



Missouri Radiation Control Program Guidance Document/Frequently Asked Question

See below for regulatory guidance on the following issue. If you have additional questions, you may contact the Missouri Radiation Control Program at MRCP@health.mo.gov or 573-751-6083

Guidance to Dental Facilities: Radiation Badges of Staff (dosimeters); Need for radiation shielding in dental offices? (updated August 2015)

Is radiation monitoring of staff (dosimeters) required for dental facilities? Accurately answering that question depends on a number of factors, different for each facility. For most routine dental facilities, individual personnel monitoring would not be required. However, that differs from facility to facility and should be evaluated on a case by case basis.

There are overlapping standards for radiation protection. In general, dental facilities that use x-ray machines must comply with both Missouri Radiation Control Program (MRCP) rules (19 CSR 20-10.010—10.200) as well as OSHA requirements (Standard 1910.1096). For some facilities, there may be additional standards required by accreditation organizations or insurance companies that must also be met. Note: throughout this document radiation dose measurements are commonly described in mR (millirem) as in the existing state regulations. The conversion between millirem (mR) and milliSievert (mSv) is 1 mSv = 100 mR.

Missouri Radiation Control Program Rule 19 CSR 20-10.050 Personnel Monitoring and Radiation Surveys

“(3) Personnel monitoring shall be required for each individual for whom there is any reasonable possibility of receiving a weekly dose of all radiation exceeding fifty (50) millirems, taking into consideration the use of protective gloves, aprons or other radiation-limiting devices.”

“(4) Routine monitoring of individuals occupationally exposed to radiation from radiation machines shall not be required if—A qualified expert has specified the operating conditions under which there is no reasonable chance that any individual will be subjected to a dose of either more than twenty-five (25) millirems in any seven (7) consecutive days.”

OSHA Standard 1910.1096(d)(2),(i)

“Every employer shall supply appropriate personnel monitoring equipment..., and shall require the use of such equipment by...each employee [18 or older] who enters a restricted area [any part of the facility] under such circumstances that he receives, or is likely to receive, a dose...excess of [25 mR per week, (25% of the quarterly limit of 1250 mR.)]”

The National Council of Radiation Protection (NCRP,) in NCRP Report #145 “Radiation Protection in Dentistry” **recommends** a conservative standard of monitoring all personnel that are likely exposed to 100 mR/year (2 mR/week). However, NCRP also notes that even this conservative standard is a level that most dental operators won’t reach. “*The majority of dental workers would not be expected to require individual monitoring.*” (NCRP 145, page 70.) Also note that NCRP #145 was written in 2004, before there were as many digital dental x-ray units in place that (in some cases) have reduced exposures significantly.

Assuming safe radiation safety procedures are used, most dental operators are not exposed to even the conservative 2 mR/week, and certainly not the regulatory limit of 25 mR/week or more. (Safe procedures would include operator training in radiation safety; ensuring that operators do not hold the head of the dental unit while making exposures; operators stepping out of the operatory at least six feet (6’) from the tube head to a protected/shielded location while making the exposure; while in use the dental unit is not pointed directly toward anyone other than the patient, etc.)

So if most facilities would **not** be required to provide monitoring, how can a facility determine whether they are one of the minority where monitoring **would** be required?

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Probably the best option is to consult with an approved Qualified Expert (QE) in radiation safety with any questions you may have about monitoring. All new dental facilities opening (or adding additional x-ray rooms) after 1/1/2014 are required to contact a QE for a radiation safety inspection. Existing dental facilities will need to arrange to have a safety inspection by a QE between 2017 and 2022, and every six years (72 months) thereafter. (Sooner if you move practice locations or add new rooms.) A QE can give your facility personalized advice and guidance on personnel radiation monitoring. If you wish to seek the consultation of a QE prior to your facility's inspection due date, MRCP keeps an active list of Qualified Experts available on the MRCP website: <http://health.mo.gov/safety/radprotection/pdf/QE-List.pdf>

Existing facilities were first notified by mail of their normal QE due date in 2012, but if you have questions you can contact the MRCP at MRCP@health.mo.gov

For those existing facilities that wish to make an informed decision about monitoring **before** your QE performs an onsite inspection, you have three basic options.

- **Badge/Monitor all exposed staff:** Certainly the easiest and safest answer is to monitor all exposed staff. That covers all the possibilities, and provides the maximum amount of protection, both for your staff and yourself. However, that *may not* be required by regulation. It depends on a number of factors which may be difficult for the individual dental facility to accurately determine.
- **Don't monitor any staff.** Based on the NRC estimates cited above, most operators in a dental setting do not require monitoring. Not monitoring is certainly (on the surface) the least expensive choice. But not monitoring based on NCRP estimates alone remains only an educated guess if you have not had an evaluation by a Qualified Expert. It also incurs a slight element of risk for both your operators and yourself. It's very unlikely, but what if an employee claims they were overexposed, or an OSHA investigation on employee exposure is initiated? Without any data points, it may be difficult to demonstrate that monitoring is NOT required. Monitoring dental operators can be seen as a form of liability insurance, albeit one that may be unnecessarily expensive for the actual risk mitigation.
- **Monitor all exposed staff for a limited amount of time.** An intermediate method, that can provide your practice with radiation safety data without the cost of ongoing monitoring is to monitor staff for a set period of time, typically at least a year. This provides at least a baseline measurement of radiation exposure to your staff, and can assist you in determining the need for continuing monitoring. Make sure your facility retains records of this information as a demonstration of compliance. Also note that if your practice workload increases significantly, the evaluation might need to be repeated.

Radiation personnel monitoring (dosimetry service) is available from a number of companies, with typical reporting periods being monthly or quarterly. Most monitoring companies track both exposure in the current reporting period as well as cumulative exposure. If monitoring is done, employee dosimetry records must be maintained for at least five (5) years, and the employees made aware of their exposure. A common method of notification is to have all monitored staff review and sign the periodic report. It should also be noted that due to concerns regarding identity theft, MRCP no longer enforces the requirement that radiation monitoring records include the employee's social security number.

Missouri Radiation Control Program rule 19 CSR 20-10.060 Radiation Exposure Records and Reports

(3) Upon termination of employment of an individual...upon request, shall be supplied with a summary statement of that individual's radiation dose. (The estimated maximum dose shall be stated if no personnel monitoring has been carried out.) ...Employee [exposure] records must be kept...during the tenure of employment of an employee and for a period of five (5) years after that.

OSHA standard 1910.1096(b)(2)(iii) *"The employer maintains adequate past and current exposure records which show that the addition of such a dose will not cause the individual to exceed the amount authorized in this subparagraph."*

Does dental x-ray require radiation shielding in the walls?

In some cases, yes. National Committee on Radiation Protection (NCRP) standards for shielding are incorporated by reference into Missouri state radiation control rules, and the owner of x-ray equipment is responsible for ensuring that the x-ray room or dental operatory area where the machine is used is properly designed and shielded accordingly.

19 CSR 20-10.190 Requirements for Room Shielding. *“The requirements for room shielding shall conform to the requirements defined in the various handbooks published by the [National Committee on Radiation Protection; the most applicable current standard is NCRP Report #145 ‘Radiation Protection in Dentistry.’]”*

Depending on x-ray workload, occupancy factors, and layout of the room, in some dental offices additional radiation shielding beyond that inherently provided in construction materials (drywall) is not necessary. Other offices will need additional shielding material (lead sheets or additional layers of drywall.) However, this cannot be adequately determined without an evaluation and/or calculation by a Qualified Expert (QE) in radiation protection.

In years past, proper conformance to applicable shielding standards in new dental offices was presumed by MRCP. However, the shielding standards were not well understood by dental facilities, and were not always consistently applied. Beginning January 1, 2014, new dental facilities or existing facilities adding new x-ray rooms or operatory areas must actively demonstrate compliance with the shielding standards.

This means that a new dental office opening or an existing practice adding additional x-ray rooms (or converting a room from intraoral or panoramic to CBCT) must have a shielding evaluation by a Qualified Expert. This shielding evaluation is in addition to the requirement of an onsite inspection of the equipment performance by a QE. The evaluation must be submitted to the MRCP office for inclusion in the facility’s file.

These shielding evaluations take some time for the QE to prepare, so it is important when dentists begin initial planning for a new office or new x-ray rooms, they obtain the consultation services of a QE before the equipment is installed, so that utilization of the equipment is not needlessly delayed.

If you have additional questions regarding radiation protection requirements, you can always contact the Missouri Radiation Control Program at MRCP@health.mo.gov or by phone at 573-751-6083.