Australian Government
Australian Radiation Protection and Nuclear Safety Agency

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Readers guide: Radiation Protection in Medical Exposure

In 2008 ARPANSA published the *Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation (2008)* (RPS 14). Since that time the International Atomic Energy Agency (IAEA) published the *Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, General Safety Requirements Part 3 (GSR3).*

The new *Radiation Protection in Medical Exposure (RPS C-5)* code was drafted to align with the IAEA-GSR3 document and thus, world's best practice in radiation protection in the medical use of ionising radiation. The Code must be used, where relevant, in conjunction with the *Code for Radiation Protection in Planned Exposure Situations (2016)* (RPS C-1) [Planned Exposure Code], which sets out the requirements in Australia for the protection of occupationally exposed persons, the public, and the environment, in planned exposure situations.

Discussion

Scope

The Code applies to exposures of patients, exposures in approved screening programs involving medical imaging, exposures of voluntary carers of patients, and to exposures of volunteers in a research study. The Code does not apply to exposures of patients in dental imaging, nor to exposures of clients in chiropractic imaging. Exposures in dental imaging will continue to be covered by RPS 10 and exposures in chiropractic imaging will continue to be covered by RPS 19.

The scope is essentially unchanged from RPS 14, except that the new Code does not cover occupational exposures of staff in medical facilities, these are covered by the Planned Exposure Code RPS C-1.

The justification of research programs involving radiation exposure of human subjects will continue to be covered by RPS8, which includes approval by a human research ethics committee and dose assessments by a medical physicist.

Responsibilities

The new Code continues the same responsibilities as in RPS 14. The facility license holder (the Responsible Person) has overall responsibility for the systems, plans, procedures and processes that support radiation protection of the patient. This includes systems for maintenance of equipment and associated quality assurance.

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The radiological medical practitioner (formerly the radiation medical practitioner) is the clinician with overall responsibility for a medical procedure. The radiological medical practitioner has responsibilities in relation to justification and approval of procedures, provision of information on benefit and risk to the patient, consideration of pregnant or breast-feeding patients, follow-up of patients after high-dose interventional procedures, and discharge of patients following radionuclide therapy.

The operator, who administers radiation to the patient, has responsibilities for the appropriate conduct of an exposure, confirming the identity of the patient, confirming the pregnancy status of the patient and reporting of incidents to facility management.

While overall responsibility for a procedure rests with the radiological medical practitioner, the medical radiation team (clinicians, physicists, technologists) has a collaborative responsibility to ensure optimal use of equipment in the conduct of a procedure.

Qualified Expert/Medical Physicist

RPS 14 required the availability of a qualified expert for consultation on optimisation, dosimetry and quality assurance and in radiotherapy stipulated that the requirements in relation to calibration, dosimetry and quality assurance be conducted by or under the supervision of a qualified expert. The new Code uses the term medical physicist instead of the term qualified expert, however the definition of medical physicist in the new Code is essentially equivalent to that of qualified expert in RPS 14 and allows the relevant regulatory authority to recognise a person as competent to perform these tasks.

The new Code adopts a graded approach to the level of involvement of the medical physicist. In radiotherapy the existing requirement from RPS 14 that calibration, dosimetry and quality assurance be conducted by or under the supervision of a medical physicist remains. In diagnostic (radiography, nuclear medicine) or image guided interventional procedures these tasks may be conducted by, under the supervision of, or with the documented advice of a medical physicist, with the level of involvement commensurate with the complexity and risk of the procedures.

Requirements for medical physicists are well-established in radiotherapy, however in diagnostic imaging and interventional radiology the role of medical physicists is less prominent. The term ‘medical physicist’ as defined in the proposed Code will allow persons who, in future, might not qualify as being medical physicists to continue to perform their functions. However the use of the term ‘medical physicist’ in the proposed Code should serve to remind all stakeholders that there is an intention that, ultimately, only accredited medical physicists will be performing these functions.

Justification of medical exposures

As in RPS14, the new Code requires that medical exposures are justified by weighing the diagnostic or therapeutic benefits that they are expected to yield against the radiation detriment that they might cause, with account taken of the benefits and the risks of available alternative techniques that involve less or no radiation exposure.

The new Code requires exposures to be justified by means of communication between the radiological medical practitioner and the referrer. This would normally happen through a written (including electronic) referral that provides the information necessary for the radiological medical practitioner to assess the suitability of the proposed exposure and provides the referrer’s contact details for further communication as necessary. Relevant referral guidelines are to be used in the justification of diagnostic medical

exposures. Special attention is to be given when justifying procedures for paediatric patients, pregnant patients and breast-feeding patients.

Equipment calibration and dosimetry

RPS 14 contained calibration requirements for equipment to be used in radiotherapy. The new Code requires calibration of all sources used in medical exposures (3.2.14). Calibrations are required to be traceable to a standards dosimetry laboratory.

Release of patients after radionuclide therapy

The radiological medical practitioner must ensure that patients are not released after radionuclide therapy until it is established that the activity of radionuclides in the patient is such that doses to members of the public would fall within the annual dose limit of 1 mSv and doses to carers and comforters would be within a dose constraint of 5 mSv per treatment episode. The dose constraint for carers and comforters has been adopted from the previous recommendations (RPS 4) which are intended to be withdrawn. As in RPS14, the radiological medical practitioner is to provide the patient (or their guardian) with information and instructions on risk to, and minimising dose to, carers and other persons.

Incidents

The new Code lists a range of scenarios that must be investigated. The reporting of incidents to regulatory authorities and the Australian Radiation Incident Register (ARIR) will continue to be governed by Schedule 13 of the National Directory (RPS 6) and any other requirements established by the relevant regulatory authorities.

Audit and review

The new Code includes requirements for regular independent audits of the quality system and for periodic independent verification of calibrations of external beam radiation therapy units. There is also a requirement for periodic internal review by the medical radiation team of the practical operation of the systems, processes and procedures that support protection of the patient and the optimal use of medical radiation.