DEPARTMENT OF CORRECTIONS

Policy Number:	**500.058**
Title:	**Radiation Use in Dentistry**
Effective Date:	**10/16/18**

PURPOSE: To ensure safe effective use of ionizing radiation and to minimize the potential risk from adverse biological effects to offender/resident patients and staff, all Minnesota correctional facilities must comply with the following procedures, and all equipment and procedures must meet all relevant state and federal regulations.

APPLICABILITY: All Minnesota correctional facilities (MCF's) and health services

DEFINITIONS:
Collimation – the process of restricting and confining the x-ray beam to a given area.

Disinfectant – an agent that is capable of destroying pathogenic micro-organisms or inhibiting their growth activity.

Extra-oral – outside of (external to) the oral cavity.

Intraoral – within the mouth.

Ionizing radiation – a production of ions (groups of atoms) as a result of the interaction of radiation with matter.

Radiation – sending out x-rays for treatment or diagnosis.

Radiograph – a negative image on photographic film, made by exposure to x-rays that have passed through tissue or other matter.

PROCEDURES:

A. Standards for the use of ionizing radiation in the dental clinics

1. Deliberate exposure of an individual to dental radiographic procedures is not permitted for training or demonstration purposes.

2. The operator must not hold the film in place for the offender/resident during the exposure. The operator must use film holding devices, bite tabs, or other positioning devices to position the film during exposure.

3. The operator must stand at least 1.8 meters (six feet) from the offender/resident. The operator must be positioned outside of the path of the useful beam and be able to directly observe the offender/resident during each exposure.

4. The operator must not hold the tube housing, the cone, or the position-indicating device during the exposure. If equipment is not stable, report the problem to the facility health services administrator and use another unit in the interim.

5. Radiographic machines designed for use with an intraoral image receptor must limit the source-to-skin distance to not less than 18 centimeters (seven inches).

6. When a cylindrically-collimated x-ray machine is being used, the circular beam must be limited to no larger than seven centimeters (2.75 inches) at the end of the cylinder. When rectangular collimation is used, the useful beam at the end of the collimator must not have a diagonal measurement of greater than seven centimeters (2.75 inches).

7. Only film of an American National Standards Institute (ASA) speed group rating of "D" or faster is used. "F" speed film or digital receptors are preferred.

8. Each dental x-ray machine must contain filtration of two mm of aluminum equivalent if operated at less than 70 kilovolt peak (kVp), and 2.5 mm of aluminum equivalent if operating at 70 kVp or above.

9. Leaded aprons are not required by the American Dental Association (ADA) for routine dental film exposures, however, leaded aprons may be used on offender/resident x-ray patients as an additional precaution to prevent unnecessary scatter radiation to the patient's body. Thyroid shields may be used except when diagnostic information will be lost by their use (panoramic and some extra-oral radiographic procedures.)

10. Each DOC dental facility must appoint a radiation safety officer (RSO), who is responsible for directing and monitoring the dental radiation practices and procedures. The RSO manages the radiation safety program, identifies and corrects radiation-related problems, ensures quality control testing is completed and documented, verifies that corrective actions are implemented, stops unsafe actions, and ensures compliance with state and federal regulations.

11. The radiation safety officer of the Minnesota Department of Health (MDH) makes periodic radiation protection surveys and inspections. The DOC must comply with all recommendations from the radiation safety officer. The facility health services administrator retains a copy of the results of these inspections and any corrective measures taken in the dental area.

12. All operators must follow prescribed exposure techniques. Appropriate exposure procedures and values are mounted on the wall of each x-ray exposure cubicle. Instructions for processing film are displayed in each darkroom or processing area. Film is processed using time-temperature processing procedures when using manual processing or automatic film processing equipment.

B. Criteria for exposure

1. A licensed dentist, employed by the State of Minnesota, must prescribe in writing all radiographs.

2. Radiographs are not permitted to be ordered on a routine basis or for screening purposes.

3. A radiographic examination must not be ordered before review of medical and dental history and completion of an initial extra-oral and intraoral evaluation.

4. If prior radiographs are available, the attending staff dentist must evaluate them before prescribing new radiographs. Only those additional views needed for complete diagnosis and treatment planning should be exposed.

5. Radiographs are taken only on patients capable of compliance.

6. A subsequent recall radiographic examination for an offender/resident is based on the diagnostic need of the offender/resident, as determined by the staff dentist.

7. Radiographs must only be obtained when clinically indicated.

8. Emergency dental patients receive only those radiographs needed to diagnose and treat the immediate emergency dental problem.

9. Properly-justified radiographic examinations are not deferred due to the offender's pregnancy. Protective shielding must be used for the pregnant patient.

C. Documentation of radiographs

1. Documentation of all radiographs must be maintained in the offender's/resident's dental record.

2. The offender's/resident's dental treatment record must include the date, the prescription detailing the type of x-rays, the number of radiographs taken, and any retakes necessary.

3. All intraoral radiographs must be mounted and labeled with the offender's/resident's name, offender/resident identification number (OID), the dentist who ordered the radiograph, and the date exposed. No loose or unmounted intraoral radiographs are stored in the offender's/resident's dental record.

D. Dental equipment and supplies

1. The MDH inspects the dental clinic x-ray equipment at a frequency in compliance with state and federal regulations. The radiation safety officer and/or facility health services administrator must retain the results of these inspections and any corrective measures taken.

2. If an error in operation is noted during the routine use of any x-ray machine, the radiation safety officer is notified, the machine is immediately taken out of service and remains out of service until appropriate repairs are made. The machine must be unplugged from the wall socket and a warning sign must be placed on the tube head that indicated "Do Not Use."

3. Any suspected malfunction of x-ray equipment must be immediately reported to the radiation safety officer and facility health services administrator for corrective measures.

4. All radiographic film is stored according to the manufacturer's instructions and used according to age sequence. Outdated film must not be used on offenders/residents and must be discarded according to current environmental regulations.

5. All radiographic processing systems are maintained and operated in a manner that ensures optimum diagnostic quality of the radiographs.

6. The following information is maintained for each automatic processor or manual developing system:
   a) The correct processing time and temperature;
   b) A description of solution evaluation and maintenance activities, including replenishment, solution change, and cleaning;
   c) Dates and description of any repairs, upgrades, or relocation of the processor; and
   d) Charted densities taken from sensitometer images (daily Crabtree test) and six-month Fog test results.

   All monitoring processes are retained in the dental area.

E. Waste disposal

1. Lead foil from intraoral radiographs is collected and disposed through the facility hazardous waste management program (see Policy 105.152, "Hazardous Waste Management.")

2. Spent fixer (a processing chemical) is collected and disposed of through the facility hazardous waste management program. This applies to all processors, except those that have silver recovery units attached to the fixer discharge.

F. Infection control (see also Policy 500.017, "Health Services Infection Control")

1. Radiographic procedures are completed in accordance with the Center for Disease Control (CDC) guidelines.

2. All dental patients are treated as potentially infectious.

3. The operator must wear protective gloves, mask, and eye wear during film and tube placement and during film processing, to minimize risk to the operator and the offender/resident.

4. Operators must wash their hands as they enter the clinic, and after removing gloves to handle processed radiographs, film mounts, and records.

5. All film packets are disinfected before being processed in the x-ray processor.

6. Re-usable film holders must be sterilized prior to offender/resident use.

7. Disposable items and supplies must be used whenever practical.

8. Upon completion of the procedures, all contaminated surfaces must be wiped down with a CDC-approved disinfectant.

INTERNAL CONTROLS:

A. Monitoring test results are retained in the dental area.

B. Minnesota Department of Health inspections and corrective action documentation are retained by the radiation safety officer or facility health services administrator.

C. Documentation of offender/resident radiographs is retained in the offender's/resident's dental record.

ACA STANDARDS: None

REFERENCES: Minn. Rules, Chapter 4732, "Ionizing Radiation"
Division Directive 105.122, "Cabinet X-Ray Radiation Safety Program"
Policy 105.152, "Hazardous Waste Management"
Policy 500.017, "Health Services Infection Control"

REPLACES: Division Directive 500.058, "Radiation Use in Dentistry," 3/1/16.
All facility policies, memos, or other communications whether verbal, written, or transmitted by electronic means regarding this topic.

ATTACHMENTS: None

APPROVALS:
Deputy Commissioner, Facility Services
Deputy Commissioner, Community Services
Assistant Commissioner, Facility Services
Assistant Commissioner, Operations Support