Title of Document:	IR(ME)R Procedure (F) Use and review of diagnostic reference levels
Directorate:	RADIOLOGY DIRECTORATE

Document type & number:	IRMPR 6
Approval committee:	RADIOLOGY DIRECTORATE GOVERNANCE MEETING
Approval date:	14.01.2026
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Version number:	V4
Key amendments:	Date:
Slight wording changes to ensure compliance with latest version of IR(ME)R (Amendments) 2024 Schedule 2. Added paragraph “Review”. Hyperlink to latest Countywide Dose Compliance audit C.	14.05.2025
Up to date DRL tables inserted. Statement added on nuclear medicine DRLS.	14.01.2026
Individuals involved in developing / reviewing / amending this document: (titles only)	
Radiation Protection Committee	
Medical Physics Expert/Radiation Protection Advisor	
Radiation Protection Supervisors	
Nuclear Medicine Lead	
Key staff responsibilities	Post:
Responsible for the level at which LDRLs are set	Radiology Clinical Services manager
Provide review of patient dose against local and national DRLs	MPE
Ensure correct DRLs are displayed in the control rooms	RPS
Perform corrective action where required	Modality Lead Radiographers

In-line with Regulation 6 Schedule 2(f) requirements within IRMER (Amendment)2024, the purpose of this procedure for the use and review of such diagnostic reference levels and Dose reference levels as the employer may have established for radiodiagnostic examination falling within regulation 3 (a), (b), (e) and (f)

The procedure ensures that competitive local dose reference levels (LDRLs) are set and that staff work within these levels. The procedure will document LDRL review period and ensures regular corrective actions are undertaken.

"Diagnostic reference levels" (DRLs) means dose levels in medical radiodiagnostic or interventional radiology practices, or, in the case of radio-pharmaceuticals, levels of activity, for typical examinations for groups of standard-sized individuals or standard phantoms for broadly defined types of equipment.

It is important to note the definition of diagnostic reference levels refers to typical examinations for standard sized patients or phantoms for broadly defined types of equipment.

National DRLs (NDRLs) are set on the basis of wide scale surveys of the **third quartile doses representing typical practice for a patient group** at a range of representative healthcare facilities for a specific type of examination or procedure.

Nuclear Medicine DRLs (NM DRLs) are based on ARSAC published data, agreed by the ARSAC license holder and average doses are reviewed by the MPE.

Local DRL's (LDRL's) should always be less than the corresponding NDRL for any given examination.

Practice

LDRLs set are documented in Appendix A. The available LDRLs are also displayed by the control panel in each room. It is the responsibility of the area lead and RPS's to ensure these are displayed appropriately.

LDRLs are set and reviewed annually by the MPE and RPS's.

Departmental examination protocols must indicate which examinations have an established DRL and give its value where this is available.

Any examination protocol should, if possible contain, a proposed appropriate LDRL in conjunction with the medical physics expert. Alternatively, please include a NDRL.

Examinations and equipment following standard protocols (such as standard radiographic procedures) will be assessed by data input from RIS with NDRLs.

Appropriate actions:

Doses recorded below the NDRL/LDRL can be documented within CRIS without any further actions.

Doses recorded above the NDRL/LDRL should be accompanied by a comment in CRIS in regards to patient habitus, weight or further reasoning to explain increased dose and its

recognition. Any incidents where there is no accompanying reason for the increased dose should be flagged to the RPS/area superintendent for investigation.

Where there is a local diagnostic reference level (DRL), enforcing authorities have determined that a dose greater than or equal to 10 times the local DRL will help you to determine what incidents are notifiable to the CQC. This applies even when there has been **no procedural failure**. These incidents must be reported via the incident reporting system DATIX immediately.

Periodic Monitoring

Routine patient dose audit will be completed by the MPE on an annual basis and measurements will be made at least annually on each piece of equipment or whenever changes are made to equipment or procedures that are likely to significantly affect patient dose.

This might be in terms of entrance surface dose, dose area product or screening time. The results will be compared against the local DRLs.

If periodic dose monitoring reveals room mean doses that exceed DRLs, these will be investigated by the Superintendent Radiographer and Radiation Protection Supervisor in collaboration with a Medical Physics Expert.

Annual report provided by Our Medical Physics Provider IRS copies of report on Radiology Team share point, Radiation Protection folder:

M:\Acute\Radiology\Radiation Protection and IR(ME)R\Medical physics\IRS REPORTS (MPE REPORTS)\IRS PATIENT DOSE AUDIT\Countywide

Corrective Action

Modality Lead Radiographers with the assistance of the RPS's and MPE must implement appropriate corrective action where mean doses significantly exceed LDRLs of excess doses are identified.

Review

LDRLs must be reviewed with regard to National and International DRLs. This should be carried out in collaboration with the MPE whenever a Patient Dose Audit Report is produced, or whenever any significant change to practice or equipment occurs.

Appendix A

Schedule 1- Local Diagnostic Reference Levels
Date Range 01/01/2024 to 31/12/2024

Conventional Radiography

Examination Name	LDRL DAP (cGycm^2)	NDRL (Gycm^2)	LDRL DAP (Gycm2)
Abdomen AP	161	1.70	1.61
Cervical Spine AP	8	0.10	0.08
Cervical Spine LAT	10	0.11	0.10
Chest AP	7	0.09	0.07
Chest LAT	15	0.34	0.15
Chest PA	5	0.08	0.05
Lumbar Spine AP	82	1.40	0.82
Lumbar Spine LAT	132	2.10	1.32
Pelvis AP	125	1.60	1.25
Shoulder AP	10	-	0.10
Thoracic Spine AP	37	0.61	0.37
Thoracic Spine LAT	45	0.95	0.45
Knee AP	5	-	0.05
Knee LAT	6	-	0.06
Foot AP	1	-	0.01
Foot LAT	2	-	0.02
Pelvis LAT	68	-	0.68
Wrist AP	1	-	0.01
Wrist PA	1	-	0.01
Wrist LAT	1	-	0.01
Hip AP	101	-	1.01
Hip LAT	118	-	1.18
Ankle AP	2	-	0.02
Ankle LAT	2	-	0.02

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Data Range:	01-Jan-2024 - 31-Dec-2024
Review by:	1 years' time
Data Prepared by:	Timothy Lloyd and Jason Fazakerley

Fluoroscopy

Examination Name	LDRL DAP ($cGycm^2$)	NDRL DAP ($Gycm^2$)	LDRL DAP ($Gycm^2$)
Barium Meal	259	-	2.59
Barium Swallow	395	5.0	3.95
Barium Swallow & Meal	661	-	6.61
Cardiac Electrophysiology Study	35	-	0.35
Cystogram	274	-	2.74
Fluoro Abdomen	18	-	0.18
Fluoro Hip	23	-	0.23
Fluoro Lower Limb	5	-	0.05
Fluoro Lumbar Spine	56	-	0.56
Fluoro Pelvis	8	-	0.08
Fluoro Upper Limb	1	-	0.01
Fluoro guided drain Insert pericardium	10	-	0.10
Fluoro guided nerve injection lumbar	82	-	0.82
Hysterosalpingogram	22	0.55	0.22
Orthopaedic Pinning Hip	32	-	0.32
Orthopaedic Pinning Upper Limb	3	-	0.03
Sialogram Parotid Fluoroscopy	32	-	0.32
Sialogram Submandibular Fluoroscopy	20	-	0.20
Video Swallow	130	1.2	1.30
Water Soluble Contrast Enema	364	8.2	3.64
Water Soluble Contrast Swallow	254	5.3	2.54

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Angiography/Interventional

Examination Name	LDRL DAP (cGycm²)	NDRL DAP (Gycm²)	LDRL DAP (Gycm²)
Angio Antegrade Femoral	134	-	1.34
Angio Lower Limbs	337	-	3.37
Angioplasty Iliac	625	-	6.25
Angioplasty Infrapopliteal	261	-	2.61
Angioplasty Popliteal	215	-	2.15
Angioplasty Superficial Femora	337	-	3.37
Arterial Stent Iliac	730	-	7.30
Cardiac Angio Coronaries	851	-	8.51
Cardiac Angio Coronary Stent	1677	-	16.77
Cardiac Angio PTCA	1649	-	16.49
Cardiac Angio grafts	1194	-	11.94
Cardiac Angio ventricle and Cor A	475	-	4.75
Cardiac Permanent Pacemaker Insertion	31	1.7	0.31
Cardiac Pressure Wire and PCI	1066	-	10.66
Cardiac defibrillator implant	13	-	0.13
Cardiac permanent pacemaker revision	20	-	0.20
Cardiac pressure wire and Cath insertion	508	-	5.08
ERCP	218	6.4	2.18
EVAR	2612	160	26.12
Embolisation Mesenteric Artery	1424	-	14.24
Embolisation of testicular vein	727	-	7.27
Enteric stent insertion	182	-	1.82
Nephrostomy	24	1.5	0.24
Nephrostomy Catheter Exchange	15	0.52	0.15
Oesophageal dilatation	18	-	0.18
Oesophageal Stent Insertion	37	-	0.37
PC Embolisation Uterine Artery	986	-	9.86
PICC Line Insertion	11	0.31	0.11
PTA Graft	321	-	3.21
PC embolisation renal artery	752	-	7.52
Percutaneous transhepatic cholangiogram	71	-	0.71
Primary PC Coronary Intervention	1197	-	11.97
Ureteric stent antegrade	130	3.0	1.30
Radiologically inserted gastrostomy	21	1.3	0.21
Tunnelled central venous line insertion	9	0.65	0.09

Produced:	**21-Aug-2025**
Data Range:	01-Jan-2024 - 31-Dec-2024
Review by:	1 years' time
Data Prepared by:	Timothy Lloyd and Jason Eazakerley

CT

Exam	LDRL
Abdomen and Pelvis	381
Abdomen and Pelvis with Contrast	333
Abdomen Pelvis with Contrast & Drink	374
Abdomen with Contrast	299
Adrenal with contrast Both	416
Adrenals	287
Angiogram Aortic Arch and Caroti	363
Angiogram intracranial- contrast	529
Angiogram Lower Limbs	453
Angiogram renal and abdominal	502
Angiogram Upper Limbs	209
Angiography for TAVI workup	463
Ankle	136
Aorta abdominal with contrast	215
Aorta thoracic with contrast	236
Aorta whole with contrast	343
Calcium Score	44
Cardiac Angiogram Coronary	189
Cervical Spine	210
Chest	120
Chest Abdomen Pelvis	389
Chest Abdomen Pelvis with Contrast	433
Chest and Abdomen	234
Chest and Abdomen with Contrast	343
Chest HR Axial	151
Chest with Contrast	193
Elbow	99
Enteroclysis (Small bowel study)	154
Facial bones	899
Foot	133
Guided biopsy	130
Guided biopsy abdomen	120
Guided biopsy thorax	102
Guided RF ablation lung	404
Head	680
Head with Contrast	691
Hip	211
Hip Both	164

Internal auditory meatus Both	340
Kidney triple phase Both - Contrast	607
Knee	173
Liver triple phase-contrast	836
Lower leg	340
Mandible	223
Neck and Chest with Contrast	342
Neck with contrast	240
Neck, Chest, Abdomen and Pelvis	495
Neck, Chest, Abdomen and Pelvis with Contrast	643
Orbit with contrast Both	168
Pancreas dual phase-contrast	458
Pelvis	188
Pelvis with Contrast	247
Pulmonary Angiography	140
Shoulder	164
Sinuses	99
Spine lumbar	292
Spine Thoracic	300
Temporal Bones	257
Urinary Tract	122
Urinary tract with contrast	332
Venogram	500
Venogram cerebral	458
Wrist	94

Computed Tomography

Produced:	20/10/2025
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Review by:	1 years' time
Data Prepared by:	Timothy Lloyd and Jason Fazakerley

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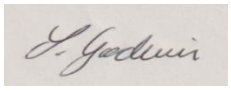
Nuclear Medicine

ROUTINE RADIOPHARMACEUTICAL ACTIVITIES FOR ADULT PATIENTS

INVESTIGATION	RADIO-PHARMACEUTICAL	MBq (RANGE)	ARSAC DRL MBq	NOTES
BONE Standard Tomography	Tc99m Oxidronate (HDP) (Technescan HDP) (I.V.)	550 (500-600) 550 (500-600)	600 800	
LUNG Perfusion (Q) Ventilation (V)	Tc99m MAA (pulmocis) (I.V.) Kr81m GAS (INHALED)	80(70-100) <6000/study	100 6000	Gently swirl vial before drawing up dose + gently invert syringe before injection
MECKELS (Ectopic Gastric Mucosa)	Tc99m Pertechnetate (I.V.)	200 (170-230)	400	NBM 6 hr prior to scan
STATIC RENAL	Tc99m DMSA (renocis) (I.V.)	70 (60-80)	80	
DYNAMIC RENAL	Tc99m MAG-3 (I.V.)	80 (70-100)	100	20mg/2ml Furosemide iv. 15 mins prior to Mag-3 NB: Give as a slow bolus
BREAST SENTINEL NODE	Tc99m Nanocolloid (Nanoscan) Intradermal	40 (35-40) next day biopsy 20 (15-20)same day biopsy	40 20	Inj vol approx 0.2ml with ~0.1ml air bubble behind injectate
ALL OTHER EXAMS	REFER REQUEST TO ARSAC Licence/certificate holder			

Witnessed by: S Godwin Lead NM Radiographer 

APPROVED BY	SIGNATURE	DATE
Dr Manish Pandit – ARSAC Certificate /Licence Holder	Manish Pandit	11.01.2024

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Worcestershire
Acute Hospitals
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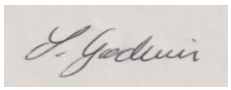
ALTERNATIVE RADIOPHARMACEUTICAL ACTIVITIES FOR ADULT PATIENTS

(for use when "routine" radiopharmaceutical is unavailable)

INVESTIGATION	RADIO-PHARMACEUTICAL	MBq (RANGE)	ARSAC DRL MBq	NOTES
BONE Standard Tomography	Tc99m Oxidronate (HDP) (Osteocis) (I.V.)	550 (500-600) 550 (500-600)	600 800	
LUNG Perfusion (Q) Ventilation (V)	Tc99m MAA (LYOMAA) I.V.) Kr81m GAS (INHALED)	80(70-100) <6000/study	100 6000	Gently swirl vial before drawing up dose + gently invert syringe before injection
MECKELS (Ectopic Gastric Mucosa)	none			NBM 6 hr prior to scan
DYNAMIC RENAL	Tc99m DTPA DTPA Technescan /Pentacis) (I.V.)	200 (180-220)	300	20mg/2ml Furosemide iv 15 mins prior to DTPA. NB: Give as a slow bolus
STATIC RENAL	none			
BREAST SENTINEL NODE	Tc99m Nanocolloid (Nanocol) Intradermal	40 (35-40) next day biopsy 20 (15-20)same day biopsy	40 20	Inj vol approx 0.2ml with ~0.1ml air bubble behind injectate
ALL OTHER EXAMS	REFER REQUEST TO ARSAC Licence/certificate holder			

Witnessed by: S Godwin Lead NM Radiographer 

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Dr Manish Pandit - ARSAC Certificate /Licence Holder	Manish Pandit	11.01.2024