

Medical Diagnostic Radiography: Reducing An Occupational Exposure Risk

This Fast Fact is intended to introduce interested workplace parties to the fundamental principles and approaches to reducing occupational exposures of ionizing radiation during medical diagnostic radiography.

Please Note: This fast fact document contains information related to prevention and control of ionizing radiation. Please see related fast fact document called, “Medical Diagnostic Radiography – An Occupational Exposure Risk” for additional information related to recognition.

What are the Basic Radiation Protection Measures?

Time

A common practice to reduce the exposure dose is to reduce the length of time exposed to ionizing radiation (e.g., through work planning, job rotation). The cumulative duration of exposure is directly proportional to exposure dose. Thus, reducing the time by one-half will reduce the radiation dose received by one-half.

Distance

Maintaining a safe distance represents one of the simplest and most effective methods for reducing radiation exposure to workers. The external radiation exposure decreases in direct proportion to the square of the change in distance from the source. This inverse square law, used as an approximation, indicates that by doubling the distance from the source of radiation exposure, the exposure would decrease by one-fourth of the original amount.

Shielding

Radiation exposure can also be reduced by placing a shielding material (such as lead and concrete) between a worker and the X-ray tube. Shielding is a principal method in controlling exposure to external radiation hazards (e.g., metal lining surrounding the x-ray tube; personal protective attire such as lead aprons, thyroid collars, leaded glasses; permanent barriers such as leaded glass, concrete and lead walls) (Plog 2002).

What are the Important Elements of an X-Ray Safety Program?

An X-ray safety program is intended to provide information for the protection of workers, as well as to ensure compliance with regulatory requirements and organizational standards. The program also outlines the methods to control and reduce the risk of occupational exposures to ionizing radiation in the form of X-rays, and should include, but not be limited to:

- a) registration of all X-ray machines and sources
- b) inspection of all X-ray machines and sources
- c) proper signage
- d) safe work procedures
- e) reporting and investigation of all incidents and accidents
- f) detecting, measuring and monitoring (dosimetry) methods
- g) radiation surveys
- h) training and education
- i) personal protective attire
- j) laboratory and other special services
- k) program audits
- l) record keeping

A Radiation Protection Officer (RPO) must be appointed and provided with adequate training to develop, establish and monitor the X-ray safety program. The joint health and safety committee (JHSC) or health and safety representative must also be consulted throughout this process and their recommendations must be carefully weighed in the context of due diligence.

REFERENCES

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