



University of Michigan  
Department of Radiation Oncology  
Division of Radiation Physics

## Shielding Rotation

Resident: \_\_\_\_\_

Rotation staff mentor/ advisor(s): Joann Prisciandaro and  
Don Roberts

Rotation Duration: 1 month

Rotation Dates: \_\_\_\_\_

A medical physics resident in radiation oncology at the University of Michigan will be expected to demonstrate the following competencies associated with shielding. Listed below are the minimum standards.

## **Contents Outline**

### Knowledge Factors

- List of reading assignments
- Shielding

### Practical Factors

- Shielding calculations

## **Knowledge Factors – List of reading assignment**

1. NUREG-1556, “Consolidated guidance about material licenses.”
2. NCRP, “Structural shielding design and evaluation for medical use of x-rays and gamma-rays of energies up to 10 MeV,” NCRP Report No. 49 (1976).
3. NCRP, “Structural Shielding Design and Evaluation for Megavoltage X- and Gamma-Ray Radiotherapy Facilities,” NCRP Report No. 151 (2005).
4. NCRP Report 116, “Limitation of exposure to ionization radiation.”
5. P.H. McGinley, Shielding Techniques for Radiation Oncology Facilities, 2<sup>nd</sup> Edition, Medical Physics Publishing, Copyright 2002.
6. NCRP Report 155, “Management of radionuclide therapy patients.”

## **Knowledge Factors – Shielding**

Read and demonstrate an understanding of the relevant, shielding related NCRP report. Demonstrate an understanding of structural shielding designs and the key parameters necessary to perform a shielding calculation.

Signature / Date

Demonstrate an understanding of the shielding requirements for the maze and door of a high-energy photon room.

Signature / Date

Demonstrate an understanding of the advantages and disadvantages of various materials that may be used for shielding.

Signature / Date

Demonstrate an understanding of how procedures such as IMRT, SBRT, and TBI may impact shielding parameters

Signature / Date

Demonstrate an understanding of state/provincial licensing of x-ray producing devices.

Signature / Date

Demonstrate an understanding of licensing issues (NUREG-1556).

Signature / Date

Discuss and demonstrate an understanding of a linac head wrap.

Signature / Date

Read and demonstrate an understanding of NCRP report 155.

Signature / Date

## **Practical Factors – Shielding**

Perform a brachytherapy shielding calculation.

Signature / Date

Perform linac room shielding calculation.

Signature / Date

Perform CT room shielding calculation. Discuss the significance of isodose distribution plots for CT units.

Signature / Date

Perform a linac radiation room survey.

Signature / Date

Prepare a shielding report summarizing the design, calculations, and survey results for a high energy linear accelerator vault.

Signature / Date