



NATIONAL RADIATION PROTECTION COMMITTEE

END OF YEAR REPORT

2023

NATIONAL RADIATION PROTECTION OFFICE

HEALTH SERVICE EXECUTIVE

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National Radiation Protection Committee

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Introduction

This report presents the main work undertaken the National Radiation Protection Committee (NRPC) in 2023.

The NRPC endeavours to promote safe practice and regulatory compliance across all radiological services operating under the patronage of the Health Service Executive (HSE). NRPC secretariat support is provided by the National Radiation Protection Office and NRPC membership is listed in Appendix 1. Four meetings of the NRPC were convened in 2023.

Legislative framework for radiation protection

The use of ionising radiation in a medical setting is regulated by various European and Irish legislation, most notably the following:

The **EU Directive 2013/59/EURATOM** was transposed into Irish law with the enactment of statutory instrument (SI) 256 (2018) and SI 30 (2019).

SI 256 (2018) legislates for patient safety in relation to radiation exposure. The statute recognises the Health Information and Quality Authority (**HIQA**) as the competent authority and regulator for patient radiation protection; and provides HIQA with the necessary inspection and enforcement powers to ensure compliance with the regulations.

Similarly, **SI 30 (2019)** regulates for the safety of workers and members of the public in relation to radiation exposure. This statute identifies the Environmental Protection Agency (**EPA**) as the regulator and competent authority; and provides for the necessary inspection and enforcement powers.

NRPC initiatives undertaken in 2023

The main initiatives undertaken by the NRPC are presented herein:

- Analysis of radiation safety incidents reported in 2023
- Compliance with SI 256 (2018)
- Monitoring occupational exposure to radiation – SI 30 (2019)
- Radiation protection awareness training

Analysis of radiation safety incidents reported in 2023

Reporting and analysing adverse events is fundamental to promoting safe practice and supports the provision of an optimal radiological service. It is the ethos of the HSE to support both patients and staff when an adverse event occurs. All incidents and near miss events must be reported locally on the National Incident Management System (NIMS) and managed in accordance with the HSE

framework for incident management. Those events which meet notifiable criteria must also be reported to the regulator¹.

The NIMS data reviewed by the NRPC did not include personal information that could identify an individual patient or staff member.

Radiation safety incidents reported on the NIMS in 2023

This section presents the radiation safety incident data from January to December 2023. Reports pertaining to magnetic resonance imaging, ultrasound scanning and issues related to peripheral vascular catheters were excluded from the analysis.

Table 1: Category of incidents reported in 2023

Category of incident	Radiology	Radiotherapy
Harm	55	1
Near Miss	522	115
No Harm	499	151
Total number of reports	1076	267

Radiation safety incidents were reported by hospital and community services where medical ionising radiation was used. These included, for example, radiology and radiotherapy departments, dental and orthodontic services, cardiac catheterisation laboratories and mammography units.

There were 1076 radiation safety events reported in radiology, of which 55 were deemed to have caused harm to an individual, 499 caused no harm and 522 were categorised as near miss events.

In radiotherapy, there were 267 radiation safety events reported which included 1 incident causing harm to an individual, 151 that caused no harm and 115 categorised as near miss events.

Reporting incidents, including near miss events, is encouraged to foster an open, non punitive work environment where staff feel empowered to identify potential risks early and take steps to mitigate them.

Table 2: Category of person affected by the radiation safety incident

Category of person	Radiology	Radiotherapy
Adult patient / service user	1027	267
New born	3	
Paediatrics	1	
Staff member	44	
Member of the public	1	

¹ Notifiable incidents involving patients are reported to HIQA; those involving staff or members of the public are reported to the EPA; and equipment failures are reported to the Health Products Regulatory Authority.

Safe practice is essential when working with medical ionising radiation and fundamental to this is the establishment of clear lines of authority in relation to radiation protection. Governance must be unambiguous and easily understood by all staff. Those involved with a patient exposure (for example, the referrer, practitioner, operator of the equipment and manager with overall responsibility for providing the service) must be familiar with their roles and legal responsibilities as regards radiation protection; and what to do in the event of a failure in care. This is particularly important when staff work across a number of different sites or services.

The analysis of data considered the failures in care that resulted in these adverse events and the various themes to emerge are presented hereunder.

- **The wrong patient undergoes a radiation exposure**

Misidentification of the patient can occur at any point in the patient's pathway. For example, the referrer can enter the wrong name on the computer system when ordering the procedure; the wrong patient can be picked up from the hospital ward and brought to the radiology department; incorrect patient details can be registered at the department; the wrong patient can be called into the procedure room; and finally, a medical report or follow up appointment can be issued in error to the wrong patient.

The NRPC encourages all staff who interact with the patient on this journey to pause and ask the patient to confirm their name and where appropriate, why they are scheduled for the particular procedure; and to re-check this information with the details available to the practitioner.

Appendix 2 presents a poster, courtesy of the radiation protection team at Beaumont Hospital, as an example of good practice in this regard.

- **Poor clinical referral practices**

Poor clinical referral practices were evident in a considerable number of incidents reported. For example, referrals were made to image the wrong body part; the medical information documented in the referral was incorrect or inaccurate; vital clinical information was omitted from the referral; the patient's previous imaging procedures were not taken into account; or non-ionising modalities such as ultrasound and magnetic resonance imaging were deemed more appropriate by the practitioner but had not been considered by the referrer.

The HSE purchased the licence for the UK Royal College of Radiologist's (RCR) *iRefer* Guidelines in 2021 and made this resource available to all public hospitals and via the *Healthlink* portal, to support best practice in relation to the justification process.

In early 2023, the *iRefer Guidelines* website was upgraded and consequently, a number of services had difficulty accessing the portal. The National Radiation Protection Office was alerted to this and promptly engaged with the RCR team to resolve the matter. A communication was issued nationally to advise referrers on the steps to be taken to restore access and engagement with frontline staff in this regard continued throughout the year.

The UK RCR is currently developing a new mobile phone application to facilitate greater access to the *iRefer Guidelines*.

- **Communication failures**

Incidents related to a breakdown in communication often occurred where multiple medical disciplines were involved in the patient's care plan. Typically, information was not shared with the relevant parties within the multidisciplinary team or did not reach the patient in a timely fashion. This resulted in delayed treatments, incorrect or unnecessary procedures being performed or failures to ensure that the appropriate follow up care was arranged.

Communication failures were particularly evident when patient care was being managed across different locations.

- **Documentation and record keeping**

Documentation and record keeping incidents included for example, failure to schedule appointments within the appropriate timeline; failure to ensure that the appropriate after care arrangements were made; and failure to ensure that the correct information accompanied the patient to the location where they were being treated.

These issues were reported in both diagnostic and therapeutic services and often resulted in the patient not receiving treatment within the optimal timeframe. Similar to the aforementioned communication failures, they were particularly evident where the patient's care was being managed across different locations.

- **Equipment failure**

It is acknowledged that medical equipment has the potential to breakdown and this can have a major impact on service delivery. Therefore, it is fundamental to safe practice for both staff and patients that radiation equipment is routinely subjected to rigorous testing and a strict quality assurance programme. In addition, all equipment must be accompanied by the relevant protocols for use and staff required to operate the equipment must have the appropriate training and competency to do so.

The risks posed by operating aged equipment have been acknowledged, particularly in radiotherapy services, where delivery of high doses of radiation is reliant on the compatibility of equipment with modern technical software. The HSE Capital Plan has dedicated resources to replace aged equipment and the programme includes a focus on radiotherapy services.

A decision made locally to operate radiation equipment beyond its nominal replacement date should include evidence, in writing, of consultation with a Medical Physics Expert.

- **Accidental occupational exposure**

Unfortunately, accidental exposure of staff to radiation during the course of their work will always be a risk. Inadvertent occupational exposures occurred for example, when a staff member walked into a room when a procedure was taking place, when they were caring for a patient whom they did not know was radioactive or when they were exposed to spillage of a radiopharmaceutical. There were also some reports of practitioners who declined to wear the appropriate personal protective equipment when performing a procedure. These incidents were managed locally by the radiation protection team onsite.

The damage from radiation exposure is often cumulative and for this reason, it is imperative that staff **always** take the necessary precautions to limit their exposure when working with medical ionising radiation.

Overall the majority of incidents reported on the NIMS were considered minor or negligible in terms of their impact on the staff or patients involved.

Compliance with SI 256 (2018)

The NRPC requests that all Designated Managers review the HIQA portal registration details for their service and the personnel to whom they have granted access privileges, to ensure that the information recorded is accurate and up to date².

Issues raised by HIQA inspections in 2023 were in the main, managed locally. They included, for example, ensuring that local diagnostic reference levels were updated and observed; that policies and guidelines were in date, fit for purpose and reflected daily practices; and that staff understood local governance arrangements and their place in that structure. Local governance and staff responsibilities were of particular importance where radiological services were delivered across a number of different locations.

Nationally, a common theme to emerge was the failure to comply with Regulation 13(2).

Compliance with Regulation 13(2)

Radiological services are legally obliged to provide patients with information related to the amount of radiation they are exposed to during a medical procedure. For high dose procedures, such as computed tomography, the dose delivered may be automatically recorded. However, for routine diagnostic imaging procedures, for example plain x-ray, this may not be possible as dose tracking software is not always available. Thus, the practitioner may need to look for and manually record the radiation dose delivered to the patient.

The NRPC acknowledged that compliance with this regulation was a challenge, given the volume of patients who avail of radiological services, the age and variety of equipment involved and the limited availability of dose tracking software. A national approach to address the issue was taken which involved collaboration with the HSE NIMIS³ Programme Team and the Faculty of Radiologists and Radiation Oncologists, Royal College of Surgeons Ireland.

Application of an automated, universally applied dose tracking software package across all locations was the agreed solution however this will take time to implement. In the interim, to mitigate the risk

² For HSE registrants, this will require engagement with the National Radiation Protection Office (radiation.protection@hse.ie).

³ The National Integrated Medical Imaging System (NIMIS) facilitates the requesting of medical imaging procedures and the storage and viewing of the associated images and reports. It also allows the secure electronic sharing of data between specialists to promote a speedier diagnosis. The NIMIS Programme is managed by the Office of the Chief Information Officer.

of enforcement, three temporary measures, presented herein, were put in place to assist locations in complying with the regulations.

1. NIMIS auto-text dose band solution

The practitioner selects the appropriate dose band for the procedure they performed from the NIMIS drop down menu when they are generating the medical report. Although not providing the exact dose given to the individual patient, the dose band will give an indication of the level of risk to the patient from the exposure, based on international values. An exposure which exceeds the typical radiation dose for that procedure type must be manually recorded and explained by the practitioner.

2. Standard wording in the NIMIS report and radiation dose webpage

A HSE webpage presenting information on the risks associated with radiation exposure in plain language was developed by the NRPC with the support of the Faculty of Radiology. The NIMIS team modified the national reporting system template to highlight that ionising radiation was delivered during the procedure and incorporated directions to this information webpage. Similar action was also taken in the non NIMIS sites. Services were advised to establish local communication pathways to address any queries or concerns received about dose.

3. Alternative local solution to recording dose

Practitioners can manually record in the medical report the specific radiation dose administered to a patient during the radiological procedure. Also, services may decide to develop and implement a new measure locally, however it must provide the requisite information to patients in plain language and be easily accessible to referrers.

Full compliance with Regulation 13(2) is mandatory and subject to enforcement by the regulator.

Clinical audit and SI 528 (2022)

SI 528 (2022) confers new responsibilities on HIQA in relation to the practice of clinical audit. Throughout the year, the NRPC provided extensive support to HIQA so they could better understand current practices and governance around clinical audit in the HSE. HIQA published new guidance on clinical audit in late 2023.

Monitoring occupational exposure to radiation – SI 30 (2019)

SI 30 (2019) requires an undertaking to provide a safe working environment for staff when delivering a medical ionising radiation service. Fundamental to this is the collection and assessment of accurate and timely personal dosimetry data by the undertaking. This information is used to inform the medical assessment of staff by the occupational health physician. The legislation also requires the individual staff member to provide said information to the undertaking.

The NRPC sought clarity from the regulator on the implementation of this regulation, particularly in relation to instances where practitioners may operate across multiple sites and be employed by different healthcare providers; and where one radiological service may not necessarily share dosimetry records with another. The EPA reiterated the aforementioned points:

- It is the responsibility of the undertaking to ensure that the total annual occupational exposure of a worker across all work places does not exceed the relevant dose limits.
- It is a statutory requirement for all exposed workers to notify the undertaking of any other workplaces where they are liable to be exposed to ionising radiation.

Considering this, the NRPC issued a communication nationally to highlight these legal obligations under SI 30 (2019). Undertakings were advised to contact all practitioners working under their remit to request they provide their personal dosimetry data from every location where they operate so that this information could be collated and considered, as part of the practitioner's overall occupational health assessment for radiation exposure. Where a worker declines to provide said information, the undertaking should document the request in the employment record, or equivalent.

All dosimetry provided by an exposed worker is treated as personal information and subject to the relevant data protection legislation.

Medical assessment by the occupational health physician

A medical assessment by the occupational health clinician requires the availability of accurate and timely personal dosimetry information which must incorporate data from all locations where the worker may be employed.

The NRPC acknowledged that there are considerable gaps in the supports available to ensure compliance with this regulation. For example, there is no national process available to validate dosimetry information provided by a practitioner who operates across numerous locations; no nationally agreed policy to support occupational health physicians when assessing workers for radiation exposure; and no pathway to refer staff for further assessment or treatment if it is deemed necessary. There is also no agreement on what such an additional assessment should entail and no formal training available to support occupational health physicians in performing this assessment.

There is a potential for staff who are routinely exposed to high doses of radiation to be designated 'Category A' status, under SI 30 (2019). That is, during the course of their work, they may reach the higher dose limit for safe occupational exposure and require annual health assessments. And in instances where the level of exposure exceeds the legal safety limit, it could potentially impact their ability to practice.

The NRPC continues to engage with the regulator and with other HSE departments to address the issues raised.

National service for monitoring personal dosimetry

In early 2023, issues were raised with the NRPC pertaining to the national personal dosimetry service provided by an external vendor. These concerns included, for example, poor customer service; dosimetry badges being exposed to radiation before reaching the hospital; badges, and sometimes dosimetry reports, being lost in transit; badges arriving late or sometimes not at all; and difficulties with hospitals attempting to register new staff with the service provider.

A meeting was convened between the NRPC and the service provider to address these issues and some actions were agreed. Subsequently, a communication was issued nationally explaining the need

for hospitals to keep badges from one month separate to the next when returning to the vendor. The service provider issued a statement to explain the steps they were taking to help resolve the customer service issues highlighted. The HSE agreed to explore the possibility of consolidating transport arrangements so that one delivery service could be used nationwide to allow for better traceability of the packages; and a trial of barcode scanners in two locations was agreed in an effort to improve traceability of the badges in transit. The trial commenced in late 2023 and was ongoing at the time of writing this report.

In addition to these measures, a trial of an alternative dosimeter badge provided by the vendor was proposed however, this product was not licenced for use in Ireland. The existing service requires dosimetry badges to be sent to the UK and then on to the USA for processing. The new product was produced by the vendor in France and could be returned to the French site for processing without the need for air travel or checks associated with UK customs. The aim of the trial was to consider the logistics involved in sending badges to the French location for processing rather than to the UK and then USA – ease of delivery / shipping / no airport checks / tracking etc.

The NRPC sought and was granted approval from the regulator to allow this trial to proceed. The vendor engaged directly with the radiation protection teams from three hospitals, namely St. James's Hospital, Sligo University Hospital and Cork University Hospital, who had kindly agreed to support the endeavour. The trial was ongoing at the time of writing this report.

Radiation protection awareness training programme

It is a legal requirement for the undertaking to ensure that all staff are appropriately trained and competent to work with medical ionising radiation. Numerous in-house training programmes have been developed by individual radiological services, based on international guidelines. These courses in radiation protection vary in content and duration, depending on the cohort of staff in attendance and their level of occupational risk to exposure. Clinical staff who attend these sessions may often have to attend similar training programmes delivered in other locations when they change employment throughout the year. This repetition is an unnecessary burden on local radiation protection teams and a misuse of time for the clinicians.

The NRPC commenced the development of a suite of online training resources for radiation protection. The aim of this programme was to provide national standardised training information based on international guidelines, to support all staff in understanding the principles of radiation protection, how to limit their exposure and what to do in the event of something going wrong.

To date, two modules have been developed and are now at the final stage of production. The first module, entitled '*Radiation safety awareness training*', is a general introduction to medical ionising radiation suitable for all staff and is intended to be used as part of an induction training programme. It explains what medical ionising radiation is, why it is considered a danger and outlines the necessary precautions all staff must take to limit their potential for occupational exposure.

Module two, entitled '*Protecting our patients in a healthcare setting*', focusses on educating clinical staff who refer patients for procedures which necessitate exposure to medical ionising radiation. It explains the legal obligations imposed on referrers, the principles of radiation protection and highlights the typical failures in care associated with poor referral practices.

This national programme is designed to standardise training and promote safe practice. It will support the important work of local radiation protection teams however it does not replace the need for more in-depth, onsite training for those at high risk of occupational radiation exposure.

Both modules will be made available on the HSELand platform in March 2024 and certificates of attendance will be issued which will be valid for a period of two years across all locations.

Conclusion

This was a busy year for the NRPC and with the support of frontline colleagues in radiation protection, considerable progress was made in the pursuit of safe practice and regulatory compliance. The NRPC also acknowledges the positive engagement and continued support of HIQA, the EPA and Department of Health in achieving this progress throughout the year.

The risks associated with medical ionising radiation may be reduced, although they will never be eliminated, thus there is no room for complacency. The NRPC will continue to ensure that radiation protection is prioritised across the HSE in 2024.

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Appendix 1: Membership of the National Radiation Safety Committee 2023

MEMBERSHIP OF THE NATIONAL RADIATION PROTECTION COMMITTEE 2023	
Dr. Andrew Bolas	Co-Chair, Assistant National Oral Health Lead, Community Operations
Dr. Ciaran Browne	Co-Chair, Acute Hospital Operations, HSE
Ms. Cora Lunn	Director of Nursing, Office of the Nursing and Midwifery Services Director, HSE
Dr. Catherine Glynn	Consultant Radiologist, Faculty of Radiologists and Radiation Oncologists, Royal College of Surgeons in Ireland
Mr. Dean Harper	Radiation Therapist, Irish Institute of Radiographers and Radiation Therapists
Ms. Deirdre Groarke	Corporate Estates, HSE
Ms. Deirdre O’Keeffe	Hospital Groups Chief Executive Officers, HSE
Dr. Grant Jeffrey	Consultant Occupational Medicine, Director Workplace Health and Wellbeing Unit, HSE
Ms. Louise Fahy	Radiotherapy Medical Physics Expert, HSE
Ms. Mandy Lewis	Medical Physics Expert, Voluntary Healthcare Association Risk Management Forum
Ms. Michele Monahan	Senior Radiographer Services Manager, HSE
Mr. Niall Phelan	Chief Physicist, National Screening Service, HSE
Dr. Peter Kavanagh	National Clinical Programme for Radiology, HSE
Mr. Thomas Heary	Diagnostic Medical Physics Expert, Beaumont Hospital

Appendix 2: Medical ionising examination checklist (courtesy of Beaumont Hospital)

Have you “PAUSED and checked”? A medical ionising examination checklist

P	Patient	<ul style="list-style-type: none"> Ensure the examination is authorised and justified, check vetting notes and consult iRefer guidelines. Check exam history and any duplication of requests in RIS. Confirm patient ID using the triple ID slip with identifiers checked and signed. Check the status of pregnancy and LMP, where appropriate. Discuss the clinical history with the patient. Give adequate information to the patient and ensure they understand the implications and freely consent to the examination.
A	Anatomy	<ul style="list-style-type: none"> Ensure the correct anatomical area has been requested and selected. Select the correct laterality. Ensure correct anatomical marker is included in the primary beam.
U	User Checks	<ul style="list-style-type: none"> Verify the timing of the examination and whether it coincides with or replaces other diagnostic tests --for example, a chest x-ray for LRTI and central line placement. Utilise the appropriate modality. Ensure appropriate instructions are afforded to patient, staff and carer. Check radiation safety measures are in place for staff and carers.
S	Settings	<ul style="list-style-type: none"> Ensure to select the correct patient and examination accession number. Select the appropriate imaging protocol and technique. Optimise the medical exposure--ALARA principle, adapted according to patient factors (regarding disease, body habitus and /or patient age).
E	Exposure	<ul style="list-style-type: none"> Once the medical exposure is complete: <ul style="list-style-type: none"> Ensure dose metrics are recorded Consider DRL Evaluate image (For example, the 10-point image check) Optimal image quality Any additional images required?
D	Draw to a close	<ul style="list-style-type: none"> Confirm images are on PACS. Evaluate the images and assess the need to comment on the image(s). Tell patient how to get results and where to go next. Make the examination available for reporting.



"It is a legal obligation and undertaking requirements that these checks are carried out before and after an exposure is undertaken"

IMAGING AND INTERVENTIONAL RADIOLOGY DIRECTORATE

RadiochtSabhailteachtFoirean

Adapted from the “Paused and checked” campaign of the Society and College of Radiographers (SCoRUk)