

Policy Applies to:

All Mercy Hospital staff, who work with (or work in the vicinity of) radiological equipment. Compliance by credentialed specialists and visitors will be facilitated by Mercy staff

Related Standard:

- *Code of Safe Practice for the use of Unsealed Radioactive Materials in Medical Diagnosis, Therapy and Research*, Office of Radiation Safety, Ministry of Health, 2010
- Health and Safety at Work Act 2015
- Radiation Safety Act 2016 (RSA 2016)

Rationale:

To ensure the risks associated with staff working in areas where they could be exposed to radiation, are minimised.

Definitions:

Authorised user: A Credentialed specialist or someone who has received special training or is credentialed to use radioactive materials and understands radiation physics, radiobiology, radiation safety and radiation management.

Distance: The physical space between a source of radiation and its target (or the distance away from a source of radiation). The greater the distance an individual or target is from the source of radiation, the lower the amount of radiation exposure.

Dosimeter: A device for determining the external radiation dose that a person has received.

Exposure: A measure of the total quantity of radiation reaching a specific point measured in the air. The unit of measure is based on the amount of ionization produced in air by a specified amount of x-ray energy. Radiation exposure is controlled in three ways: time, distance, and shielding.

Protective radiation attire: Specialised clothing/accessories worn to protect personnel from scatter radiation which may include; gowns, vests, thyroid shields, gloves, glasses

Shielding: Radiation interacts with any type of material, and the amount of radiation is reduced during passage through materials. A thin layer of lead can absorb most scattered diagnostic x-rays.

Time factor: The less time a person is exposed to radiation, the less radiation one absorbs. Remaining close to a source of radiation for 15 minutes, an individual receives one-half the radiation dose received if the exposure time was 30 minutes.

Objective

- Patients, staff, credentialed specialists and visitors' exposure to radiation is minimised.

Implementation

Minimising the Patient's Exposure to Radiation

- The patient's exposure to radiation will be limited to situations in which it is medically indicated and to the anatomical structures being treated.
- All reasonable means of reconciling an incorrect sponge, needle, or instrument count will be attempted before using a radiological examination to locate the lost item.

- *ALARA Principle*: is adhered to at all times. Exposure is (As Low as Reasonably Achievable).

Protecting the Patient from Unnecessary Exposure

- Care will be taken to keep extraneous patient body parts out of the radiation beam to prevent injury.
- As part of the preadmissions procedure and before any radiological exposure, female patients of childbearing age will be questioned about the possibility of pregnancy.
 - If the possibility of pregnancy exists, the surgeon will be notified and, in consultation with the Medical Radiation Technologist and a Radiologist, determine the advisability of continuing or postponing the procedure.
 - Lead shielding will be used to protect the foetus when other areas of a pregnant patient's body are x-rayed.
- Shielding will be placed between the patient and the source of radiation whenever possible to reduce unintended radiologic exposure.
- Shielding will not be in the beam during procedures using fluoroscopy (e.g. hand surgery).

Minimising Occupational Exposure

- Warning signs are posted to alert health care personnel to potential radiation hazards at entrances to operating theatres and other procedure rooms where radiological equipment is in use
- Health care personnel will limit the amount of time spent in close proximity to the radiation source when exposure to radiation is possible.
- Whenever possible, radioactive shielding attire will be used to provide attenuation of the radiation being delivered to the health care personnel who are potentially exposed
- The radiation equipment operator must notify personnel present in the treatment room before activating the equipment.
- During fluoroscopic procedures, health care personnel will keep the patient as close as possible to the image intensifier side of the fluoroscopic unit and away from the tube side of the unit.
- Health care personnel involved in fluoroscopic procedures will stand on the image intensifier side of the fluoroscopic unit, whenever possible, to reduce exposure (i.e., standing on the same side as the image intensifier experience decreases radiation intensity).
- Health care personnel assisting with radiological procedures should not hold the patient manually for a radiographic study because of the risk of direct beam exposure.

Shielding Devices

- Before use, newly purchased devices will be tested by Pacific Radiology for attenuation and for shielding properties to ensure no damage (e.g. cracks or holes) occurred during transit.
- Radiation aprons and thyroid shields will be stored flat or hung vertically and will not be folded.
- Aprons will be labelled or numbered so that each apron can be tracked.
- Radiation protective attire will be cleaned with a neutral detergent weekly and/or as required after use.
- Radiation attire integrity will be inspected annually by Pacific Radiology.

Radiation Monitors

- Health care personnel who are involved routinely in fluoroscopic procedures will wear a radiation monitor approved by the Office of Safety Radiation (OSR).
- When using single monitoring devices, health care personnel will wear them on the same body area (e.g. neckline outside the apron)

- Health care personnel who are pregnant will wear radiation monitors or radiation dosimeters at the waist and readings will be performed and reported to relevant personnel 3 monthly.
- Radiation monitoring devices or dosimeters will be removed and stored on the rack outside theatre 1 at the end of every workday.

Pregnant Health Care Personnel

Health care personnel are not required to disclose pregnancy; however, personnel are strongly encouraged to declare a pregnancy to their manager in order for them to manage radiation safety.

Documentation

- An incident form will be completed by Pacific Radiology/Mercy Hospital Staff for any procedure in which radiological exposure has occurred and procedures and interventions in this policy were not followed.
- Documentation of the readings of the dosimeters will be provided to relevant staff on a quarterly basis by Environmental Science and Research (ESR) This information will be stored by the Theatre Manager.
- Documentation of theatre attire integrity inspections and attire commissioning/ decommissioning will be held by the Theatre Manager
- Documentation of health care personnel education on radiation safety will be logged into their personal record maintained in accordance with Mercy theatre competencies.
- Dose and Duration of screening is documented for each patient on Pacific Radiology PAC.

Education

- Health care personnel will receive initial education on radiation safety regulations and procedures and will complete biannual Radiation competency on SharePoint.
- Initial education will include, but not be limited to:
 - radiation safety (e.g. risk, hazards spill containment),
 - biological effects of radiation,
 - regulatory requirements, and
 - environmental workplace techniques and procedures.

Evaluation

- Staff radiation dosimeter records
- Commissioning & Decommissioning Theatre Attire records
- Radiation Attire Inspection forms
- Pacific Radiology Radiation attire screening records
- Completion of Radiation competencies
- Staff training records
- Pacific Radiology Mercy Hospital Radiation Plan
- Radiation Safety Audit
- Incident Forms.

Associated Documents

External

- Recommended practices for reducing radiological exposure in the perioperative practice setting. In: *Perioperative Standards and Recommended Practices*. Denver, CO: AORN, Inc.; 2013:295-304
- <http://www.health.govt.nz/our-work/radiation-safety/users-radiation/codes-safe-practice-radiation-use>
- Register of Mercy Hospital Specialists Authorized to use X-Rays, Pacific Radiology
- General Guidance on Shielding Requirements for Medical X-Ray Diagnostic Rooms - Ministry of Health.
- MOH - Application for Source License.

Internal

- Pacific Radiology Mercy Hospital Radiation Plan, Theatre Manager
- Health and Environmental Screening Policy
- Personal Protective Equipment Apparel
- Radiation Safety Audit, <F:\Mercy Shared\Audits\Clinical Audits\Clinical Audit Tools and Checklists\Tools>

Processes

Commissioning and Decommissioning of Radiation Attire

Commissioning an apron/ attire must occur before it is put into circulation

- Set up a new Radiation Attire Inspection form record form and identify and describe (by picture) the radiation apron/thyroid shield requiring commissioning
- Assign a new identifying number to the apron/shield
- Label the apron/shield with the new number and record it on the inspection record sheet and file in the Radiation Folder.
- Carry out an inspection to ensure the apron/shield did not arrive with any defects. Live screened (plus seams) by Pacific Radiology.
- Put into circulation.

Decommissioning Lead / Radiation Attire

- Decommissioning radiation attire must occur when it has been deemed no longer fit for use
- Decommissioned lead radiation attire – (as these contain lead) must be disposed of as part of scrap metal collection. Non-lead attire must be disposed of in the controlled waste stream.

Maintenance and Repair of Radiation Attire

- Before sending for repair, send the apron to Pacific Radiology for screening to ensure that the attire is to an acceptable standard, (there is no point in repairing an apron that is going to be decommissioned)
- Clearly state what is to be repaired. (Stitching holes must not be allowed where radiation protection is required.)
- Put aprons in plastic bag (rolled not flattened) and arrange to be delivered to
- Upon return to theatre the aprons should be rescreened by Pacific Radiology to check integrity and document on the protective gown inspection form

Radiation Badges

- These must be worn on the outside of the thyroid shield, facing forward, during every case.
- They must be changed every three months.
- They must be sent to ESR for readings
- The Theatre Manager or delegate is responsible for collating and sending the film badges to the ESR every three months. The results are returned to the Theatre Manager who will send a copy to Pacific Radiology. The ESR will notify Mercy Hospital of any unusually high readings this will be highlighted in red and investigated by Pacific Radiology. In the event of two consecutive highlighted reports being received for any particular badge-holder, the (OSR/staff) will be notified.
- The Theatre Manager or delegate is responsible for ensuring all staff comply with film-badge monitoring requirements.
- All information regarding these badges must be retained by the Theatre Manager.