipping, receiving, and QA of regular calibrations for radiation detectors within the department.	
Independently perform a sim/plan/treatment on the Rando phantom in the presence of the rotation mentor.	
Perform annual QA of the Arc Check and Delta 4 devices	
TOPIC-SPECIFIC CHECKLISTS TO COMPLETE	
<ul style="list-style-type: none"> • Patient Care • Simulation • Treatment Planning • Introduction to Quality Assurance Program • Ionization Chambers • Diodes, TLDs, Film 	

Staff Signature _____ Date: _____

Resident Signature _____ Date: _____

Additional Comments:

ROTATION 1: PATIENT CARE	DATE COMPLETED
KNOWLEDGE	
Be aware of the various treatment options and medical responsibilities for cancer patients, both within the radiation oncology department and throughout the cancer center	
Gain an appreciation of the radiation oncology field from the physician's and patient's perspectives	
SKILLS	
Exhibit appropriate conversations and behaviors near patients	
ASSIGNMENTS / CLINICAL CASES	
Observe a new patient consult with the Radiation Oncologist	
Observe a patient on-treatment visit (OTV) with the Radiation Oncologist	
Observe a patient follow-up visit with the Radiation Oncologist	
Attend at least 3 tumor boards. Coordinate with the medical residents to determine when and where to go.	
Observe all steps in the treatment process (consult, simulation, treatment planning, and treatment). If possible, try to follow at least 1 patients from consult, to simulation, treatment planning, and treatment.	

Staff Signature _____ Date: _____

Resident Signature _____ Date: _____

Additional Comments: