

Radiological Safety



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Radiologic Safety: The Use of Radioactive Materials in Interventional Radiology

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Doctor X is an Interventional Radiologist who uses fluoroscopy and angiography to perform Y-90 embolization. What are the NRC and state of Michigan radiation safety requirements of performing such a case? What fines can be levied against the institution for not being compliant?

The increasing use of radioactive materials in Interventional Radiology has renewed the focus on compliance with regulations governing the use of ionizing radiation. Performing or participating in these procedures involves the use of fluoroscopy and the administration of radioactive materials to patients; examples include liver embolization using yttrium-90 (Y-90) microspheres, lung shunt evaluation using technetium-99m (Tc-99m) microaggregated albumin (MAA), and [procedure] using indium-111 (In-111) [agent]. With this trend, the question arises: what are the regulatory (radiation safety) requirements of performing these cases, and what are the ramifications of non-compliance?

In Michigan, the use of fluoroscopy (and other radiation-producing machines) is regulated by the Michigan Occupational Safety & Health Administration (MIOSHA). The applicable regulations are found in the Ionizing Radiation Rules Governing the Use of Radiation Machines (last revised 2016).

However, the use of radioactive material in Michigan (other than naturally-occurring) is regulated by the U.S. Nuclear Regulatory Commission (NRC). NRC regulations governing the medical use of radioactive material are found in Title 10, Code of Federal Regulations, Part 19 (Notices, Instructions and Reports to Workers), Part 20 (Standards for Protection Against Radiation), and Part 35 (Medical Use of Byproduct Material).

While MIOSHA and NRC regulate different types and uses of ionizing radiation, their protection goals and methods are similar. For example, both require appropriate radiation safety instruction (training) for anyone likely to receive an occupational dose exceeding 100 mrem in a calendar year; this means training is required annually for most interventional radiologists. Both also have similar occupational (and public) dose limits, most notably the annual effective dose limit of 5,000 mrem. However, while MIOSHA regulates only radiation-producing machines, 10 CFR 20.1502(a) contains a subtle but important caveat that allows NRC to bring other activities into its regulatory purview:

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