Brachytherapy Rotation I & II

Resident: ________________________________

Rotation staff mentor/ advisor(s): Choonik Lee and Joann Prisciandaro, Zheng Zhang, Charlie Matrosic, Alex Moncion

___________________

Rotation Duration: 2 months each rotation
Rotation Dates: _______________________________

A medical physics resident in radiation oncology at the University of Michigan will be expected to demonstrate the following competencies associated with brachytherapy and radiation safety. Listed below are the minimum standards.
Knowledge Factors – List of reading assignment

1. Title 10 of the federal code of regulations (parts 19, 20, & 35)
2. State Regulations (MI-LARA) -
   https://www.michigan.gov/leo/0,5863,7-336-78421_11407_35791---,00.html
   https://www.michigan.gov/leo/0,5863,7-336-94422_11407_35791-385258--.00.html
3. AAPM Task Group #43U, “Dosimetry of Interstitial brachytherapy sources.”
5. AAPM Task Group #59, “HDR brachytherapy treatment delivery.”
7. AAPM Task Group #221, “AAPM recommendations on medical physics practices for ocular plaque brachytherapy”
8. AAPM Report 98, “Third-party brachytherapy source calibrations and physicist responsibilities.”
11. AAPM Task Group 186, “Model-based dose calculation methods in brachytherapy beyond the TG-43 formalism.”


19. AAPM Clinical Brachytherapy Physics, AAPM Monogram No. 38 (2017 AAPM Summer School) – Chapters 4, 5, 6, 8 (Physical book in resident library)

20. AAPM Summer School 2005 “Episcleral Eye Plaques For Treatment Of Intra-Ocular Malignancies And Benign Diseases” by Chiu-Tsao

Knowledge Factors – List of reading assignment (OPTIONAL)

1. AAPM Task Group #137, “AAPM recommendations on dose prescription and reporting methods for permanent interstitial brachytherapy for prostate cancer.” - Executive Summary


3. AAPM Task Group 221, “AAPM recommendations on medical physics practices for ocular plaque brachytherapy”

4. AAPM Task Group 303. “MRI implementation in HDR brachytherapy—Considerations from simulation to treatment”

5. ICRU Report 89, “Prescribing, recording, and reporting brachytherapy for cancer of the cervix”


7. ABS consensus statements (https://www.americanbrachytherapy.org/consensus-statements/):
   a. GYN
      i. Cervix cancer (part 1 and 2)
      ii. Adjuvant vaginal cuff
      iii. Inoperable endometrial cancer
      iv. Interstitial for vaginal cancer
b. Eye

c. Prostate
   i. Transrectal US guided permanent implants
   ii. HDR

d. Breast

8. IROC Houston source registry: [http://rpc.mdanderson.org/RPC/home.htm](http://rpc.mdanderson.org/RPC/home.htm)


Knowledge Factors – Regulations (Rotation I, JIP)

MUST BE COMPLETED WITHIN FIRST 2 WEEKS OF ROTATION I

Read and demonstrate an understanding of 10CFR19.

Signature / Date

Read and demonstrate an understanding of 10CFR20.

Signature / Date

Read and demonstrate an understanding of 10CFR35.

Signature / Date

Read and demonstrate an understanding the Michigan State regulations.

Signature / Date

Knowledge Factors – General Brachytherapy (Rotation I)

Review and discuss the IROC Houston source registry. (CIL)

Signature / Date

Read and demonstrate an understanding of AAPM TG-43U report, including different source strength units used for brachytherapy. (CIL)

Signature / Date

Perform TG-43 calculations for a single, double, and triple source plan. (CIL)

Signature / Date

Read and demonstrate an understanding of AAPM TG-56 report, in particular, how brachytherapy programs are developed. (JIP)

Signature / Date

Read and demonstrate an understanding of AAPM TG-59 report. Discuss commissioning and acceptance of remote afterloaders. (JIP)

Signature / Date

Discuss decay, decay energies (mean energy), and half-lives of brachytherapy sources (e.g., Ra-226, Cs-137, Ir-192, Y-90, Pd-103, Cs-131, and I-125). (JIP)

Signature / Date

Discuss the advantages and disadvantages of LDR, HDR, and PDR brachytherapy. (JIP)

Signature / Date

Knowledge Factors – HDR Brachytherapy (Rotation I)

Demonstrates an understanding of GYN (cervical), anatomy, staging, and treatment. (Read ABS Cervical Cancer Guidelines I and II)

Signature / Date

Demonstrates an understanding of GYN (endometrial), anatomy, staging, and treatment. (Read ABS Vaginal Cuff Guidelines)

Signature / Date

Review and discuss the ABS guidelines, consensus statements, and task group reports for GYN cancers.

Signature / Date

Knowledge Factors – Eye plaque (Rotation I)

Read and discuss COMS protocol. (CKM)

Signature / Date

Read and demonstrate an understanding of AAPM TG-129 report. (CKM)

Signature / Date

Discuss decay, decay energies (mean energy), and half-lives of brachytherapy sources (e.g., Ra-226, Cs-137, Ir-192, Y-90, Pd-103, Cs-131, and I-125). (JIP)

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Review and discuss the ABS guidelines, consensus statements, and task group reports for GYN cancers.

Signature / Date

Knowledge Factors – Eye plaque (Rotation I)

Read and discuss COMS protocol. (CKM)

Signature / Date

Read and demonstrate an understanding of AAPM TG-129 report. (CKM)
Knowledge Factors – Handling Radioactive Sources (Rotation II)

Read and demonstrate an understanding of AAPM Report 98. (CIL)

Knowledge Factors – General Brachytherapy (Rotation II)

Read and demonstrate an understanding of AAPM TG-186 report. (ZZ)

Demonstrates an understanding of breast anatomy, staging, and treatment. (AM)

Demonstrates an understanding of prostate (GU) anatomy, staging, and treatment. (CIL)

Review and discuss the ABS consensus statements on breast cancer. (AM)

Review and discuss the ABS guidelines, consensus statements, and task group reports for prostate cancers. (CIL)

Read and discuss the AAPM TG-64 report (Prostate LDR). (CIL)

Read and discuss the AAPM TG-137 report (Prostate LDR). (CIL)

Knowledge Factors – HDR Brachytherapy (Rotation II, JIP)

Read and demonstrate an understanding of the GEC-ESTRO recommendations for volume based treatment planning for cervical cancer.

Knowledge Factors – Others (Rotation II)

Read and discuss the AAPM TG-144 report (microspheres). (ZZ)
Practical Factors – Handling Radioactive Sources
(Orientation and Rotation I)

Perform hot lab survey and quarterly inventory. Discuss leak checks of sealed sources. (JIP)

Signature / Date

Complete and demonstrate an understanding of radioactive material packaging and transportation lecture. (JIP)

Signature / Date

Practical Factors – HDR (Rotation I)

Observe morning QA.

Signature / Date

Perform morning QA independently.

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Participate in source exchange QA.

Signature / Date

Perform monthly QA.

Signature / Date

Perform patient survey before and after the HDR treatment.

Signature / Date
Signature / Date
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Participate/discuss 2nd check of treatment plans.

Date | Applicator Type | Supervisor Signature
--- | --- | ---

Generate test and/or clinical GYN treatment plans (cylinder, R&T, Miami, etc.).

Applicator Type | Reviewed by:
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1 | 
2 | 
3 | 
4 | 
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Practical Factors – LDR Eye Plaque (Rotation I)

Observe and discuss eye plaque procedure.

Signature / Date

Generate an eye plaque treatment plan.

Signature / Date
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Assay eye plaque I-125 seeds.

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Perform a post implant survey.

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Perform a post removal survey.

Signature / Date
Practical Factors – HDR (Rotation II)

Import and evaluate TG186 test cases from IROC Houston (http://irochouston.mdanderson.org/rpc/BrachySeeds/Varian_database.htm)

Perform morning QA independently.

Perform/participate in annual QA.

Review and perform a BED and EQD2 calculation.

Generate test and/or clinical HDR prostate treatment plans.

Practical Factors – LDR Therasphere (Rotation II)

Calculate activity required for Therasphere treatment.

Assay Therasphere vials before and after the infusion.

Brachytherapy Case Participation

Document participation in planning (including anonymized cases), checking, delivering, and administrative paperwork of following implants.

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<tr>
<th>HDR Cylinder (single or multi-channel)</th>
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** HDR test cases are available under the patient name “$QA_HDR, Test patient” (Reg # jip03). Instructions for use are located under the shared directory, Physics/2010 Teaching/Physics Residents/Rotations/Brachytherapy and rad safety rotation.

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### LDR Eyeplaque

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### LDR Prostate

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### Others

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