University Hospitals Birmingham
NHS Foundation Trust

CONTROLLED DOCUMENT

Ionising Radiation Medical Exposure Regulations 2017

Procedure 6: Assessment of Dose and Administered Activities of Ionising Radiation

Required under IR(ME)R 2017 Regulation 6 & Schedule 2

CATEGORY:	Procedure
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Distribution: • **Essential Reading for:**	Staff who are designated as an IR(ME)R operator. Staff in training to become an IR(ME)R operator Managers of IR(ME)R operators

• **Information for:**	IR(ME)R practitioners General managers of departments and areas that perform procedures involving ionising radiation

Contents

Paragraph		Page
1	Procedure Statement	3
2	Scope	3
3	Responsibility	3
4	Practice: Recording of factors relevant to an individual's dose	3
5	Practice: Additional information which may be recorded in the relevant electronic patient information system	4
6	Practice: Dose Record Monitoring	5
7	Practice: Individual Patient Dose Assessment	6
8	Contingencies	6

1 Procedure Statement

1.1 To enable assessment of an individual's radiation dose for any medical and non-medical imaging exposure.

2 Scope

2.1 All procedures and protocols as defined in Regulations 6(1), 6(4) and Schedule 2 of IR(ME)R 2017 carried out by the Trust.

3 Responsibility

3.1 It is the responsibility of the operator carrying out medical exposures to:

- Record dose information.
- Report incidents.

3.2 It is the responsibility of the Modality Manager, Service Lead or Department Manager to ensure that advice is sought from a Medical Physics Expert regarding:

- Assessment of doses related to an incident.
- Calibration of dose systems.
- Review of results of QA calibration of ionisation chambers.
- Dose monitoring programmes.
- Information regarding Local Diagnostic Reference Levels (DRL) and National DRLs.

4 Practice: Recording of factors relevant to an individual's dose

4.1 Operators must record details and factors detailed below, so that if necessary, the individual's dose can subsequently be assessed.

4.2 As a minimum, details must include:

- Type and anatomical location of the exposure, e.g. chest x-ray, abdomen CT, bone scan, breast treatment.
- Room or equipment used to perform the exposure.
- Dose-Area Product, dose-length product, administered activity or delivered treatment dose, as appropriate. Care should be taken to ensure that the correct units are used, for example $cGy.cm^2$, MBq.
- In the absence of information above: Projection, tube voltage (kVp), tube current, (mA) and exposure time, where appropriate.
- Where radioactive substances are administered, the isotope and chemical form (radiopharmaceutical), measured and residual activity and the corresponding measured times should be used to calculate the administered activity

- In the case of multiple exposures or repeats, wherever possible the dose from each exposure should be recorded separately.
- Doses from unintended and repeated exposures must also be recorded.

5 Practice: Additional information which may be recorded in the relevant electronic patient information system

5.1 Radiographic exposures (excluding mammography, fluoroscopy and digital acquisition):

- Number of images sent to PACS and rejects with reasons for the rejects recorded.
- If the Focus to Film Distance (FFD) is outside of standard parameters this should be documented in the Event Comments on the Radiology Information System.
- Any variation in density setting / patient size.
- Number of additional images or non-standard views.

5.2 Fluoroscopy, Digital Acquisition (DA) and Digital Subtraction Acquisition (DSA) exposures

- Fluoroscopy exposure time and DA/DSA if individually available.
- Where possible, accurate dose assessment also requires additional information, for example, number of digital acquisition images, kV, FDD (Focus to detector distance), Image field size (magnification) and dose settings.

5.3 Dental exposures

- Number and sizes of additional views or non-standard views including rejects.
- Exposure settings for example: kV, mA and exposure time.

5.4 CT (including CT/SPECT for Nuclear Medicine) & Radiotherapy (localization)

- The anatomical scan range.
- CTDI (CT Dose Index) if DLP unavailable

5.5 Breast Imaging exposures

- Total number of exposures
- Mean glandular dosekV, mAs, target filter combination and programme number where appropriate.

5.6 Nuclear Medicine (excluding CT)

- details of thyroid blocking or other adjunctive drugs e.g. frusemide if used.

5.7 Radiotherapy (CBCT)-set-up & verification imaging

- Imaging protocol for the patient within Mosaiq (allowing the dose to be calculated from exposure parameters).

5.8 Radiotherapy (MVCT)-set-up & verification imaging

- Number of slices (allowing the dose to be calculated from standard exposure parameters).

5.9 Radiotherapy Treatment

- Patient doses can be calculated from parameters automatically recorded from Mosaiq.

5.10 The above details must be recorded primarily in the relevant electronic patient information system but may be duplicated on the request form, machine documentation or room log book, whichever is appropriate.

6 Practice: Dose Record Monitoring

6.1 The assessment of patient dose recorded in this procedure will be used:

- in the determination of Diagnostic Reference Levels (where appropriate) in accordance with IR(ME)R Employer's Procedure 7.
- As part of the routine QA programme.
- To optimise techniques, particularly after changes to equipment or examination protocols.
- As evidence-based practice changes.

6.2 Occasionally more specific dose monitoring may be carried out after agreement by the departmental manager and Medical Physics Expert.

6.3 When specific dose monitoring is in progress, operators will keep a record of additional patient or examination information (such as patient weight) required by the monitoring protocol, as well as the information required routinely as above.

7 Practice: Individual Patient Dose Assessment

7.1 Assessment of dose to individual patients – e.g. effective dose or specific organ equivalent doses - will be undertaken when required (e.g. following incidents) under guidance from a Medical Physics Expert appointed by the Trust.

7.2 This will include, but is not limited to, high skin doses where deterministic effects may be observed in a diagnostic or interventional context, unexpected

foetal dose or significant extravasation of a radiopharmaceutical. Standard operating procedures outlining these occurrences are stored locally in relevant departmental Quality Management Systems.

8 Contingencies

8.1 Any failure in compliance with this procedure must be reported to the relevant Divisional General Managers or Medical Physics Expert in their absence. Failure to comply with the above procedure may result in the Trust's Disciplinary Policy being invoked.