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| **Salisbury NHS Foundation Trust** |
| IR(ME)R Employers Procedures |
| **As required under IR(ME)R 2017** |

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1. The Employer’s Procedures of Salisbury NHS Foundation Trust

# Introduction

This manual describes the framework under which medical exposures of patients will be undertaken in Salisbury NHS Foundation Trust. It has been prepared in accordance with the Ionising Radiation (Medical Exposures) Regulations 2017, Ionising Radiation Regulations 2017, supporting legislation and guidance documents. It details the arrangements that will be followed by all staff and departments involved in requesting and performing medical exposures.

This applies to all departments administered by the Trust at:

* Salisbury District Hospital
* Westminster Memorial Hospital, Shaftesbury
* Fordingbridge Hospital
* White Horse Medical Practice, Westbury

**Staff should note that a breach of these procedures is, in effect, a breach of the law and may lead to disciplinary action.**

These procedures have been approved by the Radiation Safety Committee and will be subject to bi-annual review.

This document is to be read alongside the Radiation Safety Policy (Ionising Radiation).

# Radiation Protection Committee Membership

**March 2024**

Chairperson : Fiona McNeight

Radiation Protection Advisor : Dr Steven Crook

 : Ben Johnson (UHS)

Medical Physics Experts : Dr Steve Crook, Medical Physicist, SDH

Lead IR(ME)R Radiologist : Dr Rob Alcock

Operational Lead Radiographer : Tom Beaumont

Laser Protection Advisor : Mark Brewin

Health and Safety Manager : Troy Ready

Cardiac Cath Lab Manager : Christina Craig

Theatres Matron : Jennifer Evans

# Sections Relevant to Which Staff Group

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| --- | --- |
| **Staff Group** | **Section to be read** |
| Introduction | All  |
| Radiologists | All |
| Radiographer  | All |
| Radiography Apprentices | All |
| Assistant Practitioners | All |
| Radiology Department Assistants | a, b, c, g, k |
| Radiology Nurses | a, b, c, g, k |
| Radiology Clerical staff | a, b, c, d |
| Oral Surgeons reporting Coned Beam CT | a, k, f |
| Cardiologists | All |
| Dental nurses undertaking x-ray examinations | a, b, d, e, f, g, k, l, m, n, o |
| Staff undertaking Urodynamic Studies (Consultants and nurses) | a, b, d, e, f, g, k, l, m, n, o |
| Medical Physicists | All |
| Anaesthetists | a, b |

# List of acronyms

A&E Accident & Emergency

ARSAC Administration of Radioactive Substances Advisory Committee

CMB Clinical Management Board

CPD Continuous Professional Development

CQC Commission on Quality Care

CR Computed Radiography

CRIS Computerised Radiology Information System

CT Computed Tomography

CTDIvol Volume Computed Tomography Dose Index

DAP Dose Area Product

DLP Dose Length Product

DMT Departmental management Team

DR Digital Radiography

DRL Diagnostic Reference Levels

DWP Dose Width Product

ESD Entrance Skin Dose

GP General Practitioner

HPA Health Protection Agency

IPEM Institute for Physicist and Engineers in Medicine

IR(ME)R Ionising Radiation (Medical Exposure) Regulations

LDRL Local Diagnostic Reference Levels

LREC Local Research Ethics Committee

MPE Medical Physics Expert

MGD Mean Glandular Dose

NDRL National Diagnostic Reference Levels

NRES National Research Ethics Service

PACS Picture Archiving and Communication System

PES Patient Entrance Dose

R&D Research and Development

REC Research Ethics Committee

RDA Radiology Department Assistant

RIS Radiology Information System

RPS Radiation Protection Supervisor

RPC Radiation Protection Committee

SDH Salisbury District Hospital

SOP Standard Operation Procedures

SPA Suspected Physical Abuse

DMC Directorate Management Committee

CMB Clinical Management Board

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| Document History/Review

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| --- |
| **Document Control** |
| **Document Name:** | Salisbury NHS Foundation Trust Employers procedures as required under Ionising Radiation (Medical Exposure) Regulations 2017 |
| **Authors:** | Tony Ley, Johan Marais | **Current Version:**  | 7 |
| **Reference No:**  | IEP001 | **First published:**  | July 2003 |
| **Document Managed by Name:** | Tom Beaumont | **Current Version Published:**  | March 2024 |
| **Document Managed by Title:** | Operational Lead Radiographer | **Review Date:**  | March 2026 |
| **Authorising Committee:** | DMT | **Ratification Committee:** | CMB |
| **Date Approved by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Consultation Process** |
| Radiology Manager, Clinical Lead, MPEs, Operational Lead Radiographer, RPC |

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| **Supporting Documentation** |
| Radiology SOP: IR(ME)R QA programme |

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| **Target Audience** |
| **Target Audience:** | **All Staff** |

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| --- |
| **Version Control** |
| **Version** | **Date** | **Author/Reviewer**  | **Action** | **Revision description**  |
| 1 | July 2003  | Tony Ley / Miles Woodford  | Issued  | Approved by RSC and Chief Executive.  |
| Aug 2004  | Tony Ley / Miles Woodford  | Reviewed  | No change  |
| Aug 2005  | Tony Ley / Miles Woodford  | Deferred  | Review deferred following introduction of PACS & CR  |
| Jan 2007  | Tony Ley / Miles Woodford  | Updated  | Re-write following CR & DR  |
| 2 | April 2007  | Tony Ley / Miles Woodford | Reissued  | Approved by RSC and Chief Executive  |
| Apr 2008  | Tony Ley / Miles Woodford | Reviewed | No Change  |
| Nov 2009  | Tony Ley / Miles Woodford |  | Updates RPA and RPS arrangements added to Appendix 1  |
| 3 | Feb 2011  | Tony Ley / Miles Woodford | Reissued  | Updated Radiation Safety Policy Changes in personnel Changes to local procedures Updated for Ordercomms and electronic reception  |
| Feb 2012  | Tony Ley / Miles Woodford | Delayed Review  | Delay review until June 2012 due to appointment of new Chief Executive. Delay agreed by Radiation Protection Committee.  |
| 4 | July 2012  | Tony Ley / Miles Woodford | Reissued  | Change in Chief Executive Change in personnel within RPC Addition of RPC representation on Trust H&S committee (e) Distinction between CR and DR SOPS in (g) Changes to distribution of verified copies of reports (j) Additional details on reportable and non-reportable incidents (k) Minor changes to wording throughout  |
| 5 | Jan 2017  | Johan Marais / Sally Whewell  | Revised  | Membership of Radiation Protection Committee Roles and Responsibilities  |
| Feb 2017  | Johan Marais / Sally Whewell  | Reviewed  | Removal of signatories List of acronyms Staff group relevant sections added  |
| Lucy Bushby  | Reviewed  | No changes  |
| Steve Crook  | Reviewed  | No changes  |
| 6 | Dec 2019 | Johan Marais / Sally Whewell | Reviewed | Add additional sections required under IR(ME)R 2017 |
| 7 | March 2020 | Tom Beaumont / Johan Marais | Reviewed | Change in Chief ExecutiveChange in personnel within RPCClarification of fourth ID check, procedure (b) Justification of Nuclear Medicine procedures, procedure (c) Confirmation of patient/carer understanding, procedure (l)Timing of clinically justified procedures should not be affected, procedure (n) |
| 8 | March 2022 | Tom Beaumont / Johan Marais | Reviewed | Addition of 4th ID checkNuclear Medicine practitioner clarificationCBCT operator entitlementAddition of Trust consent form to pregnancy procedure |
| 9 | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Reviewed | Changes to 3rd party ID checksNo requirement to record practitioner for CTRemoval of requirement to tick pregnancy box in CRISAmalgamation of incident notification flowchartsAddition of dose information for operators |

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1. Procedures to Identify Correctly the Individual to be Exposed to Ionising Radiation

# Purpose

This document satisfies the requirements of Schedule 1a of the IR(ME)R Employers Procedures and describes the policy for patient identification and outlines the procedure to correctly identify the patient presenting for an X-ray examination.

# Policy

The Trust policy is to use the 3 point identification of full name, date of birth and address. The patient should not be prompted. In addition for radiation exposure the following should be established:

1. Area to be examined
2. Recent similar examinations in other centers
3. Clinical details

In addition to the requirements of the Trust policy a fourth check should be made which is confirmation of the examination to be undertaken. Identification is to be confirmed by the operator before any exposure is made. They should not continue if unable to confirm identity, in which case the referring department should be contacted for assistance.

# Procedure

Confirmation of each element of identification must be made with the person undergoing the exposure.

1. When a Referral, either paper or electronic, arrives in the Department, the member of staff receiving it will check that all the essential demographic details have been completed correctly.
2. The correct details are confirmed on the Radiology Information System (RIS), any corrections must be made through the hospital information system (Lorenzo).
3. Where required the checked and corrected referral form is scanned onto RIS.
4. The patient will be called from the waiting room using their full name.
5. Prior to the procedure /examination, the Radiologist / Radiographer (in the role of Operator) must ask patients to state THREE of the following:
6. Date of Birth
7. Full name
8. Address
9. Hospital or NHS number
10. Where more than one operator is involved in an exposure, a lead operator responsible for asking the ID questions should be decided.
11. In all cases, the Radiographer should also satisfy themselves that the clinical indications given by the patient match those on the request (right side/body part etc). This can be carried out by the following:
12. Ask, “Do you know why you are having this test?”
13. Do the Clinical details match the request (site/side/symptoms)?
14. Has any preparation required been followed?
15. Confirm with the patient that they have not received imaging suitable for this request recently. This may have been at another hospital.
16. Is the scheduling of examination correct, (if appropriate)?
17. If there is any doubt that you have the right patient or investigation, then every effort must be made to contact the referrer for confirmation. If this is not possible and it is apparent that an examination is required, re-justification by a practitioner should be considered. All changes must be fully documented.
18. There may be circumstances where verbal communication is difficult or not possible and alternative means of establishing the correct identity of the individual must be utilised.

Situations where alternative methods of Identification could be required:

1. **Incapable patient:** if the patient is incapable of confirming their own identity, 2 separate forms of identification must be obtained. Examples of this are wristband and accompanying personnel. The referral form is not to be used as a method of identification. When ID is confirmed by a third party the operator must record their name and role in a CRIS comment.
2. **Non-English-Speaking Patients:** in the absence of an accompanying person, use crib cards or local interpreter if possible or contact switchboard for the interpreter service.
3. **Unknown Identity:** If the identity of the patient is unknown in the cases of trauma, the unique identification number on the wristband /case card provided by the Emergency Department must be used until the real patient details can be obtained. This will either be an IW number or a unique U number.
4. **Theatre patients:** if the patient is sedated / anaesthetised check the wristband or ask the surgeon / nurse in charge to confirm the patient was correctly identified following operating theatre procedures prior to being sedated / anaesthetised. There is no requirement for the operator to name the identifying member of staff as this is recorded in theatre systems and as such is auditable.
5. Radiologists, radiographers, cardiologists, and other non-radiology personnel acting as operators can delegate the task of identifying the patient to the person assisting them. As the operator undertaking the exposure, they remain responsible for ensuring that this is done and that the correct patient is examined.
6. The identification process must be confirmed on the RIS by the operator during post processing. The method of identification (by selecting the dropdown list marked as a red box, but NEVER choose I) and the operator who undertook the identification (in the part marked with the second red box) should be recorded (Fig 1 and 2).



*Fig 1: Box to check to confirm Identification Process has been done*

 

Fig 2: Dropdown List for selecting the method of Patient Identification



Fig 3: Flowchart for the method of Patient Identification

# Document History/Review

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| **Document Control** |
| **Document Name:** | Procedures to identify correctly the individual to be exposed to ionising radiation |
| **Author:** | Tony Ley | **Current Version:**  | 7 |
| **Reference No:**  | IEP002 | **First published:**  | July 2003 |
| **Document Managed by Name:** | Tom Beaumont | **Current Version Published:**  | March 2024 |
| **Document Managed by Title:** | Operational Lead Radiographer | **Next Review Date:**  | March 2026 |
| **Authorising Committee:** | DMT | **Ratification Committee:** | CMB |
| **Date Authorised by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Consultation Process** |
| Radiology Manager, Clinical Lead, MPEs, Operational Lead Radiographer, RPC, PACS Office |

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| **Target Audience** |
| **Target Audience:** | **All Staff** |

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| **Version Control** |
| **Version** | **Date** | **Author/Reviewer**  | **Action** | **Revision description**  |
| 1 | July 2003  | Tony Ley | Issued | Issue 1 |
| Aug 2004 | Tony Ley | Reviewed | No change |
| Aug 2005 | Tony Ley | Deferred | Review deferred following introduction of PACS & CR |
| Jan 2007 | Tony Ley | Updated | Re-write following CR & DR |
| 2 | April 2007 | Tony Ley | Reissued | Issue 2 |
| July 2007 | Tony Ley | Updated | New referral form has no ID check – ID check on CRIS |
| Apr 2008 | Tony Ley | Reviewed | No Change |
| 3 | Feb 2011 | Tony Ley | Reissued | Updated for Ordercomms and electronic reception |
| 4 | July 2012 | Tony Ley | Reviewed | No Change |
| 5 | Feb 2017 | Sally Whewell / Johan Marais | Reviewed | Add FlowchartAdd explanatory imagesChange identification RIS to using the checkbox and to record the method of identification.Add recording details of any third party identifying patientAdd additional points to the 3 point checkCorrections to be made on Lorenzo |
| 6 | Sept 2018 | Sally Whewell/Johan Marais | Reviewed | Image 3 change to give more clarity |
| 7 | March 2022 | Tom Beaumont/Johan Marais | Reviewed | Adding of 4thcheck |
| 8  | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Updated | Changes to 3rd party ID checks |

1. Procedure to Identify Individuals Entitled to act as Referrer or Practitioner or Operator

# Purpose

This document satisfies the requirements under Schedule 1(b) and describes the policy regarding individuals entitled to act as Referrers, Practitioners or Operators and the procedure for identifying the individuals.

# Policy

The Trust will maintain a list of all staff identified as Referrers, Practitioners and Operators. The Trust, and each individual identified, will maintain a record of their appropriate training.

# Referrers

|  |  |  |
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| **Referrer** | **Location of List** | **Special Comments** |
| All medically qualified staff within the Salisbury NHS Foundation Trust | Medical StaffingOrdercommsTQuest | Updated monthlyThe responsibility to ensure that all medical staff are appropriately qualified lies with the Trust |
| All identified GPs on the National GP Database | National Database on RIS | The responsibility for ensuring all GPs are appropriately qualified lies with the Practice Manager/Senior Partner at each Practice |
| All Dental Practitioners | General Dental Council register of Practicing Dentists on RIS | Can refer for some Cone Beam CT (CBCT) examinations, intra and extra oral dental examinations only.The responsibility to ensure that all dentists are appropriately qualified lies with the Senior Partner at each practice. |
| Other Healthcare Professionals identified and trained as per departmental Clinical Radiology Training Programme(includes Chiropracters, nurses and physiotherapists) | Documented on Radiology Share Drive.In areas referrals made from.Within Ordercomms and TQuest | Able to refer for examinations as training and authorisation allows.Individual scope of practice documents are located on the ‘Radiology Streamlined’ shared drive:W:\Clinical-Support-Directorate\Radiology Streamlined\IR(ME)R\IR(ME)R Documentation\IR(ME)R Non Medical Referrers and Duty HoldersNon-Medical Referrers Master Aug 2020 Update |
| Reporting Radiographers | Radiology Quality Control System | Refer for Axial and Appendicular images within Scope Of Practice |

1. Physicians Associates
	1. IR(ME)R 2017 sets out the following definitions:

*“referrer” means a registered health care professional who is entitled in accordance with the employer’s procedures to refer individuals for exposure to a practitioner;*

*“registered health care professional” means a person who is a member of a profession regulated by a body mentioned in section 25(3) of the National Health Service Reform and Health Care Professions Act 2002****(4)****;*

As such Physician’s Associates are not entitled to requested imaging tests involving Ionising Radiation as they are currently an unregulated profession.

# Practitioners

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| **Practitioner** | **Special Comments** |
| Consultant Radiologists | All exams except Nuclear Medicine which will be justified within the constraints of the “Delegation of the Authorisation of Examinations in Nuclear Medicine” document.  |
| SpR in Radiology | Limited by training and departmental protocols |
| ARSAC License holders | Nuclear Medicine Examinations |
| Consultant Cardiologist | Cardiac diagnostic and interventional procedures only.  |
| Reporting Radiographers | Axial and Appendicular imaging within their Scope of Practice |
| Advanced Practitioner in Fluoroscopy | As stated in Scope of Practice |
| Speech Therapists | As stated in Delegation of the Authorisation for Video Fluoroscopy Policy. Once completed relevant training. |
| Oral Surgeons | CBCT only once completed relevant training |

1. Recording of Practitioner for individually vetted examinations
	1. There is no requirement for the operator to record the practitioner in CRIS post processing for examinations that have been individually vetted by Radiologists. This is because the practitioner’s name is recorded via the vetting process.
2. Recording of Practitioner in CT
	1. The Lead CT Radiologist should be recorded in CRIS post processing as the practitioner for any CT examinations authorised via any of the following procedures:
		1. *Delegation of the Authorisation of Examinations in CT – All Radiographers*
		2. *Delegation of the Authorisation of Examinations in CT – CT Radiographers*
		3. *Delegation of the Authorisation of Examinations in CT – Cardiac CT Radiographers*.
	2. There is no requirement to record practitioner for CT OOH as the name of the TMC Radiologist is recorded in the vetting notes.
3. Recording of Practitioner in other modality areas
	1. There is no requirement for the operator to record the practitioner in CRIS post processing for any area where the “Recording Named IR(ME)R Practitioner” SOP names a dedicated practitioner for all examinations of that type.
	2. The requirement for recording named Practitioner in CRIS remains for various Fluoroscopy examinations. The “Recording Named IR(ME)R Practitioner” SOP provides further detail.

# Operators

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| **Task** | **Operator** | **Special Comments** |
| Authorisation of exposures | RadiographersConsultant RadiologistsSpR RadiologistsAppropriately trained speech therapistDental Nurses | All exposures must be authorized according to the departmental Practitioner’s Guidelines |
| Radiography (General) | Radiographers |  |
| Assistant Practitioners | Limited examinations for Assistant Practitioners |
| Radiography (Dental) | Dental Nurses following appropriate training | Intra and Extra oral imaging including CBCT. |
| Radiography (CT) | RadiographersAssistant Practitioners | Following additional CT training |
| Radiography (Mammography) | Radiographers | Certificate in Mammography |
| Fluoroscopy | Radiologists Radiographers  |  |
| Fluoroscopy | Cardiologists | Following appropriate trainingFor temporary pacing insertions only |
| Nuclear Medicine | RadiographersAssistant Practitioners | Following appropriate training |
| Nuclear Medicine Technologists |  |
| X-Ray Quality Assurance | RadiographersMedical PhysicistsAssistant Practitioners |  |
| Patient Identification | Operator undertaking the exposureRadiology Department Assistants and Radiography Apprentices. | Responsibility lies with the Operator undertaking the exposure |
| Assisting in X-ray procedures | NursesRadiology Department Assistants | Following appropriate trainingPreparation and assisting in procedures |
| Medical Physics Expert | Medical Physicists | Medical Physics tests DEXANuclear Medicine Scans following appropriate training |
| DEXA | Specialist Radiology Department Assistant | Following appropriate training |
| Reporting | Consultant Radiologists | Report all examinations |
| Reporting | SpR Radiologists | Report examinations as level of training allows |
| Reporting | Radiographers | Appendicular and Axial Skeleton only, after appropriate training |
| Reporting | Oral Surgery Consultants | Cone Beam CT only |
| Reporting | Speech Therapists | Video swallows only |
| Reporting | Urologists, Advanced Practitioners | Video Urodynamics |
| Reporting | Auto-reporting | As stated in Auto-reporting of Examinations Policy |
| Clinical Evaluation | DoctorsAdvanced Practitioner Nurses following appropriate training | Record evaluation in patients notes |

# Document History/Review

|  |
| --- |
| **Document Control** |
| **Document Name:** | Procedure to identify individuals entitled to act as referrer or practitioner or operator |
| **Author:** | Tony Ley | **Current Version:**  | 7 |
| **Reference No:**  | IEP003 | **First published:**  | July 2003 |
| **Document Managed by Name:** | Tom Beaumont | **Current Version Published:**  | March 2024 |
| **Document Managed by Title:** | Operational Lead Radiographer | **Next Review Date:**  | March 2026 |
| **Authorising Committee:** | DMT | **Ratification Committee:** | CMB |
| **Date Authorised by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Consultation Process** |
| Radiology Manager, Clinical Lead, MPEs, Operational Lead Radiographer, RPC, Auto-reporting of examinations policy. Reporting Radiographers Scope of Practice. Advanced Practitioner in Fluoroscopy Scope of Practice |

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| **Target Audience** |
| **Target Audience:** | **Clinical Staff Only** |

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| **Version Control** |
| **Version** | **Date** | **Author/Reviewer**  | **Action** | **Revision description**  |
| 1 | July 2003  | Tony Ley | Issued | Issue 1 |
| Aug 2004 | Tony Ley | Reviewed | No change |
| Aug 2005 | Tony Ley | Deferred | Review deferred following introduction of PACS & CR |
| Jan 2007 | Tony Ley | Updated | Re-write following CR & DR |
| 2 | April 2007 | Tony Ley | Reissued | Issue 2 |
| Apr 2008 | Tony Ley | Reviewed | No Change |
| 3 | Feb 2011 | Tony Ley | Reissued | Minor changes |
| 4 | July 2012 | Tony Ley | Reviewed | No Change |
| 5 | Feb 2017 | Sally Whewell / Johan Marais | Reviewed | Removed roles no longer relevant.Added new roles.Referenced Ordercomms |
| 6 | Sept 2018 | Sally Whewell / Johan Marais | Review | Update names and rolesAdvanced Practitioner Fluoroscopy addedExpanded list for each roleSpecialist Radiology Department assistant in DEXA added |
| 7 | March 2022 | Tom Beaumont /Johan Marais | Reviewed | Clarification re Practitioner / Nuclear MedicineAddition of CBCT for Operator / Dental  |
| 8 | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Reviewed | Addition of no requirement to record practitioner for certain CT and X-Ray examsAddition of NMR scope documents locationAddition of Physicians Associates – no entitlement to request,  |

1. Procedures for Making Enquiries of Individuals of Childbearing Capacity to Establish whether they may be Pregnant or Breast Feeding

# Purpose

This document satisfies the requirements under Schedule 1(d) and describes the policy and procedure to establish whether females of childbearing age may be pregnant or breast feeding.

# Policy

The Trust identifies individuals of childbearing age to be between 12 and 55. The operator undertaking exposures identified within the Employer’s Procedure for individuals within this group will ascertain their pregnancy or breast feeding status.

# Procedure

1. Pregnancy
2. Radiography of areas remote from the foetus may be safely carried out at any stage of pregnancy with good collimation and appropriately shielded equipment. Areas remote from the foetus are above the diaphragm, upper limbs and from the knees down. It is not necessary to enquire about the pregnancy status of these patients.
3. In emergency trauma circumstances it may not be possible to determine pregnancy status. Treatment of the patient is the most important consideration taking priority over possible risk to the foetus, however the operator should ensure the dose to the uterus should be kept to a minimum, consistent with the diagnostic procedure. The operator must ask the referrer to review the number of views requested.
4. In all other circumstances the Operator undertaking the exposure must follow the procedure as outlined in the flow chart.
5. There may be difficulties confirming the pregnancy or breast feeding status with the patient if they are unconscious, non-English speaking, or have difficulty in communicating or understanding. The Trust Communication and Interpreting Policy should be followed. This states:

**Clinical information, medical terminology or consent about clinical care should always be done through the authorised interpreting services except in an emergency.**

1. Completed pregnancy status form to be scanned onto RIS.
2. Where the patient is anaesthetised the Operator must establish pregnancy status from the surgical patient pathway documentation.
3. Breast Feeding
4. For a female who is breast feeding consideration should be given to deferring any radionuclide examination until breast feeding has stopped.
5. Alternatively arrangements can be made with the patient to obtain sufficient milk supplies to last until the level of activity in the milk is at an acceptable level.
	1. Cases of confirmed pregnancy or where pregnancy cannot be excluded.

3.3.1 The responsibility of consenting the patient (or consenting on behalf of the patient) lies with the referrer.  In cases of confirmed pregnancy, the justification should be reviewed by the IR(ME)R practitioner.  If still justified, the referrer is responsible for the completion of Trust consent form 1.

Procedure to be followed by the Operator undertaking the exposure to ascertain pregnancy status.

Radiographer receives X-ray request form.

Justification of request under IR(ME)R?

Is the patient between 12 and 55 years old\* or of reproductive capacity AND the primary beam would cover the pelvic area?

Return to IR(ME)R referrer for clarification.

Ask the patient: ‘Are you, or might you be, pregnant’?\*\*

**Proceed to examination**

Review justification with IR(ME)R practitioner (who may consult referrer). Is the request still justified?

Is menstrual period overdue?

Is the procedure low dose?

High-dose procedure – is today within the last 10 days of the patients menstrual cycle?\*\*

**Delay the procedure and re-book**

**Proceed to examination following completion of Trust consent form– keep fetal dose to a minimum.**

Can pregnancy be excluded?\*\*

**Proceed to examination**

\*age by local agreement and reviewed regularly

\*\*record patient response in line with employer’s procedures

No

No

No

No

No

No

No

Yes

Yes

Yes

Yes

Not sure

Yes

No

Yes

Yes

Yes

# Document History/Review

|  |
| --- |
| **Document Control** |
| **Document Name:** | Procedures for making enquiries of females of childbearing age to establish whether they may be pregnant or breast feeding |
| **Author:** | Tony Ley | **Current Version:**  | 7 |
| **Reference No:**  | IEP005 | **First published:**  | July 2003 |
| **Document Managed by Name:** | Tom Beaumont | **Current Version Published:**  | March 2024 |
| **Document Managed by Title:** | Operational Lead Radiographer | **Next Review Date:**  | March 2026 |
| **Authorising Committee:** | DMT | **Ratification Committee:** | CMB |
| **Date Authorised by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Consultation Process** |
| Radiology Manager, Clinical Lead, MPEs, Operational Lead Radiographer, RPC |

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| **Target Audience** |
| **Target Audience:** | All Staff |

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| **Version Control** |
| **Version** | **Date** | **Author/Reviewer**  | **Action** | **Revision description**  |
| 1 | July 2003  | Tony Ley | Issued | Issue 1 |
| Aug 2004 | Tony Ley | Reviewed | No change |
| Aug 2005 | Tony Ley | Deferred | Review deferred following introduction of PACS & CR |
| Jan 2007 | Tony Ley | Updated | Re-write following CR & DR |
| 2 | April 2007 | Tony Ley | Reissued | Issue 2 |
| Apr 2008 | Tony Ley | Reviewed | No Change |
| 3 | Feb 2011 | Tony Ley | Reissued | New procedures included |
| 4 | July 2012 | Tony Ley | Reviewed | No Change |
| 5 | Feb 2017 | Sally Whewell / Johan Marais | Reviewed | Reference to Trust Communication and Interpretation policyPathways for high and low dose Flowchart |
| 6 | Sept 18 | Sally Whewell / Johan Marais | Review | Reviewed Pregnancy PolicyReviewed flow chart against guidelines |
| 7 | March 2022 | Tom Beaumont/Johan Marais | Reviewed | No Change |
| 8 | Oct 2023 | Tom Beaumont | Reviewed | Addition of 3.3 – consent form |
| 9 | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Review | Removal of requirement to tick pregnancy status check box on CRIS post processing. |

1. Procedure to Ensure that Quality Assurance Programmes are Followed

# Purpose

In the context of IR(ME)R, a QA programme is an organised effort that delivers the standards of patient exposure as described in the organisation’s IR(ME)R procedural framework. IR(ME)R requires that this organised effort is described and this effort should form part of the whole IR(ME)R system and this is the purpose of this document.

# Policy

The required QA programme under IR(ME)R (referred to in the document: “IR(ME)R QA Audit program”) should cover all aspects of the diagnostic imaging process. Therefore the list in the document outlines what QA is required for every aspect. This is a statement of what the QA program achieves. To ensure that the QA program achieve these aims a system of regular audit will be implemented. The findings of every audit will be documented and if required, corrective action taken to ensure that the QA program achieve its goals.

# Responsibility

The Senior Management Team (SMT) is responsible for overseeing an action plan of process audits ensuring that all audits are carried out regularly.

Medical Physics will be responsible for instituting a quality assurance programme for equipment. Responsibility for testing at the recommended frequency lies with the various RPSs.

# Procedure

## Audit of Compliance with the Employer’s Procedures

Audit of all IRMER employers’ procedures is covered in the reference document: IR(ME)R QA Audit program.

Audits will be allocated to nominated individuals. All audits must be registered with the Audit Management and Tracking (AMaT) system. The nominated person will present a report at clinical governance highlighting any deficiencies or improvements and any action plan on AMaT.

An audit report and action plan must be presented to the SMT. The SMT will agree and monitor any action plan generated from audits.

## Equipment Quality Assurance

All equipment used for medical imaging using Ionising Radiation will be performance tested prior to first clinical use and at regular intervals thereafter. The guidance given by professional bodies and standards organisations (e.g. IPEM, AAPM, NEMA) will inform the test regime and frequency. Regular performance testing will be carried out by Radiographers and Medical Physics at agreed frequencies, under the direction and indirect supervision of an MPE.

Performance testing will also take place following any modification of equipment which might have an effect on patient dose or image quality. This performance testing may be carried out by local Operators or Medical Physics, but must be under the direction of an MPE.

Any equipment that fails performance tests beyond remedial level may remain in use if corrective action is planned. Any equipment that fails performance tests beyond suspension level will not be used clinically until corrective action has been successfully carried out and the system is deemed safe for use by an MPE.

The performance standards set by the Trust are defined in the Radiology Quality Management System.

# Document History/Review

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| --- |
| **Document Control** |
| **Document Name:** | Procedure to ensure that quality assurance programmes are followed |
| **Author:** | Johan Marais | **First published:**  | July 2003 |
| **Reference No:**  | IEP006 | **Current Version Published:**  | March 2024 |
| **Current Version:**  | 7 | **Next Review Date:**  | March 2026 |
| **Document Managed by Name:** | Tom Beaumont | **Authorising Committee:** | DMT |
| **Document Managed by Title:** | Operational Lead Radiographer | **Ratification Committee:** | CMB |
| **Date Authorised by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Consultation Process** |
| Radiology Manager, Clinical Lead, MPEs, Operational Lead Radiographer, RPC |

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| **Supporting Documentation** |
| Radiology SOP: IR(ME)R QA programme |

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| **Target Audience** |
| **Target Audience:** | **All Staff** |

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| --- |
| **Version Control** |
| **Version** | **Date** | **Author/Reviewer**  | **Action** | **Revision description**  |
| 1 | July 2003  | Tony Ley | Issued | Issue 1 |
| Aug 2004 | Tony Ley | Reviewed | No change |
| Aug 2005 | Tony Ley | Deferred | Review deferred following introduction of PACS & CR |
| Jan 2007 | Tony Ley | Updated | Re-write following CR & DR |
| 2 | April 2007 | Tony Ley | Reissued | Issue 2 |
| Apr 2008 | Tony Ley | Reviewed | No Change |
| 3 | Feb 2011 | Tony Ley | Reissued | No Change |
| 4 | July 2012 | Tony Ley | Updated | Addition of RPC representative to H&S committee |
| 5 | Feb 2017 | Johan Marais | Revised | Completely rewritten to incorporate QA of all aspects of the imaging process, not just documentation |
| 6 | Jan 2019 | Johan Marais/Sally Whewell | Review | Clarify understanding of certain sectionsAmalgamate some audits Moved detail descriptions of the audits to a separate document: “IR(ME)R QA programme” |
| 7 | March 2022 | Tom Beaumont/Johan Marais | Reviewed | No Change |
| 8 | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Review | OSCA changed to AMaT |

1. Procedure for the Assessment of Patient Dose and Administered Activity

# Purpose

This document satisfies the requirements under Schedule 2(e) and describes the policy and the procedure for providing the requisite information for assessing the dose or administered activity to each patient.

As well as the need to ensure compliance with the regulations, recording and assessing patient dose may be necessary for a number of different reasons. This could be to:

* Assist with dose optimization.
* Compare against or establish diagnostic reference levels.
* Enable the operator to determine if a dose has been given which is much greater than intended.
* Satisfy an ethics committee for the use of radiation in research.
* Compare different techniques or equipment.

# Policy

For all equipment fitted with a DAP display the quantity and the correct units should be recorded on the RIS. Operators must be aware of the units for their particular system and ensure they are noted in the patient record.

# Procedure

The regulations require that it be possible to retrospectively assess the dose to a patient

1. Radiography
	* 1. When Dose Area Product Meters readings are not available, a record of kilovolts (kV) and post - exposure mAs, should be made by the operator undertaking the exposure during post processing on RIS.
		2. When Dose Area Product Meters readings are available, these readings should be recorded during post processing on RIS, together with the correct units, by the operator undertaking the exposure. The correct units should be on display in the clinical area.
		3. This may be delegated (for example RDA) but remains the responsibility of the operator to ensure that it is done correctly.
2. Fluoroscopy
	* 1. The screening time and DAP reading are to be recorded during post processing on RIS by the operator undertaking the exposure.
		2. Radiologists, cardiologists and other non-radiology clinicians acting as operators in some fluoroscopy cases will delegate the task of recording the dose to the person assisting them. As the operator undertaking the exposure the Radiologist, cardiologists and other non-radiology clinicians remains responsible for ensuring that this is done and that the dose and units is recorded.
		3. The above also applies to mobile fluoroscopy.
3. CT Scanning
	* 1. The DLP readings are to be recorded, together with the units, by the operator undertaking the exposure during post processing on RIS. This may be delegated but remains the responsibility of the operator to ensure it is done.
4. Radionuclide Imaging
	* 1. All examinations included in the Standard Operating Procedures have doses calculated using a local measurement device that is calibrated at least annually by an approved medical physics expert against national standards.
		2. The administered activity must be recorded by the operator undertaking the examination in the appropriate place on RIS. The appropriate place and way of recording the dose form part of the training of the operator.
		3. More detailed calculations of patient dose where required must be referred to the medical physics expert.

# Document History/Review

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| **Document Control** |
| **Document Name:** | Procedure for the assessment of patient dose and administered activity |
| **Author:** | Tony Ley | **Current Version:**  | 7 |
| **Reference No:**  | IEP007 | **First published:**  | July 2003 |
| **Document Managed by Name:** | Tom Beaumont | **Current Version Published:**  | March 2024 |
| **Document Managed by Title:** | Operational Lead Radiographer | **Next Review Date:**  | March 2026 |
| **Authorising Committee:** | DMT | **Ratification Committee:** | CMB |
| **Date Authorised by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Consultation Process** |
| Radiology Manager, Clinical Lead, MPEs, Operational Lead Radiographer, RPC |

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| **Target Audience** |
| **Target Audience:** | Clinical Staff Only |

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| --- |
| **Version Control** |
| **Version** | **Date** | **Author/Reviewer**  | **Action** | **Revision description**  |
| 1 | July 2003  | Tony Ley | Issued | Issue 1 |
| Aug 2004 | Tony Ley | Reviewed | No change |
| Aug 2005 | Tony Ley | Deferred | Review deferred following introduction of PACS & CR |
| Jan 2007 | Tony Ley | Updated | Re-write following CR & DR |
| 2 | April 2007 | Tony Ley | Reissued | Issue 2 |
| Apr 2008 | Tony Ley | Reviewed | No Change |
| 3 | Feb 2011 | Tony Ley | Reissued | No Change |
| 4 | July 2012 | Tony Ley | Reviewed | No Change |
| 5 | Feb 2017 | Johan Marais / Sally Whewell | Revised | Add additional notes to point about the benefits of recording the dose to point 1.Add delegation of dose recording. Add Cardiologist and non-radiology operators |
| 6 | Sep 2018 | Johan Marais / Sally Whewell | Review | No changes |
| 7 | March 2022 | Tom Beaumont/Johan Marais | Reviewed | No Change |
| 8 | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Reviewed | No Change |

1. Procedures for the Use of Diagnostic Reference Levels (DRLs)

# Introduction

Diagnostic reference levels (DRLs) are dose levels for typical examinations on standard size adults and children for broadly defined types of equipment (for example CT, fluoroscopy or general radiography).

DRLs are used as a guide to help promote improvements in radiation protection practice. They can help to identify issues relating to equipment or practice by highlighting unusually high radiation doses. DRLs are a trigger to one of the steps of optimisation of patient dose and are not expected to be exceeded when good and normal practice is applied.

DRLs are average dose levels for typical diagnostic examinations on standard size adult patients and are not individual patient doses. They should be used in addition to professional judgement.

# Responsibility

The operator is responsible for assessing all exposures against the relevant DRL and escalating any concerns where a dose to an individual patient or a series of doses to multiple patients is thought to exceed a relevant DRL. The operator is also responsible for recording the dose indices on RIS.

The RPSs are responsible for supplying the exposure data to Medical Physics. RPS are responsible for ensuring that Local DRLs are available for use by the operators.

RPS in co-operation with Medical Physics is responsible for auditing dose data and providing suggested Local DRLs for Radiology & Nuclear Medicine procedures. Where an investigation into high doses is required, this should be led by the MPE.

# Procedure

## Setting of DRLs

The Trust should select the dose levels to be used as Local DRLs (LDRLs) and they should be reviewed as part of a regular dose-audit programme or when new equipment is installed or if clinical practice changes.

Consideration should be given to setting LDRLs for children for commonly requested examinations.

National DRLs (NDRLs) can be adopted as LDRLs or the Trust can choose to set its own LDRLs, however, if the latter are higher than those set nationally an investigation and explanation would be required.

* They should only be set for examinations for which a dose audit is practical.
* They should be set so as to encompass the work of all groups of operators in the organisation.

The final list can be found in the reference document:” Setting, reviewing, auditing and action of diagnostic reference levels.”

## Auditing of DRLs

An audit has to be performed for every examination which has an established LDRL. For each room applicable for the chosen examination compare the current audit with the established LDRLs. Where sufficient data is available, a comparison can be made for different operators.

## Reviewing of DRLs

LDRLs should be reviewed and, if necessary revised, at an annual meeting of the Radiation Protection Committee (RPC).

Therefore LDRLs will be reviewed during the IRQ meetings and recommendations made to the Radiation Protection Committee on an annual basis. The results of the dose audits will be discussed at these IRQ meetings, any changes to clinical practise or the equipment, as well as any new national recommendations will be taken into account in reviewing the LDRLs and form part of the recommendations made.

## Actions to be taken if consistently exceeded

Where audit or operator awareness has shown that a Local DRL has been regularly exceeded Medical Physics will work with the RPS to investigate the cause and if appropriate suggest a remedy.

## Good and normal practice

These LDRLs are not expected to be exceeded when good and normal practice is applied.

# Document History/Review

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| --- |
| **Document Control** |
| **Document Name:** | Procedure for the assessment of patient dose and administered activity |
| **Author:** | Johan Marais | **First published:**  | July 2003 |
| **Reference No:**  | IEP008 | **Current Version Published:**  | March 2024 |
| **Current Version:**  | 7 | **Next Review Date:**  | March 2026 |
| **Document Managed by Name:** | Sally Whewell | **Document Managed by Title:** | Operational Lead Radiographer |
| **Authorising Committee:** | DMT | **Ratification Committee:** | CMB |
| **Date Authorised by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Consultation Process** |
| Radiology Manager, Clinical Lead, MPEs, Operational Lead Radiographer, RPC |

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| **Supporting Documentation** |
| Radiology SOP: Setting, reviewing, auditing and action of diagnostic reference levels |

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| **Target Audience** |
| **Target Audience:** | Clinical Staff Only |

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| --- |
| **Version Control** |
| **Version** | **Date** | **Author/Reviewer** | **Action** | **Revision description**  |
| 1 | July 2003 | Tony Ley | Issued | Issue 1 |
| Aug 2004 | Tony Ley | Reviewed | No change |
| Aug 2005 | Tony Ley | Deferred | Review deferred following introduction of PACS & CR |
| Jan 2007 | Tony Ley | Reviewed | Re-write following CR & DR |
| 2 | April 2007 | Tony Ley | Reissued | Issue 2 |
| Apr 2008 | Tony Ley | Reviewed | No Change |
| 3 | Feb 2011 | Tony Ley | Reissued | No Change |
| 4 | July 2012 | Tony Ley | Updated | Distinction between CR and DR SOPs |
| 5 | Jun 2016 | Johan Marais | Rewritten | Re-written and approved by Radiation Protection Committee |
| 6 | May 2019 | Johan Marais | Reviewed | Remove detail discussion on the selection, reviewing and auditing of the LDRLs to a separate document: “Setting, reviewing, auditing and action of diagnostic reference levels” |
| 7 | March 2022 | Tom Beaumont/ Johan Marais | Reviewed | No Change |
| 8 | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Reviewed | No Change |

1. Procedures for Research Programmes

# Purpose

This document satisfies the requirements under Schedule 1(h) of the IR(ME)R Employers Procedures and describes the policy and the procedure for research programmes.

# Policy

All medical research projects within the Trust must comply with the Local Research Ethics Committee (LREC) guidelines. The Committee’s written approval must be obtained before the project can commence.

# Procedure

It is the responsibility of the local Principal Investigator to ensure the latest NRES (National Research Ethics Service) guidelines are followed. They will identify a suitable IRMER Practitioner (Radiologist) who will liaise with an appropriate local Medical Physics Expert (MPE).

1. All research programs must have approval from the relevant Ethics Committee (EC) before commencing.
2. Each research project involving exposure to individuals for whom no direct benefit is expected from the exposure the IRMER practitioner will approve a dose constraint on the advice of a suitable MPE. This dose constraint must not be exceeded.
3. Each research project involving exposure to individuals for whom a direct benefit is expected from the exposure the IRMER practitioner will approve a target level of dose on the advice of a suitable MPE. This target level of dose should be set at a level which it is anticipated will not be exceeded, but may be exceeded if the clinical benefit of additional exposure outweighs the radiation detriment.
4. All volunteers must be screened to ensure suitability. Pregnant women and children should not normally be accepted as volunteers unless the project concerns their population group specifically. Adults who lack the capacity to consent must be excluded as volunteers.
5. The risks of the exposure must be communicated to the volunteers by the research proposer or team member and confirmed by the operator.
6. The IRMER Practitioner who authorises a research exposure must:
	1. Satisfy themselves that the subjects participate voluntarily
	2. Ensure that the subjects are informed in advance about the risks of exposure
	3. Where no direct medical benefit for the individual is expected from the exposure, ensure that the employer’s dose constraint is adhered to
	4. Where there is a direct benefit, plan a target for the dose to an individual volunteer.
7. Just as for standard medical radiation exposures, there should be a record of the exposure factors, to enable an estimate of the effective dose to the individual and to ensure compliance with the dose constraint.
8. In the event that the research is part of a multi-centre trial being led by a Chief Investigator from another centre, the local IRMER Practitioner is responsible for reviewing the trial protocol and main REC application and confirm in writing to the local Principal Investigator and R&D office that the local site can adhere to the protocol, local patients are covered by the main REC (Ethical) submission and any additional exposure is justified having regard to IRMER. Similarly the local MPE is responsible for reviewing the trial protocol and main REC application to confirm to the local Principal Investigator that the estimated ranges of doses made by the Lead MPE for the research are reasonable. A local dose constraint or target dose should be established and this should be in line with the total research protocol dose estimated in the main REC application; concerns must be addressed with the Lead MPE for the research.
9. For local trials or studies which are not part of multi-centre research programmes, the procedure outlined above should be followed, where the local principal investigator and MPE have the additional responsibilities of the Chief Investigator and Lead MPE respectively.
10. The Radiation Protection Committee must be informed of all research projects before approval through the LREC guidelines.

# Document History/Review

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| --- |
| **Document Control** |
| **Document Name:** | Procedures for research programmes |
| **Author:** | Tony Ley | **Current Version:**  | 7 |
| **Reference No:**  | IEP009 | **First published:**  | July 2003 |
| **Document Managed by Name:** | Tom Beaumont | **Current Version Published:**  | March 2024 |
| **Document Managed by Title:** | Operational Lead Radiographer | **Next Review Date:**  | March 2026 |
| **Authorising Committee:** | DMT | **Ratification Committee:** | CMB |
| **Date Authorised by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Consultation Process** |
| Radiology Manager, Clinical Lead, MPEs, Operational Lead Radiographer, RPC |

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| **Target Audience** |
| **Target Audience:** | **Clinical Staff Only** |

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| **Version Control** |
| **Version** | **Date** | **Author/Reviewer**  | **Action** | **Revision description**  |
| 1 | July 2003  | Tony Ley | Issued | Issue 1 |
| Aug 2004 | Tony Ley | Reviewed | No change |
| Aug 2005 | Tony Ley | Deferred | Review deferred following introduction of PACS & CR |
| Jan 2007 | Tony Ley | Updated | Re-write following CR & DR |
| 2 | April 2007 | Tony Ley | Reissued | Issue 2 |
| Apr 2008 | Tony Ley | Reviewed | No Change |
| 3 | Feb 2011 | Tony Ley | Reissued | No Change |
| 4 | July 2012 | Tony Ley | Reviewed | No Change |
| 5 | Feb 2017 | Johan Marais | Revised | Rewritten in entirety |
| 6 | Jan 2019 | Johan Marais/Sally Whewell | Revised | No change |
| 7 | March 2022 | Tom Beaumont/Johan Marais | Reviewed | No Change |
| 8 | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Reviewed | No Change |

1. Procedures for Giving Information and Instructions to the Patient Undergoing Treatment or Diagnosis with Radioactive Medicinal Products

# Purpose

This document satisfies the requirements under Schedule 1(i) and describes the policy and the procedure for giving information and instructions to the patient undergoing treatment or diagnosis with radioactive medicinal products.

# Policy

The Trust policy states that all patients for radionuclide imaging or treatments must have access to full information and written instructions. It must be established that the patient, or the person with appropriate responsibility for the patient, understands fully the procedure and precautions required before consenting for the injection of any radioactive medicinal product.

# Procedure

For all patients undergoing radionuclide imaging or treatments there is a general leaflet explaining the basic idea of Nuclear Medicine Scanning, Having a Radioisotope Scan. The appointment letters contain the examination specific information. All staff working within the Nuclear Medicine department have access to the detailed information regarding the exact doses for each examination and can give this information to the patient on an individual basis.

## In Patients

1. All wards have access to “Ward Guidelines for the Management of Radioactive Patients” and laminated display notices that a patient underwent a radio-isotope scan, for display next to the patient.
2. For each scan a responsible member of the ward staff is spoken to with regards to appointment time, patient preparation and patient aftercare. This will include advice on radioactivity and any necessary precautions due to this.
3. On arrival in the department the patient is given a full verbal explanation of the procedure and precautions required. Then verbal consent for the injection is taken.
4. After the isotope injection has been given this is recorded on the Radiology Information System, RIS, including radioactivity dose. A separate, highly visible, leaflet is also attached to the notes outlining specific precautions around body fluids and waste.

## Out Patients

1. **Adult**
2. For a postal appointment the patient is sent a copy of the Having a Radioisotope Scan leaflet. The appointment letter containing the scan specific information is also sent to them.
3. In the rare occasion of a booked admission (arranged directly in the presence of the patient) the patient is given a copy of the Having a Radioisotope Scan leaflet. The appointment letter containing the scan specific information is also given to them.
4. On arrival for the scan the patient is given a full verbal explanation of the procedure and precautions required before verbal consent for the injection is obtained.
5. After the isotope injection has been given this is recorded on the Radiology Information System, RIS, including radioactivity dose.
6. **Adult lacking capacity to consent**
7. For patients unable to consent for the examination all instructions and precautions will be explained to an identified person with the appropriate responsibility.
8. For a postal appointment the identified responsible person is sent a copy of the Having a Radioisotope Scan leaflet. The appointment letter containing the scan specific information is also sent to them.
9. In the rare occasion of a booked admission (arranged directly in the presence of the patient) the identified responsible person is given a copy of the Having a Radioisotope Scan leaflet. The appointment letter containing the scan specific information is also given to them.
10. The identified responsible person is asked to attend the scan with the patient and is given a full verbal explanation of the procedure and precautions required before verbal consent for the injection is obtained.
11. After the isotope injection has been given this is recorded on the Radiology Information System. RIS, including radioactivity dose.
12. **Child**
13. For children all instructions and precautions will be explained to an identified adult with parental responsibility.
14. For a postal appointment the identified adult is sent a copy of the Having a Radioisotope Scan leaflet. The appointment letter containing the scan specific information is also sent to them.
15. In the rare occasion of a booked admission (arranged directly in the presence of the patient) the identified adult is given a copy of the Having a Radioisotope Scan leaflet. The appointment letter containing the scan specific information is also given to them.
16. The identified adult is asked to attend the scan with the patient and is given a full verbal explanation of the procedure and precautions required before verbal consent for the injection is obtained.
17. After the isotope injection has been given this is recorded on the Radiology Information System, RIS, including radioactivity dose.

# Document History/Review

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| **Document Control** |
| **Document Name:** | Procedures for giving information and instructions to the patient undergoing treatment or diagnosis with radioactive medicinal products |
| **Author:** | Tony Ley | **Current Version:**  | 7 |
| **Reference No:**  | IEP010 | **First published:**  | July 2003 |
| **Document Managed by Name:** | Tom Beaumont | **Current Version Published:**  | March 2024 |
| **Document Managed by Title:** | Operational Lead Radiographer | **Next Review Date:**  | March 2026 |
| **Authorising Committee:** | DMT | **Ratification Committee:** | CMB |
| **Date Authorised by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Consultation Process** |
| Radiology Manager, Clinical Lead, MPEs, Operational Lead Radiographer, RPC, Senior NM Radiographer |

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| **Target Audience** |
| **Target Audience:** | **Clinical Staff Only** |

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| **Version Control** |
| **Version** | **Date** | **Author/Reviewer**  | **Action** | **Revision description**  |
| 1 | July 2003  | Tony Ley | Issued | Issue 1 |
| Aug 2004 | Tony Ley | Reviewed | No change |
| Aug 2005 | Tony Ley | Deferred | Review deferred following introduction of PACS & CR |
| Jan 2007 | Tony Ley | Updated | Re-write following CR & DR |
| 2 | April 2007 | Tony Ley | Reissued | Issue 2 |
| Apr 2008 | Tony Ley | Reviewed | No Change |
| 3 | Feb 2011 | Tony Ley | Reissued | Changed to reflect recent changes in practice |
| 4 | July 2012 | Tony Ley | Reviewed | No Change |
| 5 | Feb 2017 | Johan Marais | Reviewed | No Change |
| 6 | Feb 2019 | Johan Marais | Reviewed | No Change |
| 7 | March 2022 | Tom Beaumont/Johan Marais | Reviewed | No Change |
| 8 | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Reviewed | No Change |

1. Adequate Information Relating to the Benefits and Risks associated with High Dose Studies

# Purpose

This document satisfies the requirements under Schedule 2(i) of the IR(ME)R Employers Procedures and describes the policy in providing that wherever practicable, and prior to an exposure taking place, the individual to be exposed or their representative is provided with adequate information relating to the benefits and risks associated with the radiation dose from the exposure.

# Policy

Patients require appropriate counselling before undergoing a procedure with the potential to deliver high doses of radiation. They must also be followed up to assess the possibility of deterministic injury.

# Introduction

Interventional radiological procedures are increasing in frequency and complexity. There is documented evidence of radiation induced skin injuries due to high doses given during the procedure. Young patients face the added risk of cancer in later life. In addition, these methods will considerably increase the operator’s dose.

# Responsibility

This procedure applies to radiological examinations or treatments where the skin dose could reasonably be expected to approach the threshold for deterministic skin injury, for example, complex interventional examinations.

It is the responsibility of the person undertaking the role of the Practitioner to:

* Counsel the patient prior to the procedure, ensuring that they have been made aware of the radiation risks associated with the examination as part of the consent process
* Ensure the recording of all patients doses, particularly those reaching the thresholds detailed in the document: “Recording and investigation of IR skin Doses”. This can be delegated (i.e. radiographer) but responsibility remains with the practitioner.
* Ensure that the procedure for skin surveillance is followed

# Background

Due to the increasing complexity of interventional procedures, it is recognised that the expected dose may be exceeded in exceptional clinical circumstances. Operators will be expected to follow the ALARA principle in optimising dose in all cases.

This procedure is based upon radiation effects noted in International Commission on Radiological Protection publication 85 (ICRP 85)1. The following table gives an indication of the time of onset of these effects and typical screening times to produce the effect.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Effect | Approximate threshold dose (Gy) | Time of onset | Minutes of typical screening(20 mGy/min) | Minutes of high dose acquisition (200 mGy/min) |
| **SKIN** |
| Early transient erythema | 2 | 2 – 24 hours | 100 | 10 |
| Main erythema reaction | 6 | ~ 1.5 weeks | 300 | 30 |
| Temporary epilation | 3 | ~ 3 weeks | 150 | 15 |
| Permanent epilation | 7 | ~ 3 weeks | 350 | 35 |
| Dry desquamation | 14 | ~ 4 weeks | 700 | 70 |
| Moist desquamation | 18 | ~ 4 weeks | 900 | 90 |
| Secondary ulceration | 24 | > 6 weeks | 1200 | 120 |
| Late erythema | 15 | 8 – 10 weeks | 750 | 75 |
| Ischaemic dermal necrosis | 18 | >10 weeks | 900 | 90 |
| Dermal atrophy (1st phase) | 10 | > 52 weeks | 500 | 50 |
| Telangiectasis | 10 | > 52 weeks | 500 | 50 |
| Dermal necrosis (delayed) | >12 | > 52 weeks | 750 | 75 |
| Skin cancer | N/A | > 15 years | N/A | N/A |
| **EYE** |
| Lens opacity (detectable) | > 1-2 | > 5 years | > 50 to eye | > 5 to eye |
| Lens/cataract (debilitating) | > 5 | > 5 years | > 250 to eye | > 25 to eye |

# Procedure

## Receipt of Referral

The Practitioner is responsible for establishing whether the patient has had previous interventional procedures, together with the magnitude, entrance site, and estimated skin doses, where available. This is essential as re-irradiation of skin and organs may significantly increase the probability of radiation effects, even if the doses used in the first or subsequent procedures were insufficient, on their own, to cause such effects.

## Informed Consent

The following issues should be added in addition to the normal subjects discussed with patients before any potential high-dose interventional procedure using ionising radiation:

1. Risks related to ionising radiation, emphasising that effects are normally delayed
2. The radiation effects of multiple procedures are additive, and will be more severe if procedures are close in time

Prior to a procedure that may result in a skin injury, the practitioner should inform the patient as follows:

"Your procedure involves the use of X-Rays and there is a very small risk that the amount of radiation may be enough to produce a delayed sunburn type effect. If your procedure exceeds the dose level above which these effects can occur, you will be informed at the time and the follow-up process explained"

## Records

Records of the DAP reading and screening time are recorded on the RIS and the “Interventional Procedure Log” spreadsheet. Where available, the estimate of skin dose indicated by the equipment should also be recorded.

These records are particularly important where the cumulative dose to the skin is at or above the ‘surveillance level’.

## Surveillance

For adult patients, the surveillance level is defined as 3 Gy for a single exposure or 1 Gy for procedures where further radiation exposure of that area is likely, e.g. post procedure checks. For paediatric patients, the surveillance level is defined as 1 Gy for a single exposure or 0.5 Gy for procedures where further radiation exposure of that area is likely. Where this level is reached the actions in the flowchart in the document: “Recording and investigation of IR skin Doses” should be followed.

## Follow Up

The procedure for follow-up and record keeping is described in the flowchart in the document: “Recording and investigation of IR skin Doses”. The responsibility for surveillance and follow up of patients receiving high exposures lies with the referrer.

## Information for Operators

See procedure M for “Information for Operators” which includes information on typical doses including high dose examinations.

# Document History/Review

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| --- |
| **Document Control** |
| **Document Name:** | IR(ME)R Employers Procedures |
| **Author:** | Tony Ley | **Current Version:** | 2 |
| **Reference No:** | IEP015 | **First published:**  | March 2020 |
| **Document Managed by Name:** | Tom Beaumont | **Current Version Published:**  | March 2024 |
| **Document Managed by Title:** | Operational Lead Radiographer | **Review Date:**  | March 2026 |
| **Authorising Committee:** | DMT | **Ratification Committee:** | CMB |
| **Date Authorised by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Consultation Process and Support Documents** |
| Radiology Manager, Clinical Lead, MPEs, Operational Lead Radiographer |

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| **Supporting Documentation** |
| Radiology SOP: Recording and investigation of IR skin Doses |

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| **Target Audience** |
| **Target Audience:** | Clinical Staff Only |

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| --- |
| **Version Control** |
| **Version** | **Date** | **Author/Reviewer**  | **Action** | **Revision description**  |
| 1 | Nov 2018 | Johan Marais | Draft |  |
| Christina Craig | Review | Clarification regarding the referenced logs and flowchart |
| March 2018 | Sally Whewell /Johan Marais | Review | Some minor clarifications |
| 2 | March 2022 | Tom Beaumont/Johan Marais | Reviewed | No Change |
| 3 | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Reviewed | Addition of link to procedure M for dose information for operators |

1. Procedure for Carrying out and Recording of an Evaluation for each Medical Exposure

# Purpose

This document satisfies the requirements under Schedule 1(i) and describes the policy and the procedure for carrying out and recording of an evaluation for each medical exposure. This includes recording of the patient dose.

# Policy

This Trust policy states that all examinations must have a clinical evaluation recorded.

# Responsibility

The responsibility for ensuring that medical exposures are evaluated and recorded lies with the Clinical Lead for Radiology.

A list of approved image evaluators is an addendum to these procedures and will be maintained by Operational Lead Radiographer and Lead Clinician for Cardiology.

# Procedure

## Reporting

A clinical evaluation is either a clinical report on the examination produced from within the Radiology Department by either a radiologist or radiographer or an evaluation of the exposure or images from the examination written in the patient’s record produced by the referring clinician or lead of the clinical team caring for the patient.

1. The operator carrying out the exposure is responsible for recording the following information during post processing on RIS:
2. That the exposure has taken place
3. Identification of the Operator
4. The examination carried out
5. Record dose as stated in section Procedure for the assessment of patient dose and administered activity.
6. Record who is the practitioner where applicable (see procedure C).
7. Where the medical exposure is evaluated within RIS, the report will be generated by either a radiologist or a radiographer with reporting qualification.
8. A clinical report is entered into the Radiology Information System and a verified copy produced for distribution.
9. The accuracy of the verified copy is the responsibility of the author of the report and not the typist.
10. A verified electronic copy is stored on the Radiology Information System.
11. A verified electronic copy is sent to the Trust wide Results Review system for referrals originating from the hospital
12. A verified electronic copy is sent to the referrer for all external referrals.
13. Where required it is the responsibility of the Referrer to get a paper copy of the verified report into the patient’s notes.
14. Where the medical exposure is not evaluated in the radiology department it is the responsibility of the Referrer to provide a written evaluation in the patients’ notes. The evaluation may be produced by the Referrer or the lead of the clinical team caring for the patient.
15. The following medical exposures are not evaluated, clinically reported, in the Radiology Department.
	* + - ALL fracture follow ups (excluding paediatrics)
			- ALL pre Op Orthopaedic X-Ray, leg length and whole spine (excluding paediatrics)
			- ALL follow up Orthopaedic X-Ray within 6 months of previous X-Ray
			- ALL post op inpatient Orthopaedic and Plastics including Spines (excluding paediatrics)
			- All Oral surgery images/Dental
			- DEXA
			- PCNL – performed in theatres
			- Pacemakers and Cardiac Resynchronisation devices
			- Cardiac Angiography and Percutaneous Coronary Interventions

Other examinations under the guidance of Image Intensifier outside the Radiology Department

* Theatres
1. Where the medical exposure is from an Image Intensifier, the Referrer is responsible for producing a written evaluation of the examination in the patients’ notes.
2. Where the medical exposure is formally reported by people outside Radiology (Video fluoroscopy) a report is produced and recorded in patients notes by a suitably trained and appointed individual.

## Radiographer reporting:

Undertaken in line with the “SDH Reporting Radiographer Scope of Practice”.

## Auto reporting

All studies which require an auto report are listed in the following document (SOP):

“Auto Reporting of Examinations”.

## QA Audit

To be undertaken by all reporters. Discrepancies to be discussed at the peer review meetings.

Reporting radiographers report as detailed within “SDH Reporting Radiographer Scope of Practice”.

## Outsourcing

Regular audit by company in line with contract.

## Insourcing

Radiologist and Radiographer Reporting insourcing arrangements affect HR and payroll process only. IR(ME)R process remains unchanged for insourced reporting.

# Document History/Review

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| --- |
| **Document Control** |
| **Document Name:** | IR(ME)R Employers Procedures |
| **Author:** | Tony Ley | **Current Version:**  | 7 |
| **Reference No:**  | IEP011 | **First published:**  | July 2003 |
| **Document Managed by Name:** | Tom Beaumont | **Current Version Published:**  | March 2024 |
| **Document Managed by Title:** | Operational Lead Radiographer | **Review Date:**  | March 2026 |
| **Authorising Committee:** | DMT | **Ratification Committee:** | CMB |
| **Date Authorised by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Consultation Process** |
| Radiology Manager, Clinical Lead, MPEs, Operational Lead Radiographer, RPC |

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| **Target Audience** |
| **Target Audience:** | Clinical Staff Only |

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| **Documents Referenced** |
| SDH Reporting Radiographer Scope of Practice |
| Auto Reporting of Examinations |
| Guidelines for Insourcing of Reporting in Radiology |

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| --- |
| **Version Control** |
| **Version** | **Date** | **Author/Reviewer**  | **Action** | **Revision description**  |
| 1 | July 2003  | Tony Ley | Issued | Issue 1 |
| Aug 2004 | Tony Ley | Reviewed | No change |
| Aug 2005 | Tony Ley | Deferred | Review deferred following introduction of PACS & CR |
| Jan 2007 | Tony Ley | Updated | Re-write following CR & DR |
| 2 | April 2007 | Tony Ley | Reissued | Issue 2 |
| Apr 2008 | Tony Ley | Reviewed | No Change |
| 3 | Feb 2011 | Tony Ley | Reissued | No Change |
| 4 | July 2012 | Tony Ley | Updated | Changes to distribution of verified reports |
| 5 | Feb 2017 | Johan Marais/Sally Whewell | Updated | Updated list for auto reporting. Removed duplications from point 3.3 |
| 6 | Sep 18 | Johan Marais/Sally Whewell | Review | Review auto reportingSentinel nodesResponsibility for auditOutsourcingInsourcingAdding responsibilities |
| 7 | March 2022 | Tom Beaumont/Johan Marais | Reviewed | No Change |
| 8 | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Review | Addition of insourcing and changes Ortho X-Ray auto reporting.  |

1. Procedures to Ensure Accidental and Unintended Doses are Minimised

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# Purpose

This document satisfies the requirements under Schedule 1(k) and describes the policy and the procedure for restricting accidental and unintended doses to patients undergoing medical exposures.

# Policy

All staff undertaking medical exposures are responsible for ensuring that any accidental or unintended doses are reduced to a minimum as far as is reasonable practicable. Any such dose must be reported on Datix and investigated. If it is found that any individual is in breach of these procedures, and if the circumstances warrant it, the Trust’s Disciplinary Process may be invoked.

This process starts with the selection and installation of the equipment and continues through to the actual exposure of the individual.

# Responsibility

**Procurement of equipment:** The Modality Lead is responsible for ensuring that the appropriate specification is produced prior to the purchase of equipment and ensuring the advice of the relevant MPE is sought.

**Exposure technique:** The Practitioner is responsible for ensuring that other appropriate techniques are considered in preference to those using ionising radiation.

**Equipment:** The Lead MPE is responsible for the design of the Quality Assurance (QA) programme, including acceptance testing, calibration and routine Quality Control (QC). The Lead MPE is responsible for those aspects of equipment QA that must be undertaken by Medical Physics staff. The relevant MPE and RPS is responsible for those aspects of equipment QA that should be undertaken by Radiographers.

**Exposure:** For diagnostic radiology, the operator making the exposure is responsible for ensuring that the dose to the patient is optimised. Only appropriately trained operators must be allowed to make exposures. Those in training may do so under supervision. For nuclear medicine, the operator carrying out the injection must ensure the correct dose is given. Only those operators who are given delegation to do so by the ARSAC permit holder may inject patients.

**Training:** It is the responsibility of the Modality Lead Radiographers to ensure adequate training of radiography and technologist staff operating the equipment. The relevant Clinical Lead will ensure adequate training of radiologist staff operating the equipment.

**Incident Learning**: Modality Lead Radiographers are responsible for ensuring that learning from incidents is appropriately disseminated and integrated into working practices.

# Procedure

All practical aspects of medical exposures are conducted with due regard to minimising unintended doses to individuals.

## Procurement of equipment

* The specification of diagnostic equipment to be purchased includes appropriate safety devices and dose-reduction features, commensurate with current best practice. The relevant Medical Physics Expert must be involved in the specification of all new equipment.
* X-ray emitting equipment is only to be installed in suitably protected rooms.
* Installations are subjected to a prior risk assessment as required by the Ionising Radiations Regulations 2017.
* Installations are subjected to a critical examination as required by the Ionising Radiations Regulations 2017 and acceptance tested to the standards required by IPEM Equipment Quality Assurance Reports, Medical and Dental Guidance Notes, NHSBSP Equipment Reports or other publications of a similar standing.
* No equipment will be procured that does not meet the minimum standards required by IRMER Regulation 15 & 16 with regard to dose reporting.

## Exposure technique

* Consideration must be given to the use of imaging techniques that employ non-ionising radiation in preference to those that use ionising radiation. The diagnostic accuracy and relative waiting time for non-ionising techniques relative to clinical need should be given due attention.
* Optimisation of exposures using beam collimation, correct selection of exposure factors and programs, automatic exposure controls, dose sparing features and other limiting devices together with good radiographic technique is expected as normal practice.
* The patient is positioned by an appropriately trained operator.
* Diagnostic exposure factors are chosen by an appropriately trained operator, following guidance from the Medical Physics Expert, if needed. Where exposure parameters are pre-programmed, they should be checked before exposure to ensure they are applicable to that patient.
* When new clinical techniques are introduced, it is particularly important that the relevant Medical Physics Expert should be involved in the optimisation of exposure.

## Equipment

* Equipment that does not meet the acceptability criteria set out by the relevant MPE at acceptance testing will not enter service until it is deemed safe for use.
* Equipment is maintained according to manufacturers' instructions.
* Equipment is subject to a documented QA programme.
* Equipment that shows signs of a fault which may affect patient dose are withdrawn from service until it has been examined and passed as fit for clinical use by the relevant MPE or their delegate.
* Where equipment repair or modification involves potential to change the performance of the system, approval of the relevant MPE is required before the equipment re-enters clinical service.

## Training

* The Modality Lead in each area will ensure that all staff working as operators and the Clinical Lead that all staff working as practitioners have received adequate training to carry out their role (as defined in IRMER Schedule 3).
* An up to date record of dates and nature of adequate training will be kept in each area (and forwarded to IRMER Lead in Radiology).
* Any other Employer contracted to provide operators or practitioners must provide evidence of adequate training immediately on request.

Any person in training may carry out operator or practitioner roles if they are adequately supervised by a trained and competent person, entitled to carry out that role.

## Pause and Check

Immediately prior to any radiation exposure, the operator should Pause and Check to confirm at least the following:

* Right Patient (4 point ID)
* Pregnancy Status Checked (check pregnancy)
* Right Examination/Laterality (check referral)
* Right Timing (check referral)
* Right Exposure Settings or Dose/Radionuclide (check equipment)
* Right Detector (check equipment)
* Confirm patient’s (or carer’s) understanding of their imaging history and the need for the examination that they have been referred for.

The process for pause and check does not require to be documented.

## Review of Practice

* To ensure that quality of imaging is continuously improved, processes and procedures are reviewed on a regular basis.
* Ensure that Referrers, Practitioners and Operators follow the patient identification procedure as identified in Employers IRMER Procedures (a).
* Ensure that the procedures for justifying and authorising the examination are followed as identified in Employers IRMER Procedures (b).
* Ensure that Operators adhere to the written protocols for that equipment
* Ensure that Operators check the correct selection of equipment and exposure factors prior to the exposure.
* Ensure that Operators inform the patient what is required of them during the examination.
* Compliance of the above points will be subject to audit and part of the IRMER QA programme.

## Incident Learning and Reporting

* Where the outcome of an incident results in actions to reduce the likelihood of reoccurrence of incidents, these are integrated into practice through review of documentation and dissemination of key learning points in team meetings and via email messages to staff.
* Where the employer knows or has reason to believe that an unnecessary radiation dose may have occurred to a person, while undergoing a medical exposure, he/she shall make an immediate preliminary investigation of the incident. When an accidental or unintended dose occurs, a Datix (The Trust’s incident reporting system) must be completed. This will act as the trigger for instigating an investigation.
* Should the investigation show that exposure to ionising radiation was much greater than intended occurred, the Operational Lead Radiographer shall make a detailed investigation of the circumstances of the exposure and an assessment of the dose received. Advice from the MPE in liaison with the RPA will be sought as to whether the dose concerned is “much greater than intended”.
* Should the dose “much greater than intended as a result of operator error then the incident should be reported to the CQC.” Radiology will take responsibility for CQC notification.
* Should the incident be classified as “moderate harm” it must be escalated through the weekly Patient Safety Summit for multidisciplinary clinical team review. This will also trigger Trust Duty of Candour process.
* Should the dose “much greater than intended” be a result of a malfunction or defect in equipment the RPA will report to the HSE.
* The modality lead will investigate the incident in line with Trust Investigation of Incident Policy.
* The investigation will establish where the failure in the process occurred.
* Steps must be taken to minimise the risk of reoccurrence, including any changes in protocols or procedures required.
* Where external referrers (such as GPS) are found to be at fault, assurance will be sought that they have addressed individual and collective learning.
* The result of the investigation will be provided to the Trusts Clinical Risk group and RPC through Datix.
* Informing a patient of a dose much greater than intended:
	+ - Where the MPE has advised that the dose received by the patient was “much greater than intended” then the Lead Radiologist within the Clinical Radiology Department is responsible for informing the referrer who will inform the patient.
		- The lead radiologist will consult with the patient’s GP and/or the Consultant in charge of the patient’s treatment before a decision is made to inform the patient. If the patient is informed, they will be given an apology and explanation as per Duty of Candour process.
		- If there is a decision not to inform the patient this must be recorded in the patient’s notes.
* Where the investigation of an incident reports exposure is not much greater than intended, the Radiology Quality Group will:
	+ - Take steps to minimise the risk of reoccurrence of such incidents.
		- On the request of the CQC all data will be shared.

## Expert Advice

Medical physics experts will be involved in diagnostic and therapeutic nuclear medicine, high dose interventional radiology and CT.

Medical physics experts will be available for consultation for all other radiological practices.

The scope of the advice of MPEs on a regular basis must include:

* Dosimetry
* Quality Assurance
* Radiation Protection
* Equipment support
* Measurement of radiation contributing to patient dose

MPEs must also contribute to the following matters, liaising with an RPA or RWA where appropriate:

* Optimisation, including use of DRLs
* Quality assurance of equipment (Regular and Acceptance testing)
* Technical Specifications for new equipment and facilities
* Surveillance of medical radiological installations
* Investigation of incidents
* Selection of test equipment
* Training of staff in radiation protection
* Compliance with IRMER 2017

no

yes

\*All incidents and actions are communicated to Radiology staff through the Incident quarterly report



# Document History/Review

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| --- |
| **Document Control** |
| **Document Name:** | Procedures to ensure that the probability and magnitude of accidental or unintended doses to the patients from radiological practices are reduced as far as reasonably practicable |
| **Author:** | Tony Ley | **Current Version:**  | 7 |
| **Reference No:**  | IEP012 | **First published:**  | July 2003 |
| **Document Managed by Name:** | Tom Beaumont | **Current Version Published:**  | March 2024 |
| **Document Managed by Title:** | Operational Lead Radiographer | **Review Date:**  | March 2026 |
| **Authorising Committee:** | DMT | **Ratification Committee:** | CMB |
| **Date Authorised by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Consultation Process** |
| Radiology Manager, Clinical Lead, MPEs, Operational Lead Radiographer, RPC |

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| **Target Audience** |
| **Target Audience:** | Clinical Staff Only |

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| --- |
| **Version Control** |
| **Version** | **Date** | **Author/Reviewer**  | **Action** | **Revision description**  |
| 1 | July 2003  | Tony Ley | Issued | Issue 1 |
| Aug 2004 | Tony Ley | Reviewed | No change |
| Aug 2005 | Tony Ley | Deferred | Review deferred following introduction of PACS & CR |
| Jan 2007 | Tony Ley | Updated | Re-write following CR & DR |
| 2 | April 2007 | Tony Ley | Reissued | Issue 2 |
| Apr 2008 | Tony Ley | Reviewed | No Change |
| 3 | Feb 2011 | Tony Ley | Updated | Changes to investigation and reporting route |
| 4 | July 2012 | Tony Ley | Updated | Additional details on reportable and non-reportable incidents |
| 5 | Feb 2017 | Sally Whewell / Johan Marais | Updated | Reference to DatixClarified points under 3.1 and added processesClarified points under 3.2. Distinction between equipment and operator errors.Under 3.3 removed points which had become irrelevant due to DatixAddition of flow charts. |
| 6 | March 2017 | Johan Marais | Reviewed | Add the different responsibilities and altered the procedure accordingly |
| 7 | March 2022 | Tom Beaumont/Johan Marais | Reviewed | Pause and check, patient/carer’s understanding |
| 8 | August 2022 | Tom Beaumont/Johan Marais | Reviewed | Additions made re escalation for clinical MDT review, assurance of learning actions from external referrers and Duty of Candour.  |
| 9 | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Reviewed | Amalgamation of notification flowcharts.  |

1. Patient Information on Benefits and Risks of Exposures

# Purpose

This document satisfies the requirements under Schedule 2(i) of the IR(ME)R Employers Procedures and describes the policy and the procedure

# Policy

Appropriate information should be included in appointment letters.

Operators are responsible for checking that information has been given before exposures take place.

# Introduction

The aim of this procedure is to ensure that all patients are given adequate information relating to the benefit of diagnosis and risk associated with the radiation dose from the radiation exposure. Information should be provided prior to entering the examination room to avoid any implicit bias or persuasion in the information given.

# Procedure

For booked examinations, information will be provided prior to exposure in written form as part of the invitation letter or a separate information sheet. For other examinations, information should be provided to patients or their representatives immediately prior to investigations, unless it is not practicable to do so.

The information provided must include the specific benefit to the patient (i.e. outcome of clinical question) and the risk to a typical individual as a result of intended radiation exposures. Where appropriate, radiation doses should be used (based on DRLs and compared to everyday risks or equivalent natural background radiation.

Where radiation doses are below 50 mSv it is acceptable to use a risk descriptor from the table below:

**Radiation Risk Descriptors (based on “X-rays – how safe are they?” - NRPB 2001)**

|  |  |  |
| --- | --- | --- |
| Descriptor | Maximum Dose | Cancer Risk Range |
| Negligible | 0.02mSv | < 1 in a million |
| Minimal | 0.2mSv | 1 in a million to 1 in 100,000 |
| Very Low  | 2mSv | 1 in 100,000 to 1 in 10,000 |
| Low | 20 mSv | 1 in 10,000 to 1 in 1000 |
| Moderate | 200 mSv | 1 in 1000 to 1 in 100 |
| High | Unlimited | >1 in 100  |

Some typical Radiation Doses for comparison.

Natural background radiation in UK is around 2.3mSv per year (0.2mSv per month / 6µSv per day)

Flights: UK to Spain 20 µSv

 UK to USA 80 µSv

 UK to Australia 0.2 mSv

If practicable, operators should verify that this information has been given to the individual prior to exposure.

Where it is not practicable to deliver the information before exposure to either the patient or their representative, (e.g. language or diminished capacity issues may lead to overestimation of the risk, the patient is unconscious or insensible or the necessary delay in imaging would be detrimental to the patient’s health) this information does not need to be provided. This should be recorded as a radiographer comment on RIS.

Within each waiting area a poster displaying risks and benefits of radiation should be displayed.

All service users of child-bearing potential should be made aware of the effects of ionising radiation on the unborn foetus and breastfeeding infants through the use of posters and signs in waiting areas and standard information included with invitation letters.

## Information for Operators

The following chart is made available on paper in all CT and X-Ray areas to support staff who may be asked questions by patients about the Radiation dose they have received.

**Ionising Radiation: Dose Comparison**

| **Source of exposure** | **Dose** |
| --- | --- |
| **Dental x-ray** | **0.005 mSv** |
| **Chest x-ray** | **0.014 mSv** |
| **Transatlantic flight** | **0.08 mSv** |
| **3D Mammogram** | **0.27 mSv** |
| **UK annual average radon dose** | **1.3 mSv** |
| **CT scan of the head** | **1.4 mSv** |
| **Barium swallow fluoroscopy** | **1.5 mSv** |
| **UK average annual radiation dose** | **2.7 mSv** |
| **Nuclear medicine bone scan** | **4.0 mSv** |
| **CT scan of the chest** | **6.6 mSv** |
| **Average annual radon dose to people in Cornwall** | **6.9 mSv** |
| **CT Abdomen and pelvis** | **10 mSv** |

**Adapted from:**

Public Health England ‘Patient dose information guidance’ (2008). [Patient dose information: guidance - GOV.UK (www.gov.uk)](https://www.gov.uk/government/publications/medical-radiation-patient-doses/patient-dose-information-guidance)

UK Health Security Agency ‘Ionising radiation: dose comparisons’ (2011). [Ionising radiation: dose comparisons - GOV.UK (www.gov.uk)](https://www.gov.uk/government/publications/ionising-radiation-dose-comparisons/ionising-radiation-dose-comparisons)

American College of Radiology 'Radiation Dose to Adults From Common Imaging Examinations' (2022). [Dose-Reference-Card.pdf (acr.org)](https://www.acr.org/-/media/ACR/Files/Radiology-Safety/Radiation-Safety/Dose-Reference-Card.pdf)

# Document History/Review

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| --- |
| **Document Control** |
| **Document Name:** | Patient information on benefits and risks of exposures |
| **Author:** | Johan Marais | **Current Version:**  | 2 |
| **Reference No:**  | IEP014 | **First published:**  | March 2020 |
| **Document Managed by Name:** | Tom Beaumont | **Current Version Published:**  | March 2024 |
| **Document Managed by Title:** | Operational Lead Radiographer | **Review Date:**  | March 2026 |
| **Authorising Committee:** | DMT | **Ratification Committee:** | CMB |
| **Date Authorised by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Consultation Process** |
| Radiology Manager, Clinical Lead, MPEs, Operational Lead Radiographer, RPC |

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| **Target Audience** |
| **Target Audience:** | Clinical Staff Only |

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| **Supporting Documentation** |
| Radiology SOP: IR(ME)R Comforters and Carers SOP |

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| --- |
| **Version Control** |
| **Version** | **Date** | **Author/Reviewer**  | **Action** | **Revision description**  |
| 0.1 | Nov 2018 | Johan Marais | Draft |  |
| 1 | March 2019 | Johan Marais / Sally Whewell | Review | Clarification of a number of points, especially regarding recording the relayed information. Referenced the supporting SOP. |
| 2 | March 2022 | Tom Beaumont/Johan Marais | Reviewed | No Change |
| 3 | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Review | Addition of “Information for Operators” |

1. Procedure to be Observed in the Case of Medico-Legal Exposures

# Purpose

This document satisfies the requirements under Schedule 1(c) of the IR(ME)R Employers procedures and describes the policy regarding medico-legal exposures and the procedure under which such exposures are undertaken.

# Policy

The Trust allows the carrying out of radiological examinations for medico-legal purposes within the parameters set out in this document.

# Responsibility

The Practitioner is responsible for deciding whether the requested procedure falls into the category of a non-medical exposure and for authorising and justifying the exposure. The responsibility for adherence to the appropriate protocol lies with the Operator.

# Procedure

Requests for imaging other than for medical purposes should only be accepted if they are based on an existing clinical imaging protocol or specific non-medical imaging protocol. In this way radiation doses are kept as low as reasonably practicable. Non-ionising imaging should always be considered in the first instance.

The referrer for any medico-legal examination must be a medical or dental practitioner. Where a request for imaging comes from another source (e.g. Court of Law, Customs Officer, Police Officer, Social Services), the authorising practitioner is the referrer. Requests for such imaging must be made in writing and state the purpose of the imaging requested (i.e. the justification).

Imaging requested without an existing non-medical imaging protocol (i.e. non-standard imaging) may be accepted but the exposure must be supervised by a consultant radiologist who should confirm the views.

Under no circumstances can an individual be compelled to undergo an examination unless ordered to do so by a Court Order.

A “medico-legal examination” means an examination performed for insurance or legal purposes without a medical indication such as:

* Medical Assessments e.g. insurance, litigation and forensic
* Emigration
* Sports e.g. divers, boxers
* Pre-employment – after discussion with Radiologist
* Security or customs purposes.
1. All referrals for medico-legal examination listed above are justified through the practitioner devised protocol. This must be carried out with due regard to there being no direct clinical benefit to the individual.
2. All examinations justified by the practitioner will be carried out exactly as per protocol
3. The fact that this examination is being carried out for medico-legal purposes must be noted on the Referral and recorded on RIS
4. In examining a patient for medico-legal reasons the dose should not exceed 2 standard deviations above the reference dose (DRLs as displayed).
5. Every effort must be made to limit the dose to that absolutely necessary.

# Forensic Radiography

Any imaging carried out for the intention of providing evidence in a court of law, e.g. Suspected Physical Abuse (SPA), is classed as forensic radiography. There is no direct clinical benefit to the patient from this type of exposure. A non-medical imaging protocol must be followed for these cases to ensure that imaging is admissible in court and does not need to be repeated.

With the exception of SPA, there is no Forensic Radiography service at Salisbury Foundation Trust. Separate policies detail these processes for SPA. This imaging is most likely for paediatrics and should be carried out with the support of a paediatric specialist radiologist.

# Suspected Physical Abuse

The Standard Operating Procedure for Suspected Physical Abuse (SPA) must be followed for all cases.

This requires individual justification by a Radiologist with special interest in paediatrics.

Every individual medical exposure undertaken for SPA must be evaluated by the Radiologist justifying the examination.

The practitioner and operator should pay special attention to the need to keep doses as low as reasonably practicable. The practitioner should consider a reduced number of views.

Clinically justified imaging should always be undertaken in a timely manner and should not be delayed, even if there is a possibility that the images will become part of a forensic investigation.

# Occupational Health Checks

These are not done for the direct medical benefit of patient, but are required for licensing of professional functions, emigration checks or other occupational health checks.

These examinations can only be done when accompanied by a request form signed by a recognised referrer. The radiographer must ensure that all the necessary paperwork and identification procedure (eg. radiographer signing photograph for emigration chest X-ray) is correct before the examination is completed so that it is not invalidated for administrative reasons.

# Document History/Review

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| **Document Control** |
| **Document Name:** | Procedure to be observed in the case of medico-legal exposures |
| **Author:** | Tony Ley | **Current Version:**  | 7 |
| **Reference No:** | IEP004 | **First published:** | July 2003 |
| **Document Managed by Name:** | Tom Beaumont | **Current Version Published:** | March 2024 |
| **Document Managed by Title:** | Operational Lead Radiographer | **Review Date:** | March 2026 |
| **Authorising Committee:** | DMT | **Ratification Committee:** | CMB |
| **Date Authorised by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Consultation Process** |
| Radiology Manager, Clinical Lead, MPEs, Operational Lead Radiographer, RPC |

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| **Supporting Documentation** |
| Radiology SOP |

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| **Target Audience** |
| **Target Audience:** | Clinical Staff Only |

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| --- |
| **Version Control** |
| **Version** | **Date** | **Author/Reviewer**  | **Action** | **Revision description**  |
| 1 | July 2003  | Tony Ley | Issued | Issue 1 |
| Aug 2004 | Tony Ley | Reviewed | No change |
| Aug 2005 | Tony Ley | Deferred | Review deferred following introduction of PACS & CR |
| Jan 2007 | Tony Ley | Updated | Re-write following CR & DR |
| 2 | April 2007 | Tony Ley | Reissued | Issue 2 |
| Apr 2008 | Tony Ley | Reviewed | No Change |
| 3 | Feb 2011 | Tony Ley | Reissued | Additional section for NAI |
| 4 | July 2012 | Tony Ley | Reviewed | No Change |
| 5 | Feb 2017 | Johan Marais / Sally Whewell | Reviewed | Responsibility for justification.Pre-employment referralsOptimisation aspects extended, Points 4.2 – 4.5 |
| 6 | Sep 18 | Johan Marais / Sally Whewell | Review | Consult guidelinesNon-medical exposures |
| 7 | March 2022 | Tom Beaumont/Johan Marais | Reviewed | SPA, clinically justified imaging should not be delayedChange of acronym from NAI to SPA |
| 8 | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Review | Addition of “no forensic Radiography at SFT”. |

1. Appropriate Dose Constraints and Guidance for the Exposure of Comforters and Carers

# Introduction

This document satisfies the requirements under Schedule 1(b)

This procedure relates to exposure of those supporting an individual undergoing an examination using ionising radiation. Dose constraints and guidance for the exposure of these individuals must be produced. Each exposure must be justified in the context of the individuals’ positive effect on the imaging process and the radiation detriment that results.

# Responsibility

The Operator is responsible for deciding whether a comforter and carer exposure is justified and for setting the dose constraint.

The Operator is responsible for ensuring that consent is received and that the dose constraint should not be exceeded.

An MPE will provide guidance as to the likely effective doses.

# Procedure

## Exclusion from Requirement

Where a comforter or carer is exposed to a dose which contributes less than 0.3mSv per year to their annual effective dose, that person may be treated as any other member of the public during that exposure (IRR17 Approved Code of Practice L121), Members of the public are not required to give consent for exposures up to this level however a number of safeguards should be in place to ensure doses are optimised:

* The need for imaging, and the likely success of imaging should be reviewed prior to any assistance being provided to the patient.
* Mechanical restraints or tools should be used in preference to persons
* Family members or friends should always support in preference to members of staff.
* Where a staff member regularly supports patients, a number of staff members should be exposed in rotation rather than a single person (dose sharing).

The dose to a person supporting another during all diagnostic radiology plain film examinations is much less than 0.1mSv.

The dose to a person supporting another during all diagnostic nuclear medicine examinations is less than 0.3mSv.

No person may support a patient undergoing an interventional X-ray procedure.

## Justification and Consent

Where it is deemed necessary to expose a Comforter or Carer to a dose in excess of 0.3mSv (total dose during the episode of care), the exposure is only justified if it would show a sufficient net benefit. The Operator should consider:

* The likely direct benefit to the patient
* The possible benefits to carer or comforter
* The detriment the exposure may cause

Before the exposure is to be carried out:

* The Operator will explain the risks and benefits of being exposed to the exposure of ionising radiation prior to the examination to the Comforter or Carer.
* Lead rubber protection will be given and a consent form signed by the Comforter or Carer.
* This consent form will also explain the risks to the Comforter or Carer and records the Patients details, examination, Radiographer, exposure factors/dose and protection provided.
* This form will be scanned onto the Patients RIS event and a copy saved on the radiology shared drive for audit and dose monitoring purposes.

Refer to the supporting document: IR(ME)R Carers and Comforters SOP.

Should a calculated dose constraint exceed 5mSv for the episode of care, the provision of care or the caring arrangements should be re-evaluated.

# Appendix A: Carer and Comforter UK Effective Doses and UK background equivalent radiation times

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| **Examination**  | **Effective Dose (mSv)** | **UK background equivalent radiation time** |
| Skeletal survey  | 0.15 | 3 weeks |
| L-spine complete  | 0.02 | 3 days |
| Abdomen AP  | 0.01 | 2 days |
| Pelvis AP  | 0.01 | 2 days |
| C-spine complete  | 0.002 | 7 hours |
| T-spine complete  | 0.015 | 2 days |
| Chest X-ray  | 0.0005 | 2 hours |
| Extremity  | 0.0005 | 2 hours |

# Document History/Review

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| --- |
| **Document Control** |
| **Document Name:** | IR(ME)R Employers Procedures |
| **Author:** | Johan Marais | **Current Version:** | 2 |
| **Reference No:** | IEP013 | **First published:** | March 2020 |
| **Document Managed by Name:** | Tom Beaumont | **Current Version Published:** | March 2024 |
| **Document Managed by Title:** | Operational Lead Radiographer | **Review Date:** | March 2026 |
| **Authorising Committee:** | DMT | **Ratification Committee:** | CMB |
| **Date Authorised by DMT:** | 25/02/2020 | **Date Ratified by CMB:** |  |

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| **Target Audience** |
| **Target Audience:** | Clinical Staff Only |

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| --- |
| **Version Control** |
| **Version** | **Date** | **Author/Reviewer**  | **Action** | **Revision description**  |
| 1 | March 2020 | Johan Marais | Creation |  |
| 2 | March 2022 | Tom Beaumont/Johan Marais | Reviewed | No Change |
| 3 | March 2024 | Tom Beaumont / Johan Marais / James Fryer | Reviewed | No Change |