SESLHD PROCEDURE COVER SHEET

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SUMMARY	Requirements for training to ensure radiation safety across the LHD

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1. POLICY STATEMENT

The South Eastern Sydney Local Health District (SESLHD) is committed, through a risk management approach, to protecting employees, contractors, students, volunteers, patients, members of the public and the environment from unnecessary exposure to radiation arising from systems and processes which use radiation apparatus and radioactive substances, whilst maintaining optimum diagnostic and therapeutic quality, therapeutic efficacy and patient care.

This document provides the procedure necessary to ensure compliance in relation to training of radiation workers and general hospital staff.

2. BACKGROUND

2.1 Description of the procedure

Hospitals within SESLHD utilise radiation for various therapeutic and diagnostic purposes. Radiation workers and general hospital staff need appropriate training to ensure radiation safety of themselves, patients and members of the public.

3. RESPONSIBILITIES

3.1 Hospital General Manager

- using radiation will ensure that all radiation workers have appropriate professional qualifications, registrations and accreditations
- will ensure that hospital general staff are adequately trained to be able to identify radiation signs and understand the basic principles of minimising radiation risk.

3.2 Radiation Worker

- will have appropriate qualifications, accreditations, registration and licenses to allow them to work safely with the radiation sources that they are responsible for using
- will ensure that they are familiar with and comply with all local business guidelines related to safe use of the particular equipment in their department.

3.3 Radiation Safety Officer

- will oversee and provide advice on radiation training for radiation workers and general hospital staff.

4. PROCEDURE

4.1 Radiation Training for staff in Departments performing diagnostic and interventional radiology

4.1.1 Radiation Health Professionals

The ARPANSA Code RPS 14 requires that operators and other practitioners have appropriate training to perform; or direct exposures using ionizing radiation to be performed.

Radiation health professionals (i.e. radiologists and radiographers) will have such knowledge from the courses that lead to their professional qualification. The Department manager should however provide additional training specific to the equipment used at the institution. In some instances, such as CT and interventional equipment, the equipment supplier's representative can provide training during installation but the responsibility for ongoing training lies with the Department manager. The Department manager should also provide on-going refresher training on other radiation safety matters, for example an annual update from the RSO.

4.1.2 Other professional groups

Other professional groups (specialists, nurses etc.), who perform or direct exposures using ionizing radiation, should also have appropriate training. A suitably qualified person (e.g. a radiology medical physicist or other person with relevant experience in radiation safety) should deliver training which includes the following "core of knowledge":

- the responsibility of the individual in maintaining a safe workplace
- risk-benefit analysis of using ionizing radiations
- the importance of good clinical examination prior to exposure
- the importance of previous examination results
- alternatives to using ionizing radiations
- the key features of the relevant X-ray and ancillary equipment
- film processing (where relevant)
- radiographic interpretation (where relevant)
- risk factors such as age and the tissue type being irradiated
- measurement of radiation dose
- knowledge of the magnitude of typical doses from different examinations
- methods of reducing radiation doses during radiological examinations
- minimising the occupational hazards arising from the use of radiological equipment
- occupational dose limits
- the ALARA principle.

Professional bodies and relevant regulatory authorities should ensure that courses they accredit include this core of knowledge. A representative of the sponsoring organisation should issue a signed certificate to individuals undertaking and completing this training.

4.1.3 Users of Interventional Radiology Equipment

Additional and continuing training is necessary when operators are required to use interventional radiology equipment and should include:

- an appreciation of the magnitude of the skin doses delivered to patients during procedures they undertake on the equipment they use; and
- an awareness of their potential to cause injury.

The ICRP (ICRP 2000a) highlighted this issue in reviewing the cause of a number of the serious radiation injuries to patients. To quote:

'In many of these cases, it appears certain that the physicians performing the procedures had no awareness or appreciation that the absorbed dose to the skin was approaching or exceeding levels sufficient to cause inflammatory and cell-killing effects.'

In rare circumstances, cumulative fluoroscopy times may be useful as a surrogate for skin dose. However, this correlation will be poor when digital acquisition runs represent a significant part of the procedure.

Very high radiation doses have caused skin injuries in patients:

- mainly because of poor operator technique; and
- partly because of the use of inappropriate equipment

The primer by Wagner and Archer (2000) is an excellent teaching resource in this regard.

4.1.4 Use of CT equipment

Training forms a key component of the optimisation process in CT scanning. ICRP Publications 87 and 102 (ICRP 2000b, ICRP 2007) offer specific advice to operators on patient dose reduction strategies for single slice; and multi-slice CT scanners.

Any training needs to relate to the site-specific CT scanner. As part of the optimisation process, training should address the impact of the scanning parameters on patient dose and image quality.

In particular, operators of multi-slice scanners need to receive training that highlights the impact of the nominal collimated X-ray beam width, mAs, scanned volume and pitch on patient dose and image quality.

Operators need to be able to:

- tailor these parameters to fit the need of the specific examination on an individual patient basis
- interpret the significance of the dose index CTDIvol (or its equivalent) displayed on the operator's console of new CT scanners before irradiation
- understand the concept of anatomy dependent, attenuation based methods of X-ray tube current regulation that has being introduced on newer scanners
- understand clearly the implications of modifying redefined acquisition protocols.

It is suggested that the department manager ensure that local business rules require specific vendor training and assessment of any individuals who will be authorised to define new clinical scan protocols.

4.2 Radiation Training for staff in nuclear medicine departments

4.2.1 Radiation health Professionals

Staff who perform or direct exposures of patients to ionizing radiation are required to have appropriate training. Although radiation health professionals such as nuclear medicine specialists and technologists have knowledge of radiation safety by virtue of undertaking a course leading to their professional qualification, the Responsible Person should provide additional training specific to the equipment used at a particular institution and should ensure that a program of continuing professional development is available for all the staff.

4.2.2 Other health Professionals

Nurses working in nuclear medicine departments and who care for patients undergoing nuclear medicine procedures, particularly therapeutic procedures, should also have appropriate training. This training should be delivered by suitably qualified personnel and should be specific for each group to include:

- the responsibility of the individual in maintaining a safe workplace
- occupational dose limits and the ALARA principle
- methods of reducing occupational radiation doses during nuclear medicine examinations including time, distance and shielding
- knowledge of the magnitude of typical doses from different examinations
- risk factors such as age and the tissue type sensitivity
- measurement of radiation dose, if appropriate.

Professional bodies should ensure that such a core of knowledge is included in courses that they accredit and the individuals who receive such training should be issued with a certificate signed by a representative of the sponsoring organisation.

Other health professionals and ancillary staff should be provided with information on the basic principles of radiation protection such as time, distance and shielding.

4.2.3 Staff involved in Radionuclide therapy

Additional training should be provided for staff involved in the administration of radioactivity to patients for therapeutic purposes, or who care for patients receiving radionuclide therapy. This training should be delivered by suitably qualified personnel and should include the topics listed above plus:

- the limitations of shielding for gamma radiation of high energy
- procedures to minimise the likelihood of radioactive contamination
- procedures to handle potentially radioactive waste
- potential problems with incontinent patients
- contamination monitoring of the patient's room, and any necessary decontamination;
- restrictions, if any, for the patient's visitors
- appropriate signage during treatment
- requirements for the patient's discharge from hospital; and appropriate documentation of the patient's treatment and discharge.

4.3 Radiation training for staff in Radiotherapy Departments.

4.3.1 Radiation health professionals

The ARPANSA Code of Practice, RPS 14, requires that operators and other practitioners have appropriate training to perform or oversee exposures using ionizing radiation.

Although radiation health professionals, such as Radiation Oncologists, Radiation Oncology Medical Physicists, and Radiation Therapists have knowledge of radiation safety by virtue of undertaking a course leading to their professional qualification, the Department manager should ensure that a program of continuing professional development is available for all relevant staff and provide additional training specific to the equipment used at the facility, particularly with the introduction of new technologies or techniques. The Department Manager should also provide refresher training on other radiation safety related matters, for example an annual update from the facility's Radiation Safety Officer.

Where the person operating or otherwise dealing with radiotherapy equipment or radioactive sources is acting under the supervision of an authorised person, this may be general supervision, personal supervision or immediate personal supervision depending on the level of experience and qualification of the person under supervision.

4.3.2 Other health professionals

Nurses, other health professionals and support staff working in radiotherapy facilities and who care for patients undergoing radiotherapy procedures should also have appropriate training. This training should be delivered by suitably qualified personnel and should be specific for each group to include:

- the responsibility of the individual in maintaining a safe workplace
- occupational dose limits and the ALARA principle
- methods of minimising radiation doses to staff and carers during the delivery of radiotherapy, including time, distance and shielding
- minimising the occupational hazards arising from the use of radiotherapy equipment
- knowledge of the magnitude of typical radiation doses from different radiotherapy treatment procedures.

4.4 Radiation training for general staff

All hospital general staff may from time to time enter departments where radiation is used or may come into contact with radioactive patients. For this reason all hospital staff should have basic training in radiation safety. This training should be performed as part of induction and orientation of new employees and refreshed once per year thereafter. The training should basic concepts such as:

- What is radiation and what are its effects
- What are the common sources of radiation in LHD facilities
- Familiarisation with radiation warning signs
- Awareness of the LHD radiation management plan and incident reporting procedures

All of these topics are covered in the SESLHD General Staff Online Radiation Safety training course. It is the responsibility of the Department Manager to ensure that all hospital staff in their department have undertaken this training.

For general hospital staff who may need to work in radiation areas from time to time (eg hotel services, engineering or security) the department manager responsible for these areas should ensure that the visiting general staff receive suitable induction and orientation to the radiation risks in the department appropriate to their roles.

5. DOCUMENTATION

None

6. AUDIT

The following records should be available for audit:

- Records of staff in-service training kept by Department Managers.
- Local department induction training specific to particular equipment and local business rules to be documented and stored with review dates noted.

7. REFERENCES

[1] ARPANSA (2008) *"Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation", , RPS 14, ARPANSA, Yallambie*

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[3] ARPANSA (2008) "Safety guide for Radiation Protection in Nuclear Medicine (RPS 14.2)" *ARPANSA, Yallambie*

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[5] ICRP 2000a. *Avoidance of radiation injuries from medical interventional procedures*, ICRP Publication 85, Annals of the ICRP, 30 (2).

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[7] ICRP 2007. *Managing patient dose in multi-detector computed tomography (MDCT)*, ICRP Publication 102, Annals of the ICRP, 37 (1).

[8] Wagner LK and Archer BR 2000. *Minimising risks from fluoroscopic X-rays*, 3rd Edition, Partners in Radiation Management, Woodlands, Texas.

[9] NSW Government (2013) "Radiation Control Regulation"

8. REVISION AND APPROVAL HISTORY

Date	Revision No.	Author and Approval
9/9/2010	Draft	Martin Carolan, SHN RSO
Nov 2010	Draft	Richard Smart, RSO
February 2011	0	Approved by Combined Clinical Council
May 2016	1	Brent Rogers, three year review
October 2016	1	Updates endorsed by Executive Sponsor
March 2020	2	Updates endorsed by Executive Sponsor