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Ionising radiation legislation
How to comply

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The role of the RPS

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The RPS appointment letter should clearly describe your role

Prime duty

IRR17!

Securing compliance with the Regulations for work in controlled areas

Securing compliance will require oversight of

- Workload, equipment, staff groups and practice
- Risk assessments and local rules
- Radiation incidents
- Staff dosimetry
- Staff training
- Personal Protective Equipment (PPE)
- Outside workers

Attributes of an RPS

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An RPS should

- Be closely involved in the work
- Have received specific training Like today!
- Have working knowledge of the Regulations
- Have a detailed understanding of the Local Rules
  - Understand the measures to restrict dose
  - Understand contingency plans
- Command sufficient authority

The HSE expect a ratio of 1 RPS per 20-30 members of staff

Using your RPA

Must consult	Should consult
➢ Advice on compliance with Regs ➢ Dose limitation ➢ Requirements for Controlled Areas & Supervised Areas ➢ New installations ➢ Checking monitoring equipment ➢ Safety features & systems of work	➢ Risk assessment ➢ Radiation incidents ➢ Classification of workers ➢ Dose assessment & recording ➢ Contingency plans ➢ Quality Control ➢ PPE ➢ Training

Contacting CMPE

- RPA contacts (phone or email)
- Department visits

Helpful resources: Website, Newsletters and Advice sheets

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Risk Assessment

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Risk assessment

- **Type of risk**
- Workload
- **Personnel**
- Classification of staff
- Area designation
- **Structural protection**
- **Engineering controls and warning devices**
- **PPE**
- Systems of work
- **Projected doses**
- Training
- Audit
- Maintenance and testing of engineering controls
- Investigation level
- Extra precautions (pregnancy, inexperienced workers, others)
- **Contingencies**
- Review arrangements

CMPE templates

- must be customised
- RPA to approve final version

RPS should review

- Regularly
- Following significant changes in workload, practice or equipment

Local Rules

Should identify the key working instructions to ensure doses are kept ALARP.

Must contain

- Name of RPS
- Description of designated areas (including warning signs)
- Work not covered in risk assessment
- Arrangements for entering and working in the controlled area
- Key work instructions
- Contingency plans
- Incident reporting
- Investigation levels

Should be:

- Brief, clear and local
- **Reflect actual work practice**
- Reviewed regularly

Radiation incidents

- If suspected **overexposure** to staff or member(s) of the public
  - “Overexposure” = exceeding a dose limit!
- Inform department manager
- Perform and document an immediate investigation *with your RPA!*
  - Collect incident details (e.g. name, pregnancy status, PPE, exposure factors, description of events, …etc.)
  - Request dose assessment from RPA
  - Action RPA’s recommendations using Trust processes
- Record incident on organisation incident database (if necessary)
- Feedback findings to relevant persons and colleagues

Staff dosimetry

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Things to consider:

- Does dosimetry match that identified in the risk assessment
- Are staff doses reviewed regularly?
  - Is anyone approaching the investigation or classification level?
- Are staff wearing dosimeters correctly?
  - Legal requirement to wear as directed
- Are staff working at other hospitals?
- Management of pregnant workers
- Don’t take dose badges through airports!

Training

- All employees **engaged in work** with ionising radiation should know
  - risks to health
  - precautions to be taken
  - importance of complying with the Regulations

- Other employees **directly concerned** with work with ionising radiation require
  - "*adequate*" information to ensure their health and safety

Training

All employees **engaged in work** with ionising radiation should receive

- General radiation protection training
- Training specific to the characteristics of the controlled area and the practices within it

The provision of training and information should be repeated at appropriate intervals **and documented**

Training (Additional requirements)

- Staff who may become pregnant or start breast feeding must know
  - The possible risks to the foetus or nursing infant
  - The importance of notifying their employer of the pregnancy as soon as possible
- Additional training requirements for
  - **Classified Staff** making entries in radiation passbooks
  - Staff monitoring radiation/contamination levels
  - RPS Like today!

Training

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Example: Theatre staff working where X-rays are used (do not operate X-ray equipment)			
	When	How	What to record
Basic awareness	At induction Refresher at 3 year intervals	Face-to-face presentation e-learning	Entry on induction checklist Names and dates of staff attending presentations, records or reports from e-learning systems (NHS ESR)
Local rules	At induction Following any new version of the rules Refresher at 3 year intervals	Physical copy at induction E-mail request following new issue of rules	Obtain printed name, signature and date on sheet. Maintain log of staff names with dates of signature
Specific training: wearing and storing of PPE	At induction Refresher at 5 year intervals	Face-to-face or video	Entry on induction checklist Names and dates of staff attending or watching presentations

PPE

- Are staff wearing PPE in accordance with risk assessment
  - Aprons, collars, glasses depending on type of work!
- Are PPE fit for purpose (lead equivalence, coverage…etc)
- Are QC assessments on PPE documented
  - Lead aprons / thyroid collars should be screened annually to check for damage!

Outside workers

Definition: A worker who carries out services in the controlled or supervised area of another employer.

Cooperation between employers

- Dose information
- Training to work safely

Things to consider

- Who are outside workers…examples
- Who needs training

Some common HSE findings

- Risk Assessments & Local rules
  - Not local or specific enough
  - Not reviewed regularly
  - Out of date
  - Not enforced properly
- Staff training
  - Not all staff identified
  - Refresher training is not regular
- Staff dosimetry
  - Dosemeters not worn (correctly) or not returned
  - Extremity monitoring not carried out
- Cooperation between employers
  - Accurate dose records not shared

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IR(ME)R 2017

Common IRMER topics you may encounter

- Procedures
- Protocols
- Diagnostic Reference Levels
- **Radiation incidents**
- Instructions to patients administered with radioactive materials
- Pregnancy, breastfeeding, children and screening
- **Quality Assurance**
- Clinical evaluation
- Clinical audit
- Equipment – inventory
- Training

Accidental or unintended patient exposures

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- Collect information and inform CMPE
  - Use CMPE feedback form (next slide)
- CMPE will….
  - Estimate the dose
  - Determine whether dose significantly greater than intended
  - Provide a report detailing the required actions
    - This report can be attached to the incident on your trust incident reporting platform

RP303/1

Diagnostic Radiology Incident

Incident Feedback Form

Christie Medical Physics & Engineering - Radiation Physics Group

Please make as many copies of this form as necessary to complete the relevant details of the incident

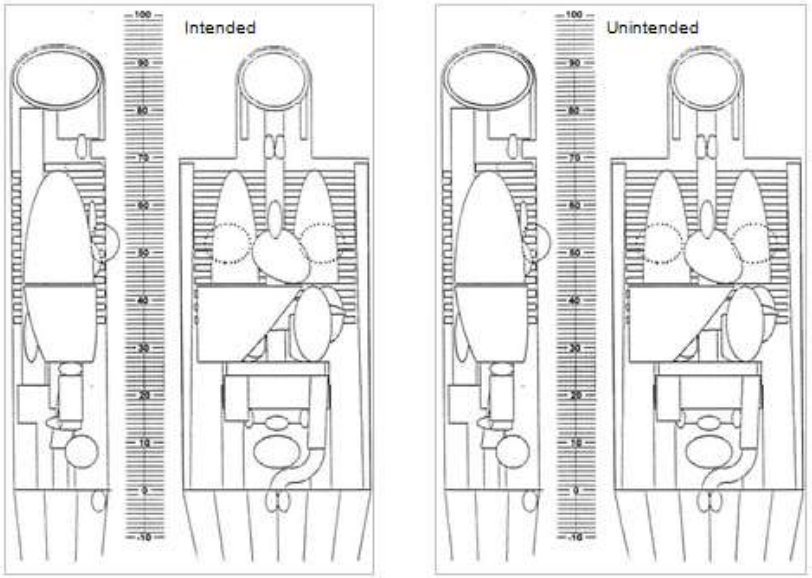
HOSPITAL NAME:		DEPT:	
HOSPITAL CONTACT NAME:		TEL:	
EMAIL:		FAX:	

DATE OF INCIDENT:			LOCATION:		
DATIX NUMBER:			ACCESSION NUMBER:		
SEX: Male / Female	DOB:		Pregnant? Y / N	Term or Date LMP:	
PATIENT SIZE:	SMALL / MEDIUM/ LARGE				
Type of examination:					
Incident Details:					
Has the same or a similar incident occurred before (details & dates):					
Was/were the patient/s informed? Has the Chief Executive been informed?					

Radiographic / fluoroscopic exposure details

Intended examination

X-ray Room :		Equipment and tube used:					
Radiographic View / Fluoroscopy		kV	DAP Units:	mAs	FFD (cm)	Detector dose index	Screening time (mins)



CT exposure details

N.B. DLP and bodyregion information in shaded cells are essential; other info will aid accuracy ofdose estimation.
Details of the scanogram/scout/SPR/topogram are not required.

Details			Intended exam		Unintended exam	
CT scanner used						
Scan type (delete as applicable)			Helical / Axial		Helical / Axial	
Sequence names e.g	Thorax	Abdo/Pelvis				
Start location (from cm scale on diagram above)						
Stop location (from cm scale on diagram above)						
Actual scan length (from patient images) (cm)						
DLP (dose-length product) (mGy.cm)						
$CTDI_{vol}$ (mGy)						
kV						
Rotation or Scan time (s)						
Pitch (helical exams)						
Table interval/Feed/Couch movement (axial exams) (mm)						
Table speed (helical exams) (mm/rotation)						
Gantry tilt (°)						
No. of scans/images (axial exams)						
Detector configuration/Acq./Thickness (e.g. 16 x 0.75 mm)						
Reconstructed image thickness (mm)						
Current modulation/Automatic exposure used?			Y / N		Y / N	
If N:	mA, mAs or Eff. mAs (delete as applicable)					
If Y:	Min/ max mA, or Eff. mAs					
	GE – Auto mA/Smart mA	Noise index				
	Siemens –	Reference mAs				

When to Notify the CQC

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Significant Accidental or Unintended Exposure

- https://www.cqc.org.uk/guidance-providers/ionising-radiation/notifying-irmer-incidents
- Notification always required for
  - Radiotherapeutic exposures significantly lower than intended
  - Radiotherapy verification – 5 repeat exposures over course of treatment
  - Total geographical miss (radiotherapy)
  - Foetal dose ≥ 10 mGy (most relevant to CT imaging of abdomen)
  - Interventional or cardiology unintended exposures resulting in tissue reactions
  - Breast feeding infant (NM only) – procedural failure and infant effective dose ≥ 1 mSv
  - Exposure of multiple individuals
- For other exposures multiplicative factors apply (next slide)

When to Notify the CQC

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	Situation	SAUE criteria to be reportable
Accidental	No dose intended (e.g. wrong patient, intended MRI)	>3 mSv (adult) >1 mSv (child)
Unintended	Intended dose < 0.3 mSv	>3 mSv (adult) >1 mSv (child)
	Intended dose between 0.3 mSv and 2.5 mSv	10x intended
	Intended dose between 2.5 mSv and 10 mSv	25 mSv or above
	Intended dose of more than 10 mSv	2.5 x intended

When to Notify the CQC

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Clinically Significant Accidental or Unintended Exposure (CSAUE)

- Defined in guidance from RCR
- Deterministic effects
  - 0.5 Gy to the lens of the eye.
  - 0.5 Gy to the heart or brain.
  - 5 Gy to the skin (including backscatter for skin reactions).
- Stochastic effects
  - Greater than 1 in 1000 lifetime risk of radiation-induced cancer
- Psychological harm

When not to notify the regulators

- Repeat exposures with no procedural, human, systematic or equipment error
  - e.g. technical repeat x-rays

- ~~Foetal exposures with no procedural failure~~
  - ~~e.g. patient has confirmed there is “no possibility of pregnancy” in line with trust procedure~~

- Foetal exposures >10 mGy are now reportable, even if there is no failure or procedures.

Equipment QC

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Ensure

- Adequate testing before first use
  - Medical physics commissioning (and Critical Exam -> IRR)
- Testing at regular intervals
  - Local QA
  - Medical physics
- Testing after maintenance
  - Consult MPE for what testing is required

QC results must be recorded and corrective action taken where necessary.

QA records must be kept!

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Questions