Responsibilities of Personnel in Large Medical Radiological Facilities


Owner

- The owner is ultimately responsible for the radiation safety of the facility.
- It is the responsibility of the owner to ensure that the equipment and the facilities in which the equipment is installed and used meet all applicable radiation safety standards.
- It is the responsibility of the owner to ensure that a radiation safety program is developed, implemented and maintained for the facility.
- The owner may delegate this responsibility to qualified staff; how this responsibility is delegated will depend upon the number of staff members, the nature of the operation, and on the number of X-ray equipment owned. However, the owner must ensure that one or more qualified persons are designated to carry out the roles as described.
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Responsible User

The main role of the responsible user is to monitor and manage the radiation safety program of the facility including personnel requirements, equipment performance and safety procedures and to communicate program information with the appropriate staff. There must be at least one person designated as the responsible user. The responsible user must:

- possess qualifications for operating the equipment required by any applicable federal, provincial, or territorial regulations or statutes and be certified according to a recognized standard, such as:
  - i) for physicians, the Royal College of Physicians and Surgeons of Canada, or
  - ii) for technologists, the Canadian Association of Medical Radiation Technologists
- acquire re-qualification or refresher training according to any applicable federal, provincial, or territorial regulations or statutes and according to a recognized standard, such as:
  - i) for physicians, the Royal College of Physicians and Surgeons of Canada, or
  - ii) for technologists, the Canadian Association of Medical Radiation Technologists
- ensure that the X-ray equipment, image processing equipment, and auxiliary equipment function correctly and are maintained properly by implementing and maintaining an effective imaging quality assurance program for the facility, including quality control testing, establishing diagnostic reference levels, and record keeping;
- ensure that the equipment is used correctly, and maintained properly, by competent personnel who are properly trained in the safe operation of the equipment;
- ensure that inexperienced personnel, including students, operate the equipment only under the direct supervision of a licensed, certified, and experienced X-ray equipment operator until competence in a given clinical procedure is achieved, at which time supervision should be indirectly provided by a supervisor available on-site when needed;
- establish documented safe operating procedures for the equipment and ensure that operating staff are adequately instructed in them;
- promulgate documented rules of radiation safety and ensure that staff are made aware of them through training;
- ensure an investigation is completed of any known or suspected exposures received by personnel that are
  - (a) unusually higher than the usual dose received by that individual, or
  - (b) in excess of 1/20th of the dose limit for radiation workers, specified in Schedule 1 of Alberta’s Radiation Protection Regulation;
- ensure that radiation levels in controlled and uncontrolled areas are below the maximum permissible limits such that the annual dose limits to radiation workers and the public, given in Schedule 1 of Alberta’s *Radiation Protection Regulation*, will not be exceeded;
- ensure that an effective communication system is maintained between X-ray equipment operators, referring physicians, medical physicists/Radiation Safety Officers and information systems specialists to discuss all matters related to radiation protection of patients and workers;
- ensure that the Medical Physicist/Radiation Safety Officer and all operators have access to a copy of *Safety Code 35: Radiation Protection in Radiology—Large Facilities*, published by Health Canada.
X-ray Equipment Operator

All X-ray equipment operators have the responsibility of carrying out prescribed radiological procedures in a manner which does not cause any unnecessary exposures to patients, themselves and other workers in the facility. Depending on the type of radiological procedure, the equipment may be operated by a physician, a physician/practitioner or a radiation technologist. All operators must:

- possess qualifications required by any applicable federal, provincial, or territorial regulations or statutes and be certified according to a recognized standard, such as:
  - i) for physicians, the Royal College of Physicians and Surgeons of Canada or
  - ii) for technologists, the Canadian Association of Medical Radiation Technologists
- acquire re-qualification or refresher training according to any applicable federal, provincial, or territorial regulations or statutes and according to a recognized standard, such as:
  - i) for physicians, the Royal College of Physicians and Surgeons of Canada or
  - ii) for technologists, the Canadian Association of Medical Radiation Technologists
- have documented training in:
  - i) the safe operation of the X-ray equipment and accessories used in the facility,
  - ii) the radiological procedure being performed,
  - iii) patient positioning for accurate localization of regions of interest,
  - iv) all manufacturer-specified quality assurance procedures, if necessary; and
  - v) radiation protection procedures and measures.
- be familiar with, and have access to, the manufacturer’s operator manual for the specific equipment used in the facility;
- recognize the radiation hazards associated with their work and take measures to minimize them;
- monitor their radiation exposures with the use of a personal dosimeter, if they are likely to receive a dose in excess of 1/20th of the dose limit to radiation workers specified in Schedule 1 of Alberta’s Radiation Protection Regulation;
- have a thorough understanding of safe working methods and appropriate techniques and procedures, including the appropriate use of personal protective equipment;
- have documented clinical training, in accordance to federal, provincial, or territorial statutes and regulations and any relevant professional standards, on new radiological procedures before commencing independent work on patients;
- strive to eliminate unnecessary radiographic procedures by reducing the number of retakes, and reducing all patient radiation exposures to the lowest practical values;
- participate fully in the established quality assurance program for the facility, including reporting any change in equipment performance to the responsible user;
Medical Physicist/Radiation Safety Officer

There must be a Medical Physicist or Radiation Safety Officer to act as an advisor on all radiation protection aspects during the initial stages of construction of the facility, installation of the equipment, and during subsequent operations. Medical physicists are health care professionals with specialized training in the medical applications of physics. A radiation safety officer is the title commonly assigned to a radiation safety specialist who routinely manages a facilities radiation protection program. The medical physicist /radiation safety officer must:

- possess qualifications required by any applicable federal, provincial, or territorial regulations or statutes and be certified according to a recognized standard, such as:
  i) for medical physicists, the Canadian College of Physicists in Medicine;
- acquire re-qualification or refresher training according to any applicable federal, provincial, or territorial regulations or statutes and according to a recognized standard, such as:
  i) for medical physicists, the Canadian College of Physicists in Medicine;
- ensure that the installation complies with all applicable regulatory requirements by:
  i) assessing the radiation safety of an installation at the time of planning and/or construction of the facility, or when modifications are planned and/or being made to an existing facility,
  ii) registering the equipment with the appropriate agency when new equipment is purchased, iii) setting periodic scheduled inspections for the facility. In some jurisdictions, the agency responsible for inspections has the mandate for setting inspection schedules;
- establish safe working conditions according to the recommendations of this Safety Code and the statutory requirements of federal, provincial, or territorial legislation, where applicable;
- ensure that established safety procedures are being followed and report any non compliance to the responsible user;
- review the safety procedures periodically and update them to ensure optimum patient and operator safety;
- instruct X-ray equipment operators and other personnel participating in X-ray procedures in proper radiation protection practices;
- carry out routine checks of equipment and facility safety features and radiation surveys;
- ensure that appropriate radiation survey instruments are available, in good working condition, and properly calibrated;
- keep records of radiation surveys including summaries of corrective measures recommended and/or instituted
• declare who is to be considered an occupationally exposed person (i.e. personnel who may receive a radiation dose in excess of 1/20th of the recommended dose limit for a radiation worker, as specified in Schedule 1 of Alberta’s Radiation Protection Regulation);
• organize participation in a personnel radiation monitoring service provided by a dosimetry service provider licensed by the Canadian Nuclear Safety Commission
• ensure that all occupationally exposed persons wear personal dosimeters during radiological procedures or when occupational exposures are likely;
• review, manage and maintain records of occupational exposures received by personnel;
• investigate each known or suspected case of excessive or abnormal exposure to patients and staff to determine the cause and to take remedial steps to prevent its recurrence;
• participate in the establishment of diagnostic reference levels; and
Referring Physician/Practitioner

The referring physician/practitioner is the individual authorized to prescribe diagnostic or interventional X-ray procedures. The main responsibility of the referring physician/practitioner is to ensure that the use of X-rays is justified. In some jurisdictions, a registered nurse or nurse practitioner may be authorized by legislation to order X-ray examination. In such cases, the responsibilities of the referring physician/practitioner listed below would apply to those individuals. It is recommended to contact the appropriate provincial radiation safety agency for information on any applicable provincial statutes or regulations. The referring physician/practitioner must:

- possess qualifications required by any relevant federal, provincial, or territorial regulations or statutes and be licensed according to a recognized standard such as:
  i) the Royal College of Physicians and Surgeons of Canada
- acquire re-qualification or refresher training according to any applicable federal, provincial, or territorial regulations or statutes and according to a recognized standard, such as:
  i) for physicians, the Royal College of Physicians and Surgeons of Canada
- prescribe an X-ray examination based on professional experience, judgment and common sense;
- give consideration to alternative, non X-ray utilizing, examinations; and should:
  i) be confident that the procedure will improve the patient diagnosis and/or treatment sufficiently in comparison with alternate, non X-ray utilizing, methods of diagnosis and/or treatment;
  ii) be aware of the risks associated with X-ray procedures.
**Information Systems Specialist**

Facilities performing digital image processing should have access to an individual who is trained and experienced in maintenance and quality control of information technology software and hardware such as those for PACS and teleradiology equipment. Depending on the facility, the individual may be on-site or available upon request. The required qualification of this individual will depend highly on the type of facility and the type of equipment used in the facility. In all situations, the information systems specialist must ensure confidentiality of patient records.

The information systems specialist should:

- be educated and experienced in information technology;
- possess equipment-specific training provided by manufacturers, where available;
- be knowledgeable of networking concepts such as DICOM and HL7;
- be familiar with the workflow of the facility;
- understand the policies and procedures in place within the facility;
- understand the importance of and the requirements for an information systems quality assurance program;
- communicate with staff any changes/upgrades made to the information management equipment hardware or software and the resulting consequences on the operating procedures of the facility.
Repair and Maintenance Personnel

The repair and maintenance personnel are individuals authorized to perform hardware and software repairs and maintenance on X-ray generators, control systems, imaging systems and their operating software. Depending on the facility, these individuals may be on-site or available upon request, but in general, this function is sometime contracted to an outside organization, or to the equipment manufacturer. The required qualification of this individual will depend highly on the type of facility and the type of equipment used in the facility.

The repair and maintenance personnel should:

- have knowledge and training in:
  (i) repair and maintenance of radiological imaging equipment, and
  (ii) radiation protection principles and procedures;
- ensure that, after a repair or maintenance procedure, the equipment meets the required regulatory standards or manufacturer’ specifications;
- ensure that all repair and maintenance procedures are properly recorded and communicated to the responsible user and other appropriate staff;
- report any non compliance with the established safety procedures to the responsible user;
- review the maintenance procedures periodically and update them to ensure optimum patient and operator safety;
- communicate, if necessary, to staff the need for the appropriate acceptance testing, baseline setting and quality control testing; and
- follow manufacturers’ recommendations for the repair and maintenance of equipment.