COMPLIANCE WITH MINNESOTA RADIATION RULES

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Why Are You Here?

Is it required? No…
Is it continued education? Maybe …
Is it updating “old” information? Maybe…
Fear of an inspection? Maybe…
Compliance with requirements? YES!!
Before We Go Too Far... Definitions

- **Registrant** means:
  - A. a person having administrative control of any radiation-producing equipment except those specifically exempted under this chapter and who is legally obligated to register with the commissioner according to this chapter, or

  - B. **Service provider** is a person who is legally obligated to register with the commissioner as a service provider according to this chapter
Protection and Safety Definitions

• **Protection** means:
  A. a policy and procedure that is a state of being kept from harm or loss; or
  B. The state of being protected; something that protects someone or something.

• **Safety** means:
  A. a concept that includes all measures and practices taken to preserve the life, health, and bodily integrity of individuals; or
  B. to ensure the safety of workers necessary and beneficial for any organization.

  C. Regulatory bodies such as OSHA mandate a variety of safety measures employers must take and the authority to impose fines if an inspection reveals a violation of these standards.
What is Necessary to Know?

• MDH Radiation Rules, Chapter 4732:
  • Registration of radiation-producing equipment
  • Policies and procedures for your facility
  • Quality Assurance Program (Radiation Safety Program)

• MN Statutes:
  • 144.121 X-ray requirements;
  • 144.989-993 “Health Enforcement Consolidation Act”
What is Necessary to Know?

• Minnesota Dental Rules, Chapter 3100-9500
• MN Statute #150A.01-150A.31,
• Dental Licensing Board requirements and Practice standards:
  • Dental Assistant
  • Licensed Dental Assistant
  • Dental Hygienist
  • Licensed Dental Hygienist
  • Dental Therapist
How Does This Effect What You Do?

- Patient Care and Dose Limits
- Radiation Safety and Protection
  - Changes fear to respect of radiation
  - Use of protective equipment
- Quality Assurance Program
  - Understanding Policies and Procedures for compliance with Chapter 4732
By Using Your Knowledge to…

• Understand patient needs
• Communication with the patient
• Diseases that cause changes
  • Paget’s disease, osteoporosis, some medications lowers bone density
• Internet/social media information
  • Good or bad?
  • Fear or respect?
MN Radiation Rule Requirements

- Registration of x-ray equipment
- Radiation Safety Officer/Registrant Agreement
- Quality Assurance Program (radiation safety program)
- Protection methods - Aprons and Gloves etc.
- Staff training - Initially and as needed
- Shielding plans and placard
- Any manufacturer’s recommendations to be included from the operator's manual.
Radiation Rule Requirements (continued)

• Verification MNSP registration anytime repair, testing or installing equipment is performed
• Testing of equipment - Frequency
• Testing of New equipment
• Testing Equipment performance evaluations
• Individual Monitoring, if applicable
• Annual audit - Annually
• Safety methods – Time, distance, shie
Radiation Rule Requirements (continued)

• Understanding the ALARA concept (As Low As Reasonably Achievable),
• Understand and use policies and procedures
• Use of aprons and gloves, if required?
• Policies and procedures for holding patients, image receptors or cassettes
• Use and understand your operating and emergency procedures
• Know and understand the dose limits in rule
Technique Charts Required

• Every facility with x-ray equipment must have and use a technique chart for all patient exposures
• Charts may be on paper or embedded in the computer
• All staff must be able to show inspector where they are and how they are used
Technique Chart Information

• Computer embedded charts must be:
  • Available by staff at time of exposure
  • Understandable for staff’s exposure choice
    (lights, anatomical notations, nothing available)
  • Exposure factors noted for future follow-ups (consistency)

• Paper charts can be:
  • Posted in the exposure “button” area
  • In a notebook in the exposure “button” area
  • Exposure factors noted for future follow-ups (consistency)
Dental Radiation Dose Information…
but not a technique chart

<table>
<thead>
<tr>
<th>Radiation Type</th>
<th>Radiation Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Digital Bitewing</td>
<td>5 microsieverts</td>
</tr>
<tr>
<td>Digital Panorex</td>
<td>20 microsieverts</td>
</tr>
<tr>
<td>Full Set of Digital Bitewings (6)</td>
<td>30 microsieverts</td>
</tr>
<tr>
<td>Daily Background Radiation (food, air, water, cosmic rays)</td>
<td>8 microsieverts</td>
</tr>
<tr>
<td>Cross-Country Flight</td>
<td>30 microsieverts</td>
</tr>
<tr>
<td>Chest CT Scan</td>
<td>7,000 microsieverts</td>
</tr>
</tbody>
</table>
Comparison Chart for Old and New Exposure Dose Terms

**Old (rem)**
- 100 rem
- 50 rem
- 15 rem
- 10 rem
- 5 rem
- 1.5 rem
- 1 rem
- 500 mrem
- 100 mrem
- 10 mrem
- 2.5 mrem
- 1 mrem
- 0.75 mrem
- 0.5 mrem
- 0.25 mrem
- 0.1 mrem

**New (sievert)**
- 1 Sv
- 500 mSv
- 150 mSv
- 100 mSv
- 50 mSv
- 15 mSv
- 10 mSv
- 5 mSv
- 1 mSv
- 100 μSv
- 25 μSv
- 10 μSv
- 7.5 μSv
- 5 μSv
- 2.5 μSv
- 1 μSv

**FIGURE 1-20** Scales for effective dose.
Service Provider Requirements

• **Must register** with MDH annually, whether they are located in or out of Minnesota to work in Minnesota (**exception:** in-house employed service providers work only)

• Registration number will look like **MNSP-1234**

• **Only If** qualified for shielding can they provide shielding plans

• **Must** list all equipment used to test your equipment with serial numbers and calibration date.

**Note:** If this information is not on report, the testing maybe classified as null and void.
PREPARING FOR A DENTAL INSPECTION

What happens next…

Panic? or OK lets do it!

This up to the facility, either you are ready or not…

Which do you prefer?
Routine Dental Inspection Information

• Routine dental inspections are due every 4 years.
• They are announced either by phone call or email letting them know they’ll be in your area and will inspect then.
• Schedule your inspection convenient for both parties.
• Rule states inspections can happen anytime during normal business hours.
Start of Inspection Process

- Receives MDH call to schedule inspection
- Date and time convenience for both parties
- RSO reviews facility process for compliance
- Inspector arrives, discusses the process with RSO
- Inspection is finished
- Inspector discusses findings with RSO
- Inspector leaves…now what???
What Are They Looking At?

- Registration current?
- Radiation Safety Officer, Who is it?
  - Single office or Satellite offices?
- Quality Assurance Program Manual (Radiation safety program)
- Equipment testing results installation and Equipment Performance Evaluations
- Technique Charts, where and use
What Are They Looking At? (Continued)

- Annual Audit Results
- Training documentation; on hire and as needed
- Utilization Log/Retake/Reject, if applicable
- Policies and procedures
  - Holding patients, image receptors, cassettes
  - Declared pregnancy
  - Individual monitoring use, if applicable
  - Protective garments; aprons, gloves, thyroid collars, goggles, etc.
Radiation Safety Manual
(Quality Assurance Program Manual)

• Staff training, Initially and annually
• Topics:
  • Facility-specific and system-specific safe operating procedures
  • Operating and Emergency procedures for malfunctioning equipment or patient/staff issues
  • Quality assurance procedures
  • Radiation exposure hazards
Radiation Safety Manual (continued)

- Use of aprons and gloves
- Patient, imaging receptors, or Film holding
- Personnel dosimetry (Individual Monitoring)
- Radiation safety surveys
- Shielding plan/survey:
  - Drawing
  - Calculations
- Shielding Placard placed on a wall
  - Entire shielding plan or information where to find shielding information
• Any restrictions of the operating technique required for the safe operation an x-ray system.
• Who is in the operatory when x-rays are taken?
• How is the control of access of the Panoramic or Cephalometric area being handled?
Policies and Procedures

• Quality Assurance Manual (Radiation Safety Manual):
  • Fog tests, if film based
  • Processor or monitor quality control tests
  • Image receptor or cassette tests, if film-based or CR/SDR
  • Equipment performance evaluations
  • Equipment installation tests
Policies and Procedures (continued)

• Employee & patient safety issues:
• Declared pregnancy policy
• Effects of radiation exposure to the human body and the embryo-fetus
• Projections where holding devices cannot be used
• Dose limit policy (individual monitoring)
Basic Dental Equipment Needs

Intraoral or Extra-oral Equipment:

• Technique charts; paper or computer generated
• Techniques for Pediatric or Adult patients
• Increased specialization may need more requirements from manufacturer’s requirements
  Panoramic/cephalometric units
  Panoramic units
  Cephalometric units
Specialized Radiographic Equipment

- New upcoming dental digital radiographic equipment:
  - Cone Beam Computed Tomography (CBCT) (dose issues)
  - Panoramic 3 D
  - Hand-Held X-ray Unit (locked and security issues)

Note: More on these newer pieces of x-ray equipment.
New Equipment Testing

• Installation of new equipment:
  • Installation calibrations of new diagnostic x-ray equipment, **whether dropped shipped or installed** by service provider must be completed prior to use on patients!!!
  • Equipment must be registered within **30 days** with MDH

**Note:** Suggest the MDH be notified that new equipment is being installed with date, manufacturer, model number and approximate date of installation completion.
Equipment Performance Evaluations

• Equipment performance evaluations must be:
  • Completed at intervals not to exceed 24 months (730 days),
  • Performed over the clinical range for the equipment according to parts 4732.1100-4732-1130 and with
  • Any recommendations from manufacturer added,
  • Report to RSO for review and verification,
  • Reports must be kept until the next inspection by MDH, for a minimum of 4 years (responsible for equipment from “cradle to grave”).
Equipment Performance Tests Completed by Service Providers

- Timer reproducibility and accuracy
- kVp accuracy
- Reproducibility-output
- mA linearity
- Filtration-half value layer
- Dose at the end of the cone
Inspection Testing Procedures

- Inspectors Testing Equipment:
- For all equipment:
  - Radcal 1015 radiation monitor
  - Mini-X kVp/time meter

Note: Inspectors may perform some tests depending on findings
Equipment Performance Tests for Facilities With Film Screen

- Film processing:
  - Crabtree test- Radiographic Quality Control
  - Step wedge test- Density test
- Fog test-daylight loader/darkroom:
  - Extraoral film
  - Coin test-periapical film

Note: Inspector may choose to do some testing depending on findings.
Film-Screen Testing Equipment

Step Wedge (11 step)  Dental radiographic quality control device (crabtree)
## Diagnostic Equipment Performance tests (HVL)

<table>
<thead>
<tr>
<th>Measured kVp</th>
<th>Millimeter of aluminum</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>1.5</td>
</tr>
<tr>
<td>70</td>
<td>1.5</td>
</tr>
<tr>
<td>71</td>
<td>2.1</td>
</tr>
<tr>
<td>80</td>
<td>2.3</td>
</tr>
<tr>
<td>90</td>
<td>2.5</td>
</tr>
</tbody>
</table>
Documentation Issues

• Is the documentation available?
• Is the documentation complete?
• Has the Radiation Safety Officer reviewed the documentation?
• Has the Administrator reviewed the documentation?
Records Review

• Quality Assurance Program Manual (Radiation safety manual)
• Equipment installation reports
• Equipment performance evaluations
• Quality control tests and evaluations
• Personnel dosimetry records, if applicable
• Staff training documents
• Staff credentials
Inspection Results

• IF violations found will be discussed with RSO
• Options on compliance discussed
• Given 30 days to complete compliance or provide correction plan to MDH
• Failure to respond in timely fashion may result in an Administrative Penalty Order.
• If NO violations found, “THANK YOU” and see you in 4 years!!
Let's take a short break, look at the "toys" on the table.