

RADIATION PROTECTION

Students entering the Program must be advised of the radiation protection precautions before beginning clinical rotations where ionizing radiation is produced.

Responsibility: Program Director, faculty, students, clinical preceptors, Radiation Safety Officer (RSO)

Standard: Human Resources

JRCERT 2021 Radiography Standard(s): 5.1, 5.3, 5.5

No student shall be assigned in an area of clinical education where the student is exposed to ionizing radiation before receiving basic instruction and demonstrating understanding of radiation protection measures. This includes but is not limited to, the following areas of education:

- a. Risks of ionizing radiation
- b. Exposure limit
- c. Radiation monitoring practices
- d. Safety precautions
- e. Cardinal rules of radiation protection
- f. Protection from scatter radiation

Sufficient instruction in this area will be met with successful completion of the course 260-*Health Physics I* and successful completion of the laboratory exercises corresponding to this course. All students must strictly observe Imaging Services Department Radiation Safety Policies.

ALARA - As Low As Reasonably Achievable (ALARA) means making every reasonable effort to maintain exposure to radiation as far below the dose limits as practical, consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology. This definition recognizes the concept of ALARA to include energies for magnetic resonance and sonographic imaging.

All students must be instructed about and shall practice the concept of ALARA for radiation exposures. This shall be accomplished for patients, visitors, employees, other students, and themselves.

Radiation Monitor Badges:

1. The Program Director shall provide each student entering the Program a radiation monitoring badge request form. This form must be completed and returned to the Program Director. This completed form shall be used to obtain a radiation monitoring badge for the student.

2. Radiation monitoring devices (personnel dosimeters) shall be worn by the student attached to the clothing-on the anterior surface of the body at collar level. When wearing a radiation protective apron, the dosimeter shall be worn at collar level of the anterior surface of the body and outside the apron.
3. Each student must have their Regional West Medical Center radiation monitoring badge on his/her person at all times while at any clinical education setting or when in a laboratory situation where ionizing radiation is used.
4. Any student who does not have his/her radiation monitoring badge will not be permitted to attend his/her clinical area, and the student will be sent home to get the monitoring badge.
5. If the student loses his/her monitoring badge, the student will notify the diagnostic supervisor so that arrangements may be made for a replacement.
6. A new badge is provided every month for each student. The student shall promptly exchange his/her current badge with a new badge.
7. The student shall use the same assigned monitoring badge for the monthly interval for all clinical educational settings.
8. To minimize exposure of the radiation monitoring badge from non-occupational radiation sources, the student should avoid placing the badge near radiation sources. Examples of radiation sources include microwaves, granite counters, smoke and fire detectors, watches with luminescent dials, televisions and computer monitors.
9. If the student needs to have a radiographic procedure as a patient, the student shall not wear the monitoring badge during the procedure.

Radiation Exposure Report:

1. The effective dose equivalent limit for students is 3.5 Rem/year (35 mSv/year or 3500 mrem/year). The numerical value of the individual student's lifetime effective dose equivalent in mSv shall not exceed the value of the student's age in years times ten(10).

2. The Radiation Safety Officer (RSO) monitors radiation reports of students and informs a student if the hospital's action levels are exceeded.
3. A copy of the monthly radiation monitoring badge report will be provided to a Program official for review. The Program or Sponsoring Institution will provide students with their badge report within 30 days following the receipt of the data.
4. The final cumulative badge report will be placed in the student's permanent record.
5. The Program shall provide students leaving the Program a record of the final cumulative radiation dose received while in the Program when the final report is available.

Pregnant Radiology Student:

1. The student who becomes pregnant should refer to the Pregnant Radiography Student Policy 722.8.41.10

Review of Radiation Exposure Reports:

1. Regional West Medical Center has established investigational levels for occupational external radiation doses, which when exceeded, will initiate review and investigation by the RSO and/or the Radiation Safety Committee (RSC).
2. The RSO or his designee shall review the results of the radiation monitoring reports on a monthly basis to determine if students are following the principle of ALARA. The investigation levels adopted are listed in Table 1. Level I and Level II are set for monthly exposures. These levels apply to the exposure of individual students.
3. The following actions will be taken at the levels as stated in Table 1:

- a. Personal doses less than Investigational Level I.

Except those deemed appropriate by the RSO, no further action will be taken in those cases where a student's dose is less than Table 1 values for the investigation Level I in a month.

- b. A student's dose equal to or greater than Investigational Level I but less than Investigational Level II.

The RSO will review the dose of each student whose monthly dose equals or exceeds Investigational Level I in a month and will report the results of the review at the first Radiation Safety Committee (RSC) meeting

following the quarter when the dose was recorded. If the dose does not equal or exceed Investigational Level II in a month, no action related specifically to the exposure is required unless deemed appropriate by the RSC. The RSC will, however, review each such dose in comparison with those of others performing similar tasks as index of ALARA program quality and will record the review in the RSC minutes.

c. A student's doses are greater than Investigational Level II.

The RSO will investigate in a timely manner the causes of a student's dose equaling or exceeding Investigational Level II in a month and, if warranted, will take action to reduce further dose. A report of investigation, and action taken, and a copy of the exposure report or the equivalent will be presented to the RSC at the first meeting following completion of the investigation. The details of the reports will be included in the RSC minutes. A copy of the report will also be placed in the student's permanent record.

TABLE 1

Investigational Levels (mRem) Per Reporting Period			
Description	Level I	Level II	Annual Limit
1. Whole Body (DDE)	125/month	375/month	3500
2. Lens of the Eye (LDE)	150/month	450/month	10,000
3. Extremity (SDE-ME)	500/month	2000/month	45,000
4. Skin (SDE-WB)	500/month	2000/month	45,000
5. Declared Pregnant Women (DPW)	40/month	50/month	300/ gestational period

4. In the event of accidental exposure to ionizing radiation, the student shall fill out an incident report form and inform the Clinical Coordinator or the RSO of such an event so that appropriate action can be taken to reduce the chance of a reoccurrence and to determine the amount of accidental exposure.

Protection of the Student from Unnecessary Radiation:

1. All energizing switches in fixed units shall be maintained at a distance of thirty inches from the control booth opening so the student cannot be exposed to radiation.
2. A student shall be in the radiographic room during radiation exposure only when necessary.

3. Radiation protection apparel shall be worn when in the fluoroscopy room during fluoroscopy, in a radiographic room during an exposure or when making the exposure or in the vicinity of the portable unit or the patient during the exposure.
4. Technologists are required to observe and correct students on radiation safety practices.
5. Students must not hold image receptors during any radiographic procedures.
6. Students should not hold patients during any radiographic procedure when an immobilization method is the appropriate standard of care.

Protection of Patients, Visitors and Other Staff from Unnecessary Radiation:

1. Female patients of childbearing age shall be asked to sign a menstrual history questionnaire prior to exposure to ionizing radiation
2. All doors in radiographic rooms shall be closed during radiation exposure.
3. Close collimation of the x-ray beam is required on every exposure. At minimum, the x-ray field must never be larger than the image receptor being used.
4. The minimum distance between the x-ray tube and the patient's skin surface shall not be less than 12 inches (30 centimeters).
5. Visitors and family are not routinely permitted in radiographic rooms.
6. If no other immobilization method is appropriate or if no other ancillary personnel / staff are available and the student must assist a patient during exposure, the student must protect him or herself by wearing radiation protective apparel with the following requirements:
 - a. Of the student, staff or ancillary personnel remaining in the room, no part of the body shall be exposed to the primary beam without protection of at least 0.5 mm of lead equivalent.
 - b. Of the student, staff or ancillary personnel remaining in the room, the body shall be protected by lead apron or whole-body barriers of at least 0.25 mm of lead equivalent if not in the primary beam.
 - c. When a student is required to hold a patient during an exposure, his or her name and pertinent data shall be entered in the Program's Exposure Holding Log.

7. When portable procedures are performed, the technologist and the student are responsible for proper radiation safety of the patient and other persons.

All people in the area must be moved to a safe environment. Patients who cannot be removed from the room shall be protected from scatter radiation by whole body protectors of at least 0.25 mm lead equivalent or shall be positioned at least 2 meters from the tube head and image receptor. Before an exposure is made, the technologist/student shall inform all people in the area that the exposure is to be made and allow for these individuals to move to a safer distance.

8. When the C-arm or O-arm is in operation, all personnel in the area shall wear lead aprons and lead gloves as applicable. The fluoroscopy time or total dose shall be part of the patient's record.

Signature
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Program Director

Signature
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Director of Imaging Services

Reviewed: 3/28/00, 3/28/02, 8/12/08, 1/28/2010, 7/7/2011, 5/24/12, 5/16/13, 2/3/17, 2/6/18, 5/1/20, 9/3/2021

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RADIATION MONITOR REQUEST FORM

PLEASE PROVIDE A RADIATION MONITOR BADGE FOR THE FOLLOWING PERSON:

Name: _____

Social Security Number: _____

Birth date: _____

Date: _____

RADIATION DOSIMETRY REPORT

Student Name: _____

PERIOD

Reporting Period _____ to _____	
Description	Dose Equivalent in mrems
Whole Body (DDE)	
Lens of the Eye (LDE)	
Skin (SDE-WB)	

YEAR TO DATE

<u>January 1, 20</u> _____ to _____	
Description	Dose Equivalent in mrems
Whole Body (DDE)	
Lens of the Eye (LDE)	
Skin (SDE-WB)	

LIFETIME TO DATE

Inception Date of _____	
Description	Dose Equivalent in mrems
Whole Body (DDE)	
Lens of the Eye (LDE)	
Skin (SDE-WB)	

Method of Monitoring: OSL
 Monitoring Company: Landauer

M = Minimum