



**MONTGOMERY
COLLEGE**

Radiologic Technology Safety Practices

SAFETY PRACTICES

The purpose of this Safety Practice Document is to provide students and the general public information as to the policies of safety practices specific to Health Care providers as well as to student radiographers working in diagnostic imaging. Within this document information on radiation safety, the program's pregnancy policy, the policy for repeat radiographs, direct and indirect supervision, communicable disease policy, information on latex sensitivity, MRI and the screening tool used by the program and the curriculum sequence addressing radiation safety can be found.

Radiation Safety

Students will follow the ALARA and the cardinal rules of radiation safety as discussed in their first day of the RADT 119 class, which is a clinical class conducted on campus beginning the third week of May each year. Radiation safety practice objectives are reinforced throughout the program in each RADT class, both clinical and didactic with advanced radiobiology concepts and regulations addressed in classes as noted in the syllabi. See page 8 of this document (or appendix D in Students handbook) for curriculum sequence. In addition, this Safety Practices document is provided to all students and can be found on the Rad. Tech web page under link entitled Safety Practices . The document is also found outside of the energized lab in HC 430.

Exposure monitoring (dosimeters) and identification

Montgomery College provides dosimetry badges (Optically Stimulated Luminescent Dosimeters or OSL) for the Radiologic Technology students. The students will always wear the OSL while working with any form of ionizing radiation. It is to be worn around the upper chest area (on the collar) at all times. When wearing protective lead apparel, the dosimeter is to be worn above this apparel. No student will be allowed to work in the clinical areas without the dosimeter. or classroom energized laboratory area without their dosimeter. Students are reminded to bring their dosimeters to the labs while exposures are made using the energized lab or portables. If a student forgets their dosimeter, they are not to remain in the room when exposures are made on the phantoms. Appropriate protective wear will be used according to the procedure protocol.

Exposure labs on campus: All students are expected to follow radiation safety practices in the lab as well as at the clinical sites. Students are to wear their radiation dosimeters for all labs.

Dosimeter and the clinical site: Students must always wear dosimeters at the clinical site. Students who fail to wear their dosimeter in the clinical site must leave the site. They may return the same day once they retrieve their dosimeter. Loss of time at the site must be made up. Continued non-compliance of appropriate wearing of the dosimeter at the clinical resulting in absences from the site may result in a grade reduction and/or unsuccessful completion of the clinical course.

Students must always wear lead aprons and thyroid shields while assisting in fluoroscopic procedures and mobile radiography studies

Under no circumstance is a student to hold a patient or image receptor for an exposure.

Badge inserts are changed monthly, and it is the responsibility of each individual student to see that the badge insert is changed before the 20th of each month. **Should a student not turn in their dosimeter prior to the deadline, points may be taken off the final grade of the clinical course in which they are enrolled.** Failure to adhere to this policy may result in an inaccurate radiation exposure reading since the rest of the dosimeters will be mailed to the dosimetry service with the "control" badge. However, students should wear their dosimeter even if it is past the expiration date until a new dosimeter is obtained.

A printout from the vendor who provides the OSL's is provided for student's review each month . Each student is asked to review his/her radiation exposure reading *using dosimeter number only each month (every 30 days)*. All other identifying information are removed from this report. The radiation safety officer maintains the original of each monthly report in a secure place. Students will be consulted for any reading reported for 10 or more millirems on a monthly report to determine

how the exposure has occurred. A reading over 40 millirems for the month will necessitate a possible change in rotation from high exposure areas or procedures. A conference will be necessary with the RSO and the program director in the event of an unusually higher radiation dose on any report summary. This will be necessary to determine if the dose was physically obtained by the student or if the dosimeter was inadvertently left on an apron or shield. All students are reminded that the summary reports track a lifetime dose and will remain on a radiographer's report for the remainder of their career. Each student is encouraged to keep track of their dosimeters accordingly and turn them in a timely fashion. A monthly checklist with the student's initials is provided along with the monthly dosimeter printout. Each student is asked to check their monthly reading and place their initials in the column provided next to their name. The checklist is kept in a secured binder in RSO office and the report is placed in the energized lab. The dosimeters usually arrive by the 10th day of the month and will be placed in the student mailboxes. The students are expected to switch out their old dosimeters and the RSO (Full Time Rad. Tech Faculty) will mail them back to Landauer within the next week.

DIRECT AND INDIRECT SUPERVISION

Students who have not yet demonstrated competency (based on a successful competency as noted in the section above) must be under direct supervision of a registered radiographer. Direct supervision means that the radiographer is in the radiographic room observing and supporting the student. Once the student has demonstrated competency on an examination, they may perform the same examination under indirect supervision. Indirect supervision implies that a radiographer is within speaking distance of the student. The radiographer does not need to be outside of the room but close enough to respond a student's call. Use of a telephone or paging system does **not** comply with indirect supervision. Students should not go on portables without a radiographer accompanying them even if they have demonstrated competency in portable radiography. The same policy holds true in the surgical suite. Students should not be left alone in the room and a radiographer needs to be within calling distance of the student.

REPEATING RADIOGRAPHS

When a student must repeat a radiograph taken on a patient, **the student must have a registered technologist in the room with him or her, no matter the level of competence.** At all times, it is imperative to keep any unnecessary exposure to a minimum for the patients.

Students are required to document all repeats. The student should enter the Repeat in Caselog in Evaluate which will request a verification from the supervising technologist that they may have assisted and did observe the student performing the Repeat. A detailed tutorial will be available on the E-value web site. Students that do not record their repeats will be penalized and conference due to this being a Program requirement.

PREGNANCY POLICY

At monthly information sessions and during orientation of newly accepted students the pregnancy policy is reviewed. In addition, an additional review of the policy is incorporated into the RADT 119 (Clinical radiology I) class

The National Council on Radiation Protection and Measurement (NCRP) recommends that the dose equivalent to the embryo-fetus from occupational exposure to the expectant mother should be limited to 0.5 REM for the entire gestational period. It is also stated that females involved in the occupation may voluntarily disclose their possible pregnancy to their supervisor if suspected. Through proper instruction to these precautions, it is possible to limit all occupational exposure to under 0.5 REM per year and prevent fetal dose equivalents from being surpassed.

All students enrolled in the Radiologic Technology Program are instructed in proper safety precautions and personnel monitoring prior to being admitted to any ionizing radiation area. Students are required to abide by **ALL** safety precautions and importance of keeping exposure as low as practical through a combination of time, distance and shielding is stressed.

Should any student suspect pregnancy, she is recommended to voluntarily disclose it to the Program Coordinator. This must be in writing and indicate the expected date of delivery. In the absence of this information, a student cannot be considered

pregnant.

Upon voluntary disclosure of the pregnancy, the student will:

1. Meet with the Program Coordinator regarding the nature and potential radiation injury associated with in-utero exposure, the regulatory limits established by the NCR Regulatory Guide 8.13 and the required preventative measures to be taken throughout the gestational period. A statement of receipt of this information will need to be signed at this time.

2. The pregnant student has the option to complete the program without any modifications. If requested by the student, modifications will be made for clinical rotation during the pregnancy. If the student requests modifications, upon consultation with the student the faculty and clinical instructor from the clinical site will finalize the rotation schedule

3. The student will abide by the following:

- a. Strict adherence to ALL safety precautions for protection purposes.
- b. A second dosimeter will be provided and is to be worn at the student's waist, to monitor fetal dose.
- c. At any time that the pregnant students feels she is working in an unsafe area or under conditions she feels detrimental to herself or fetus, stop immediately and report to the clinical instructor.
- d. At no time and for no reason will the pregnant student place herself in the primary beam of radiation.

4. If a student chooses to temporarily leave the program, every effort will be made to assure a successful return to the program. As always, return into the program after a break is dependent on clinical space availability and student may be asked to remediate clinically or didactically as part of her return.

5. The student must realize that she must complete, upon her return or when she is no longer pregnant all the clinical competencies she may have missed due to voluntary modifications as well as related coursework.

6. Students have the option of withdrawing declaration of pregnancy at any time. This must also be presented in writing and submitted to the program coordinator.

COMMUNICABLE DISEASE POLICY

Students with known communicable diseases will need to follow the clinical facilities protocol for personnel with communicable diseases. The college has no jurisdiction over a clinical facilities communicable disease protocol. Please be aware that radiography students take part in invasive procedures. As part of the RADT 119 class and prior to clinical rotations, students are instructed in Standard Precautions as well as OSHA regulations.

At monthly information sessions and during orientation of new accepted students, students are advised that all immunizations must be up to date and HEB B vaccine is required.

During student experiences in the clinical setting, the student may possibly come in contact with diseases, equipment, and treatments that may be hazardous to the individual and/or to an unborn fetus. It is expected that the student utilize standard and OSHA precautions with patient care procedures to minimize risks to the student and/or unborn fetus. If a student has an incident occur involving contact with a communicable disease and/or bloodborne pathogens, it is expected that the student **follow their affiliate's exposure control policies**. It is then the student's responsibility to see their own physician immediately to establish baseline testing and seek any required follow-up. TB exposure should be followed immediately with a PPD or if applicable a chest x-ray and a three (3) month follow-up after that. A copy of the incident should be brought back to the College for the student's file. *If the student comes into contact with diseases outside of the Program or contracts diseases which may be hazardous to other students, patients, or hospital personnel, it must be reported to the Montgomery College Security with 24 hours of incident as well as notifying the Program Coordinator.* Security will forward to Montgomery College's Risk Manager.

A student, who may be exposed to a communicable disease, may be asked to leave the clinical area until incubation periods. Some diseases may be fatal to patients with compromised immune system. Any time missed in this case must be completed.

LATEX SENSITIVITY

Students with known latex sensitivity or allergies should be aware that the college cannot guarantee non-exposure to latex in the clinical arena.

MRI SAFETY

The magnetic field is constant in an MRI room and highly magnetic items such as certain jewelry, implanted devices, medical equipment and credit cards can be adversely affected by this field, causing potential injury to the student as well as to the patient. Gradient magnetic fields cause many things including peripheral nerve stimulation. In addition radiofrequency fields used during an MRI can cause heating/burning. Therefore students should be aware of what is on their person as well as what is on or in their patient before entering the MRI suite. Students should familiarize themselves with the facilities Magnetic ZONE policies (safe and unsafe areas). An MRI screening document will be completed in the first fall semester of the program and repeated yearly by each enrolled student (see appendix E of the Student Handbook) and also part of this safety manual.

Students will receive further education on MRI safety in RADT 119, the first class of the program and offered in the summer and in RADT 207, offered in the final semester of the program. If there is a concern based on the screening tool, the student will be appropriately advised by faculty

FEDERAL LAW CONCERNING CHEMICAL HAZARDS

Federal law requires that all individuals must be notified about hazardous chemicals present in the work place. This law applies to all occupations, with the basic purpose of raising the level of conscientiousness on chemical safety.

**Radiologic Technology Program
MRI SCREENING FORM**

Students may be in situations where they enter zones 3 and 4 in the MRI area to transport patients, lifting help, or for advanced modality observation. The magnetic field is always on that is why student's need to be aware of the safety issues and what zones are safe for students (see zones included in this document. Students are introduced to the MRI zones and MRI safety during Orientation to the program, Fall clinical orientation, RADT 101 and RADT 207. Before entering the MR environment or MR system room, students should be screened and given authorization to enter zones 3 and 4 by the MR department. They will also be advised to remove the following metallic objects including hearing aids, dentures, partial plates, keys, beeper, cell phone, eyeglasses, hair pins, barrettes, jewelry, body piercing jewelry, watch, safety pins, paperclips, money clip, credit cards, bank cards, magnetic strip cards, coins, pens, pocket knife, nail clipper, tools, clothing with metal fasteners, & clothing with metallic threads.

The MC Radiologic Technology Program MRI screening form is filled at least twice while the student is in the Program. In the interim, it is the student's responsibility to report any changes on this form to the faculty.

Student Name _____

Please address the following:

Have you had an injury to the eye involving a metallic object or fragment (e.g., metallic slivers, shavings, foreign body, etc.)? No Yes

If yes, please describe: _____

Have you ever been injured by a metallic object or foreign body (e.g., BB, bullet, shrapnel, etc.)? No Yes If yes, please describe: _____

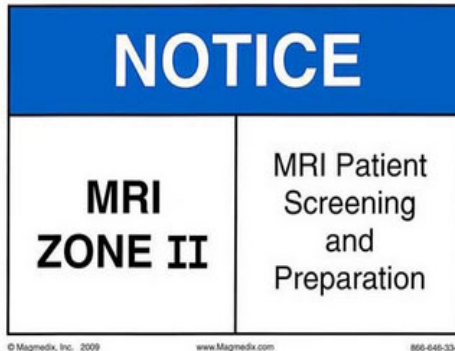
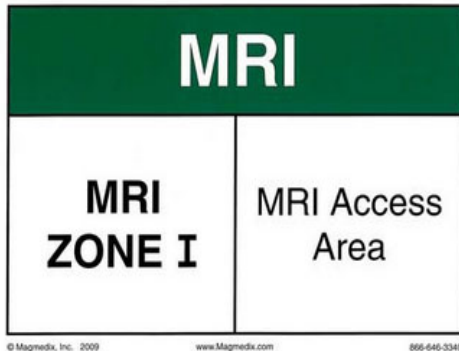
Please indicate if you have any of the following:

- | | |
|--|--------|
| • Aneurysm clip(s) | Yes No |
| • Spinal fixation or fusion devices | Yes No |
| • Cardiac pacemaker | Yes No |
| • Implanted cardioverter defibrillator (ICD) | Yes No |
| • Electronic implant or device | Yes No |
| • Magnetically-activated implant or device | Yes No |
| • Neurostimulation system | Yes No |
| • Spinal cord stimulator | Yes No |
| • Internal electrodes or wires | Yes No |
| • Bone growth/bone fusion stimulator | Yes No |
| • Cochlear, otologic, or other ear implant | Yes No |
| • Insulin or other infusion pump | Yes No |
| • Implanted drug infusion device | Yes No |
| • Any type of prosthesis (eye, penile, etc.) | Yes No |
| • Heart valve prosthesis | Yes No |
| • Eyelid spring or wire | Yes No |
| • Artificial or prosthetic limb | Yes No |
| • Metallic stent, filter, or coil | Yes No |
| • Shunt (spinal or intraventricular) | Yes No |
| • Vascular access port and/or catheter | Yes No |
| • Radiation seeds or implants | Yes No |
| • Swan-Ganz or thermodilution catheter | Yes No |
| • Medication patch (Nicotine, Nitroglycerine) | Yes No |
| • Any metallic fragment or foreign body | Yes No |
| • Wire mesh implant | Yes No |
| • Tissue expander (e.g., breast) | Yes No |
| • Surgical staples, clips, or metallic sutures | Yes No |
| • Joint replacement (hip, knee, etc.) | Yes No |
| • Bone/joint pin, screw, nail, wire, plate, etc. | Yes No |
| • IUD, diaphragm, or pessary | Yes No |

- Dentures or partial plates Yes No
- Tattoo or permanent makeup Yes No
- Body piercing jewelry Yes No
- Hearing aid (Remove before entering MR system room) Yes No
- Other implant _____ Yes No

I attest the above information is correct to the best of my knowledge. I have read and understand the entire contents of this form, and I have had the opportunity to ask questions regarding the information on this form. Faculty will review this form and those students who do indicate **Yes** to any of the above will be coached by Faculty to assure the student's safety.

Student Signature _____ Date _____



Radiologic Technology Program Radiation Safety Practice Curriculum Sequence
Radiation Safety Curriculum Sequence

Summer Session (1st year)

Outcomes RADT 119

Introduce and apply ALARA, time, distance, shielding principals for occupational and patient/personnel radiation protection

Fall Semester (1st year)

Outcomes RADT 111

Demonstrate appropriate radiation safety and protection methods including ALARA. utilize the energized laboratory and positioning lab equipment, as well as the exposure factors to produce optimum radiographs

Outcomes RADT 101

Discuss human injury caused by radiation.
List basic radiation protection equipment.
Describe a brief history of modern radiography (to include DR and CR) and discuss what behaviors are required of a radiographer.
Discuss time, distance and shielding in reference to radiation protection.

Outcomes for RADT 120 (Clinical)

Demonstrate safe operation of radiographic equipment.
Demonstrate effective use of technique manipulation to produce an optimum quality radiograph.
Apply radiation protection methods, and ALARA as indicated by specific radiographic procedures.

Spring Semester (1st year)

Outcomes RADT 112

Demonstrate appropriate radiation safety methods and ALARA
Demonstrate knowledge of the energized laboratory and practice lab equipment, as well as the exposure factors necessary to produce optimum radiographs.

Outcomes RADT 102

Define health physics.
List the cardinal principles of radiation protection and discuss the ALARA concept.
Explain the meaning of NCRP and the concept of dose limits.
Name the dose limits for occupational and non-occupational worker for whole-body, skin, and extremities.
Discuss the radiosensitivity of the stages of pregnancy.
Describe the recommended management procedures for the pregnant radiographer and for the pregnant patient.
Evaluate the radiosensitivity of tissues and organs.
Identify the leakage radiation limit for x-ray tubes.

List the beam-on indicators on the control panel.
Indicate the nine radiation protection aspects of radiographic equipment.
List the nine radiation protection features of fluoroscopic equipment.
Discuss the design of primary and secondary radiation barriers.
Describe the design of the three types of radiation detection dosimeters used in diagnostic imaging.

Outcomes RADT 124 (Clinical)

Demonstrate safe operation of radiographic equipment.
Demonstrate effective use of technique manipulation to produce an optimum quality radiograph.
Apply radiation protection methods, as indicated by specific radiographic procedures

Summer Session (1st year)

Outcomes RADT 125 (Clinical)

Demonstrate mastery of more complex principles in safe operation of radiographic equipment.
Demonstrate more effective use of technique manipulation, at an intermediate level, to produce an optimum quality radiograph.
Apply appropriate radiation protection methods, as indicated by specific radiographic procedures, during procedures and exhibit these methods of the radiograph.
Demonstrate knowledge of surgical suite and C-arm and portable machine manipulation in the surgical environment.

Fall Semester (2nd year)

Outcomes RADT 211.

Utilize exposure factors to produce optimum radiographs
Employ optimum radiation protection methods including ALARA.
Utilize the energized laboratory and positioning lab equipment, as well as the exposure factors to produce optimum radiographs

Outcomes RADT 206

Exhibits knowledge of the theory of cellular biology and the principles of radiobiology
Demonstrates an understanding of the causes and effects of short and long term exposure to radiation.
Recognizes the importance of radiation protection in terms of radiation biology.

Outcomes for RADT 224 (Clinical)

Demonstrate mastery of higher skill levels in the safe operation of more complex radiographic equipment.
Demonstrate effective use of technical skills to produce an optimum quality radiographic image.
Employ more complex radiation protection methods and ALARA as indicated during procedures and exhibits these methods on the radiographs.

Spring Semester (2nd year)

Outcomes for RADT 207

Discuss appropriate radiation protection protocols for CT

Outcomes for RADT 225 (Clinical)

Demonstrate complete mastery of higher level skills in safely operating more complex radiographic equipment.

Demonstrate the most effective use of technique manipulation to produce an optimum quality radiograph of more complex nature.

Employ the most complex radiation protection methods, as indicated by specific radiographic procedures, during procedures and exhibits these methods on the radiographs.