NATIONAL RADIATION PROTECTION COMMITTEE

END OF YEAR REPORT

2024

NATIONAL RADIATION PROTECTION OFFICE
HEALTH SERVICE EXECUTIVE

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National Radiation Protection Committee

End of Year Report 2024

Introduction

The National Radiation Protection Committee (NRPC) was established to advise the Health Service Executive (HSE) on matters pertaining to radiation protection. The committee promotes safe practice and regulatory compliance across all hospital and community based radiological services.

Four meetings of the NRPC were convened in 2024, with secretariat support provided by the National Radiation Protection Office (NRPO). Committee membership is listed in the appendix.

This report highlights the main initiatives undertaken by the NRPC in 2024:

- Radiation safety incidents reported in 2024
- Open disclosure and the identification of clinically significant radiation safety incidents
- Regulatory compliance
- International Regulatory Review Service Mission to Ireland
- Radiation protection awareness training
- Radiation protection in nursing and midwifery services
- Sharing the learning

Analysis of Radiation Safety Incidents Reported in 2024

All radiation safety incidents and near miss events must be reported on the National Incident Management System (NIMS) and managed in accordance with the HSE incident management framework. In addition, radiation incidents which meet specific notifiable criteria are reported to the regulator - notifiable incidents involving patients must be reported to the Health Information and Quality Authority (HIQA); those involving staff or members of the public must be reported to the Environmental Protection Agency (EPA); and equipment failures should be reported to the Health Products Regulatory Authority. The HSE endeavours to support both patients and staff when an adverse event occurs.

Radiation safety incidents reported on the NIMS in 2024

The information presented herein summarises the radiation safety incidents reported on the NIMS from January to December 2024. The data reviewed was anonymised and the analysis excluded reports pertaining to magnetic resonance imaging, ultrasound scanning and issues related to peripheral vascular catheters.

The NIMS reports upon which this summary is based are generated by the NRPO and reviewed at each NRPC meeting. The individual reports can be accessed here: https://www.hse.ie/eng/about/who/acute-hospitals-division/radiation-protection/analysis-of-radiation-safety-incidents-reported-on-nims/

Table 1: Category of incidents reported in 2024

Category of incident	Radiology	Radiotherapy
Harm	60	1
Near Miss	756	209
No Harm	553	78
Total number of reports	1369	288

There were 1369 incidents reported on the NIMS in 2024 involving medical ionising radiation in radiology. Of these, 60 were deemed harmful to patients, 553 were considered non harmful and 756 were categorised as near miss events.

Radiotherapy services reported 288 incidents on the NIMS, of which one was considered moderately harmful and required medical treatment, 78 were categorised as non harmful and 209 were considered near miss events.

These reports were made by various radiological services, including hospital and community diagnostic imaging services, radiotherapy departments, cardiac catheterisation laboratories, dental and orthodontic services, and the *Breastcheck* screening service.

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

Category of person	Radiology	Radiotherapy
Adult patient / service user	1306	288
Neonate / new born	2	
Staff member	43	
Member of the public	18	

In radiology, 1306 adult and 2 neonate patients were affected by a radiation incident, with 288 patients in radiotherapy services. The 18 members of the public who sustained an inadvertent exposure were mainly parents or carers who comforted patients during a procedure.

There were 43 inadvertent staff exposures reported on the NIMS. These incidents typically involved staff entering a procedure room unaware that an exposure was taking place; practitioners declining to wear appropriate personal protective equipment; spillage in the preparation of a radiopharmaceutical; and failure to notify ward staff or laboratory technicians that a patient was radioactive following a nuclear medicine procedure.

The NRPC has created an online radiation protection training programme for staff and made this freely available on the HSELanD platform. (Training is discussed later in this report.) Harm from occupational exposure can be acute or cumulative and all staff are encouraged to utilise this training resource to understand the potential risks associated with medical ionising radiation and the preventative steps that must be taken to limit occupational exposure.

The main themes to emerge from the trending analysis are presented hereunder:

- **Poor clinical referral practices**

Typically, these incidents involved the ordering of an incorrect or unjustified imaging procedure for a patient or the identification of the wrong body part for scanning. There were also instances where the patient's demographic data was incorrectly recorded; the patient's previous medical imaging history had not been considered; and relevant clinical information had been omitted from the referral.

Clinical staff permitted to refer patients for radiological procedures include doctors, dentists and appropriately trained nurses. An initiative led by the Department of Health was commenced in 2024 to expand this authority to refer to encompass physiotherapists. This project is ongoing.

The HSE purchased the licence for the UK Royal College of Radiologist's (RCR) *iRefer Guidelines* and made this online tool available to support referral practices. All hospital and GP services can access this referral tool through the HSE.

In late 2024, the RCR made changes to the platform hosting *iRefer* which caused some disruption to the service nationally. However, the NRPO worked diligently with the RCR and frontline radiology services to resolve the matter. The NRPO also engaged with the HSE Community Diagnostic team and the Office of the Nursing and Midwifery Services Director to improve access for general practice services to the *iRefer Guidelines*. In addition, work by the RCR on developing a mobile application for the *iRefer Guidelines* is ongoing. If referrers have an issue with accessing this online resource, they are encouraged to contact the NRPO for assistance.

In addition, the newly developed radiation protection training programme discussed later in this report contains a module to support referral practices.

- **The incorrect patient undergoes a radiological procedure**

In these incidents, there was a failure in the identification process which typically led to the wrong patient undergoing a procedure unnecessarily. These mainly occurred when the incorrect patient was brought from the hospital ward or called into the procedure room from the radiology waiting area; when staff made an error either referring or registering the patient under the wrong name on the radiology system; and when the medical report or follow up care was recorded under the wrong patient medical record.

These types of errors are not unique to radiological services and the NRPC encourages all staff who engage with patients to pause and check that they are engaging with the correct individual before proceeding with the radiological procedure.

- **Equipment failure and computer software issues**

Reports of this nature included for example, incidents where equipment failed to start working or stopped unexpectedly mid-procedure; a failure of diagnostic images to transfer correctly to the radiology reporting system; and equipment failing to mobilise so that patients could not be positioned correctly for a procedure. The malfunction often led to the patient undergoing repeated exposures that could have been avoided; delayed diagnoses and subsequent delayed treatment which was

particularly detrimental to potential stroke victims; and delayed surgical procedures that, in some cases, were abandoned or had to proceed without the benefit of imaging equipment.

All radiological equipment must undergo regular quality assurance testing to ensure that it is fit for purpose and safe to use. Each machine must also be accompanied by relevant protocols to support staff who operate the equipment. And all staff operating radiation equipment are required to be appropriately trained and competent. Radiation equipment is also required to have a nominal replacement date. A decision made locally to operate a machine beyond this nominal replacement date must be accompanied by written evidence of consultation with a Medical Physics Expert.

In many services, radiological equipment must be compatible with modern computer software to ensure the safety of a procedure. This is most notable in radiotherapy, where treatments are individually planned and typically necessitate exposure to high doses of radiation. The HSE National Capital Plan makes provisions for the replacement of aged medical devices, including radiation equipment.

- **Communication and failures in documentation**

Incidents related to communication failures and poor record keeping included for example, not recording past radiological exposures when obtaining the patient's medical history; not disseminating the relevant medical information to all members of the multidisciplinary team; failing to ensure that the patient had understood the plan for follow up care; and most notably, a failure to ensure the relevant medical records accompanied a patient when their care was being managed across multiple sites and different services.

These incidents often led to delayed treatments, missed appointments and the patient needing to undergo additional unnecessary exposures to ionising radiation.

This trending analysis allows the NRPC to identify emergent risks and will inform the strategy for radiation protection for 2025.

Open Disclosure and the Identification of Clinically Significant Radiation Safety Incidents

The Patient Safety (Notifiable Incidents and Open Disclosure) Act (2023) and statutory instrument (SI) 256 (2018) require practitioners to disclose errors of clinical significance incurred during the course of a medical procedure.

In regards radiation exposure, there is limited guidance available to support practitioners in identifying a clinically significant event because the risk to a person is dependent on many factors, such as the dose received, the age of that person and their previous medical history of radiation exposures. In addition, if open disclosure (OD) is required, a clinically significant inadvertent exposure may only be discovered sometime after the patient has left the department which could potentially lead to confusion when informing the patient of the incident.

The NRPC commissioned a national survey to establish current practice in relation to OD in radiological services and to determine how clinically significant unintended radiation exposures were identified.

This survey, entitled ***National Survey on Open Disclosure and Clinically Significant Radiation Safety Events,*** identified the measures taken in all radiological services to support the OD conversation with the patient. It also highlighted the need for national guidance on what constituted a clinically significant inadvertent radiation exposure. The survey report can be accessed here: https://www.hse.ie/eng/about/who/acute-hospitals-division/radiation-protection/reports/

The NRPC subsequently established a working group to develop this guidance and the initiative was ongoing at the time of writing this report.

Regulatory Compliance

Designated Managers are responsible for ensuring the information recorded on the HIQA portal pertaining to their service, including the personnel to whom they have granted access privileges, is accurate and up to date[1].

This is particularly important when there are several radiological services with different governance arrangements operating at one location, such as community diagnostic services and dental practices. Each service must have a unique HIQA portal registration number to ensure that the correct service is notified when there is an inspection.

The majority of issues highlighted by the HIQA inspections in 2024 were managed locally. These included for example, a failure to analyse incidents and near miss events for trending purposes and failure to review and update local diagnostic reference levels. Also, there was often a need to clarify local governance arrangements and in particular, the roles and responsibilities of staff in relation to radiation protection. This was especially relevant in services that operated outside the remit of the radiology department (such as theatre and cardiac services) and in community locations where the radiological service was often provided by the local hospital staff. In some instances, local policies and procedures did not reflect daily practices and relevant documentation was unavailable or out of date. HIQA also focussed on clinical audit, in particular how outcomes were managed and lessons were learnt.

One issue common to many locations was the failure to provide relevant dose information to the patient in the medical report.

Regulation 13(2) - Providing dose information to patients

Providing patients with information on the radiation dose administered during a medical exposure is a legal requirement under SI 256 (2018)(13)(2).

Typically, this information is automatically recorded on the medical report for high dose procedures such as computed tomography. In the majority of low dose imaging procedures however, dose

[1] For HSE registrants, this may require engagement with the National Radiation Protection Office (radiation.protection@hse.ie).

tracking software is not always available and the practitioner must manually record the dose information in the medical report. To lessen the burden on the practitioner, modifications were made to the NIMIS[2] platform to allow for a drop down menu which listed the various doses associated with typical procedures, which provided the patient and referrer with an indication of the risk associated with the procedure. In addition, it also directed the reader to a newly established dose information webpage on the HSE radiation protection website which provided further information on the radiation risk.

Similar paediatric dose information was developed by Children's Health Ireland (CHI) which was shared with the HSE and adapted to support paediatric services nationally. The information was published on the HSE radiation protection webpage, with a link to the CHI website, should people require further information about paediatric exposures.

These initiatives proved successful in radiology and radiotherapy services however, inspections continued to highlight noncompliance with Regulation 13(2) in departments operating beyond these areas. Practitioners working in, for example, theatres or cardiac catheterisation laboratories, typically did not have access to the NIMIS and were therefore required to manually record the dose information in the medical report. However, inspections demonstrated that this practice did not routinely occur.

Full compliance with Regulation 13(2) is mandatory across all departments that use medical ionising radiation and subject to enforcement by the regulator. Work on developing a national solution to resolve this issue of non compliance is ongoing.

International Regulatory Review Service Mission to Ireland

Various international laws and conventions require countries to undertake regular self-assessments of their national regulatory framework for radiation safety. These include for example, the EURATOM Nuclear Safety and Radioactive Waste Directives and the International Atomic Energy Agency (IAEA) Convention on Nuclear Safety.

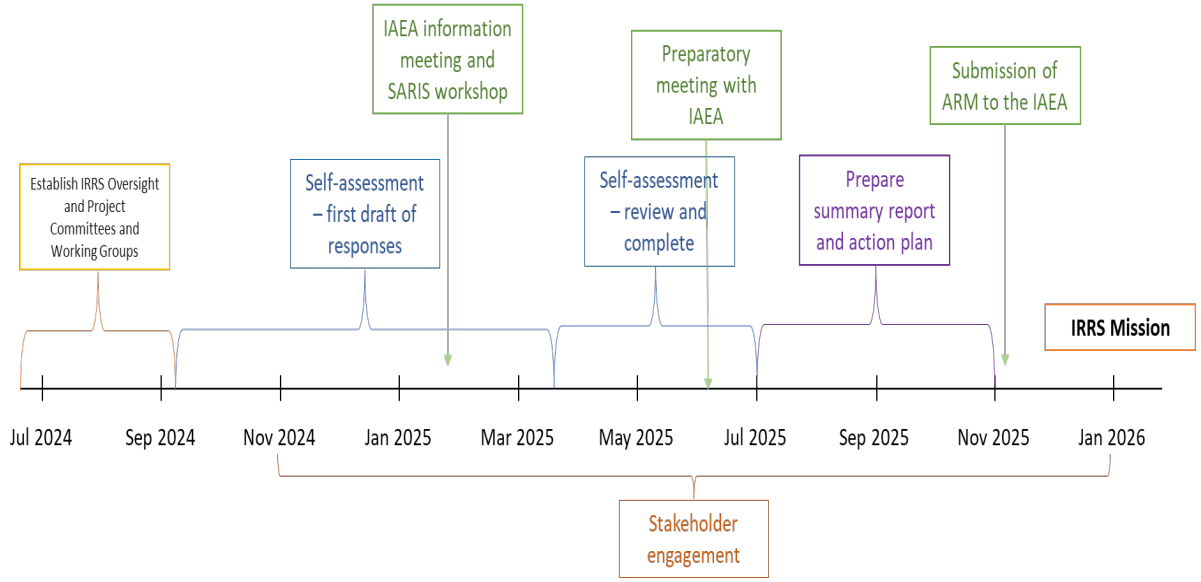
To support the self-assessment process, the IAEA (www.iaea.org) published a suite of safety standards that countries should meet in order to optimise safe practice when working with radiation. Each country must invite an IAEA-led international panel of experts, namely the International Regulatory Review Service (IRRS), to undertake a review of the local regulatory framework and competent authority for radiation protection at least once every 10 years. The purpose of this review is to highlight good practice and identify opportunities for education and improvement.

The IRRS last visited Ireland in 2015 and the outcome of this review led to various improvements in radiation safety, including the establishment of HIQA as the new regulator and competent authority for patient radiation safety. A follow up review was scheduled in 2020 but did not proceed due to pandemic restrictions. The IRRS has now been invited by the Irish government to undertake a full review, termed an IRRS *Mission*, in January 2026.

[2] 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 preparations for the Mission are being led by the EPA and will involve cross collaboration between the Department of Environment, Climate and Communications (DECC), HSE, Department of Health (DOH) and HIQA. There will also be other stakeholders involved to varying degrees, for example, the Department of Transport, Health and Safety Authority, An Garda Síochana and the Office of Emergency Management.

The preparatory work for the Mission commenced in mid-2024 and the key milestones to be achieved are presented hereunder:



The Questionnaire

An IRRS self-assessment questionnaire must be completed prior to the Mission which consists of 218 detailed questions on the policies, procedures and regulatory powers in place to support radiation safety in Ireland. The questions are organised into various sections, as follows:

Section	**Questions**
Module 1: Responsibilities and Functions of the Government	17
Module 2: The Global Safety Regime	3
Module 3: Responsibilities and Functions of the Regulatory Body	14
Module 4: Management System for the Regulatory Body	19
Module 5: Authorization	2
Module 6: Review and Assessment	3
Module 7: Inspection	3
Module 8: Enforcement	2
Module 9: Regulations and Guides	4
Module 10: Basic Primary responsibilities of the regulatory body in emergency	11
Radiation Sources	27
Transport	12
Predisposal Management of Radioactive Waste	22
Public Exposure	26
Medical Exposure	12
Occupational Exposure	21
Decommissioning of Facilities	20
Total number of questions	**218**

Every question, within each section, has been delegated to the most pertinent agency for completion, with support from the other stakeholders, where appropriate. The lead agencies from a healthcare perspective are the DOH, EPA and HIQA, with the HSE, as a service provider, facilitating background support, as needed.

Once completed, the questionnaire will be returned to the IRRS in advance of the Mission to inform the review process. As part of the Mission, the IRRS team will accompany both EPA and HIQA staff to healthcare and industrial locations to observe inspection processes and procedures. It is anticipated that the IRRS team will also interview staff onsite, who work with medical ionising radiation, to understand their experience of the regulatory process. The IRRS Mission Report will be written over the course of the review in January 2026 and will be published on the IAEA website and in Ireland shortly thereafter.

This IRRS Mission provides an opportunity for the various stakeholders in radiation protection to work closely together to identify potential gaps in legislation, national policy and regulations, so that improvements can be made and that the highest standards for radiation protection can be achieved.

Radiation Protection Awareness Training

All staff who work in medical services where they may encounter ionising radiation must be trained on the risks associated with radiation exposure and understand the measures that are required to limit the potential for occupational exposure.

The NRPC developed a national training programme to promote radiation safety awareness and made this resource freely available to all healthcare staff via the HSELanD portal. The programme was based on international guidelines and aimed to standardise the information provided to staff. It promoted an understanding of the principles of radiation protection and highlighted the legal obligations imposed on staff for ensuring safe practice with ionising radiation. It also outlined the measures that should be taken to reduce the risk of occupational exposure and provided examples of typical radiation safety incidents. Two modules of the programme were developed and successfully launched on HSELanD in March 2024

Module one, entitled '***Radiation safety awareness training'***, provided an introduction to medical ionising radiation, explained the types of radiation, the risks associated with exposure and the various measures that should be taken to limit occupational exposure. This was considered an introduction to radiation safety and was developed to support induction training for all healthcare staff. Upon completion of module one, staff progressed to module two, if relevant to them.

Module two, entitled '***Protecting our patients in a healthcare setting'*,** was developed to support clinical staff who refer patients for radiological procedures. This module explained the principles of radiation protection, the legal responsibilities imposed on referrers when prescribing a radiological procedure and the common incidents associated with poor referral practices.

Certificates of attendance for both modules are provided by HSELanD and remain valid for two years. In 2024, 2829 people of various grades, have undertaken module one of the training programme and 1145 people have completed module two. An overview of these participants and the various services that employed them are presented in the tables hereunder.

Table 1: Overview of grade of staff who have undertaken the training programme

Grade of Staff	Module One	Module Two
Ambulance staff	2	0
Care staff	175	54
Clerical & Administrative staff	55	14
Clinical Nurse Specialists / Advanced Nurse Practitioners / Public Health Nurses	112	65
Hospital Consultants	106	72
Health and Social Care Professionals	623	421
Management	13	4
Non Consultant Hospital Doctors	463	225
Nursing / Midwifery staff	812	163
Nursing/ Midwifery Students	29	14
Other Medical specialists	104	69
Support staff	138	7
Therapists	27	9
Other	170	28
Total number of participants	**2829**	**1145**

The participants categorised as 'Other' refer to people who identified on HSELand as agency staff, volunteers, GP practice nurses and school nurses.

Table 2: Overview of the locations where people who undertook the training on HSELanD originated from.

Overview of Locations	Module One	Module Two
Community Health Organisation	365	189
HSE Funded Services	22	5
Acute Hospital Services	1956	788
National Services and National Divisions	57	39
Private Care Homes	7	0
Private Hospitals	125	43
TUSLA Child and Family Agency	3	2
Volunteer Services	156	22
Other	138	57

The locations categorised as 'other' were mainly agency staff and volunteers working in HSE locations or HSE funded services and staff employed in private hospitals.

The training programme aims to support, but not replace, the important work of local radiation protection teams by promoting safe practice and regulatory compliance. Currently, this training programme is not recognised as mandatory by all locations, however the NRPC strongly recommends that all staff undertake these modules.

In this regard, regular communications issued by the NRPO throughout the year to all locations highlighted the availability of this online training resource. In addition, information of the training programme featured in both the summer edition of *Health Matters* and the *World of Irish Nursing* publication.

Going forward, the NRPC will consider the development of a third module in the programme, aimed at supporting practitioners, with a particular focus on services operating outside of radiology and radiotherapy departments.

Radiation Protection in Nursing and Midwifery Services

The NRPC collaborated with the HSE Office of Nursing and Midwifery Services Director (ONMSD) throughout the year to promote radiation protection in nursing and midwifery services. Two surveys were commissioned by the NRPC and summaries of the outcomes are presented herein. Both reports can be accessed here: https://www.hse.ie/eng/about/who/acute-hospitals-division/radiation-protection/reports/

National Survey of Nurse and Midwife Referral Practices for Radiological Procedures

Nurses and midwives who are appropriately trained and competent have the authority to refer patients for procedures that involve medical ionising radiation, under SI 256 (2018)(4). The NRPC commissioned a national survey to establish the extent and governance of nurse and midwife referrals for radiological procedures in hospital and community services.

The survey confirmed that the nurse / midwife referrers were authorised to refer patients for radiological procedures within their documented scope of practice. The nurse / midwife referrers were supported by the patient's attending consultant and endorsed by the local Radiation Safety Committee. Also, referrals were always assessed by the practitioner before proceeding.

This survey identified that nurse / midwife referrers were ordering a wide range of diagnostic imaging procedures in the majority of locations. It also highlighted that there was an increasing need for nurses and midwives to take on the extended role of referrer in order to meet service demands.

The following recommendations were made:

- Expanding the scope of imaging procedures for which a nurse / midwife can refer should be implemented with the oversight of the local Radiation Safety Committee.
- The referral site coordinator for nurse / midwife referral for radiological procedures, or an experienced nurse / midwife referrer for radiological procedures, should be included in the membership of the local Radiation Safety Committee.
- Nurses / midwives who refer for radiological procedures must adhere to existing legislation, national guidance and local governance arrangements when completing an episode of care within their scope of practice.

- All nurse / midwife referrals for radiological procedures, including DXA[3], must be visible to the local Radiation Safety Committee.
- All nurse / midwife referrers for radiological procedures must undertake regular audit of their practice and share audit outcomes with the local Radiation Safety Committee.

National survey of nurse led DXA services

The demand for DXA imaging services has increased in recent years with the public focus on healthy aging, obesity management and disease prevention. Staff who operate DXA imaging equipment must be appropriately trained and competent and must have a clear understanding of their legal role and responsibilities in relation to radiation protection. DXA services are typically managed by radiographers however in some services, this role has been delegated to nurses.

Considering this, the NRPC commissioned a national survey to establish the number of nurse-led DXA services in operation and to determine the potential demand for certified training on DXA imaging technique. The survey found that 26 locations were providing a DXA service with 7 of these being nurse led (27%) and the remainder managed by radiographers (73%).

Nurses were delegated authority from the local practitioner to operate the DXA imaging equipment. They had undertaken a variety of education, including programmes with University College Dublin, specialist bone health certificate training provided by the International Society of Clinical Densitometry and the Irish DXA Society, and training in other jurisdictions. They also cited training provided by the local radiation protection team and the manufacturer of the DXA equipment.

Respondents supported the notion of providing a national standardised training programme for DXA imaging technique. They suggested that it would potentially allow for the establishment of a recognised post graduate qualification for nurses in the area of DXA and bone health and perhaps support the development of a clinical nurse specialist role.

Sharing the Learning

It was important throughout the year for the NRPO to communicate regularly with frontline services so that radiation protection remained a priority in the ongoing healthcare restructuring programme. The NRPC was also invited to present on radiation protection projects at the annual conference of the Irish Association of Physicists in Medicine in April 2024.

In addition to these regular updates, the NRPO asked frontline radiation protection teams for information on local initiatives that had been successfully introduced to promote radiation safety. This request was positively received and the information returned was disseminated nationally by the NRPO to share the learning and promote good practice.

All submissions received will be published on the HSE radiation protection webpage in 2025.

[3] Dual energy x-ray absorptiometry (DXA) is a diagnostic imaging procedure typically ordered to assess a patient's bone density or their level of visceral adipose tissue.

Conclusion

A lot was achieved this year in terms of regulatory compliance, radiation protection training and promoting safe practice with medical ionising radiation. Fundamental to this success was the positive and proactive engagement and support of frontline radiation protection staff. However, there is no room for complacency when it comes to mitigating the risks of radiation exposure and the NRPC will continue to advocate for radiation protection, education and safe practice across all radiological services in 2025.

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Appendix: Membership of the National Radiation Safety Committee 2024

Membership of the National Radiation Protection Committee 2024	
Dr. Andrew Bolas	Co-Chair, Assistant National Oral Health Lead, Community Services
Dr. Ciaran Browne	Co-Chair, Access and Integration, 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
Dr. Maureen Flynn	National Lead for Nurse Referral for Radiological Procedures, Office of the Nursing and Midwifery Services Director, HSE
Ms. Michele Monahan	Senior Radiographer Services Manager, HSE
Dr. Naomi Lavan	Consultant Radiation Oncologist, St. Luke's Radiation Oncology Network
Mr. Niall Phelan	Chief Physicist, National Screening Service, HSE
Mr. Thomas Heary	Diagnostic Medical Physics Expert, Beaumont Hospital