

Q-Pulse Database	DIAIMA	
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Document Title	Guidance on Incident Reporting	

Notification to the Statutory Authorities IRMER(2017)

Ionising Radiation (Medical Exposure) Regulations (IRMER 2017) [1] require that incidents involving significant accidental or unintended exposure (SAUE) of an individual due to an equipment fault or procedural error are reported to Scottish Ministers (SM). In addition, any incidents that result in an individual receiving a dose which is deemed clinically significant (CSAUE) must also be reported to the Scottish Ministers. Such incidents must be reported via the HIS portal at <https://hisportal.scot.nhs.uk/> Notifications must only be made by those persons identified in EP15.

SAUE: Guidance on the report content and notification criteria are contained in the document "Significant Accidental Unintended Exposure: Criteria for making a notification" [2]

CSAUE: Guidance on the criteria for determining if an accidental or unintended exposure is clinically significant has been published in the document "IR(ME)R Implications for clinical practice in diagnostic imaging, interventional radiology and diagnostic nuclear medicine" [3].

If it is suspected that a SAUE or CSAUE has occurred, a preliminary investigation must be carried out as soon as possible, and a notification made to the Scottish Ministers **within 2 weeks** of discovering the incident through the on-line portal. A detailed investigation must then be carried out, with the investigation report being submitted to the Scottish Ministers **within 12 weeks** of discovery of the incident.

Further information can be found on the HIS website at

http://www.healthcareimprovementscotland.org/our_work/inspecting_and_regulating_care/ionising_radiation_regulation.aspx

IRR(2017)

Ionising Radiations Regulations (IRR 2017) [4] require that incidents involving an overexposure of a member of staff or member of the public be reported to the Health and Safety Executive (HSE). The dose limits for these groups of staff are set out in IRR 2017 Schedule 3 Dose Limits.

<https://www.legislation.gov.uk/ukxi/2017/1075/schedule/3/made>

In addition, IRR17 sets out levels at which loss, release or spill of a radioactive material should be reported to HSE. These can be found in Schedule 7 of IRR(2017)

<https://www.legislation.gov.uk/ukxi/2017/1075/schedule/7/made>

Where there is such a loss the Scottish environmental protection agency (SEPA) and Police Scotland should also be informed.

Where the cause of an incident has been equipment failure (whether IRMER or IRR) the issue may also be reported to IRIC Incident reporting and investigation centre – this can be done via the Health facilities Scotland website at

<http://www.hfs.scot.nhs.uk/services/incident-reporting-and-investigation-centre-iric-1/how-to-report-an-adverse-incident/>.

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Patient radiation doses and risks associated with diagnostic exposures

General terms that can be used to describe risk are given in Table 1 [5], with an estimation of the effective dose for the most common examinations/procedures given in Table 2 [6], [7], [8]. NB: These are effective doses for standard examinations of typical sized patients - the effective dose received by the patient will be estimated by an MPE on a patient-by-patient basis, using relevant exposure factors and dose quantities. Table 2 also gives the effective dose in terms of the equivalent period of background radiation to put the radiation risk into perspective [8].

Table 1: Terminology for describing radiation risks to adult patients [5]

Examples of Medical exposures	Effective Dose (mSv)	Risk Descriptor
Radiographs of chest, limbs, head, neck and teeth; Nuclear medicine ¹⁴ C breath test, DXA	< 0.1	Negligible
Radiographs abdomen and pelvis; Nuclear medicine lung ventilation scans.	0.1 – 1	Minimal
Barium swallow, single CT scans of head or body; coronary angiography and angioplasty; most Nuclear medicine imaging procedures, e.g. bone scan.	1 – 10	Very low
Higher dose or multiple interventional radiology or cardiology procedures; Double CT scans for contrast enhancement, Nuclear medicine ²⁰¹ Tl myocardial imaging.	10 – 100	Low
Multiple CT scans, multiple high dose interventional radiology, or high dose cardiology procedures on larger patients.	>100	Consult MPE

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Table 2: Approximate effective doses and equivalent period of background radiation from specific sources of radiation [6], [7], [8] , [9]

Source of exposure		Effective dose (mSv)	Equivalent period of average background radiation in UK*		
Radiology	Extremities	<0.01	<2 days		
	Dental	<0.01	<2 days		
	Chest	0.014	2 days		
	Skull	0.07	2 weeks		
	Hip	0.3	7 weeks		
	Lumbar spine	0.6	3 months		
	Abdomen	0.7	4 months		
	Pelvis	0.9	5 months		
CT	Head	1.4	8 months		
	CTPA	3.3	1.5 years		
	KUB	5.5	2.5 years		
	Chest	6.6	3 years		
	Abdo/pelvis	6.7	3 years		
	CAP	10	4.5 years		
	Fluoroscopy	HSG	0.42	10 weeks	
Pacemaker		1.1	6 months		
Barium swallow		1.5	8 months		
ERCP		2.5	14 months		
Angioplasty		4.4	2 years		
Embolisation (aneurysm)		20	9 years		
Nuclear Medicine	Thyroid scan (Tc-99m)	1.0	5 months		
	Lung perfusion (Tc-99m),	2.2	1 year		
	Bone scan (Tc-99m)	2.9	16 months		
	Renogram Dynamic (Tc-99m)	0.7	4 months		
	Myocardial perfusion (TI-201)	11	5 years		
	PET – FDG (F-18)	7.6	3.5 years		
DXA		GE	Hologic	GE	Hologic
	AP Spine	< 0.01	0.013	< 2 days	2 days
	Hip / femur	< 0.01	< 0.01	< 2 days	< 2 days
	VFA (vertebral fracture assessment)	0.012	< 0.01	2 days	< 2 days
	Total scan	0.018	0.028	3 days	4 days
	Other	100g Brazil nuts/flight to London	0.01	2 days	
Transatlantic flight		0.08	2 weeks		
Flight to Australia		0.2	5 weeks		
UK annual average Radon dose		1.3	7 months		
UK average natural background radiation		2.2	1 year		
Average annual radon dose to people in Cornwall		6.9	3.1 years		
Annual exposure limit for radiation employees		20	9.1 years		

*everybody is exposed to natural background radiation on a daily basis. This comes from ground and building materials, cosmic rays, food and drink, and radon gas. The average natural background radiation in the UK is 2.3 mSv [9].

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- [2] The Health Departments, IRMER 2017 Significant Accidental and Unintended Exposure, Guidance for Employers and Duty holders, published June 2019.
- [3] IR(ME)R: Implications for clinical practice in diagnostic imaging, interventional radiology and diagnostic nuclear medicine London; The Royal College of Radiologists, 2020
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