

# Did you know?

## And Yet More Selections from the Iowa Administrative Code.

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So far we have looked at Chapters 30, 39 and part of Chapter 40 of the Iowa Administrative Code (IAC) that pertain to radiation and radiology. In this column we shall finish Chapter 40 and move on to Chapter 41 which applies much more to the practice of dentistry.

In the last column we looked at 641—40.15(136C) Occupational dose limits for adults. This chapter also deals with dose limits to other groups.

**641—40.21(136C) Occupational dose limits for minors.** The annual occupational dose limits for minors are 10 percent of the annual occupational dose limits specified for adult workers in 40.15(136C).

No explanation is required here as this is straightforward. It should also be remembered that most radiation protection guidelines state that individuals under the age of 18 years should not receive any occupational exposures.

**641—40.22(136C) Dose equivalent to an embryo/fetus.**

**40.22(1)** The licensee or registrant shall ensure that the dose equivalent to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant woman, does not exceed 0.5 rem (5 mSv). See 40.86(136C) for record-keeping requirements.

**40.22(2)** The licensee or registrant shall make efforts to avoid substantial variation above a uniform monthly exposure rate to a declared pregnant woman so as to satisfy the limit in 40.22(1).

**40.22(3)** The dose equivalent to an embryo/fetus shall be taken as the sum of:

*a.* The deep dose equivalent to the declared pregnant woman; and

*b.* The dose equivalent to the embryo/fetus from radionuclides in the embryo/fetus and radionuclides in the declared pregnant woman.

**40.22(4)** If by the time the woman declares pregnancy to the licensee or registrant, the dose equivalent to the embryo/fetus has exceeded 0.45 rem (4.5 mSv), the licensee or registrant shall be deemed to be in compliance with 40.22(1) if the additional dose equivalent to the embryo/fetus does not exceed 0.05 rem (0.5 mSv) during the remainder of the pregnancy.

The first thing needed here is the definition of a “declared pregnant woman.” The IAC defines this term as follows:

*“Declared pregnant woman”* means a woman who has voluntarily informed her 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.

In most radiology procedures in general dental practice utilizing proper radiation hygiene/protection procedures, such as standing behind a barrier that blocks scatter radiation, the operator and others should be receiving no measurable amount of radiation, and thus no special procedures are needed. The dentist should consider individual procedures in each office on a one to one basis. As well the facility is responsible for monitoring the staff’s exposure. This can be done by badging or calculating total

exposure. A record should be kept of all exposures during the time of the declared pregnancy, just for liability purposes.

And now for Chapter 41, Safety Requirements For the Use of Radiation Machines and Certain Uses of Radioactive Materials:

**641—41.1(136C) X-rays in the healing arts.**

**41.1(1) Scope.** This rule establishes requirements, for which a registrant is responsible, for use of X-ray equipment by or under the supervision of an individual authorized by and licensed in accordance with state statutes to engage in the healing arts or veterinary medicine.

The first item that related directly to dentistry is

**41.1(3) Administrative controls.**

*a. Registrant.* The registrant shall be responsible for maintaining and directing the operation of the X-ray system(s) under the registrant's administrative control, for ensuring that the requirements of these rules are met in the operation of the X-ray system(s), and for having the following minimum tests performed by a registered service facility according to the following schedule:

2. Dental/podiatry: timer accuracy, exposure reproducibility and kVp accuracy as set forth in 41.1(7) every four years.

In Iowa these tests can be arranged through the dental supply companies.

All service and installation shall be performed by persons registered under 641—subrule 39.3(3). The registrant or the registrant's agent shall ensure that the requirements of these rules are met in the operation of the X-ray system(s).

(1) An X-ray system which does not meet the provisions of these rules shall not be operated for diagnostic or therapeutic purposes unless so directed by the agency.

This requires no further explanation.

(2) Individuals who will be operating the X-ray systems shall be adequately instructed in safe operating procedures and be competent in the safe use of the equipment in accordance with 641—Chapter 42 as applicable. The individual's permit to practice shall be posted in the immediate vicinity of the general work area and visible to the public.

In Iowa this refers to dentists and dental hygienists, and some dental assistants. A dental assistant allowed to operate x-ray equipment must have the "a current registration certificate and active radiography qualification issued by the board" (Iowa Board of Dental Examiners rules Chapter 22. See <http://www.state.ia.us/dentalboard/>, and scroll down to BOARD RULES, then click on BOARD RULES under this heading, and go to Chapter 22 )

Chapter 41 also has a requirement for a chart near the x-ray unit that provides guidance as to procedures, protocols and exposure factors.

(3) A chart shall be provided in the vicinity of the diagnostic x-ray system's control panel which specifies, for all examinations performed with that system, the following information:

1. Patient's body part and anatomical size, or body part thickness, or age (for pediatrics), versus technique factors to be utilized unless automatically set by the x-ray system;
2. Type and size of the film or film-screen combination to be used;
3. Type and focal distance of the grid to be used, if any;

4. Source to image receptor distance to be used, except for dental intra-oral radiography; and
5. Type and location of placement of human patient shielding to be used (e.g., gonad).

As well, Chapter 41 requires that

- (4) Written safety procedures shall be provided to each individual operating X-ray equipment, including patient holding and any restrictions of the operating technique required for the safe operation of the particular X-ray system. The operator shall be able to demonstrate familiarity with these procedures.

The protocol with respect to holding or supporting a patient for The University of Iowa College of Dentistry, which you may wish to use as a template for the office is as follows:

In general, no one other than the patient should be in the room when an exposure is made. When a patient or image receptor must be provided with auxiliary support during a radiation exposure mechanical holding devices shall be used when the technique permits. Such devices may be pillows or straps to help support the patient. If this is not reasonably practical the following procedures should be followed.

A human holder should be selected to support the patient and/or image receptor. This individual should be a parent, grandparent, guardian or someone similarly related to the patient.

This human holder shall be over the age of 18 years of age.

This human holder shall not be coerced into performing this task.

No one person shall be used routinely to hold/support the patient or image receptor.

Any such holder shall be instructed in personal radiation safety and be protected by use of leaded aprons, thyroid collars and leaded gauntlets, as well as being positioned so as to be outside the primary beam.

Individual projections used in the dental clinics where holding devices may not be able to be utilized are:

Lateral oblique projects of the mandible  
Occlusal projections of the maxilla  
Occlusal projections of the mandible

Another requirement that may relate to dental practice states that

6. Each facility shall have leaded aprons and gloves available in sufficient numbers to provide protection to all personnel who are involved with X-ray operations and who are otherwise not shielded.

- (9) Procedures and auxiliary equipment designed to minimize patient and personnel exposure commensurate with the needed diagnostic information shall be utilized.

1. The speed of film or screen and film combinations shall be the fastest speed consistent with the diagnostic objective of the examinations. Film cassettes without intensifying screens shall not be used for any routine diagnostic radiological imaging, with the exception of veterinary radiography and standard film packets for intra-oral use in dental radiography.
2. The radiation exposure to the patient shall be the minimum exposure required to produce images of good diagnostic quality.
3. Portable or mobile X-ray equipment shall be used only for examinations where it is impractical to transfer the patient(s) to a stationary X-ray installation.

Paragraph 4. does not apply to most of dental practice.

5. If grids are used between the patient and the image receptor to decrease scatter to the film and improve contrast, the grid shall:

- \_ Be positioned properly, i.e., tube side facing the correct direction, and the grid centered to the central ray;
- \_ If of the focused type, be at the proper focal distance for the SIDs being used.

Paragraph 5., above, only applies to some dental offices, most likely just orthodontic practices, and then only if the cephalometric unit used is one that has a grid. SID means source to detector distance. The codes defines these as follows:

*“SID”* (see *“Source-image receptor distance”*).

*“Source”* means the focal spot of the X-ray tube.

*“Source-image receptor distance”* means the distance from the source to the center of the input surface of the image receptor.

Once again we have reached the point of potential overload, and it is time to stop. I am trying to keep these reviews of the code as short as acceptable for reading without omitting important points. Chapter 41 continues on for many many more pages. I shall extract those items that pertain to us in future columns.

I should like to acknowledge and thank Ms. Charlene Craig of the Iowa Department of Public Health, who has read each of the manuscripts to date to ensure accuracy. It was her suggestions to add the part about the facility’s responsible for monitoring the staff’s exposure and record keeping during the time of the declared pregnancy just for liability purposes.