

Did you know?

And Even More Selections from the Iowa Administrative Code.

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When I was a teenager the local rock station used to use advertise that “the hits just keep on coming.” The same could be said of the Iowa Administrative Code (IAC). The rules just keep on coming. And, during the time that I have been writing these reviews, the Iowa Department of Public Health has announced another set of proposed changes, additions and deletions to the IAC. These may air may not come into effect in their current form, but they are not yet in effect. So, we shall continue to look at those parts in effect and that most impact on us.

The next section of Chapter 41, labeled as Ch 41, p.8 Public Health[641] IAC 4/2/03 (10) deals with protective clothing and dosimeters.

1. When protective clothing or devices are worn on portions of the body and a personnel monitoring device(s) is present, it (they) shall be worn in accordance with the recommendations found in Chapter 4 of the National Council of Radiation Protection and Measurements Report No. 57.

The National Council of Radiation Protection and Measurements, better known as NCRP is a non-governmental agency with membership from major academic and industry groups, including our American Academy of Oral and Maxillofacial Radiology, that makes recommendations regarding radiation protection and measurements, as its name implies. Although its recommendations are just that, recommendations, they are looked at closely by regulatory bodies agencies when enacting law rules to govern radiation use. Report No. 57, whose full title is *Instrumentation and Monitoring Methods for Radiation Protection: Recommendations of the National Council on Radiation Protection and Measurements* was published in 1978. The most applicable part to dental practice in relation to the above states that a dosimeter “*should* be worn on the trunk of the body since the gonads and most of the blood-forming organs that constitute the critical organs for whole-body exposure are located in the trunk. Suitable locations are the breast pockets, lapels and the belt.” “When the trunk of the body is largely shielded by protective clothing...[i]f only one dosimeter is worn and one of its purposes is the estimation of “whole-body” dose, it is recommended that it be worn on the trunk **under** [emphasis is mine] the apron.”

2. Exposure of a personnel monitoring device to deceptively indicate a dose delivered to an individual is prohibited.

The latter is self-explanatory, and is a warning to anyone who might try to make an exposure of a dosimeter in order to be excused from working in a radiology facility or try to gain financially by falsifying occupational exposure.

- c. X-ray utilization log. Except for veterinary facilities, each facility shall maintain an X-ray log

containing the patient's name, the type of examinations, the dates the examinations were performed, the name of the individual performing the X-ray procedure, and the number of exposures and retakes involved. When the patient or film must be provided with human auxiliary support, the name of the human holder shall be recorded. These records shall be kept until the facility is inspected by this agency or until all films listed on the utilization log have been purged.

This first part of requirement can be met by recording the radiographs made, including remakes, in the patients CRT (Chronological Record of Treatment), i.e. the patient chart. If the person who made the radiographs signs the record it would show who made the radiographs. It would also be a good idea, although not required by this section of the code, to record the mA, kVp, focal film distance (for bisecting angle technique usually 8 inches, and for paralleling technique usually 16 inches, although 7 inch distances for the former and 12 inches distances for the latter have been used) and the exposure time used.

The second part is self-explanatory. If a film or patient holder person is used (including the dentist or staff even though this is not recommended) record that name, and, I recommend, the details of protective clothing, that is lead gauntlets and aprons..

d. Plan review.

(1) Prior to construction of all new installations, or modifications of existing installations, or installation of equipment into existing facilities utilizing X-rays for diagnostic or therapeutic purposes, the floor plans and equipment arrangements shall be submitted to the agency for review and verification that national standards have been met. The required information is denoted in Appendices A and B of this chapter.

This part is also self-explanatory. If you plan to make changes in the facility, contact the IDPH first and ask what you need to do.

(2) The agency may require the applicant to utilize the services of a qualified expert to determine the shielding requirements prior to the plan review and approval.

(3) The approval of such plans shall not preclude the requirement of additional modifications should a subsequent analysis of operating conditions indicate the possibility of an individual receiving a dose in excess of the limits prescribed in 641—Chapter 40.

Ch 41, p.9 Public Health[641] IAC 4/2/03

Once again, this part is self-explanatory.

f. X-ray film processing facilities and practices (except for mammography). Each installation using a radiographic X-ray system and using analog image receptors (e.g., radiographic film) shall have available suitable equipment for handling and processing radiographic film in accordance with the following provisions:

(1) Manually developed film.

1. Processing tanks shall be constructed of mechanically rigid, corrosion-resistant material; and
2. Film shall be processed in accordance with the time-temperature relationships recommended by the film manufacturer. The specified developer temperature and immersion time shall be posted in the darkroom.
3. Devices shall be utilized which will indicate the actual temperature of the developer and signal the passage of a preset time appropriate to the developing time required.

In other words, margarine tubs and no temperature controls are not acceptable. And lest you think I jest, remember I have been an oral and maxillofacial radiologist for 33 years, and I have seen it all (not necessarily in Iowa). And, of course, instead of just developing, all of the film processing procedure is meant here.

(2) Automatic processors and other closed processing systems.

1. Film shall be processed in accordance with the time-temperature relationships recommended by the film manufacturer.
2. Processing deviations from the requirements of 41.1(3)“f” shall be documented by the registrant in such manner that the requirements are shown to be met or exceeded (e.g., extended processing and special rapid chemistry).

With respect to this, the guidelines from Kodak’s publication N410 state “Processing times and temperature will vary based on processor. These values are only guidelines.” In the Kodak publication N-413 (Exposure and Processing for Dental Radiography, available on line at <http://www.kodak.com>) it says “These values are provided only as example to illustrate the relationship between time(cycle) and temperature. Follow the manufacturer’s recommendations when setting up your processor.” My interpretation of this is that we would blend both the film manufacturer’s recommendation and the processor manufacturer’s recommendations, and then check the quality of the radiographs, and make appropriate adjustments to optimize the images.

(3) Other requirements.

2. The darkroom shall be light tight and use proper safelighting such that any film type in use exposed in a cassette to X-radiation sufficient to produce an optical density from 1 to 2 when processed shall not suffer an increase in density greater than 0.1 when exposed out of the cassette in the darkroom for 2 minutes with all safelights on. If used, daylight film handling boxes shall preclude fogging of the film.

These requirements are best met by ensuring that the manufacturer’s recommendation of which safelight filter, wattage of the bulbs in the safelight, and distance from the working area are followed for the most sensitive film to be processed in the darkroom. As well, the dentist should periodically go into the darkroom and turn off all the lights, including the safelight and spend *at least* 5 minutes, preferably 10, to allow his/her eyes to dark adapt, and see if there are any white light leaks around the door, ventilation openings, and wall joints. These will cause film fogging, and should be repaired or corrected.

In the case of daylight hoods, which are notorious for not providing proper safelight conditions, they should not be placed directly under a bright light. Subdued lighting is still best for these. They are generally not best in direct daylight, despite their name.

3. Darkrooms typically used by more than one individual shall be provided a method to prevent accidental entry while undeveloped films are being handled or processed.

Either the door must be locked from the inside, or so-called roundabouts or interlocking door systems can be installed. These are available from most radiography suppliers.

4. Film shall be stored in a cool, dry place and shall be protected from exposure to stray radiation. Film in open packages shall be stored in a light tight container.

What should also be noted is that, in the case of boxes of screen films (to be used in cassettes between screens) they should be stored standing on edge, not lying flat. This is to avoid pressure on the emulsion.

5. Film cassettes and intensifying screens shall be inspected periodically and shall be cleaned and replaced as necessary to best ensure radiographs of good diagnostic quality.

This is a protocol that is not followed in some dental offices. In a screen-film system, such as in pantomographic (panoramic) or lateral cephalometric imaging, the major source of exposure to the film is not from the x-ray beam, but from light that is produced within the screen. Thus the screens must be kept clean. If dirt or other foreign bodies get onto the screen, they will block the light coming from the screen to the film and cause areas of decreased film density (lighter areas) which can make interpretation difficult and can cause misinterpretations. Cleaning is best accomplished using the screen manufacturer's recommended cleaning agent, and following the instructions that come with these. The cleaning agent should have an antistatic agent in it. The cleaning should be done at least monthly, and more often if the cassette is used very often.

Cassettes should be visually inspected to ensure that they are light tight. The films used in the screen-film system are even more sensitive to light than intraoral dental x-ray films. Any light leak into the cassette will result in overexposure and fogging, or complete exposure of part of the film, with the same consequences- difficult or misinterpretation.

And, of course, could result in the need to remake the image, increasing the patient's exposure, and probably still producing a poor radiograph.

6. Outdated X-ray film shall not be used for diagnostic radiographs, unless the film has been stored in accordance with the manufacturer's recommendations and a sample of the film passes a sensitometric test for normal ranges of base plus fog and speed.

Inasmuch as such tests are not routinely available in a dental office, it is best to avoid using outdated film. It is not a good idea to buy larger quantities of film than can be reasonably used before the expiry date. The analogy that I use is that one would not take the vacation trip of a lifetime, and use out of date photographic film to record the sights. Neither should one do this with x-ray film.

7. Film developing solutions shall be prepared in accordance with the directions given by the manufacturer and shall be maintained in strength by replenishment or renewal so that full development is accomplished within the time specified by the manufacturer.

Not only is the developer and fixer to be maintained at optimum strength by replenishment or renewal based upon a combination of the area of film processed (see manufacturer's directions) but also the temperature needs to be maintained at optimal conditions. Film processing is a chemical reaction, and is affected by the concentration of the reagents and the time of use. The first is because reagents are depleted by the reaction, and the second because of oxidation over time.

(4) Records shall be maintained to verify that the items in 41.1(3) "f" are performed according to the requirements. Records may be discarded only after an agency inspection has been completed and the facility determined to be in compliance.

Basically this means that you should inspect your radiography system, from one end to the other, and record any defects, and the actions taken to correct them, when and by whom.

And this is another good place to stop before this section gets out of hand.

Once again I should like to thank the staff at the Iowa Department of Public Health, and Ms. Charlene Craig in particular, for reviewing this manuscript for errors.