MONTGOMERY COMMUNITY COLLEGE
DENTAL ASSISTING PROGRAM
RADIATION PROTECTION PROGRAM

In order to maintain the appropriate records, including signature(s) necessary to remain in compliance with 10A NCAC 15 .1636 (a)(2) the radiation officer will be required to sign the document annually upon the annual review of the document content and implementation.

My signature below indicates I have reviewed the Radiation Protection Program document content and implementation.

Date	Signature	Notes/Comments

RADIATION PROTECTION PROGRAM

EMPLOYEE/STUDENT
TRAINING MANUAL

OPERATING AND SAFETY PROCEDURES
FOR THE
DENTAL EDUCATIONAL FACILITY
OF
MONTGOMERY COMMUNITY COLLEGE

1011 Page Street
Troy, NC 27371
Revised: February 2021

Department Head: Lori McAllister

RADIATION PROTECTION PROGRAM TRAINING MANUAL

The radiation protection program training manual has been written to protect the public and the dental professional. The manual complies with the state rules for radiation control and safety. The Radiation Protection Section enforces the radiation rules in North Carolina. These rules require machines that produce radiation to meet specific requirements while they also require specific procedures be followed and records be kept on file. A copy of these rules is available for review and can be found in the **Dental Assisting Lab, on the desktop computer at the front of the lab near the hallway. The document is titled "2015 Radiation Protection Regulations**". A copy can be obtained through the Radiation Officer named in this document and a digital copy can also be found at http://www.ncradiation.net/regs.htm

A current copy of the radiation protection program training manual may be found in the dental assisting lab, in the office of the department head and on the program website. Students are provided a copy of the manual through the distance learning platform during the spring semester.

Let it be known that this is an educational facility.

The intent of this manual is to establish procedures to minimize radiation exposure to faculty/students and patients without sacrificing diagnostic quality. Faculty/students are required to understand the procedures and requirements and be able to demonstrate their use. After reading the manual and demonstrating use of the machines safely and correctly all personnel and students must sign and date the "Record for Instruction of Individuals in Operating and Safety Procedure" provided in this manual.

The rules require that each x-ray facility be registered with the state. The notification for the program is posted in the clinical facility of the dental assisting program.

Operators, either faculty or student, are responsible for following all required radiation safety procedures. **The Radiation Safety Officer and trainer Lori McAllister** has the responsibility and authority for overseeing matters relating to radiation protection. The Radiation Safety Officer also confirms all training and serves as the contact person with the state. Faculty and students should submit all radiation questions or concerns about radiation safety to the Radiation Safety Officer.

ALARA

Faculty and students are to observe, practice and implement the ALARA concept. ALARA is an acronym for "As Low As Reasonably Achievable." ALARA is interpreted as attempting to make every reasonable effort to maintain exposures to radiation as far below the dose limits in 15A NCAC 11 as is practical, consistent with the purpose for which the licensed or registered activity is undertaken, taking into account the state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of sources of radiation in the public interest.

Radiation Safety for Montgomery Community College Dental Assisting Program:

A. All x-ray examinations or dental image"retakes" must be ordered by the current supervising dentist or appropriate faculty.

X-ray equipment is not to be used unless authorized by the current supervising dentist/instructor.

1.

B. Operation of X-ray Equipment

2. No person is allowed in the room with the patient during an x-ray exposure
3. Extraoral Imaging utilizes automatic internal settings based on operator selection of image
4. Intraoral x-ray machines are controlled automatically by the exposure control settings. The exposure time is determined when all parameters are established based on the individual patient and teeth being exposed. All intraoral x-ray machines in the dental lab are set at 70 kVp and 10 mA.
5. During exposure, the operator must remain behind the protective barrier. The exposure switch is permanently mounted in the hallway outside the room. A single switch is permanently mounted in the hallway for operatory #1. The operator must position themselves at the control box and remain behind the wall at all times during exposures. Double switches are mounted for operatories #2, 3, & 4. The operator is required to be positioned behind the wall barrier and remain in that protected area during the entire exposure to maintain safety.
6. Faculty is to maintain control of hallways when making x-ray exposures. In addition, operators are to maintain control and clear all adjoining areas when making x-ray exposures for OPERATORY #1
7. Instructors/operators are to maintain control and clear all adjoining areas; **hallway and operatory #1 when exposures are being made with the extraoral machine**.

The operator must be positioned behind the adjacent wall and view-window when exposing images.

8. Operators must observe all safety precautions in accordance with the use of the hand-held device.
9. Caution radiation signs must be posted in the area of radiation use, and visible to operators and patients. Barriers must not be placed as to cover any warning signs on the x-ray equipment.
10. Receptor holders must be used for all exposures. Patients, faculty nor students are allowed to hold any type of receptor with their hand or finger in the mouth during an exposure. Children are not seen in the dental assisting lab, however, should there ever be an incident that a child would be exposed to dental imaging neither faculty nor students are to hold the patient or hold the receptor during x-ray exposure.
11. The tube or housing support should not be held during exposures. The tube housing must not drift or move during any exposure. If a problem with stabilization of the suspension arm develops, notify the Radiation safety Officer for maintenance of the unit.
12. Dental fluoroscopy with image intensification shall not be used.

Personnel:

A. Faculty/Students

1. Radiology faculty and students will be required to wear personal monitoring devices while using ionizing radiation. An occupational dose to individual adults are subjected to the following dose limits: An annual limit, which is the more limiting of: (A) the total effective dose equivalent being equal to five rems (0.05Sv); or (B) the sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rems (.5 Sv); and (2) the annual limits to the lens of the eye, the skin of the whole body, and the skin of the extremities which are: (A) an eye dose equivalent of 15 rems (.15 Sv); and (B) a shallow-dose equivalent of 50 rems (.5 Sv) to the skin of the whole body or to the skin of any extremity.

   Rule .1604 (a) Occupational Dose Limits for Adults ϖ 5 rems (5000 mrem) (0.05Sv) = Total effective dose equivalent (TEDE) ϖ 50 rems (50,000 mrem) (.5 Sv) = Total Organ does equivalent (TODE) ϖ 15 rems (15,000 mrem) (.15 Sv) = Eye dose equivalent ϖ 50 rems (50,000 mrem) (.5 Sv) = Shallow dose equivalent (SDE)

2. Faculty and students are required to wear a dosimeter badge at all times when radiation is being used in the dental assisting lab. In addition, students are required to wear their badge while attending extramural clinical sites. The program will purchase dosimeter badges for all faculty and students that have potential for radiation exposure. Dosimeter badges will be submitted to the manufacture for interpretation

following the end date supplied by the manufacture (quarterly). Faculty and students will be notified by the department head of a dose that is above the minimum reportable dose on the dosimetry report. Reports are kept in the department heads office and are retained indefinitely.

3. Dosimeter badges are to be worn on or near the collar section of the clinical jacket, or in the area toward possible radiation exposure, if in an unusual area or position. Dosimeter control badge will be retained in the office of the department head, personnel badges will be retained by the individual in a safe area away from any type of radiation.

4. Should faculty or student suspect there has been an excessive exposure or a radiation incident, they should immediately notify the Radiation Safety Officer. The Radiation Safety Officer will then notify the Division of Radiation Protection. The address: Radiation Protection Section: 5505 Creedmoor Road, Suite 100, 1645 Mail Service Center, Raleigh, NC 27699-1600.
   Phone: 919-814-2250

   N.C. Emergency Management Operations Center: 800-858-0368 (after business hours)

Rule .1647 Data reported to the individual and Radiation Protection:

Each report required by Paragraph (a) of this Rule shall describe the extent of exposure of individuals to radiation and radioactive material, including, as appropriate: (1) estimates of each individual's dose; (2) the levels of radiation and concentrations of radioactive material involved; (3) the cause of the elevated exposures, dose rates, or concentrations; and (4) corrective steps taken or planned to ensure against a recurrence, including the schedule for achieving conformance with applicable limits, ALARA constraints, generally applicable environmental standards, and associated license conditions. (c) Each report filed pursuant to Paragraph (a) of this Rule shall include for each occupationally overexposed individual: the name, social security account number, and date of birth. With respect to the limit for the embryo/fetus required by Rule .1610 of this Section, the identifying information shall be that of the declared pregnant woman. The report shall be prepared so that this information is stated in a separate and detachable part of the report. (d) Reports made by licensees or registrants in response to the requirements of this Rule shall be addressed to the agency as specified in Rule .0111 of this Chapter. (e) Any reports made by licensees or registrants in response to the requirements of this Rule shall also be provided to the exposed individual. The copy submitted to the exposed individual shall be transmitted at a time no later than the transmittal to the agency.

Pregnancy Policy for Faculty/Students:

1. The dose to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant woman, shall not exceed 0.5 rem (5mSv). The dose of an embryo/fetus shall be taken as the sum of:
   (a) the deep-dose equivalent to the declared pregnant woman; and
   (b) the dose to the embryo/fetus from radionuclides in the embryo/fetus and radionuclides in the declared pregnant woman

To meet the above guideline of acceptable radiation the following will be the responsibility of the pregnant faculty or student while in the Montgomery Community College Dental Assisting Lab, when radiation is in use.

Inform (declare) to the program head that they may be pregnant, this declaration should be in writing, with estimated due date. Until there is a declaration of pregnancy, the occupational dose limits shall remain those guidelines set for adult personnel/students.

Declaration of Pregnancy should include:
Full name
Estimated date of conception/or due date
The date you signed the Declaration of Pregnancy
To declare pregnancy, no documented medical proof is necessary.

Following declaration, medical opinion must be provided acknowledging the faculty/student is involved in the use of radiation and in their professional opinion it is acceptable to continue using radiation with safety precautions. This document must be submitted to the program head as an additional protection measure. The documentation is required to remain active in the program and MUST BE IN WRITING. This legally protects the faculty/student and employer/college.

2. Once declaration of Pregnancy is signed:
Faculty/student will be counseled by the supervisor and/or the RSO, to include:

a. Review of exposure history
b. Educational review on exposure levels for unborn children (maximum permissible dose, 0.5 rem) and fetal risk associated with exposure to radiation.
c. Discussion of employees/student work schedule, supervisor, RSO or employee may ask for reassignment to minimize exposure, however since students are in an educational facility reassignment may not be feasible at which time the student may choose not to continue in the radiation portion of the program, however this will adversely affect the student's capability to remain in the program.
d. Obtain the pregnant person with a monitor for fetal dose.

e. Pregnant faculty and students are required to wear an operators shield at all times while in the dental assisting lab when radiation is in use. As normal precaution all faculty/students must be positioned behind a barrier when exposing radiographs.
f. Following the general principles for maintaining exposure to radiation as low as reasonable achievable; time, distance and shielding.

3. If the dose to the embryo/fetus is found to have exceeded 0.5 rem (5 mSv) of this does, by the time the pregnancy is declared to the licensee, the licensee shall be deemed to be in compliance with paragraph (a) of this rule, if the additional dose to the embryo/fetus does not exceed 0.05 rem (.5 mSv) during the remainder of the pregnancy. In recognition of the possibility of increased radiation sensitivity, and because dose to the embryo/fetus is involuntary on the part of the embryo/fetus, this more restrictive dose limit has been established for the embryo/fetus of a declared pregnant radiation worker.

"Declared pregnant" means a woman has voluntarily informed the licensee or registrant, in writing, of her pregnancy and the estimated date of conception. The declaration remains in effect until the declared pregnant woman withdraws the declaration in writing or is no longer pregnant. "Embryo/Fetal" means the developing human organism from conception until time of birth.

A number of studies have suggested that the embryo/fetus may be more sensitive to ionizing radiation than adults, especially during the first trimester of gestation. The National Council of Radiation Protection and Measurement (NCRP) has recommended that special precautions be taken to limit exposure when an occupationally exposed woman could be pregnant.

Genetic effects are those that affect the offspring of exposed persons, usually in the range of 20-200 rem. At normal exposure levels, genetic effects of radiation are negligible. Rule .1640

Record Keeping

(a) The licensee or registrant shall maintain the records of dose to an embryo/fetus with the records of dose to the declared pregnant woman. The declaration of pregnancy shall also be kept on file, but may be maintained separately from dose records.
(b) The licensee or registrant shall retain all radiation badge records indefinitely.

Rule .1611 The Lower limit for declared pregnant radiation worker is 0.5 rem, but for the general population the limit from licensed or registered operations is not to exceed 0.1 rem (1 mSv) in a year.
The risk to embryo/fetus from 0.5 rem or even 5 rem of radiation exposure is relatively small compared with some other avoidable risk, such as alcohol consumption and cigarette smoking.

Patients that are pregnant or suspect they are pregnant will not be seen in the Dental Assisting Lab at Montgomery Community College

Additional Information:

Equipment is housed in the dental assisting lab. Front and back doors are kept locked at all times when faculty is unavailable to monitor and oversee the lab, therefore preventing the use and or removal of equipment.

General requirements for radiation safety, your rights and obligations as a radiation worker are found in NCRFPAR, Section 1600. The specific sections of NCRFPAR that most impact our facility are Rules 0603, 0604, and 0607. All faculty/students should be familiar with these rules

X-ray machines are equipped with devices to limit the radiation exposure to patients and employees. These devices include filters that reduce unnecessary low-energy radiation from the primary beam and collimators which restrict the size of the x-ray beam. Do not alter, remove, tamper with, or defeat these devices, or in any way cause needless radiation exposure.

All protective lead aprons contain 0.25 millimeter or more lead equivalence. The use of the protective apron and thyroid shield must be used on adults of childbearing age and all children. It is the policy of MCC that all patients be protected by the use of an apron and thyroid shield during exposures. Aprons can be located in each operatory and in the panoramic alcove. Inspect lead aprons by looking for holes, cracks, or tears. If a defect is found, notify the Radiation Safety Officer.

External imaging machine is located in the dental assisting lab.

a. Settings on the machine by the manufacture are digital
b. The lead apron must be used when exposing external images
c. The exposure button is located outside of the alcove. This location requires the operator to remain outside of the area during exposure
d. The operator may view the patient through the viewing glass. The operator should observe the patient during exposure and should listen for the audible signal
e. No person is allowed in the hallway or operatory #1 when external imaging is in operation

Notice to Employees is posted in the hallway of the dental assisting lab.

All registrations and plan reviews are kept in the office of the dental assisting department-head.

Certifying Statement

These procedures have been developed to ensure safe radiological working conditions. Everyone must adhere to these procedures. Prior approval must be obtained for deviation from these procedures.

In accordance with Rule 10A NCAC 15 .1603(c) the registrant shall annually review the radiation protection program content and implementation. A signature log will be maintained at as the front page of this document.

_____ _____

Radiation Safety Officer Date

APPENDIX

RECORD FOR INSTRUCTION OF INDIVIDUALS IN OPERATING AND SAFETY PROCEDURES FOR MONTGOMERY COMMUNITY COLLEGE DENTAL ASSISTING CLINIC.

In accordance with Radiation Protection Section of North Carolina these procedures have been made available to each individual who operates the x-ray equipment. I certify that each of the individuals listed has demonstrated to me, on the date indicated that she/he is competent in operating and implementing all safety procedures according to policy.

_____ _____

Signature of Radiation Safety Officer Date

Operator Statement: I have read these procedures and agree to abide by them.

Date	Signature

Date	Signature