National Radiation Safety Committee

Annual Report 2015
Contents

Executive Summary 2
Forward 6
1 Introduction 7
2 Work of the NRSC and MERU 8
3 Work of the NRSC Subcommittees 13
4 Transition of MERU to HIQA 16
5 Work Themes for the NRSC in 2016 17
6 Appendices 18
Executive Summary

This report outlines the work of the National Radiation Safety Committee (NRSC), its three national subcommittees and the Medical Exposure Radiation Unit (MERU) in 2015.

The NRSC was established in 2007 by the Director General (DG) of the Health Service Executive (HSE), under Statutory Instrument (SI) 478 (2002) to advise on the protection of patients in relation to medical exposure to ionising radiation in both public and private radiological facilities.

The main focus for 2015 was on preparing for and participating in the International Atomic Energy Agency / Integrated Regulatory Review Service (IAEA/IRRS) peer mission to Ireland which took place in September 2015.

Incident Reporting and Analysis

Over 100 public and private radiological facilities are licensed to deliver medical ionising radiation in Ireland and are expected to return an annual incident report to MERU each year. However, it is disappointing to note that only 57 radiological facilities completed and returned the annual incident returns template to MERU in 2015. The NRSC believes that incidents and near miss events do occur in almost all hospitals and has concerns that incidents are under-reported nationally. This is considered a risk to patient safety. The sharing of and learning from incidents that occur in Irish hospitals are vital elements of any effective radiation safety culture and these will be areas of focus for the NRSC in the coming years.

Incident reporting will enhance patient safety and radiology and staff should view this as a tool for trending and learning. By reporting and analysing incidents and near miss events, alerts can be raised before issues become significant.

The analysis of patient radiation safety incidents is ongoing and a trending report on incidents reported to MERU entitled ‘Incidents reported to the Medical Exposure Radiation Unit in Diagnostic Radiology (including Nuclear Medicine) and Radiotherapy 2013 – 2015’ was completed and published.

A request for an audit of incident reporting in radiotherapy was submitted to the HSE and this audit is expected to commence in 2016.

Two audits were conducted in 2015 by the HSE Healthcare Audit team against the key performance indicators listed in the Patient Radiation Protection Manual, namely;

- ‘Audit of incident reporting and learning as outlined in section three of the MERU Patient Radiation Protection Manual 2013’ – Findings suggested that incidents in radiology were under-reported to MERU, possibly due to confusion about what constituted a notifiable incident and a lack of appreciation for the value of learning from adverse events or near misses. The Patient Radiation Protection Manual will be updated in 2016 to address these issues.
- ‘Audit of patient pregnancy protocols and diagnostic reference levels as outlined in the MERU Patient Radiation Protection Manual’ – This audit highlighted the fact that the protocol for the management of potentially pregnant patients was not standardised across radiological facilities. The auditors recommended the development of a national policy to standardise practice and work on this is due to commence in 2016.

All of these reports are available on the MERU website.
*IAEA/IRRS Mission to Ireland*

At the request of the Irish government, the IAEA convened an international team of senior safety experts to conduct a review of the Irish regulatory framework for radiation safety in September 2015. This review was largely positive, in respect to the remit of the Office of Radiological Protection / Environmental Protection Agency (ORP/EPA). However, it did identify areas relevant to patient protection that are in need of urgent attention. These are:

- Implementing an effective legal framework for the regulation of patient protection and urgently putting in place arrangements to carry out inspections and enforcement to ensure patient protection.
- Ensuring that the regulatory body for patient protection is independent
- Ensuring effective coordination between the Department of Health (DOH) (competent authority for patient safety) and the ORP/EPA (responsible for the protection of workers and the public).
- Establishing policies and processes regarding development updating of guidance documents and code of practice for patient radiation safety.

These findings were not surprising to the NRSC and are consistent with its long held position on the current gaps in the regulatory framework for patient protection in Ireland. The ongoing work in relation to the transposition of the European Commission’s Basic Safety Standards (BSS) Directive by the DOH offers a unique opportunity to address the concerns identified by the IRRS review team and the NRSC will support this work to ensure that Ireland affords the highest standards of radiation protection for patients.

**Crucial Enabler**

The NRSC supports the implementation of the Unique Patient Identifier (UPI) which was introduced into legislation in July 2014. The Committee sees this development as an urgent and critical tool to allow it more completely fulfil its brief, allowing it to help monitor and reduce unnecessary repeat procedures and assist in the measurement of individual and cumulative radiation doses to patients.
The National Subcommittees of the NRSC

The National Dental Subcommittee did not convene in 2015. The term of the Dental Council came to an end resulting in a number of dentists stepping down. The new Dental Council was elected in October 2015 and applications have been sought to fill the vacancies on the subcommittee.

The National Population Dose and Optimisation Subcommittee convened twice in 2015 due to the extensive workload associated with the IAEA/IRRS mission. This subcommittee finalised the report entitled ‘National survey of dual energy x-ray absorptiometry (DXA) services in Ireland’ which confirmed that DXA contributes less than 1% to the population dose from medical exposure and identified issues in relation to governance and quality assurance.

The absence of a technical resource in MERU had an impact on the work of this committee and following submission of a case to the HSE, the Executive agreed to recruit a principal physicist in 2016 to address this deficit.

The National Radiotherapy Subcommittee convened twice in 2015. The report entitled ‘Audit of the dosimetry calibration of prostate intensity modulated radiation therapy’ was completed and published in 2015. The report found that all centres were substantially compliant with international dosimetry standards. Further radiotherapy audits are planned for 2016.

Competent Authority – Transition

In 2013, the Department of Health agreed to the development of proposals on the transition of the function of Competent Authority for patient safety to the Health Information and Quality Authority (HIQA). The formulation of legislation to facilitate this transfer is in progress and is expected to be completed in 2018. The NRSC considers this a priority and will support the ongoing work.
Legislative Framework for Radiation Protection in Ireland

European Atomic Energy Community Treaty (EURATOM)

Basic Safety Standard BSS 96/26/EURATOM

Workers and General Public

Environmental Protection Agency / Office of Radiological Protection SI 125

Medical Exposure Directive 97/43/EURATOM

Patients

Department of Health SI 478

Health Service Executive MERU
National Radiation Safety Committee Chair’s Foreword

I am pleased to present the 2015 National Radiation Safety Committee (NRSC) Annual report which describes the activity and progress made by the NRSC across a number of key themes concerning patient radiation safety, the essence of which are outlined in the executive summary.

I would like to thank committee members for their commitment and expertise which has allowed the NRSC to deal with a considerable workload during the year. I wish also to acknowledge the crucial and positive support we received from Mr. Patrick Lynch, National Director, Quality Assurance and Verification Division (QAVD) HSE, who is the DG’s delegated officer and Dr. Edwina Dunne, Assistant National Director, Quality Assurance and Verification Division (QAVD). In particular, I wish to acknowledge the work undertaken by both in efforts to restore the support resources within MERU which were seriously depleted following the transfers of key staff.

The work of the NRSC is predominantly reliant on the Medical Exposure Radiation Unit (MERU) and I would like to convey my particular thanks to the MERU executive, administrative and specialist advisers for their invaluable input.

A special word of thanks to Cork University Hospital and St. Vincent’s Private Hospital for facilitating the NRSC by hosting the meetings throughout the year. Visiting these sites allowed the NRSC to meet frontline staff, listen to their concerns first hand and hear about the innovative practice taking place nationwide. It also gave frontline staff an opportunity to meet committee members and learn what role the NRSC has in protecting patients undergoing medical ionising radiation procedures. This practice of holding meetings on-site was considered worthwhile by all concerned and will continue in 2016.

In conclusion, the NRSC and its advisors are mindful of their responsibilities and the reliance that the system has on them to provide assurance that medical radiation exposure is at optimum level. The committee will continue to make every effort to optimise their impact with full commitment and diligence.

Pat Harvey

Pat Harvey, Chair
National Radiation Safety Committee
1. Introduction

The European Medical Exposure Directive 97/43 transposed into Irish law by the SI 478(2002) requires that appropriate mechanisms be in place to protect patients from the harmful effects of ionising radiation. To meet this statutory requirement, the DG, HSE, established the NRSC in 2007 to advise on matters pertaining to ionising radiation exposure.

This committee consists of no more than 10 members, appointed by the DG for a period not exceeding five years. The NRSC is required to meet twice a year at a minimum and met five times in 2015.

Please see Appendix 1 for the NRSC membership list.

The roles of the NRSC include the following:

- Advise the DG, HSE, on measures or arrangements that are necessary to protect the health and safety of patients, the general public and persons employed in radiological facilities.
- Receive reports from clinical auditors and inspectors.
- Produce an annual report.
- Receive record and analyse reports on radiation incidents as required and advise where appropriate.
- Gather lifetime data on equipment and an assurance that each piece is maintained appropriately.
- Issue guidance notes where applicable.
- Review relevant new clinical risk practices to ensure that the exposure and outcome for the patient is in line with international best practice and provide advice where applicable.
- Establish the total exposure level of ionising radiation to the population.
- Monitor radiation dose reference levels as established by Irish Medical and Dental Councils.
- Any other appropriate matters that may arise.

The Medical Exposure Radiation Unit (MERU)

MERU was established following the recommendation from the HSE Task Force on the Implementation of SI 478(2002). MERU regulates patient radiation protection practices in radiological facilities, both private and public, and is the executive, administrative and advisory unit for the NRSC.

The regulatory roles of MERU include the following:

- Commission clinical audit in radiological facilities.
- Manage the mandatory incident reporting system.
- Develop and provide guidance on direction to holders, practitioners, other staff and statutory bodies on relevant matters as guided by the NRSC.
- Ensure quality assurance programmes are in place in radiological facilities.
- Maintain a register of installations.
- Support and manage the work of the NRSC and its sub committees.

The guidance of the advisors to MERU, the NRSC and its subcommittees has been crucial to the achievements of MERU to date.
2. Work of the NRSC and MERU

The NRSC is supported by MERU and its advisors and convened five times in 2015. HIQA representation was unavailable to attend these meetings.

The advisors to MERU in 2015 were as follows:
- Ms. Bernadette Moran, Radiographic Advisor
- Ms. Mandy Lewis, Physicist Advisor
- Dr. Peter Wright, Public Health Specialist Advisor
- Dr. Andrew Bolas, Dental Advisor
- Mr. Fintan Bradley, Chief Physicist and Radiotherapy Advisor

The work of the NRSC is delivered through the subcommittees that are established by the NRSC and chaired by a member of the NRSC. Updates from each subcommittee and MERU are standing items on the agenda for the NRSC meetings.

Please see Appendix 2 for subcommittee membership details.

Patient Radiation Incidents

There are over 100 public and private radiological facilities licensed to deliver medical ionising radiation in Ireland. The MERU Patient Radiation Protection Manual was published in 2013 to support the practical application of the safe and optimal use of medical ionising radiation. Section three of this manual defines and categorizes incidents and directs all facilities using medical ionising radiation to report to MERU notifiable incidents upon discovery and to forward a final investigation report within three months. Those incidents considered non-notifiable or a near miss must be reported to MERU annually.

Incidents Reported to MERU in 2015

At the time of writing this report, 57 radiation facilities completed and returned the annual returns template to MERU in 2015. These reports consisted of 597 near miss events, 468 non-notifiable and 53 notifiable incidents. 14 sites reported that no incidents or near miss events occurred in 2015 and the remaining facilities made no returns.

The figures below and subsequent discussion describes the incidents reported to MERU in 2015 and indicate that such events are considerably under-reported nationally which the NRSC considers a risk to patient safety.
Figure 1: Notifiable incidents reported to MERU from each modality in 2015

![Notifiable Incidents per Modality](image)

Figure 2: Causes of notifiable incidents reported to MERU in 2015

![Notifiable Incidents 2015](image)
Figure 3: Types of notifiable incidents reported in Radiology in 2015

Radiology Notifiable Incidents 2015

- Incorrect Patient: 18
- Incorrect Procedure: 1
- Incorrect Anatomy: 5
- Adult > twice diagnostic overexposure >10mSv: 4
- Inadvertent dose to foetus >1 mSv: 3
- Incorrect radiopharmaceutical: 1
- Any other radiation exposure incident to patient: 1
- Radiation therapy dose or volume variation from the fraction prescribed > 20%: 1
- Cardiology: 1
- Nuclear Medicine: 1
- General X-ray: 1

Legend:
- CT
- General X-ray
- Nuclear Medicine
- Cardiology
All notifiable incidents were assessed by MERU advisors when reported and the annual returns were reviewed and analysed once they were received.

The fundamental role of incident reporting is to improve practice and enhance patient safety. Data analysis for 2015 suggests that radiological facilities need to recognise the importance of shared learning and the role it plays in enhancing patient safety. It is noted that 14 radiological facilities reported no adverse events or near misses had occurred. However, it should also be noted that many facilities made no returns whatsoever. MERU and the NRSC consider this a risk to patient safety and locations not reporting incidents or near miss events will be the focus of external auditing in 2016. The NRSC has also requested the HSE conduct an audit of incident reporting in radiotherapy, which is expected to commence in 2016.

Practice can only be improved if there is shared learning from adverse incidents and near miss events which can inform quality improvement initiatives. Radiological facilities must view incident data as a quality measure and encourage a safe culture where staff understand their responsibilities and report incidents appropriately. This culture requires support and leadership from the most senior people in the organisation who promote an environment where staff are encouraged to report, investigate, disseminate and implement learning from incidents promptly.

MERU wish to acknowledge the co-operation, goodwill and proactive approach to reporting incidents and near miss events taken by the management and staff at the majority of radiological facilities. However, it is clear that there is still considerable work to be done in educating and encouraging staff to report adverse events.

**IAEA/IRRS Mission**

At the request of the Irish government, the IAEA convened an international team of senior safety experts to conduct an IRRS mission in September 2015. The purpose of this peer review was to measure the Irish regulatory framework for radiation safety against IAEA safety standards which are the international benchmark for radiation safety. The mission was also used to exchange information and experience between the IRRS team members and their Irish counterparts. The IRRS review examined all facilities and activities involving the use of ionising radiation regulated by the Environmental Protection Agency (EPA) and the HSE.
The EPA and HSE provided the IRRS review team with advance reference material and documentation, including the results of a self-assessment in all areas within the scope of the mission. Throughout the mission, the IRRS team was extended full cooperation in regulatory, technical and policy issues by all parties; in particular, staff of the EPA and HSE provided the fullest practicable assistance and demonstrated extensive openness and transparency.

The IAEA/IRRS review highlighted a number of areas of good practice and made recommendations or suggestions to indicate where improvements are necessary or desirable to enhance patient protection and the effectiveness of regulatory functions in line with the IAEA Safety Standards. These recommendations are listed below:

- Implement an effective legal framework for the regulation of patient protection and urgently put in place arrangements to carry out inspections and enforcement to ensure patient protection.
- Ensure that the regulatory body for patient protection is independent and does not have responsibilities for, or interests in, providing medical exposure to ionising radiation.
- Ensure effective coordination between the EPA and the regulatory body for patient protection.
- Establish policies and processes regarding development and updating of guidance documents and code of practice for radiation safety.

The IAEA/IRRS team recognised that their findings broadly correlated with the action plan prepared by the EPA and HSE as a result of the self-assessment and press release was issued at the end of the mission.

**Head of European Radiological Competent Authority (HERCA)**

Justification and Optimisation are two of the fundamental principles in radiation protection and must be carried out for every individual exposure and all new practices in radiology in accordance with the new European radiation protection directive 2013/59. Regulatory bodies have an important role in promoting justification and optimisation and ensuring that they are properly implemented at locations where medical ionising radiation is used. Inspection and audit to verify local implementation of these principles is therefore an important task for the regulatory bodies. One of the goals of HERCA is to facilitate the development of training and provide opportunities to share experience, such that inspectors gain sufficient competence to advise and influence the justification and optimisation processes for medical exposures.

The MERU radiographic advisor is a member of the HERCA Working Group on Medical Radiation Exposures and attended a three-day workshop held in Brussels in October 2015.

The aims of the workshop were as follows:

- To disseminate and harmonise good inspector practices throughout Europe
- To identify areas for improvement.
- To discuss how onsite inspection can be used as an effective tool for implementing the principles of justification and optimisation in diagnostic radiology.

The outcome was the sharing of good practice across Europe and the production of recommendations on the practical aspects of inspection of justification and optimisation within diagnostic radiology. Also, the generation of recommendations to assist in the transposition of the BSS 2013/59 in all European countries.
3. Work of the NRSC Subcommittees

National Population Dose and Optimisation Subcommittee

This committee is responsible for assessing radiation dose to the population and advising on optimisation, which is a requirement under SI 478 (2002). The committee convened twice in 2015. The committee members were pleased to welcome new member, radiographer Liz Darcy who has considerable expertise in computed tomography dose optimisation.

Recruitment of a Principal Physicist

The absence of technical resources in MERU meant that no new data collection cycles were initiated in 2015. Instead, the focus was on securing resources to exploit dose data collection systems already in place. This involved a coordinated approach between the NRSC, the Faculty of Radiology and the HSE Quality Assurance and Verification and Acute Hospitals Divisions.

It was agreed the HSE would recruit a Principal Physicist in 2016 to act as a technical resource facilitating accurate dosimetry, training of users, highlighting trends and identifying outliers. Outliers are considered important as too little radiation used in studies can mean they are of poor diagnostic quality and too much radiation without clinical benefit can lead to adverse health effects, such as increased cancer risk, or tissue effects such as in utero brain damage, skin burns and hair loss.

The deployment of a centralised solutions system as required by the HSE’s own guidelines and position which has in the main being paid for will result in significant cost savings in the order of one million euro per annum from estimates of some marketed products (Based on 40 hospitals with 5 modality licence per annum at a cost of 5,000 euros per licence.)

Governance of dose data will remain the responsibility of local centres under the Chief Executive Officer and Practitioner-in-Charge. Assessments of dose trends and outliers were undertaken in pilot studies in 2015 and the findings were communicated to the imaging centres involved. Subsequently, plans to reduce the likelihood of outliers occurring were developed and initiated.

National Survey of Dual X-ray Absorptiometry Services in Ireland

The ‘National Survey of Dual X-ray Absorptiometry Services in Ireland’ was initiated in 2014, finalised in 2015 and demonstrated compliance with SI 478(2002), SI 303 (2007) and SI 459 (2010). This report showed that dual x-ray absorptiometry for osteoporosis and body fat assessment is a low dose modality with a contribution of 0.16 uSv per caput of the entire 4000 mSv per caput per annum. However, it was also found that governance and quality assurance legislative requirements were not being met by all centres.

HSE Healthcare Audits

This committee welcomed the work of the HSE healthcare auditors; who undertook two audits, to measure compliance with legislative requirements outlined in the Patient Radiation Protection Manual:

- ‘Audit of incident reporting and learning as outlined in section three of the MERU Patient Radiation Protection Manual 2013’ and
A key component of the latter audit focused on dose reference levels and highlighted issues in relation to local policies and education. Six hospitals were examined and it was recommended that audit of dose reference levels be included in education programmes in radiological facilities. There is also an education piece to be developed around the practical implementation and purpose of dose reference levels.

**Diagnostic Reference Levels (DRLs)**

The European Society of Radiology is moving toward DRLs based on clinical need rather than anatomical indication. This committee will undertake national dose surveys of mammography and computed tomography in 2016 to identify improvements required in radiation dose reduction and optimisation in order to promote patient safety. However, the use of skilled radiologists, radiographers and physicists to undertake manual, expensive and resource intensive data collection would seem counter intuitive in an environment where demands on radiology services are increasing.

**National Radiotherapy Subcommittee**

There were two meetings of the National Radiotherapy Subcommittee in 2015. Due to the extensive workload associated with the IAEA/IRRS mission, it was not possible to hold the usual four meetings.

**Radiotherapy Dosimetry Audit**

The ‘Audit of the dosimetry calibration of prostate intensity modulated radiotherapy’ was started in late 2014. The aim of this audit was to determine the level of compliance with international dosimetry standards and the objective was to confirm the calibration of prostate intensity modulated radiation therapy (IMRT) systems. Twelve radiotherapy centres participated in the assessment and the results were submitted to MERU in October 2015. The findings suggested that all twelve centres were substantially compliant with international dosimetry standards for treating prostate cancer with IMRT systems. The audit report was approved by Dr. David Fitzpatrick, chair of the Radiotherapy Subcommittee and at the October meeting, it was proposed to conduct a further audit of head and neck radiotherapy treatment using IMRT in 2016.

**The National Incident Management System (NIMS)**

MERU continues to engage with the State Claims Agency regarding incident reporting by public radiological facilities using the NIMS. The Radiotherapy Subcommittee advises that all major and critical incidents are reported to MERU within 24 hours and minor or near miss incidents are reported annually.

There were 14 notifiable radiotherapy incidents reported to MERU in 2015, with one centre reporting 7 of these incidents. (See Figure 4 above for details of these.) Of the 12 radiotherapy centres in Ireland, five reported that no notifiable incidents or near miss events occurred in 2015. All incidents and near miss events are self-reported and this committee considers it disappointing that some centres failed to submit any data. It is anticipated that the findings from the HSE audit on incident reporting in radiotherapy due to commence in 2016 will provide valuable insight.
Online Imaging Review

The Radiotherapy Subcommittee issued a letter to all radiotherapy departments clarifying the definition of online imaging review and specifying that radiation therapists review the image before treatment is delivered to the patient.

National Dental Subcommittee

Under SI 478 (2002), dentists are required to appoint a Medical Physics Expert (MPE) to have responsibility for ionising radiation equipment. The MPE and the Radiation Protection Advisor (RPA) may in some cases, be the same individual. The MPE acts or gives advice on dosimetry, the development and use of complex techniques and equipment, optimisation, quality assurance, including quality control, and other matters concerning radiation protection and exposure. The RPA or MPE do not have responsibility for patient safety in the use of ionising radiation.

In 2009, a HSE subgroup established to identify the role of the MPE produced an acceptable checklist for MPE tasks in line with SI 478 (2002). In September 2012, MERU surveyed all RPA’s working in dentistry to identify what MPE service they were providing and to determine if they were willing to carry out the full MPE service, if not already doing so. Results demonstrated that all RPA’s were willing to provide the full MPE service to dentists.

In August 2013, MERU issued a letter to all dentists regarding the provision of the MPE service. Dentists were asked to contact their RPA to make the necessary arrangements to ensure that the full MPE service would be provided in their facility. Feedback from dentists was positive and as all dental x-ray licences are due for renewal in 2016, appointment of the RPA can be verified at that time.

During 2015, the term of the Dental Council came to an end. This resulted in a number of the dentists who would normally sit on the National Dental Subcommittee not being available. The new Dental Council was elected in October 2015 and applications have been sought to fill the vacancies on the committee. It is hoped that the committee will schedule a meeting in 2016.
4. Transition of MERU to Health Information and Quality Authority

The DG of the HSE is the designated Competent Authority for regulating medical ionising radiation under SI 478(2002) and MERU was established by the HSE to regulate patient protection practices in public and private radiological facilities.

It has been agreed between the Department of Health, HSE and HIQA that the regulatory function move to HIQA which is the independent health regulator. Legislative changes to the Health Act (2007) are required in order to undertake this transfer of responsibilities. Work is ongoing in relation to this and it is proposed that the transition will be completed by 2018.
5. Work themes for the NRSC in 2016

1. Support the Subcommittees
   - National Radiotherapy Subcommittee
   - The National Population Dose and Optimisation Subcommittee
   - The National Dental Subcommittee

2. Site Visits


4. Manage, review and redefine the incident reporting process
   - Continue to engage with the State Claims Agency in relation to the National Incident Management System
   - Commission an audit of incident reporting in radiotherapy
   - Disseminate information in relation to the work carried out by MERU on incident reporting and other relevant issues

5. Proceed with implementation of the recommendations of the International Atomic Energy Agency / Integrated Regulatory Review Service Mission
   - Pursue the programme for transfer of responsibilities to the Health Information and Quality Authority
   - Support the Department of Health in the transposition of the Basic Safety Standard legislation

6. Support the development of the National Policy on Patient Pregnancy Protocols

7. Monitor and analyse population dose data
   - Support the HSE in the recruitment of a Principal Physicist
   - Commission a CT Population Dose Survey
   - Commission a Mammography Dose Survey

8. Set Guidelines for Patient Radiation Safety

9. Support the implementation of the Unique Patient Identifier legislation.
6. Appendices

Appendix 1

Membership of the National Radiation Safety Committee

Mr. Pat Harvey, Chair; Harwyn Management Consultants. Former Chief Executive Officer of the North Western Health Board.

Mr. Paddy Gilligan; Chief Medical Physicist, Mater Private Hospital. Chair of the National Population Dose and Optimisation Subcommittee.

Dr. David Fitzpatrick; Consultant Radiation Oncologist, St. Luke’s Hospital, Dublin and St. Luke’s Radiation Oncology Centre, Beaumont Hospital. Member of the Faculty of Radiologists of the Royal College of Physicians in Ireland. Chair of the National Radiotherapy Subcommittee.

Dr. Andrew Bolas; Deputy Principal Dental Surgeon in Sligo/Leitrim; Lecturer in Dublin Dental School; Chair of the National Dental Subcommittee

Ms. Catherine McKenna; Radiation Therapy Services Manager (RSM), St. Luke’s Hospital Dublin; Member of the Radiographers Registration Board; RSM chair on the Council of the Irish Institute of Radiographers and Radiation Therapists

Dr. Stephen Fennell; Manager, Radiation Protection Regulation, Office of Radiological Protection, Environmental Protection Agency

Dr. Edwina Dunne; Assistant National Director, Quality Assurance and Verification Division, HSE

Mr. Brian Keane; Chief Executive Officer, St. Vincent’s Private Hospital; Council Member of the Independent Hospitals Association of Ireland

Mr. Declan Sheppard; Consultant Radiologist, Diagnostic Directorate, Roscomon/Portiuncula Hospital, Saolta University Hospital Group

Dr. Peter Wright; Specialist in Public Health Medicine

Ms. Anne O’Connell; Regulation, Health Information and Quality Authority

Ms. Louise Diamond; Radiography Services Manager, University Hospital, Waterford

Advisors to MERU

Ms. Mandy Lewis; Principal Physicist, Radiation Protection Advisor, Mater Misericordiae University Hospital; Physics advisor to MERU

Ms. Bernadette Moran; Radiographic Advisor to MERU
Appendix 2

**National Dental Subcommittee**

**Dr. Andrew Bolas**, Chair; Deputy Principal Dental Surgeon Sligo/Leitrim; Lecturer in Dublin Dental School

**Mr. Eamon Croke**; Dentist, Molesworth House, Dublin 2

**Mr. Terry Farrelly**; Dentist, Roscrea, Co Tipperary

**Dr. Niamh Galvin**; Assistant National Oral health Lead, Tralee General Hospital, Kerry

**Mr. Paddy Gilligan**; Chief Medical Physicist, Mater Private Hospital; Chair of the National Population Dose and Optimisation Subcommittee

**Dr. Maurice Quirke**; Dental Surgeon; Member of the Irish Dental Association

**Ms. Tanya Kenny**; Senior Scientific Officer, Medical Physicist, Project Manager, Radiation Protection Regulation, Office of Radiological Protection/Environmental Protection Agency

**Mr. Fintan Bradley**; Chief Physicist Medical Physics Department Cork University Hospital

**National Radiotherapy Subcommittee**

**Dr. David Fitzpatrick**, Chair; Consultant Radiation Oncologist, St. Luke’s Hospital, Dublin and St Luke’s Radiation Oncology Centre, Beaumont Hospital. Member of the Faculty of Radiologists of the Royal College of Physicians in Ireland

**Ms. Tanya Kenny**; Senior Scientific Officer, Medical Physicist, Project Manager, Radiation Protection Regulation Office of Radiological Protection Environmental Protection Agency

**Ms. Catriona McDonald**; Manager of Operations, Chief Radiotherapist, UPMC Whitfield Cancer Centre, Waterford

**Ms. Catherine McKenna**; Radiation Therapy Services Manager (RSM), St. Luke’s Hospital Dublin; Member of the Radiographers Registration Board; RSM chair on the Council of the Irish Institute of Radiographers and Radiation Therapists

**Ms. Bernadette Moran**; Radiographic Advisor to MERU

**Dr. Frederick Vernimmen**; Consultant Radiation Oncologist, Cork University Hospital, Cork

**Prof. Wil van der Putten**; Chief Physicist, Galway University Hospital, Galway
National Population Dose Subcommittee

Mr. Paddy Gilligan, Chair; Chief Medical Physicist, Mater Private Hospital, Member of the National Dental Subcommittee

Ms. Noeleen Cunningham; Radiation Protection Regulation, Radiological Protection Institute Ireland

Ms. Liz Darcy; Clinical Specialist Radiographer, Wexford General Hospital, Wexford

Dr. Shane Foley; Radiography Programme Coordinator, University College Dublin

Dr. Neill O’Donovan; Consultant Radiologist, South Infirmary, Victoria University Hospital, Cork

Ms. Mandy Lewis; Principal Physicist, Radiation Protection Advisor, Mater Misericordiae University Hospital, Physics advisor to MERU

Mr. Brendan McCoubrey; RSO Clinical specialist, St. James’s Hospital, Dublin

Dr. Peter Wright; Specialist in Public Health Medicine

Mr. Michael Maher; Consultant Radiologist, Cork University Hospital, Cork

Ms. Bernadette Moran; Radiographic Advisor to MERU

Dr. Lesley Malone; Radiation Protection Advisor, Faculty of Radiologists, Trinity College Dublin