

Bergen
Community College

Division of Health Professions

RADIATION THERAPY PROGRAM

Clinical Manual – Section II

Clinical Forms
Radiation Safety
2010 - 2011

Clinical Manual Section II

Program Directory

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Radiation Therapy Program Clinical Curriculum

1. Pre-Competency Requirements
 - A. Demonstration of laboratory competency module
 - B. Prior to attempting a competency evaluation, the student must document demonstration of at least two comparable patient set-ups. (assisted or unassisted under direct supervision) on the specific procedure.
The two demonstrations are to be performed on two different patients when possible. Documentation is required.
2. Competency Requirements:
 - A. A clinical competency requires both a psychomotor and cognitive evaluation.
 - B. Students are evaluated from the criterion that is indicated on the Clinical Competency Evaluation forms.
 - C. Points are awarded based on the Clinical Supervisor's clinical judgment.

DIRECT SUPERVISION POLICY

All students and clinical staff are required to adhere to Bergen Community College policy and JRCERT standards requiring all radiation therapy procedures be performed under the Direct Supervision of a qualified practitioner. The Direct Supervision at all times policy will be strictly enforced by college and clinical staff and adhered to by students. The monitoring of such a policy will be overseen by the clinical supervisor and/or radiation therapist. Direct Supervision is as follows:

Clinical Supervision

All radiation therapy students must be under DIRECT CLINICAL SUPERVISION of a registered radiation therapist regardless of their level of competency of the student. The following are the prescribed parameters for direct clinical supervision:

A qualified radiation therapist reviews the procedure in relation to the student's achievement.

A qualified radiation therapist evaluates the condition of the patient in relation to the student's knowledge.

A qualified radiation therapist is present during the conduct of the procedure

A qualified radiation therapist reviews and approves the procedure

Radiation Therapy Basic Skill Evaluation

To demonstrate the goals of the program, upon completion the graduate will be able to perform

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the following:

- Administer radiation therapy as prescribed by the physician.
- Display professional conduct essential to the well being of the radiation oncology patient.
- Demonstrate effective written communication skills; Maintain accurate and detailed treatment chart documentation.
- Demonstrate effective verbal communication skills in the clinical setting.
- Observe the clinical progress of the radiation oncology patient, use clinical decision making skills to recognize and report any signs of complications.
- Utilize treatment accessories to accurately reproduce the radiation treatment.
- Adhere to radiation safety procedure protocol.
- Safely and effectively operate a variety of computerized simulation and treatment machines.
- Perform machine safety checks, know safe limits of equipment operations, and report abnormalities or inconsistencies to the proper authority.
- Construct immobilization devices and employ custom blocking techniques that are conducive to conformal radiation therapy.
- Utilize sophisticated imaging equipment and treatment planning systems for precise tumor localization.
- Work closely with the radiation Oncologist and the therapy team in the preparation of a treatment plan that is customized to the patient's needs.
- Adhere to the Radiation Therapist Code of Ethics.

Professional Behavior Policy:

Radiotherapy students are required to:

- comply with the policies of the affiliate since students are guests of the Hospital.
- adhere to all Radiation Therapy Department policies.
- conduct themselves in a professional manner at all times.
- professional ethics:
 1. the student may not turn the key to any treatment machine.
 2. the student may not study at the treatment or simulator console.
 3. the student may not read magazines or newspapers while at the treatment console.
 4. the student is to keep the patient chart open until the completion of the patient's treatment.
 5. the student will audibly and visually monitor the patient at all times.
 6. the student will avoid eating, drinking and gum chewing within the sight of patients.
 7. the student will never leave patients unattended.
 8. The student will address faculty, management, staff and patients in a professional manner.
- inform the program of address or phone number changes.
- maintain professional credentials as required by the program.
- sign, date and return all original clinical competency and student assessment forms

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- to the designated clinical supervisor. **No copies will be accepted.**
- ❑ avoid using the department's telephones for personal use- emergencies only.
 - ❑ notify the instructor or designee before leaving the department.
 - ❑ maintain pagers on "pulse" mode.

Record Keeping Responsibilities:

- ❑ Clinical Forms:
 - a. Clinical Competency Evaluation Forms (43 competencies are required)
 - b. Clinical Competency Requirement Form (ARRT requirement form)
 - c. Clinical Tracking Forms (documenting two demonstrations prior to competency)
 - d. Attendance Form (Fall, Spring and Summer Semesters)
 - e. Student Assessment Forms (three per semester – following every clinical rotation)
 - f. Student Conference Form (to supplement Student Assessment Form)
- ❑ Clinical Supervisors are responsible for accurately recording and maintaining all Clinical Competency Evaluation Forms and Student Assessment Forms (including Student Conference Forms). Students are encouraged to make copies of all forms as they are submitted. All forms will be collected, tallied and secured by the Senior Clinical Supervisor. No copies will be accepted.
- ❑ Clinical Competency Requirement Form (ARRT requirement form), Clinical Tracking Forms and Attendance Forms are the responsibility of the student and will be delivered directly to the Senior Clinical Supervisor by the student. Students are encouraged to make copies of all forms as they are submitted. No copies will be accepted.

Evaluation Policy

- ❑ The student will review their didactic and clinical progress with the Program Director and Senior Clinical Supervisor at a mid-semester conference. At the end of the semester, the Program Director and Senior Clinical Supervisor will meet with the student to discuss the cumulative results. Attendance, program completion requirements and academic status will be discussed at these meetings.
- ❑ Clinical Evaluation Forms, Student Assessment Forms and Attendance Forms will be used to determine the students' clinical grade. Clinical Evaluation Forms and Student Assessment Forms will be completed by the designated Radiation Therapy Clinical Supervisor with input from the staff. The evaluations will be based on the student's overall performance in accordance with specific objectives for each semester. The cognitive, psychomotor and affective domains are evaluated by the student assessment form once during each rotation (3 times per semester).

Clinical Competency Forms

1. Clinical Competency Evaluation Forms – Completed by an appointed Clinical Supervisor. It is to be reviewed with the student and signed at the time of completion. The Clinical Supervisor will submit completed forms to the Senior Clinical Supervisor in a timely manner. Only original forms will be accepted.

2. Treatment Machine Procedures (pages 7 & 8) – RTT 121
3. Treatment Machine or Low Volume/High Risk Procedure (pages 9 & 10) – RTT 221-222
4. C.T. Simulation Procedure (pages 11 & 12)
5. Fluoro Procedure (pages 13 & 14) – RTT 121 / 221, 222
6. Beam Modification Devices (pages 15 & 16)
7. Dosimetry (pages 17 & 18)
8. General Patient Care (pages 19 & 20)

2. Clinical Competency Requirements Form (pages 21 - 23) – These forms are in accordance with ARRT requirements for registration examination eligibility. These forms will be given to the student at the beginning of the program and will serve as documentation for the successful completion of all required competencies. The student is responsible for securing the completed forms and bringing them to the mid and end semester evaluation meetings. The student is responsible for submitting these forms directly to the Senior Clinical Supervisor. Only original forms will be accepted.

3. Clinical Tracking Forms (pages 24 – 26) – The student will track their development from laboratory to demonstration to clinical competency. The purpose of this form is to assure a progressive learning experience from didactic to laboratory to clinical competency. The student is responsible for submitting these forms directly to the Senior Clinical Supervisor. Only original forms will be accepted.

4. Clinical Rotation Attendance Form (page 27) – This form is given to the student at the beginning of the school year and as needed. On a daily basis, the student is responsible for signing in and out at the time of arrival and departure. On a daily basis, the student is responsible for obtaining verification with an authorized signature. **A clinic representative, i.e. radiation therapist, nurse, dosimetrist, physicist, who is present when the student arrives and leaves may sign this form.** The student is responsible for submitting these forms directly to the Senior Clinical Supervisor. Only original forms will be accepted.

5. Student Assessment Form (pages 28 – 31) - Completed by the Clinical Supervisor with input from the staff. It is to be completed for each student once during each clinical rotation (3 per semester). The Radiation Therapy Clinical Supervisor is responsible for delivery of the completed form to the program Senior Clinical Supervisor in a timely manner. Only original forms will be accepted.

The Criteria Guidelines for the Student Assessment Form is used to define the criteria for evaluation.

6. Student Conference Form (page 32) – Used for comments and clarification of the completed Student Assessment Form. It is used to document student progress and possible areas of concern and improvement. Both student and staff will verify acknowledgement with signatures.

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RADIATION THERAPY TECHNOLOGY PROGRAM

CLINICAL COMPETENCY EVALUATION – RTT 121

TREATMENT MACHINE PROCEDURE

A student is eligible to perform a clinical evaluation after successful completion of a laboratory competency module and 2 (two) clinical demonstrations (assisted or unassisted under direct supervision) on the specific procedure.

*** Core Competency Questions: A grade of 4 (A) on questions 6, 10 and 11 is required to pass the competency.**

Successfully completed: Lab. module _____ Two Patient Demonstrations _____

Patient _____ Simulated _____ Procedure _____

Student _____ Date _____

Please check the appropriate performance based on the student’s demonstrated ability. A minimum of a Good / Competent rating must be achieved in each task in order to successfully complete the evaluation. Comment on any rating below 2.

Letter Grade	Numerical Range	Conversion	Numerical Grade Equivalent
A	90% to 100%	Excellent / Distinguished	4
B+	85% to 89.9%	Very Good / Above Average	3
B	80% to 84.9%	Good / Competent – Average for Level of Training	2
C+	75% to 79.9%	Acceptable / Marginal and Conditional	1
C	70% to 74.9%	Poor / Unsatisfactory and Failing	0

	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>0</u>	<u>N/A</u>
1. Review chart and information system accuracy prior to preparing patient for treatment.	_____	_____	_____	_____	_____	_____
2. Explain physician’s orders and dose prescription.	_____	_____	_____	_____	_____	_____
3. Prepare treatment room prior to admitting patient.	_____	_____	_____	_____	_____	_____
4. Describe pathology and stage of disease.	_____	_____	_____	_____	_____	_____
5. Greet / Escort correct patient to / from treatment area.	_____	_____	_____	_____	_____	_____
6. *Confirm patient’s identity as correct.	_____	_____	_____	_____	_____	_____
7. Assist the patient onto the treatment table using proper body mechanics or adequate lifting assistance.	_____	_____	_____	_____	_____	_____
8. Explain procedure and confirm patient understanding.	_____	_____	_____	_____	_____	_____
9. Position patient to reproduce set-up as indicated in treatment chart.	_____	_____	_____	_____	_____	_____
10. *Use the correct positioning and immobilization device	_____	_____	_____	_____	_____	_____

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	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>0</u>	<u>N/A</u>
11. *Position treatment machine to reproduce set-up as indicated in treatment chart.	_____	_____	_____	_____	_____	_____
12. Apply principles of radiation protection.	_____	_____	_____	_____	_____	_____
13. Use appropriate accessory devices safely and correctly.	_____	_____	_____	_____	_____	_____
14. Select the proper tray, blocks, template, etc., and use them as indicated on treatment chart.	_____	_____	_____	_____	_____	_____
15. Insert correct wedge properly.	_____	_____	_____	_____	_____	_____
16. Recheck set-up with treatment chart before leaving the room.	_____	_____	_____	_____	_____	_____
17. Instruct patient to maintain position during treatment.	_____	_____	_____	_____	_____	_____
18. Set, activate appropriate controls on console.	_____	_____	_____	_____	_____	_____
19. Monitor patient both visually and audibly.	_____	_____	_____	_____	_____	_____
20. Monitor treatment machine console during treatment.	_____	_____	_____	_____	_____	_____
21. Record pertinent data concerning patient status on proper document.	_____	_____	_____	_____	_____	_____
22. Record, add, and initial daily treatment entry and accumulated dose.	_____	_____	_____	_____	_____	_____
23. Capture treatment and port film charges.	_____	_____	_____	_____	_____	_____
24. React effectively in the event of treatment machine malfunction or radiation hazard. Describe the correct procedure to follow in case of malfunction or emergency.	_____	_____	_____	_____	_____	_____
25. All of the above done in a timely manor.	_____	_____	_____	_____	_____	_____

Comments:

Designated Clinical Supervisor Signature

Print Name _____ **Date** _____

Clinical Site _____ **Treatment Unit** _____

Student Signature _____ **Date** _____

BERGEN COMMUNITY COLLEGE
RADIATION THERAPY TECHNOLOGY PROGRAM

CLINICAL COMPETENCY EVALUATION - RTT 221 / RTT 222

PROCEDURE : TREATMENT MACHINE / LOW VOLUME - HIGH RISK

Student _____ Date _____

Successfully completed: Lab. module _____ Two Patient Demonstrations _____

Patient _____ Simulated _____ Procedure _____

Clinical Site _____ Treatment Unit _____

Designated Clinical Supervisor (print name) _____

*** Core Competency Questions:** A grade of 4 (A) on questions 10 and 11 is required to pass the competency.

Please check the appropriate performance based on the student's demonstrated ability. A minimum of a Good / Competent rating must be achieved in each task in order to successfully complete the evaluation. Comment on any rating below 2.

Letter Grade	Numerical Range	Conversion	Numerical Grade Equivalent
A	90% to 100%	Excellent / Distinguished	4
B+	85% to 89.9%	Very Good / Above Average	3
B	80% to 84.9%	Good / Competent – Average for Level of Training	2
C+	75% to 79.9%	Acceptable / Marginal and Conditional	1
C	70% to 74.9%	Poor / Unsatisfactory and Failing	0

	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>0</u>	<u>N/A</u>
1. Review chart and information system accuracy prior to preparing patient for treatment.	_____	_____	_____	_____	_____	_____
2. Explain physician's orders and dose prescription.	_____	_____	_____	_____	_____	_____
3. Prepare treatment room prior to admitting patient.	_____	_____	_____	_____	_____	_____
4. Correlate pathology, stage of disease and field arrangement	_____	_____	_____	_____	_____	_____
5. Greet patient, confirm patient's identity as correct and escort patient to and from treatment area.	_____	_____	_____	_____	_____	_____
6. Assist the patient onto the treatment table using proper body mechanics or adequate lifting assistance.	_____	_____	_____	_____	_____	_____
7. Explain procedure and confirm patient understanding.	_____	_____	_____	_____	_____	_____
8. Identify patients on treatment protocols and describe any procedures specific to that protocol	_____	_____	_____	_____	_____	_____
9. Position patient to reproduce set-up as indicated in treatment chart.	_____	_____	_____	_____	_____	_____

	4	3	2	1	0	N/A
10. *Safe and appropriate use of:						
correct positioning and immobilization devices	_____	_____	_____	_____	_____	_____
accessory devices	_____	_____	_____	_____	_____	_____
tray,, blocks, template, etc.	_____	_____	_____	_____	_____	_____
correct wedge properly inserted.	_____	_____	_____	_____	_____	_____
11. *Position treatment machine to reproduce set-up as indicated in treatment chart.	_____	_____	_____	_____	_____	_____
12. Apply principles of radiation protection.	_____	_____	_____	_____	_____	_____
13. Discuss matching borders and gaps when applicable.	_____	_____	_____	_____	_____	_____
14. Demonstrate ability to take, evaluate and document port films	_____	_____	_____	_____	_____	_____
15. Recheck set-up with treatment chart before leaving the room.	_____	_____	_____	_____	_____	_____
16. Instruct patient to maintain position during treatment.	_____	_____	_____	_____	_____	_____
17. Set, activate appropriate controls on console.	_____	_____	_____	_____	_____	_____
18. Monitor patient both visually and audibly.	_____	_____	_____	_____	_____	_____
19. Monitor treatment machine console during treatment.	_____	_____	_____	_____	_____	_____
20. Assess and evaluate patient’s physical and emotional status, recognize radiation induced side effects and respond appropriately to changes in the patient’s condition.	_____	_____	_____	_____	_____	_____
21. Record, add, and initial daily treatment entry and accumulated dose.	_____	_____	_____	_____	_____	_____
22. Capture treatment and port film charges.	_____	_____	_____	_____	_____	_____
23. React effectively in the event of treatment machine malfunction or radiation hazard. Describe the correct procedure to follow in case of malfunction or emergency.	_____	_____	_____	_____	_____	_____
24. Perform, evaluate and document daily quality assurance procedures. Notify appropriate personnel when warranted	_____	_____	_____	_____	_____	_____
25. All of the above done in a timely manor.	_____	_____	_____	_____	_____	_____

Comments:

Clinical Supervisor Signature

Date

Student Signature

Date

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CLINICAL COMPETENCY EVALUATION

PROCEDURE: C.T. SIMULATION **DAILY Q.A.**

A student is eligible to perform a clinical evaluation after successful completion of a laboratory competency module and 2 (two) clinical demonstrations (assisted or unassisted under direct supervision) on the specific procedure.

All simulation competencies must be demonstrated on patients.

Procedure _____

Student _____ **Date** _____

Please check the appropriate performance based on the student's demonstrated ability. A minimum of a Good / Competent rating must be achieved in each task in order to successfully complete the evaluation. Comment on any rating below 2.

Letter Grade	Numerical Range	Conversion	Numerical Grade Equivalent
A	90% to 100%	Excellent / Distinguished	4
B+	85% to 89.9%	Very Good / Above Average	3
B	80% to 84.9%	Good / Competent – Average for Level of Training	2
C+	75% to 79.9%	Acceptable / Marginal and Conditional	1
C	70% to 74.9%	Poor / Unsatisfactory and Failing	0

	4	3	2	1	0	N/A
1. Obtain necessary patient and physician information before the start of the simulation.	_____	_____	_____	_____	_____	_____
2. Prepare the room prior to the start of the simulation procedure.	_____	_____	_____	_____	_____	_____
3. Explain physician's orders in relation to patient position, immobilization devices, equipment and contrast media.	_____	_____	_____	_____	_____	_____
4. Describe pathology and stage of disease.	_____	_____	_____	_____	_____	_____
5. Turn machine ON/OFF and observe C.T. scanner warm up procedures.	_____	_____	_____	_____	_____	_____
6. Greet / Escort correct patient to / from simulator.	_____	_____	_____	_____	_____	_____
7. Explain procedure and confirm patient understanding.	_____	_____	_____	_____	_____	_____
8. Obtain necessary identification and authorization documentation.	_____	_____	_____	_____	_____	_____
9. Locate and operate couch movement controls.	_____	_____	_____	_____	_____	_____
10. Identify and explain proper use of the inside and outside lasers.	_____	_____	_____	_____	_____	_____

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4 3 2 1 0 N/A

- | | | | | | | |
|--|-------|-------|-------|-------|-------|-------|
| 11. Assist the patient onto the C.T .simulation table using proper: body mechanics or adequate lifting assistance. | _____ | _____ | _____ | _____ | _____ | _____ |
| 12. Position patient using lasers for alignment. | _____ | _____ | _____ | _____ | _____ | _____ |
| 13. Determine the placement of the pilot scan. | _____ | _____ | _____ | _____ | _____ | _____ |
| 14. Take the pilot scan and determine where C.T. slices are to be obtained (sim sheet). | _____ | _____ | _____ | _____ | _____ | _____ |
| 15. Accurately mark patient treatment area. | _____ | _____ | _____ | _____ | _____ | _____ |
| 16. Transfer C.T, images onto X-ray film. | _____ | _____ | _____ | _____ | _____ | _____ |
| 17. Inform patient of the importance of reproducibility. Tattoo or Tegaderm marks. | _____ | _____ | _____ | _____ | _____ | _____ |
| 18. Prepare immobilization device and demonstrate patient immobilization. | _____ | _____ | _____ | _____ | _____ | _____ |
| 19. Demonstrates radiation protection ALARA principles. | _____ | _____ | _____ | _____ | _____ | _____ |
| 20. Monitors the patient and demonstrates appropriate patient care. | _____ | _____ | _____ | _____ | _____ | _____ |
| 21. Accurately label simulation films and film jacket. | _____ | _____ | _____ | _____ | _____ | _____ |
| 22. Interpret the information on the DRR and worksheet. | _____ | _____ | _____ | _____ | _____ | _____ |
| 23. Interpret coordinates from the simulation sheet | _____ | _____ | _____ | _____ | _____ | _____ |
| 24. Record patient position and other required information. | _____ | _____ | _____ | _____ | _____ | _____ |

RTT 221 / RTT 222 to be demonstrated once during second and third semester:

- | | | | | | | |
|---|-------|-------|-------|-------|-------|-------|
| 25. Perform daily QC as per protocol of department. | _____ | _____ | _____ | _____ | _____ | _____ |
| 26. Review and discuss CT scan and treatment plan with clinical supervisor, medical physicist or dosimetrist. | _____ | _____ | _____ | _____ | _____ | _____ |

Comments: _____

Designated Clinical Supervisor Signature

Print Name _____ **Date** _____

Clinical Site _____ **Simulation Unit** _____

Student Signature _____ **Date** _____

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CLINICAL COMPETENCY EVALUATION – RTT 121 / RTT 221, 222

PROCEDURE: FLUORO SIMULATION

DAILY Q.A.

A student is eligible to perform a clinical evaluation after successful completion of a laboratory competency module and 2 (two) clinical demonstrations (assisted or unassisted under direct supervision) on the specific procedure.

All simulation competencies must be demonstrated on patients.

Procedure _____

Student _____ **Date** _____

Please check the appropriate performance based on the student’s demonstrated ability. A minimum of a Good / Competent rating must be achieved in each task in order to successfully complete the evaluation. Comment on any rating below 2.

Letter Grade	Numerical Range	Conversion	Numerical Grade Equivalent
A	90% to 100%	Excellent / Distinguished	4
B+	85% to 89.9%	Very Good / Above Average	3
B	80% to 84.9%	Good / Competent – Average for Level of Training	2
C+	75% to 79.9%	Acceptable / Marginal and Conditional	1
C	70% to 74.9%	Poor / Unsatisfactory and Failing	0

	4	3	2	1	0	N/A
1. Obtain necessary patient and physician information before the start of the simulation.	_____	_____	_____	_____	_____	_____
2. Prepare the room prior to the start of the simulation procedure.	_____	_____	_____	_____	_____	_____
3. Explain physician’s orders in relation to patient position, immobilization devices, equipment and contrast media.	_____	_____	_____	_____	_____	_____
4. Describe pathology and stage of disease.	_____	_____	_____	_____	_____	_____
5. Greet / Escort correct patient to / from simulator.	_____	_____	_____	_____	_____	_____
6. Explain procedure and confirm patient understanding.	_____	_____	_____	_____	_____	_____
7. Obtain necessary identification and authorization documentation.	_____	_____	_____	_____	_____	_____
8. Assist the patient onto the simulation table using proper body mechanics or adequate lifting assistance.	_____	_____	_____	_____	_____	_____
9. Position patient appropriately for simulation procedure.	_____	_____	_____	_____	_____	_____
10. Prepare immobilization device and demonstrate patient immobilization.	_____	_____	_____	_____	_____	_____

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	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>0</u>	<u>N/A</u>
11. Position the fluoro simulator to produce the set-up as requested by the radiation oncologist.	_____	_____	_____	_____	_____	_____
12. Call the radiation oncologist to start the fluoroscopic simulation.	_____	_____	_____	_____	_____	_____
13. Demonstrates radiation protection ALARA principles.	_____	_____	_____	_____	_____	_____
14. Monitors the patient and demonstrates appropriate patient care.	_____	_____	_____	_____	_____	_____
15. Sets appropriate radiographic technique and obtain appropriate films.	_____	_____	_____	_____	_____	_____
16. Demonstrate appropriate film processing technique.	_____	_____	_____	_____	_____	_____
17. Accurately label simulation films and film jacket.	_____	_____	_____	_____	_____	_____
18. Accurately mark patient for treatment.	_____	_____	_____	_____	_____	_____
19. Obtain contour and record all measurements and set-up instructions.	_____	_____	_____	_____	_____	_____
20. Record machine set-up parameters.	_____	_____	_____	_____	_____	_____
21. Photograph treatment marks and patient in treatment position.	_____	_____	_____	_____	_____	_____
22. Inform patient of the importance of reproducibility. Tattoo or Tegaderm marks.	_____	_____	_____	_____	_____	_____
23. Differentiate between SSD and SAD technique.	_____	_____	_____	_____	_____	_____
24. Draw and label diagram of the treatment field in the chart.	_____	_____	_____	_____	_____	_____

RTT 221 / RTT 222 to be demonstrated once during second and third semester

25. Estimate equivalent square.	_____	_____	_____	_____	_____	_____
26. Determine magnification factor from radiograph	_____	_____	_____	_____	_____	_____
27. Determine field size or TFD from radiograph	_____	_____	_____	_____	_____	_____
28. Perform simulator QA as per protocol of department	_____	_____	_____	_____	_____	_____

Comments:

Designated Clinical Supervisor Signature

Print Name _____ **Date** _____

Clinical Site _____ **Simulation Unit** _____

Student Signature _____ **Date** _____

BERGEN COMMUNITY COLLEGE
RADIATION THERAPY TECHNOLOGY PROGRAM

CLINICAL COMPETENCY EVALUATION

BEAM MODIFICATION DEVICES

A student is eligible to perform a clinical evaluation after successful completion of a laboratory competency module and 2 (two) clinical demonstrations (assisted or unassisted under direct supervision) on the specific procedure.

Patient _____ **Simulated** _____

Student _____ **Date** _____

Procedure:

Photon Block Fabrication _____
Electron Block Fabrication _____
Bolus Fabrication _____

Please check the appropriate performance based on the student's demonstrated ability. A minimum of a Good / Competent rating must be achieved in each task in order to successfully complete the evaluation. Comment on any rating below 2.

Letter Grade	Numerical Range	Conversion	Numerical Grade Equivalent
A	90% to 100%	Excellent / Distinguished	4
B+	85% to 89.9%	Very Good / Above Average	3
B	80% to 84.9%	Good / Competent – Average for Level of Training	2
C+	75% to 79.9%	Acceptable / Marginal and Conditional	1
C	70% to 74.9%	Poor / Unsatisfactory and Failing	0

4 3 2 1 0 N/A

- | | | | | | |
|---|-------|-------|-------|-------|-------|
| 1. Accurately select correct patient and simulation films | _____ | _____ | _____ | _____ | _____ |
| 2. Accurately select correct TFD / SFD. | _____ | _____ | _____ | _____ | _____ |
| 3. Accurately select correct orientation for the block to be cut. | _____ | _____ | _____ | _____ | _____ |
| 4. Accurately mark the correct location of the handle on the Styrofoam. | _____ | _____ | _____ | _____ | _____ |
| 5. Accurately verify the blocked field using the field light coincidence. | _____ | _____ | _____ | _____ | _____ |
| 6. Correctly label the Styrofoam. | _____ | _____ | _____ | _____ | _____ |
| 7. Employ safety and hazardous waste precautions. | _____ | _____ | _____ | _____ | _____ |

Clinical Manual Section II

	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>0</u>	<u>N/A</u>
8. Accurately mount cerrobend blocks to Lucite tray.	___	___	___	___	___	___
9. Accurately label the completed block(s).	___	___	___	___	___	___
10. Differentiate between a positive and negative block.	___	___	___	___	___	___
11. Accurately fabricate an electron cut-out.	___	___	___	___	___	___
12. Accurately label an electron cut-out.	___	___	___	___	___	___
13. Demonstrate custom bolus fabrication.	___	___	___	___	___	___

Comments:

Designated Clinical Supervisor Signature

Print Name _____ **Date** _____

Clinical Site _____

Student Signature _____ **Date** _____

BERGEN COMMUNITY COLLEGE
RADIATION THERAPY TECHNOLOGY PROGRAM

CLINICAL COMPETENCY EVALUATION

DOSIMETRY

Patient _____ **Simulated** _____

Student _____ **Date** _____

Procedure _____

Clinical Site _____ **Tx. Planning System** _____

Please check the appropriate performance based on the student's demonstrated ability. A minimum of a Good / Competent rating must be achieved in each task in order to successfully complete the evaluation. Comment on any rating below 2.

Letter Grade	Numerical Range	Conversion	Numerical Grade Equivalent
A	90% to 100%	Excellent / Distinguished	4
B+	85% to 89.9%	Very Good / Above Average	3
B	80% to 84.9%	Good / Competent – Average for Level of Training	2
C+	75% to 79.9%	Acceptable / Marginal and Conditional	1
C	70% to 74.9%	Poor / Unsatisfactory and Failing	0

4 3 2 1 0 N/A

- | | | | | | |
|---|-------|-------|-------|-------|-------|
| 1. Interpret dose prescription. | _____ | _____ | _____ | _____ | _____ |
| 2. Accurately perform point calculations on the computer. | _____ | _____ | _____ | _____ | _____ |
| 3. Correlate components of the treatment chart with the simulator films and worksheets. | _____ | _____ | _____ | _____ | _____ |
| 4. Calculate the blocked equivalent square. | _____ | _____ | _____ | _____ | _____ |
| 5. Explain tissue compensators. | _____ | _____ | _____ | _____ | _____ |
| 6. Create a treatment plan and calculations for a single, open field. | _____ | _____ | _____ | _____ | _____ |
| 7. Create a treatment plan for parallel opposed fields with blocks. | _____ | _____ | _____ | _____ | _____ |
| 8. Create a treatment plan for a wedged field or tangents. | _____ | _____ | _____ | _____ | _____ |
| 9. Create a treatment plan for an electron field. | _____ | _____ | _____ | _____ | _____ |

Clinical Manual Section II

4 3 2 1 0 N/A

10. Create a computer generated isodose plan.	_____	_____	_____	_____	_____	_____
11. Accurately calculate given dose.	_____	_____	_____	_____	_____	_____
12. Accurately calculate % depth dose.	_____	_____	_____	_____	_____	_____
13. Accurately calculate monitor units / time.	_____	_____	_____	_____	_____	_____
14. Accurately calculate geometric gap.	_____	_____	_____	_____	_____	_____
15. Accurately calculate weighted fields and evaluate for optimum dose distribution.	_____	_____	_____	_____	_____	_____
16. Perform SSD, SAD, and extended distance SSD calculations.	_____	_____	_____	_____	_____	_____
17. Define treatment volume, target volume, tumor volume and critical structures.	_____	_____	_____	_____	_____	_____
18. Explain tumor lethal dose and normal tissue tolerance dose.	_____	_____	_____	_____	_____	_____
19. Design, compare and contrast treatment plans.	_____	_____	_____	_____	_____	_____

Comments:

Designated Clinical Supervisor / Representative Signature _____

Print Name _____ **Date** _____

Student Signature _____ **Date** _____

BERGEN COMMUNITY COLLEGE
RADIATION THERAPY TECHNOLOGY PROGRAM

CLINICAL COMPETENCY EVALUATION

GENERAL PATIENT CARE

A student is eligible to perform a clinical evaluation after successful completion of a laboratory competency module and 2 (two) clinical demonstrations (assisted or unassisted under direct supervision) on the specific procedure.

Patient ____ **Simulated** ____

Procedure:

Vital Signs (Blood Pressure, Pulse, Respiration, Temperature) _____

CPR Verification _____

Oxygen Administration _____

Patient Transfer _____

Student _____ **Date** _____

Please check the appropriate performance based on the student's demonstrated ability. A minimum of a Good / Competent rating must be achieved in each task in order to successfully complete the evaluation. Comment on any rating below 2.

Letter Grade	Numerical Range	Conversion	Numerical Grade Equivalent
A	90% to 100%	Excellent / Distinguished	4
B+	85% to 89.9%	Very Good / Above Average	3
B	80% to 84.9%	Good / Competent – Average for Level of Training	2
C+	75% to 79.9%	Acceptable / Marginal and Conditional	1
C	70% to 74.9%	Poor / Unsatisfactory and Failing	0

Vital Signs

4 3 2 1 0 N/A

- | | | | | | | |
|--|-------|-------|-------|-------|-------|-------|
| 1. Accurately perform vital signs (blood pressure, pulse, respiration and temperature) | _____ | _____ | _____ | _____ | _____ | _____ |
| 2. Accurately document vital signs. | _____ | _____ | _____ | _____ | _____ | _____ |
| 3. Identify the equipment needed to take pulse, blood pressure and respiration. | _____ | _____ | _____ | _____ | _____ | _____ |

4 3 2 1 0 N/A

CPR

4. Properly perform CPR

5. Present current CPR card

Expiration Date _____

Oxygen Administration

6. Explain apparatus for O2 administration.

7. Set the O2 dose in accordance with the prescription.

8. Demonstrate O2 administration

Patient Transfer

9. Safely and effectively transfer patient from stretcher to table.

10. Safely and effectively transfer patient from wheel chair to table.

Comments:

Designated Clinical Supervisor Signature _____

Print Name _____ **Date** _____

Clinical Site _____

Student Signature _____ **Date** _____

Student:	
----------	--

Bergen Community College
 Radiation Therapy Technology Program

RADIATION THERAPY CLINICAL COMPETENCY REQUIREMENTS

RADIATION TREATMENT PROCEDURES			
<p>Candidates must demonstrate competence in the 20 procedures identified below. Fifteen of the treatment procedures must be demonstrated on patients; five procedures may be demonstrated under simulated conditions if demonstration on patients is not feasible. Demonstration of competence does not require actual delivery of dose.</p>			
	Date Completed	Patient or Simulated	Verified By
BRAIN			
Primary			
Metastatic			
HEAD AND NECK			
Laterals Only			
3 Field – Laterals and Supraclavicular			
CHEST			
AP/PA			
Obliques			
BREAST			
Tangentials			
Supraclavicular			
Posterior Axilla			
ABDOMEN			
AP/PA			
3 or More Fields			
Para-Aortic			
PELVIS			
AP/PA			
Multiple Field Supine			
Multiple Field Prone			
Inguinal			
SKELETAL			
Spine			
Extremity			
ELECTRON FIELDS			
Single			
Abutting Fields			

Student: _____

Bergen Community College
Radiation Therapy Technology Program

RADIATION THERAPY CLINICAL COMPETENCY REQUIREMENTS

SIMULATION PROCEDURES			
Competency may be demonstrated on a conventional simulator, CT simulator or treatment machine. All simulation procedures must be demonstrated on patients			
	Date Completed	Patient	Verified By
Brain			
Head and Neck			
Chest			
Breast			
Abdomen			
Pelvis			
Skeletal			
DOSIMETRY			
Calculations should be performed for actual patients; however, calculations may be completed for simulated patients if demonstration on actual patients is not feasible			
Perform calculations for each of the following:			
	Date Completed	Patient or Simulated	Verified By
Single, Open Field			
Parallel Opposed Fields with Blocks			
Geometric Gap			
Weighted Fields			
Wedged Fields			
Computer Generated Isodose Plan			
Electron Field			
BEAM MODIFICATION DEVICES			
Competency is demonstrated by fabricating the following:			
	Date Completed	Patient or Simulated	Verified By
Custom Blocks (Photon)			
Custom Blocks (Electron)			
Bolus			

Student: _____

Bergen Community College
Radiation Therapy Technology Program

RADIATION THERAPY CLINICAL COMPETENCY REQUIREMENTS

GENERAL PATIENT CARE			
<p>The activities should be performed on patients; however, simulation is acceptable if state or institutional regulations prohibit candidate from performing the procedure on patients. Competency is demonstrated by performing:</p>			
	Date Completed	Patient or Simulated	Verified By
CPR			
Vital Signs (BP, pulse, respiration, temperature)			
O2 Administration			
Patient Transfer			

LOW VOLUME / HIGH RISK PROCEDURES			
<p>Competence may be demonstrated under simulated conditions if necessary. Demonstration of competence does not require actual delivery of treatment dose. Competence is demonstrated by performing the following:</p>			
	Date Completed	Patient or Simulated	Verified By
Total Body Irradiation (TBI)			
Craniospinal			

BRACHYTHERAPY – Observation strongly recommended.	
Semester / Date - _____	Verified By: _____
Procedure - _____	

Bergen Community College - Radiation Therapy Training Program

CLINICAL TRACKING FORM

Radiation Treatment Procedures

NAME _____

EXAMINATION	Lab Module Date	Demonstration # 1 Date	Demonstration # 2 / Date		Pass / Fail *	RTT Supervisor
			Original Patient	Different Patient		

*A failing grade requires the student to complete two additional demonstrations before each additional competency attempt.

Bergen Community College - Radiation Therapy Training Program

CLINICAL TRACKING FORM

Simulation Procedures

NAME _____

EXAMINATION	Lab Module Date	Demonstration # 1 Date	Demonstration # 2 Date	Pass / Fail *	RTT Supervisor

*A failing grade requires the student to complete two additional demonstrations before each additional competency attempt.

**Bergen
Community College
Radiation Therapy Technology Program**

STUDENT ASSESSMENT FORM

Student: _____ Date: _____

Clinical Supervisor: _____

Clinical Site: _____ Grade: _____

Semester: () Fall () Spring () Summer

Letter Grade	Numerical Range	Conversion	Numerical Grade Equivalent
A	90% to 100%	Excellent / Distinguished	4
B+	85% to 89.9%	Very Good / Above Average	3
B	80% to 84.9%	Good / Competent – Average for Level of Training	2
C+	75% to 79.9%	Acceptable / Marginal and Conditional	1
C	70% to 74.9%	Poor / Unsatisfactory and Failing	0

I. Dependability

	Criteria	Grade	Points	Total Group Points
01	Follows absentee protocol			
02	Punctual			
03	Responsible for assignment			

II. Discretion and Judgment

	Criteria	Grade	Points	Total Group Points
04	Appropriate behavior			

III Communication Skills

	Criteria	Grade	Points	Total Group Points
05	Helpful / cooperative			
06	Attitude			
07	Enthusiastic			
08	Adaptable			

Clinical Manual Section II

IV Professional Ethics

	Criteria	Grade	Points	Total Group Points
09	Conduct / Leadership			
10	Confidence			
11	Courteous			
12	Respect authority and diversity			

V Affective Behavior

	Criteria	Grade	Points	Total Group Points
13	Patient care skills			
14	Effectiveness / confidence			

VI Technical Skills

	Criteria	Grade	Points	Total Group Points
15	Quantity			
16	Quality			

VII Organization

	Criteria	Grade	Points	Total Group Points
17	Work sequence			
18	Equipment manipulation			
19	Maintains performance records			

VIII Safety

	Criteria	Grade	Points	Total Group Points
20	Patient safety			
21	Universal precautions			
22	Radiation safety			

IX Critical Thinking Skills

	Criteria	Grade	Points	Total Group Points
23	Information assimilation			
24	Reasoning and problem solving			
25	Routine and non-routine procedures			

Clinical Supervisor Signature: _____ Date _____

Student Signature: _____ Date _____

**Bergen
Community College
Division of Science and Health
Radiation Therapy Program**

Criteria Guidelines for: Student Assessment Form

Dependability:

01. Adheres to attendance policy (see RTT Student Handbook / Syllabus)
02. Adheres to clinical time schedule
03. Self motivated, responsible, and an independent learner

Discretion and Judgment:

04. Assesses the situation and exercises care, discretion and judgment with appropriate speech and actions.

Communication Skills:

05. Helpful and cooperative: demonstrates tact, diplomacy, and good interaction with staff, administrators and instructors.
06. Positive attitude toward clinical experience and patients (including non-conforming patients).
07. Responds professionally, benefits from suggestions, maintains open dialog with instructor, and communicates respect to others.
08. Able to adapt, at their academic level, to the clinical site, staff, environment, equipment and procedures.

Professional Ethics:

09. Demonstrates leadership qualities by professional interactions with patients, physicians, staff, instructors and peers. Complies with policies of the program at all times.
10. Is capable of agreeing / disagreeing with staff, doctors, administrators and instructors in a calm, direct manner.
11. Does not discuss patient's diagnosis or prognosis with others.
12. Demonstrates respect and compassion for patients of all cultures by using proper names, protects patient privacy, aids patient comfort, and assists patient when possible.

Affective Behavior:

13. Speaks confidently to patients in a calm manner, instills a sense of security, explains procedures thoroughly to patients at their level of understanding. Demonstrates instructions to non-English speaking patients when necessary. Is confident in verbal, writing, computer skills as they pertain to completing requisition.

Clinical Manual Section II

14. Focuses attention on the patient from the moment of introduction to the patient's dismissal from the department. Is aware of the patient's needs at all times. Creates a caring, comfortable safe atmosphere for the patient. Smiles and extends him/herself to the patient. Demonstrates professional behavior.

Technical Skills:

15. Quantity - Attempts a variety of procedures, works within a reasonable time frame, is self motivated and uses time wisely.
16. Quality - Reads the chart and follows patient set-up instructions. Demonstrates accuracy and is thorough with chart documentation. Makes the patient a first priority. Contributes to the cohesiveness of the work environment.

Organization:

17. Patient comfort, protocols, works in a logical manner that contributes to team building.
18. Handles equipment in appropriate manner, cleanliness of room, supplies, prepares the room prior to the patient's arrival. Insures emergency equipment is available.
19. Maintains performance records, keeps logs, attendance forms and performance records up-to date.

Safety:

20. Ensures patient's physical safety, protects the patient from falling, helps patient onto table, helps patient out of wheelchair, demonstrates safety and provides patient comfort during stretcher transfers.
21. Universal precautions: Hand washing, gloves, properly disposes of soil linens, needles, etc. Identify and follow isolation established institutional protocols. Provides a clean environment for the patient.
22. Radiation safety - uses proper collimation and radiation safety techniques to protect the patient and self from unnecessary radiation exposure.

Critical Thinking Skills:

23. Demonstrates adaptation and flexibility in the assimilation of new information and techniques. Performs patient demonstrations and clinical evaluations in a timely fashion and at the expected level.
24. Uses reasoning, problem-solving skills and critical thinking when handling simple to complex treatment plans and therapeutic cases.
25. Demonstrates ability to anticipate therapeutic needs for routine and non-routine procedures.

**Bergen
Community College
Division of Science and Health
Radiation Therapy Technology Program**

STUDENT CONFERENCE FORM

Student: _____	Date: _____
-----------------------	--------------------

Incident date: _____

Location: Main Campus Clinical Site

Regarding: Academic Issue Disciplinary Issue Other

Course: **RTT** _____ **Course Title:** _____

Narrative / Description

Student Comments / Action Plan

I have read the above and it has been explained to my satisfaction. I have been advised that it does / does not indicate a severe problem at this time. This form will become part of my permanent record. My signature does not necessarily imply agreement, but documents that the conference occurred as stated above.

Student's Signature: _____	Date: _____
-----------------------------------	--------------------

Supervisor's Signature: _____	Date: _____
--------------------------------------	--------------------

Program Director: _____	Date: _____
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Student conference form

BERGEN COMMUNITY COLLEGE
RADIATION THERAPY PROGRAM

OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION'S STANDARDS
RADIATION SAFETY

Hospital and Department Safety Procedures	p. 34
Emergency Telephone Numbers	p. 35
Infection Control / Standard Precautions.....	p. 35-37
General Student Health and Safety Orientation	p. 37-38
Environmental Protection – Toxic and Hazardous Materials	p. 39-41
Orientation to Radiation Safety	p. 42-50

HOSPITAL AND DEPARTMENT SAFETY PROCEDURES

The **College** is required to follow many codes, standards, and regulations, including those promulgated under the Occupational Safety and Health Administration (OSHA) to protect the safety and health of students.

The intention of OSHA is to ensure, insofar as possible, that every student has safe working conditions for training in Radiation Therapy Technology. Regulations are created by OSHA to ensure safe work conditions.

SAFETY RESPONSIBILITIES OF STUDENTS

All students must understand that it is their responsibility to comply with appropriate safety and health standards as issued by the Hospital and College, their departments and their supervisors. They are to follow safe work practices and report all unsafe conditions to their immediate supervisor.

An orientation of the hospital clinical site and radiation therapy department will provide students with information regarding the location and use of safety equipment including fire extinguishers, exit doors, stairways, and power source circuit breakers. Notify your supervisor when you suspect an emergency situation.

If a student is injured while on the premises of the clinical site, it is the responsibility of the student to immediately report the injury to a clinical supervisor and to the supervisor of the department in which the accident occurred. An incident report form is to be completed by the student and the supervisor at this time. If your condition requires medical attention, the supervisor will send you to the Emergency Room.

Emergency Procedures:

IN CASE OF FIRE:

- R** – Rescue (Get people out of danger)
- A** – Alarm (Pull alarm)
- C** – Confine (Close doors)
- E** – Extinguish (If possible)

STEPS FOR BLOOD/ BODY FLUID EXPOSURE:

1. Wash Wound Immediately
2. Advise Supervisor
3. Fill out Incident Report
4. Report to Emergency Department

EMERGENCY CODES:

- | | |
|---------------------------|-----------------------------|
| Amber – Child Abduction | Silver – Hostage / Gun |
| Blue – Adult Emergency | Triage – Disaster |
| Gray – Security Needed | White – Pediatric Emergency |
| Orange – HAZMAT | Yellow – Bomb Threat |
| Red – Fire | 10 – Medical Emergency |
| Clear – Situation Cleared | 777 – Evacuation |

Emergency Telephone Numbers

Emergency telephone extensions should be posted by the telephone(s) in each clinical area of the radiation therapy department.

The telephone number of the Radiation Therapy Program Director at Bergen Community College is: 201-493-5034.

The telephone number of the Radiation Therapy Program Senior Clinical Supervisor at Bergen Community College is: 201-689-7009 / 973-738-2137 (c)

INFECTION CONTROL / STANDARD PRECAUTIONS

OSHA issued a standard designed to prevent health care (and others) workers from being exposed to bloodborne pathogens such as hepatitis B and HIV.

Occupational Exposure means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

Other Potentially Infectious Materials means (1) The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; (2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and (3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

Universal Precautions is an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

HAND WASHING

Wash hands after touching blood, body fluids, secretions, or excretions.

Wash hands immediately after gloves are removed.

Wash hands between patients.

Wash hands between tasks on the same patient.

Use a plain (nonantimicrobial) soap for routine hand washing.

Use an antimicrobial agent or a waterless antiseptic when directed by infection control.

GLOVES

Clean, nonsterile gloves are adequate for most procedures.

Wear gloves when touching blood, body fluids, secretions, excretions and any contaminated items.

Put on clean gloves just before touching mucous membranes or nonintact skin.

Clinical Manual Section II

Change gloves between tasks and procedures on the same patient.

Remove gloves promptly and before touching noncontaminated items, equipment, and environmental surfaces and then immediately wash hands.

MASK, EYE PROTECTION, AND FACE SHIELD

Wear these devices to protect mucous membranes of your eyes, nose, and mouth during procedures likely to generate splashes or sprays of blood, body fluids, secretions or excretions.

GOWN

A clean, nonsterile gown is adequate for most purposes.

Wear a gown to protect your skin and to prevent soiling your clothing where splashes or sprays are likely.

Select a gown that is appropriate for the amount of fluid likely to be encountered (cloth vs. plastic).

Remove a soiled gown promptly.

PATIENT-CARE EQUIPMENT

Handle used equipment in a careful manner to prevent transfer of infection.

Properly discard single-use items.

Ensure that reusable equipment is not used again until it has been reprocessed.

ENVIRONMENTAL CONTROL

This pertains to routine care, cleaning and disinfection of environmental surfaces such as treatment couches, treatment equipment, and other frequently touched surfaces.

LINEN

Handle, transport, and process used linen soiled with blood, body fluids, secretions, or excretions in a careful manner so as not to spread pathogens.

OCCUPATIONAL HEALTH AND BLOODBORNE PATHOGENS

Take care to prevent injuries when using needles, scalpels, and other sharp or heavy instrument devices.

Never recap a used needle, do not manipulate them using both hands, or use any technique that involves directing the point of the needle toward any part of the body.

Do use either a one-handed technique or a mechanical device designed for holding the needle sheath.

Do not remove used needles from disposable syringes by hand and do not bend, break, or otherwise manipulate used needles by hand.

Clinical Manual Section II

Do place used needles, syringes, and other sharps into puncture-resistant containers, which should be located as close as possible to the area in which such items are used.

Use mouthpieces, resuscitation bags, or other ventilation devices as an alternative to mouth-to-mouth resuscitation methods.

PATIENT PLACEMENT

Place a patient who contaminates the environment or who does not (or cannot be expected to) assist in maintaining appropriate hygiene or environmental control in a private room or controlled environment.

DISEASES REQUIRING TRANSMISSION-BASED PRECAUTIONS

AIRBORNE PRECAUTIONS	DROPLET PRECAUTIONS	CONTACT PRECAUTIONS
Measles Varicella (including Zoster) Tuberculosis	Diphtheria Pertussis Pneumonic plague Mumps Rubella Influenza	Multi-drug-resistant bacteria (G.I., respiratory, skin, wound infections) Enteric infections (E-coli, shigella, hepatitis A) Highly contagious skin infections (herpes simplex, impetigo, scabies, zoster) Viral hemorrhagic infection (Ebola, Lassa, and Marburg)

GENERAL STUDENT HEALTH and SAFETY ORIENTATION

One of the regulations passed under OSHA is the Hazard Communication Standard or Right-To-Know Law. This regulation requires that each student be informed of the hazards in their work area and be provided with sufficient training and, if necessary, equipment to minimize or eliminate exposure to the hazardous agent.

Your clinical supervisor must alert you to, and provide guidance with regard to the hazards in your work area.

HAZARDS

Hazards can be placed into three general categories. They are **chemical**, **biological** and **physical** hazards.

Chemicals can cause disease, injury, or fatalities if mishandled. In order for them to have their effect, they must make contact with the body, usually by inhalation, ingestion, injection or contact.

MATERIAL SAFETY DATA SHEETS (MSDS's)

MSDS's are prepared and distributed by manufacturers and distributors of hazardous materials. All chemical manufacturer and distributors must obtain or develop a MSDS for

Clinical Manual Section II

each hazardous material they produce or import. A hazardous material is one that is either a physical hazard (i.e., flammable, oxidizer, etc.) or a health hazard (i.e., causes acute or chronic health effects).

Every clinical site maintains the MSDS file for all hazardous materials used or handled in the workplace. Data sheet documentation must be in compliance with OSHA standards.

MSDS's are in English and contain the following information:

- The identity of the chemical.
- The physical and chemical characteristics.
- The physical and health hazards.
- Primary routes of entry.
- Exposure limits.
- Precautions for safe handling.
- Controls to limit exposure.
- Emergency and first aid procedures.
- Name of manufacturer or distributor.

MSDS AVAILABILITY

Every clinical site maintains copies of all MSDS's for each hazardous material in the workplace and makes them readily accessible during each workshift to BCC students and faculty when they are in their work area(s). Students and faculty may review the MSDS's for the materials they work with at the time, while they are in their work area. They also may request a copy of an MSDS if they wish. Copies of MSDS's for materials used in each work area are maintained in that work area, during all shifts. Upon request, the National Institute for Occupational Safety and Health (NIOSH) and OSHA have access to the MSDS's

Biohazards are microorganisms which may cause illness or death in humans. Biohazards can be in the form of bacteria, fungi, viruses and parasites.

A variety of **physical hazards** can be present at the clinical education site. These can cause serious injury or even death. Some common physical hazards are: slips or falls, ergonomic (awkward position of the work or worker), material handling, cuts or punctures, and radioactive materials or radiation devices.

Back injuries, sprains, strains and falls are very common problems in many workplaces. The way to minimize these physical hazards is to follow the work area's procedures, to pay attention to your surroundings; to have wet floors mopped quickly and to observe the proper working posture for lifting (i.e., use your legs during the lifting process). **SLIPS, FALLS AND BACK INJURIES ARE THE MOST COMMON PROBLEMS AND ARE UNDERESTIMATED BY WORKERS.**

ENVIRONMENTAL PROTECTION – TOXIC AND HAZARDOUS MATERIALS

Personal Protective Equipment is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

Metals (Mold Room Shielding Alloy) – Every mold room contains at least three main areas: a hot-wire foam cutter, an alloy melter and a casting plate and block breakout/detailing area.

Mold Room Safety Tips:

- Wear protective clothing

- Wear gloves

- Wear a respirator when filing blocks

- Wear eye protection.

- Leave all of the above protection devices in the mold room

- Check alloy melter temperature daily

 - The primary area of concern is the alloy melting unit and the potential for releasing cadmium and/or lead oxide fumes into the room's atmosphere. The determining factor in the release of metallic oxide fumes is temperature. The higher the temperature, the greater the potential for release of these fumes and an increased chance of personal injury from burns.

- The recommended pouring temperature of alloy is:

 - Low melting 158F / 175 – 185F pouring temperature (alloy of choice)

 - Medium melting 203F / 220 – 225F pouring temperature

- Skim and collect alloy sludge for periodic recycling

- Minimize spills and splashes

- Minimize vigorous filing and sanding of blocks

- Always use a vacuum for cleanups to prevent the dust from becoming airborne – avoid sweeping. A HEPA vacuum should be used. A tacky surface mat, placed at the door of the mold room, collects hazardous dust from shoes to prevent its spread outside of the mold room.

- Do not eat, drink or smoke in the mold room

- Wash face, hands and arms when work is completed

- Confirm working engineering controls.

 - With the mold room door closed, it is recommended that the air in the mold room be exchanged 5 to 6 times per hour through the building's heating and air conditioning system.

- A sign indicating hazardous materials area – authorized personnel only should be posted on the mold room door

- Confirm the implication of safety procedures

Chemicals (Film Processing) – X-Ray film processing chemical pose no direct hazard to the radiation therapist. All records of disposal or recycling of film processing fixer

Clinical Manual Section II

solutions containing silver and lead foil backing on x-ray film must be kept on site for three years.

Chemotherapy – Antineoplastic agents derive their name from their ability to halt new growth. They are also known as cytotoxic agents. Despite their use in cancer therapy, several agents are known human carcinogens. Other antineoplastic agents are teratogenic (cause fetal mutation/malformation).

Chemotherapy is not administered in the radiation oncology department, but it is not unusual for a patient to arrive for a radiation treatment procedure while receiving chemotherapy. If a leak or spill should be discovered while the patient is in the radiation therapy department, notify your clinical supervisor immediately. Do not attempt to clean the spill or come in contact with the chemotherapy agent in any way. To prevent further contamination, do not remove the leaky source or patient from the area. Environmental services will be contacted for proper clean-up and disposal. If contact with the agent has already occurred, wash the area immediately with soap and water if possible. Report the incident to your clinical supervisor and the program director. Follow the directions of the clinical supervisor and the protocol of the clinical site. An incident report may be warranted.

Fire is another potential hazard. A fire can occur at any time. Please be aware of the location of all fire alarm pull stations and exits in your clinical site work area. In the event of visible flame or smoke, activate the nearest fire alarm pull station and exit the building.

If, in the course of your day, you hear the fire alarm, please exit the building. Please immediately evacuate via the nearest exit in the event of a bomb threat or gas leak. **Never use the elevators during a fire evacuation. The elevators may become smoke filled or may stop between floors due to loss of power.** Fire extinguishers are mounted throughout the clinical education site. Make sure you know how to use one before attempting to extinguish a fire.

SOME GENERAL SAFETY AND HEALTH CONSIDERATIONS

1. Observe the signage in the area you are entering. Law requires that entrance doors to certain work areas list the hazard categories that can be found inside.
2. In order for a hazardous agent to affect you, it must somehow interact with your body. Be aware of the common routes of exposure: **INHALATION, INGESTION, INJECTION AND CONTACT.**
3. Read the label of the materials you use.
4. Read the Material Safety Data Sheet (MSDS) for materials you use.

**5. REPORT: HAZARDOUS SPILLS
 FIRES
 ELECTRICAL PROBLEMS
 ODOR OR SMOKE
 CHEMICAL ODOR
 ACCIDENT/INJURY
 UNUSUAL EVENTS**

6. Follow standard operating procedures for safe use of hazardous materials. In the mold room these procedures are well defined. For other work areas, consult with your supervisor or a medical physicist.
7. Use personal protective equipment (gloves, goggles, protective clothing) and engineering controls (fume hood, cabinets, fans). When possible, control hazards at the source by providing the appropriate ventilation or by de-energizing equipment.
8. Apply the concepts of Identification, Evaluation and Control when working with potential hazards.
9. Familiarize yourself with the proper emergency response. Washing the affected area for fifteen (15) minutes with a mild soap and water is a general recommendation for removing hazardous materials that have been in contact with the body.
10. Wash your hands regularly while in the clinic, after removing gloves, and especially before eating.
11. Those students observing brachytherapy must follow the guidelines set by the facility and be in compliance with OSHA guidelines.
12. Never pour any chemical down the drain.

ORIENTATION TO RADIATION SAFETY

A.L.A.R.A. (AS LOW AS REASONABLY ACHIEVABLE)

The Radiation Therapy Program abides by the A.L.A.R.A. principles of radiation safety.

Occupational Radiation Monitoring Devices – Film Badges

Purpose of monitoring of radiation dose received by individual radiation workers:

1. It allows the worker to know how much radiation he or she is receiving.
2. It allows the facility safety officer and administration to determine if certain areas or workers are receiving more radiation than expected.
3. It provides a permanent record of radiation received if questions arise at a later time.

Storage

Radiation badges will be issued on the first day of the program. The radiation badge does not provide protection from radiation; its sole purpose is to measure the amount of radiation to which it is exposed. Radiation badges must be worn at all times during clinical school hours. The student must notify the program director immediately if the badge is lost or forgotten. The student will be given a spare badge until a replacement is obtained. When not in use, badges should be kept in a location in the department free from radiation. Do not take the badges home or leave it in a car. Do not wear it when you are receiving medical tests or treatments, including dental examinations.

Wear your radiation badge between your neck and waste with the clip side of the badge toward your body and fastened so it remains vertical. Wear only the radiation badge with your name on it. The badge is changed quarterly. Return the previous badge promptly each quarter when your new badge is issued.

Exposure Limits

The Nuclear Regulatory Commission (NRC) and the State of New Jersey require individuals to be monitored if an individual's radiation exposure is expected to exceed ten percent of the annual limits.

The annual limit for an **Adult Radiation Worker is 5 rem or 5000 mrem in a year.**

The annual limit to **Any Organ other than the lens of the eye is 50 rem.**

The **Skin and Extremities** have an annual dose equivalent limit of **50 rem.**

The **Lens of the Eye** has an annual dose limit of **15 rem.**

The annual limit for **Non-Radiation Workers is 0.5 rem**

The annual limit for the **General Public is 0.1 rem**

Pregnancy

If a female radiation therapy student becomes pregnant, she may voluntarily declare her pregnancy. This is done by notifying the program director in writing of the pregnancy and the estimated date of conception. A private consultation with the radiation safety officer is scheduled to discuss the risks of using ionizing radiation while pregnant and to review exposure history information. All declared pregnancy information is kept confidential.

The choice whether to declare your pregnancy is completely voluntary. If you choose not to declare your pregnancy, you and your embryo/fetus will continue to be subject to the same radiation limits that apply to occupational workers.

Dose to the embryo/fetus during the entire pregnancy, due to occupational exposure of the declared pregnant worker, must not exceed 0.5 rem (500 mrem or 5 mSv). Once a pregnancy becomes known, exposure of the embryo-fetus shall be no greater than 0.05 rem (50 mrem or 0.5 mSv) in any month (excluding medical exposure).

These limits can only be enforced if the pregnancy is declared. Following declaration of pregnancy, a second dosimeter will be offered to be worn at the waist / gonadal area. This dosimeter will be used to provide an estimate of the dose to the embryo/fetus.

The Radiation Therapy Program abides by the NRC regulations regarding the declared pregnant student (worker) and fetal exposure. In the event of a declared pregnancy, the program director will place the pregnant student in a work area having a low probability of personal exposure, if this is administratively possible without unduly disrupting clinical rotation schedules or achievement of clinical objectives. The other alternative is for the student to take a leave of absence and return after the birth to start at the beginning of the term where she left. Credit will be given for all completed courses and clinical rotations. The Program Director and Radiation Safety Officer will assist the declared pregnant woman with making an informed decision by providing information regarding the risks of radiation exposure in the radiation oncology department.

Accidental Exposure

Emergency – Off Procedures

Only the patient is allowed in the treatment room, when the machine is on. In the event that another person is accidentally left in the room or there is a malfunction in the treatment machine, emergency push buttons are located at several points within the room and on the machine itself. They remove all power to the unit when pressed. Circuit breakers, located outside of the treatment room remove all power to the treatment room area, including the treatment machine.

The machine will not be energized when the buttons are released unless the therapist proceeds through the normal start procedures at the control panel.

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Safety devices and emergency-off buttons must be tested frequently and in accordance with manufactures and regulatory agency recommendations.

Reporting and Documenting an Emergency

Notify the Clinical Supervisor and Program Director if you suspect an overexposure or have been inadvertently exposed. The Radiation Safety Officer of the college and the Radiation Safety Officer of the clinical site will be notified. Notify the program director if the badge is accidentally contaminated, exposed to excessive heat or is exposed during a radiation oncology procedure. Radiation safety will be notified and a replacement badge may need to be furnished. An incident report form may be needed for documentation.

All badges are sent out for processing and upon receipt of the badge results, the Radiation Therapy Program Coordinator performs a review to ensure results are within acceptable limits and/ or determine if any investigations are required. Following this review, a copy of any questionable results is forwarded to the Radiation Therapy Radiation Safety Officer for review. The results are maintained permanently by the Radiation Therapy Program.

The lowest reading for a whole badge is 10 mrem, results less than this are reported as 0 for minimal. At 125 mrem/quarter (ALARA level 1) and 375 mrem/quarter (ALARA level 2) results are considered investigational and will be reviewed in accordance with state regulations. At greater than 1250 mrem/quarter, notification of the NJDH and the NRC may be required in addition to an investigation and review.

Radiation Safety Concepts

A.L.A.R.A. – To keep exposure to ionizing radiation As Low As Reasonably Achievable.

Lowering radiation received lowers any risk of adverse effects.

Measures should be taken, whenever possible, to reduce individual exposure well below regulatory limits.

The three basic ways of keeping radiation exposure low are:

TIME – Amount of time of exposure to radiation

DISTANCE - The distance from the radiation source

SHIELDING – Shielding oneself from the source.

Procedures must be used to ensure that patients undergoing radiation treatment Receive only that dose prescribed by the Radiation Oncologist and a minimum exposure elsewhere.

Although the radiation exposure from a simulator is small compared to a therapeutic dose, it is still good practice to minimize the exposure from unnecessary x-rays.

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Ensure that the correct factors are used and that the film processor is operating correctly.

Time

The less time one is exposed to radiation, the less dose is acquired. In a radiation therapy department, there is little opportunity to use this method of radiation protection since all personnel are outside the linear accelerator treatment room when the therapy machine is on.

The time spent near brachytherapy patients should be minimized since they emit radiation after the sources have been implanted.

In a simulation procedure, fluoroscopy exposure should be kept to a minimum.

Distance

This method only applies to brachytherapy patients and cobalt-60 units since all personnel is outside the linear accelerator treatment room during operation. When exposed to a radioactive source, the inverse square law applies: doubling the distance from the source reduces the exposure to one fourth its original level.

*Shielding

Shielding is the most important method for protection of operators and members of the general public in the radiation therapy department.

In a radiotherapy simulator procedure, the collimator must be set as small as possible so as to avoid irradiating larger fields than necessary.

External beam therapy units produce radiation beams of high energy and the shielding that is required is greater than conventional X-Ray units.

The choice of shielding material depends on the energy of the beam. Where lead is primarily used for superficial units, iron, concrete, steel and lead are used at higher energies where Compton interactions dominate. Since these materials attenuate radiation equally, the choice is usually based on economic and space factors. For new construction, concrete is usually the material of choice because of its low cost.

Factors that influence radiation shielding:

- (W) Workload of the machine and patients treated per week.
- (U) Primary beam use factor – The amount of time that the beam is aimed at the floor, ceiling or a particular wall.
- (T) Time that the area adjacent to the treatment room will be occupied.
- (D) Distance from the source of radiation to the occupied area.
- (P) Dose limit for the occupied area.

Radioactivity

The role of regulatory agencies is to license users of radioactive materials and radiation-producing equipment, inspect such users and enforce the appropriate laws. One of the leading federal regulatory agencies in the U.S. is the NRC (Nuclear Regulatory Commission), which oversees the use of isotopes produced in nuclear reactors. In the

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radiation therapy department, these sources are used for both teletherapy and brachytherapy sources.. The use of machines that produce ionizing radiation, such as linear accelerators, fall under the jurisdiction of the Food and Drug Administration (FDA) and state agencies.

The NRC and state regulators have additional regulations designed to protect both the operator of the equipment and the patient:

Warning Signs – Entrance doors to the therapy rooms must be posted with a sign that says: “CAUTION, HIGH RADIATION AREA” because the radiation levels can exceed 1mSv (100 rems) in 1 hour. When radiation levels may exceed 5gy (500cGy) in 1 hour the sign should read “GRAVE DANGER, VERY HIGH RADIATION AREA”. This is not typically seen in a medical facility.

Warning Lights – Beam on indicators are required on the control panel at the entrance door and on the treatment unit itself. These lights should be illuminated whenever the therapy unit is on.

Door Interlocks - Entrance doors to therapy rooms must be equipped with an interlock that will shut off the machine if the door is opened during treatment. The machine will not produce radiation when the door is closed unless the operator deliberately turns it on.

Visual and Auditory Communication – It is necessary for the radiation therapist to be able to see and hear the patient throughout the treatment. This is accomplished with television monitors and an intercom system located at the control consol area outside of the treatment room.

“Beam On” Monitors – High energy therapy units are required to have an independent beam-on monitor in the room to alert the therapist if he/she enters the room when the beam is on.

Radioactive Materials –

Unlike x-ray machines that produce radiation when turned on, radioactive materials are always giving off radiation and, therefore, must be kept in a lead lined container when not in use. Some examples of radioactive materials that are used in Nuclear Medicine and Radiation Oncology are: Cesium, Iodine, Thallium and Strontium.

Brachytherapy – Sources for implants are always emitting radiation. A license from either the NRC or the state is required to receive, possess and use such sources. Sources are stored in a heavily shielded safe in an area secure from theft or loss.

Written Directives and Inventories – Before the implant is prepared, a written directive must be completed by the requesting physician and a careful inventory must be maintained.

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Transportation – Sources must be transported in shielded carriers.

Patient Rooms – The patient is placed in a private room. Care must be taken so that the patient's bed is placed so as not to expose the patient in the adjoining room.

Training Personnel – Instruction in radiation safety; Nurses should wear personnel monitors.

Warning Signs and Surveys – The entrance door to the patient's room must be posted with a caution sign. Visiting periods should be limited to 20 minutes per visitor per day. Visitors should keep a safe distance from the patient as established by the Radiation Safety Officer. Radiation warning signs are to be placed on patient's wrist, bed and chart. After removal of the implant, a survey needs to be done.

Leak Test – Brachytherapy sources must be leak tested in intervals not to exceed 6 months.

Low Dose Rate Brachytherapy – Requires the patient to be hospitalized 24 to 72 hours.

High Dose Rate Brachytherapy – Greater radiation activity decreases the treatment time. These are done on an outpatient basis, and, since they are computer controlled, there is less exposure to the preparer. The sources, Iridium 192 and Cesium 137 cannot be handled manually. Potential problems include error or loss of control of the source.

Radioactive Drugs – Upon injection into the patient, certain radioactive pharmaceuticals settle into certain body organs. A gamma camera in Nuclear Medicine senses the radiation in the organ, allowing it to be recorded on film. The uptake of the radioactive pharmaceutical may indicate pathology and provide the doctor with information for a diagnosis. Some tests that use radiation in this way are bone scans and heart scans. Thyroid disease may be treated using a type of radioactive pharmaceutical.

Sealed Sources – Some sealed sources of radiation may be put into a body cavity as a treatment. Examples of this are cesium implants, which is used for some gynecological (female) cancers, and palladium or iodine “seeds” for treating prostate cancer in men.

Handling and Disposal

Brachytherapy patients – In general there is radioactive contamination problems with brachytherapy patients, and therefore the only hazards arise from the radiation emitted by the sources and the potential hazard of sources becoming displaced from the tissue. Removal will be carried out by a member of the Radiation Oncology Department who will advise staff of any special precautions at the time of removal.

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Patients with permanent implants will only be permitted to leave the hospital once the activity of the radioisotope has decreased to a level which is internationally recognized as safe.

Accidental contamination procedures

There are three major causes of spillage of liquid radioactive material:

1. Spillage from a source container
2. Leakage from an injection procedure
3. From patient excretion such as urine, feces, sweat, saliva and vomit

Any spill has a level of danger and all accidents involving radioactive material will be reported to the clinical site Radiation Safety Officer as well as the program director. In cases where personal injury is involved, such as a scratch on the skin where radioactive material may enter the person's body, an incident report form must be completed.

The following procedure should be followed on discovery of a radioactive material contamination problem:

All persons involved in the incident are to vacate the immediate vicinity but are not to move freely around the department, as this involves a danger of spreading contamination.

IMMEDIATELY notify the clinical supervisor and the Radiation Safety Officer.

If the contamination is due to a container spill of liquid and the hands are protected with gloves, right the container, and ensure that it is adequately shielded. If the problem is due to a leaky syringe or other container, place suspect item in a plastic bag and remove it to the Hot Lab, if possible.

Follow the directions of the Radiation Safety Officer and the protocol of the clinical site.

Pregnant Patient

The Radiation Oncologist will inform the patient of the risks of radiation treatment during pregnancy. The radiation therapist will deliver the radiation dose in accordance with the prescription and safety requirements established by the Radiation Oncologist, Radiation Safety Officer and physics staff.

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Information on Radiation Monitoring Badges

A film badge is a device used to measure the radiation exposure that a person receives during clinical hours. It is to be worn at every clinical site.

Film badges are distributed quarterly and are to be exchanged for the previous quarter's badge immediately upon receipt. The old badges must be returned to this college clinical supervisor immediately in order to avoid further exposure.

Radiation badges must be worn at all times that a student is on the clinical site premises. They must not be left in such areas as simulation rooms, treatment rooms, console areas, or in areas immediately adjacent to the walls of the above rooms.

Film badges are to be worn at lapel level with the side which is open on the badge holder forward. Badges are not to be worn inside pockets or under the lapel so that the side or back of the holder is exposed to radiation. If ever a lead apron is worn, the badge is to be worn outside the apron to estimate maximum exposure.

Any individual who is concerned about exposure to other organs, may request the assistance of the Radiation Therapy Program Director in determining if additional monitoring is necessary.

If exposure to hands or fingers is of concern, please notify the Radiation Therapy Program Director to determine if a ring badge will be supplied.

In case the radiation badge is damaged or exposed accidentally to radiation not received by the person, the Radiation Therapy Program Director must be notified immediately. This badge must be returned to the Radiation Therapy Program Director. A replacement badge will be issued.

The badge records are maintained in a locked file cabinet in the Radiation Therapy office. Any individual who receives a badge exposure exceeding 375 millirems in any quarter will be notified. The circumstances will be investigated by the program and the RSO of the clinical site and the report of such investigation will be kept on file.

Late badges and non-returned badges are considered a regulatory non-compliance violation and may result in unfavorable disciplinary action. You must return all the radiation monitors, not only to comply with regulatory guidelines and commitments but in order for the BCC Radiation Therapy Program to receive credit for the chips and filter components that are removed for recycling.

Students whose badge readings are within normal limits will be informed of their most recent exposure readings upon request.

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Bergen Community College
Radiation Therapy Program

Radiation Overdose Policy

Appropriate radiation monitors (dosimeters) are provided for all students of the radiation therapy program. Exposure reports are reviewed by the BCC Radiation Safety Officer and the Radiation Therapy Program director. They are maintained in the director's office and all students are routinely informed of their most recent exposure readings. Any incidence of overdose that warrants investigation shall be recorded and maintained on the incidence report form and kept in the program directors office.

In accordance with our ALARA program, the following investigational levels have been established:

- | | | |
|----|--------------|---|
| A. | Whole Body: | Level I - 125 mrem
Level II - 375 mrem |
| B. | Skin: | Level I - 1250 mrem
Level II - 3750 mrem |
| C. | Extremities: | Level I - 1250 mrem
Level II - 3750 mrem |
| D. | Lens of Eye: | Level I - 375 mrem
Level II - 1125 mrem |

These levels are based on quarterly reports.

Any exposure above ALARA Level I will be documented verbally.

Any exposure above ALARA Level II will be documented in writing.

Any exposure exceeding these levels will be reported to the NJDEP in compliance with section 7:28-13.2.