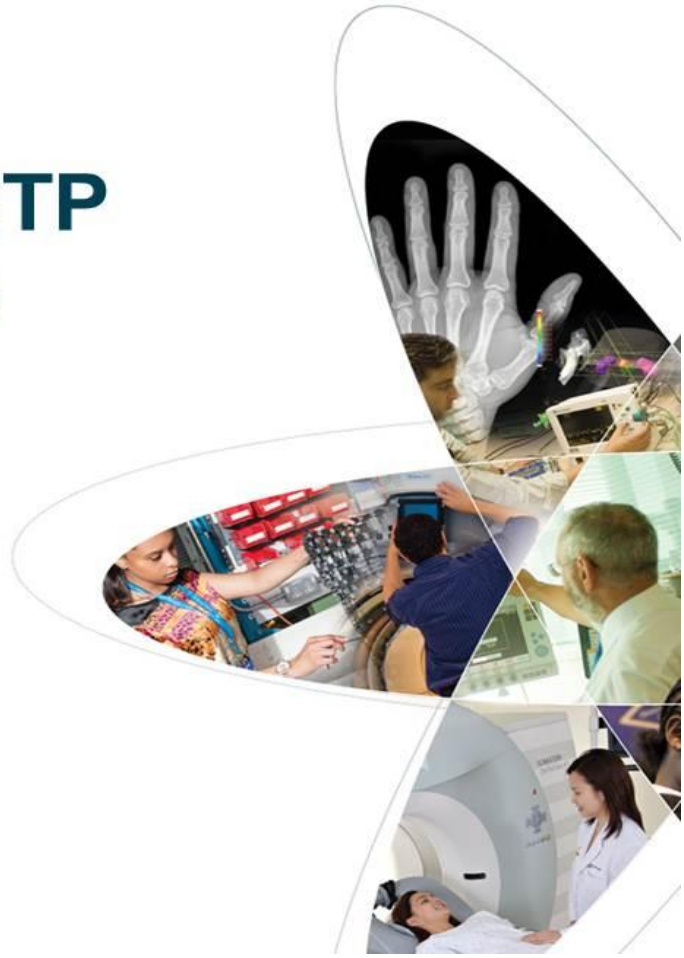
# Guide for STP Trainees

## Rotations



IPEM Institute of Physics and Engineering in Medicine

# Guide for STP Trainees: Imaging with Non-Ionising Radiation - Rotation

**DOPS**

| | DOPS | Examples of evidence which may relate to this DOPS | Competencies which may share evidence with this DOPS |
|---|---|---|---|
| INIR DOPS | Measure the output of a source of non-ionising radiation | Perform power balance measurement of physiotherapy equipment/output from UV, laser, blue or red light using appropriate meter and detector/filter if needed | |
| | Perform a risk assessment of a non-ionising radiation facility | ultrasound dept, new/existing laser in theatre/clinical room, UV light therapy suite, risk assessment of an MRI suite | |
| | Measure and analyse quantitative equipment performance | perform ultrasound/MRI QA and electrical safety test on an ultrasound scanner | |
| | Measure and analyse quantitative imaging equipment performance | MRI/US QA, T1 mapping (MRI) if available at centre | |

**CbD**

| | Examples of possible subjects for CbD. Note that these are not prescribed within the Learning Guide | Examples of possible evidence | Competencies which may share evidence with this CbD |
|---|---|---|---|
| INIR CbD | DVT scan case study (from patient referral/ history, scan, result following patient through to treatment/management in the haematology department | US -write up of DVT patient case study (scan performed by trainee), including scan images, discussion of reasons for referral, symptoms, risk factors for DVT, scan protocol (including choice of imaging controls), patient management following scan (DVT clinic) | PP1-C-1, PP1-c-3, PP1-C-8, PP1-C-8, PP1-C-19 |
| | Discuss non-ionising radiation safety | Discussion on bio-effects of ultrasound/MRI/UV/lasers, current guidelines and standards in non-ionising radiation (e.g. MHRA, BMUS COAR at work regs) | INIR-C4 |
| | Carotid Doppler case study (from patient referral/history , scan, result, through to management (endarterectomy) | write up of Carotid stenosis patient case study (scan performed by trainee), including scan images, discussion of reasons for referral, symptoms, risk factors, disease processes, scan protocol (including choice of imaging controls), patient management following scan (endarterectomy, surgical referral (follow patient through to vascular surgeon and attend surgery if feasible) | PP1-C-1, PP1-c-3, PP1-C-8, PP1-C-8, PP1-C-19 |
| | Design & management of MRI/UV/Laser facility | Discussion on design & management of: MRI facility (e.g. controlled areas, signage, staff/patient screening, categories of staff , patient set-up/coils, MR safety, acoustic noise, contrast agents), UV (e.g. light therapy facility), laser (risk assess a new laser in theatres) | |

**Competencies**

| Learning Outcome Subject | Code | Competency | Examples of evidence | Other competencies which may be demonstrated by this evidence |
|---|---|---|---|---|
| Ultrasound | INIR-C-1 | Use Doppler to determine blood flow characteristics, appropriately selecting harmonic imaging, Doppler and other techniques to maximise the diagnostic potential | Formal write up of project: "Investigate the effects of Doppler controls on blood flow measurements". Which covers Initial investigation of the controls using the Doppler flow Phantom, followed by the practical use of the controls in a range of basic clinical Doppler scans (DVT, Carotid, Arterial - both observed and performed by the trainee). To include examples of flow phantom images to demonstrate the effect of the controls, and images from clinical scans performed by the trainee with a discussion of their choice and adjustment of the Doppler and imaging settings: a summary of the controls , how they work, advantages and disadvantages, errors, artefacts, when and why they are used clinically. Attendance at US clinics to observe or assist with Doppler measurements e.g. carotid scans, vein mapping, transcranial monitoring, Obstetric scanning. Documenting types of Doppler used, velocity profiles, PI & RI measurements | INIR-C-2, INIR-C12 |
| | INIR-C-2 | Investigate the effects of user-selectable parameters such as Time-Gain Compensation (TGC), gain, power, etc. on the viewable image | Formal write up of project: "Investigate the effects of user-selectable B-mode parameters". Which covers Initial investigation of the effect and use of B-mode controls using QA Phantoms, followed by the practical use of the controls in a range of basic clinical Doppler scans (DVT, Carotid, Arterial - both observed and performed by the trainee). To include examples of phantom images to demonstrate the effect of the controls, and images from clinical scans performed by the trainee with a discussion of their choice and adjustment of the Doppler and imaging settings: a summary of the controls , how they work, advantages and disadvantages, errors, artefacts, when and why they are used clinically. Provide phantom (and clinical if possible) images showing effects of scanner controls image quality. Provide explanations of the how these parameters affect image quality | INIR-C-1, INIR-C12, |
| | INIR-C-3 | Perform routine quality control measurements on ultrasound scanners, including general, small parts and cardiac scanners | Written report of routine B-mode QA tests performed by the trainee, including a summary and discussion of the test regime and procedures, IPEM guidelines, including the reasons/purpose of each test, choice of test phantom, frequency of test and tolerance levels, and any action required. With examples (including images) of test measurements performed by the trainee. As above for Doppler QA measurements with a string phantom | INIR-C6,INIR-C10, INIR-C11, INIR-C12 |
| | INIR-C-4 | Make measurements of ultrasound power output | Formal write up of Power balance/hydrophone project by taking measurements using a diagnostic ultrasound power balance and / or suitable hydrophone for B-mode and Doppler mode pulses. Note: Not all departments have the specialist equipment / expertise needed to complete this competency - training courses should be available | INIR-C6,INIR-C10,INIR-C12, INIR-C14 |
| MRI | INIR-C-5 | Perform routine quality control measurements on a clinical magnetic resonance scanner | Formal written report of routine MR QA tests performed by the trainee, including a summary and discussion of the test regime and procedures, IPEM/international guidelines, including the reasons/purpose of each test, choice of test phantom, frequency of test and tolerance levels, and any action required | INIR-C5, INIR-C12, |
| | INIR-C-6 | Undertake online and offline analysis and interpretation of the results | Formal written report on analysis of routine MR QA tests including methods/choice of analysis techniques, tolerance levels, and any action required | INIR-C5 |
| | INIR-C-7 | Investigate the methods of varying the tissue contrast weighting using a contrast phantom | Formal written report on scanning an "in-house" simple phantom (e.g. test-tubes containing water, oil, sugar solution, paramagnetic salt) including discussion of simple sequences (T1W, T2W, proton density, water/fat saturation) and image contrast | INIR-C12 |
| | INIR-C-8 | Review a range of normal and pathological images obtained in one common application using simple pulse sequences | log of MR clinical observations or written case report for common applications (e.g. brain, spine, knee) | |

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| Non-Imaging Modalities | INIR-C-9 | Measure and record the output of a range of equipment, e.g. lasers, UV and physiotherapy ultrasound | Formal write up of Power balance measurements performed on a physiotherapy machine, BECA system measurements for a range of ultrasound imaging equipment, UV output measurements, UV clinic (dermatology), laser output measurements. To include discussion of test equipment and test methods, test regimes, reasons for testing , possible faults, tolerance and relevant action.<br>Laser power or energy (per pulse) measurement using an appropriately calibrated head/meter combination. Also, laser spectral output, beam profile (using a camera based system or simple photographic paper), pulse length (using fast photodiode)<br>UV - Make measurement from UVA, UVB, and other intense light sources, e.g. Blue, Red lights, using a spectroradiometer and/or hand held radiometer with the appropriate detectors and filters. Use of work instructions and spreadsheets<br>US - Measurement of power from an ultrasound physio unit over a range of intensities, frequencies, pulsing regimes and transducer sizes. Use of work instructions and spreadsheets<br>Note: Not all departments have the specialist equipment / expertise needed to complete these competences - training courses may be sought as an alternative | RADS4-C-1 to 4 , INIR-C4, |
| | INIR-C-10 | Perform safety and quality control checks on a range of equipment, e.g. lasers, UV and physiotherapy ultrasound | Examples of test reports from ultrasound QA, laser QA, UV QA etc.<br>Laser: visual inspection of external optics, electrical components, warning signs, PPE (goggles). Check warning signals, emergency stop. Assess output as above<br>UV - Completed work instructions documenting visual inspection of UV tubes (type), panels, door interlocks for cabins. Key control, warning signage and irradiance checks.<br>US - Completed work instructions documenting power output checks, timer checks, transducer electrical safety checks. Note: Not all departments have the specialist equipment/expertise needed to complete this competency - training courses may be sought as an alternative | RADS4-C-1 to 4, RADS5-C-1 to 10, INIR-C3, INIR-C5 |
| | INIR-C-11 | Measure and analyse quantitative measurements of non-imaging equipment performance | Formal reports and examples of UV QA, laser QA, physiotherapy output measurements.<br>Analysis of laser measurements described above - consider energy/power output in relation to effect on treatment and requirements from standards. Determine cause of any anomalies found, e.g. measurement technique/calibration/accuracy, damage to optics<br>UV -Make measurements for calibrating cabin and Hand/foot machines - considering calibration of the measuring instrument, occupied vs. non-occupied calibration for cabins, tolerances and action levels.<br>US - Analysis of differences between expected and measured power for physio units both in terms of detector inaccuracies, measurement technique and equipment performance<br>Note: Not all departments have the specialist equipment/expertise needed to complete this competency - training courses should be available | RADS4-C-1 to 4, RADS5-C-1 to 10 |
| | INIR-C-12 | Work safely in rooms where exposure to non-ionising radiation may present a hazard | US-Example of safe working when performing B-mode/ Doppler ultrasound scans: ALARP, MI, TI, infection control techniques (hand washing, gloves, apron, probe/machine decontamination inc. MRSA, HIV, Cdiff), manual handling techniques, patient safety (chaperoning)<br>MRI- performing MRI QA measurements & investigating tissue contrast<br>Laser-Present during laser treatments and/or measurements. Performing laser measurements/ Provide recommendations to theatre staff regarding use of PPE, Controlled areas and working procedures for laser and UV<br>UV - Performing UV measurements using appropriate PPE and adherence to Risk Assessments and Local Rules | INIR-C3, INIR-C5 |
| | INIR-C-13 | Perform a risk assessment of a non-ionising radiation facility | US- checking scanner/probes/cables for damage, trip hazard from cables, ALARA principle scanning volunteer/patients, infection control, correct posture when scanning to avoid RSA<br>MRI - consideration of dangers of working with strong magnetic fields (static, gradient, RF), controlled areas, identifying MR unsafe/MR-safe/MR conditional equipment, acoustic noise<br>Laser-consideration of relative risks in theatre, for example (e.g. for door locking/access to room vs. NOHD, use of goggles/comfort during long surgical procedures with low risk of accidental exposure)<br>UV - Do risk assessments, include: measurement of stray light hazard for AORD calculation for different areas of the clinic, access restriction, and infection control. Audit of appropriate warning signage. Audit of Risk Assessment and Local Rules documentation | RADS4-C-1 to 4, RADS5-C-1 to 10 |
| Equipment Performance | INIR-C-14 | Make patient exposure measurements and performance testing on a range of non-ionising equipment | US - formal write-up output measurements (hydrophone/power balance) & QA measurements.<br>MRI - measure acoustic noise, measure static magnetic field using a gauss meter, formal write-up of QA measurements. UV - Do MED calibration and observe MED testing of patients. Treatment dose plan for topical / bath PUVA (Trust/dept. dependent). Formal write up of UV dermatology clinic patient observations. Note: Not all departments have the specialist equipment/expertise needed to complete this competency - training courses may be sought as an alternative | RADS4-C-1 to 4, RADS5-C-1 to 10, INIR-C4 |
| Emerging Modalities | INIR-C-15 | Critically appraise an emerging modality | Project write up- i.e.. SMI for EVAR surveillance, US -Implications of tissue specific optimisation on ultrasound QA measurements etc. Document on Elastography imaging / contrast enhanced ultrasound imaging / gene transfection / High Intensity focussed Ultrasound / MRI -short report on emerging/research techniques e.g. MR elastography, MRI-linacs, PET/MR/Raman Spectroscopy | PP1-C-16, PP1-C-25 |

# Guide for STP Trainees : Imaging with Ionising Radiation - Rotation

IPEM Institute of Physics and Engineering in Medicine

**DOPS**

| | DOPS | Examples of evidence which may relate to this DOPS | Competencies which may share evidence with this DOPS |
|---|---|---|---|
| IIR DOPS | Carry out a rotation test on a SPECT system | Evidence based on C1 | IIR-C-1 |
| | Prepare samples and standards for GFR measurement | Evidence based on C6 and 7 | IIR-C-6, 7 |
| | Measure the radionuclide purity (molybdenum breakthrough) for technetium-99m eluate | Evidence based on C11 | IIR-C-11 |
| | Draw up radioactivity and prepare phantom for QC studies | Evidence based on C15 | IIR-C-15 |
| | Operate and perform QA measurements on a radiographic imaging | Evidence based on C16-21 | IIR-C-16, 17, 18, 19, 20, 21 |
| | Undertake a calibration check on a dose area product meter | Evidence based on C16-21 | IIR-C-16, 17, 18, 19, 20, 21 |

**CbD**

| | Examples of possible subjects for CbD. Note that these are not prescribed within the Learning Guide | Examples of possible evidence | Competencies which may share evidence with this CbD |
|---|---|---|---|
| IIR CbD | GFR case: discussion of all aspects surrounding the test, patient | Short case report for patient GFR result | IIR-C-6,7,9 |
| | Clinical imaging case study | Short report for clinical study. Discussion showing understanding of clinical reason for study, image processing and clinical implications of results. | |
| | Basic radionuclide therapy case study | Short report for clinical therapy. Discussion showing understanding of clinical reason for therapy and clinical implications of results. | |
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**Competencies**

| Learning Outcome Subject | Code | Competency | Examples of evidence | Other competencies which may be demonstrated by this evidence |
|---|---|---|---|---|
| Radionuclide Imaging | IIR-C-1 | Perform routine quality control measurements on gamma cameras, SPECT/CT scanners and PET/CT scanners if available | •Report of regular QA including extrinsic and intrinsic uniformities (with various isotopes), centre of rotation and sensitivity<br>•For SPECT/CT report of similar tests as those on the gamma cameras with additional CT tests<br>•Report of PET QC including SUV validation, uniformity, CT QC and gantry alignment | |
| | IIR-C-2 | Investigate the effects if acquisition parameters and post-acquisition processing and display on planar image. This should include planar, SPECT, SPECT/CT and/or PET/CT imaging if available | • Report of phantom acquisitions (e.g. Williams phantom) using different acquisition parameters and manipulating display.<br>• Comparison of images produced using different reconstruction parameters | |
| Non-Imaging Radionuclide Tests | IIR-C-3 | Establish appropriate operating conditions for sample counters, including energy calibration and choice of energy | • Report including details of energy calibration, QC measurements and investigation into the effect of changing settings, source volumes and geometries for equipment Example equipment: Gamma probe, sample counter, thyroid uptake counter, calibrators. Balance QC may also be covered | IIR-C-3, 4, 5 |
| | IIR-C-4 | Perform routine quality control measurements on sample counters and associated equipment, e.g. centrifuges | | IIR-C-3, 4, 5 |
| | IIR-C-5 | Investigate the effect on measured count-rate of factors such as energy window setting, sample volume and source-detector geometry for in-vitro and in-vivo counters | | IIR-C-3, 4,14 |
| | IIR-C-6 | Prepare radioactive samples and standards for counting | • Report detailing practical aspects of standard and sample preparation e.g., for GFR. Practical work can be done as part of IIR-C-3, 4 and 5 | IIR-C-3, 4, 5 |
| | IIR-C-7 | Assist in routine patient investigations using uptake counters, gamma spectrometers, manual and automatic beta and gamma sample counters correctly and safely, and, where possible, other equipment such as whole body counters demonstrating patient-centred, safe practice and the effect of equipment settings and counting geometry on measured count-rates | • Report detailing purpose of patient investigations, including a case study with results and clinical implications<br>• Examples: Whole body counter measurements, SeHCAT tests, GFR, Gamma probes use for sentinel nodes, thyroid measurements using a thyroid uptake counter | |
| | IIR-C-8 | Control of infection pre, during and post investigations and actions taken to manage these | • Report explaining importance of infection control procedures and practical observations<br>•Written confirmation of Infection control discussion with departmental nurses Certificate from mandatory training | |
| | IIR-C-9 | Analyse data from non-imaging tests to give quantitative physiological information | • Report/presentation covering the non-imaging test: purpose, results and implications of test outcome for patient. Examples of non-imaging tests: GFRs, SeHCATs | |
| Radiopharmacy | IIR-C-10 | Measure and record air pressures in the rooms of a radiopharmacy | • Copy of sheet showing daily air pressure measurements with short explanation. • Lab report detailing radiopharmacy visit | IIR-C-10, 11, 12, 13 |
| | IIR-C-11 | Perform QC testing of the Tc-99m generator eluate, including yield, radionuclide purity and chemical purity | • Short explanation of tests performed including results obtained whilst trainee was in Radiopharmacy<br>• Lab report detailing radiopharmacy visit | IIR-C-10, 11, 12, 13 |
| | IIR-C-12 | Prepare a technetium-99m radiopharmaceutical kit | • Report of the preparation of technetium-99m radiopharmaceutical kits including copy of production sheet for a particular day<br>• Lab report detailing radiopharmacy visit | IIR-C-10, 11, 12, 13 |
| | IIR-C-13 | Measure the radiochemical purity of a technetium-99m labelled radiopharmaceutical | • Short explanation of the radiochemical purity test and result sheet<br>• Lab report detailing radiopharmacy visit | IIR-C-10, 11, 12, 13 |
| | IIR-C-14 | Perform routine quality assurance measurements on a radionuclide calibrator | • Results of daily, monthly and annual QC tests on a radionuclide calibrator including repeatability and linearity (when available). Short explanation of all calibrator QC tests performed in the department | IIR-C-5 |
| Radiation Protection | IIR-C-15 | Handle sealed and unsealed radioactive sources, demonstrating the application of the principles of time, distance and shielding to minimise radiation dose | • Evidence of safe phantom filling for QC demonstrating knowledge of radiation protection | DOP |

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| **Diagnostic Radiology Equipment Performance** | IIR-C-16 | Operate a range of quality control equipment, including ionisation chambers, solid state dosimeter, an electrometer and a kV meter | •Carry out critical exam and commissioning checks on different X-ray modalities including AEC and DAP calibration, and write a report<br>•Review calibration requirements and methods for X-ray QC equipment<br>•Perform ion chamber/solid state comparison | •RADS-C-6 to 8<br>•RADS-C-17 to 21<br>•IIR-C-19 , 21, 23 |
| | IIR-C-17 | Change image acquisition parameters and review the effect of the measurements made using quality control equipment | •Review X-ray equipment features relating to optimisation<br>•Evidence of performance of IQ measurements on different modalities (e.g. test objects, different kV, mA parameters, grid in/out) and demonstrate understanding of relationship between IQ and patient dose | •RADS-C-15 and 16<br>•IIR-C-17, 19 and 20 |
| | IIR-C-18 | Undertake cross-calibration of an ionisation chamber or solid state dosimeter | | •IIR-C-16 |
| | IIR-C-19 | Operate a basic range of radiographic and fluoroscopic x-ray equipment under supervision and perform quality assurance tests | •Carry out critical exam and commissioning checks and/or QC checks on X-ray room including AEC and DAP calibration, and demonstrate understanding of process and choice of equipment<br>•Review X-ray equipment features relating to optimisation<br>Evidence of performance of IQ measurements on different modalities (e.g. test objects, different kV, mA parameters, grid in/out) and demonstrate understanding of relationship between IQ and patient dose | •RADS-C-6 to 8<br>•RADS-C-17 to 21<br>•IIR-C-19 , 21, 23 |
| | IIR-C-20 | Undertake image quality tests on a radiographic or fluoroscopic system | •Evidence performance of IQ measurements in a DDR room (e.g. TO20 test object, different kV, mA parameters, grid in/out) and demonstrate understanding of relationship between IQ and patient dose | •RADS C19 and C20 |
| | IIR-C-21 | Measure the parameters of an automatic exposure control | | •RADS-C-6 to 8<br>•RADS-C-17 to 21<br>•IIR-C-19 , 21, 23 |
| **Patient Dose Measurements** | IIR-C-22 | Undertake a patient dose audit and present the results, including reference to appropriate dose reference levels | •Review methods for patient dose assessment<br>•Review requirements for diagnostic reference levels and look at method for establishing DRLs in IPEM Report 88<br>•Calculate DRLs for common examinations using appropriate metrics and compare to National DRLs | •RADS-C-14 |
| | IIR-C-23 | Measure the performance characteristics of a dose area product meter against a calibrated reference ionisation chamber | •A report from routine QC or commissioning in which DAP calibration check results are presented. | •IIR-C-19 |
| | IIR-C-24 | Measure or calculate patient doses for a range of examinations, including the estimation of foetal dose | •A dose report for a patient dose greater than intended<br>•A foetal dose assessment report<br>•A dose and risk assessment for a research study<br>•A Skin dose report<br>•A report describing software packages used for dose calculations | •RADS-C-24 and 25<br>•IIR-C-25 |
| | IIR-C-25 | Calculate the risks and the risk factors associated with patient dose | •A dose report for a patient dose greater than intended, describing the radiation risk<br>•A report on a foetal dose assessment, describing the radiation risk<br>•A dose and risk assessment for a research study | •RADS-C-24 and 25<br>•IIR-C-24 |

# Guide for STP Trainees : Radiation Safety - Rotation

IPEM Institute of Physics and Engineering in Medicine

**DOPS**

| | DOPS | Examples of evidence which may relate to this DOPS | Competencies which may share evidence with this DOPS |
|---|---|---|---|
| RADS DOPS | Carry out measurements to assess patient dose for a radiographic procedure | • Use a phantom to take relevant measurements to assess patient doses e.g. for optimisation of a procedure<br>• Carry out checks to ensure patient dose measurement equipment is within tolerance e.g. DAP meters, assessment of DLP | •RADS-C-15 |
| | Organise and record the outcome of rehearsal of a contingency plan | • Organise the rehearsal of a contingency plan contained within a set of Local Rules | • RADS-C-26 |
| | Choose an appropriate instrument and carry out an environmental survey of a radiation facility | •Carry out an environmental survey of a radiation facility<br>○Select appropriate instrument and carry out necessary function checks<br>○Make and record appropriate measurements<br>○Interpret measurements and produce a report with suitable recommendations | •RADS-C-17 to 21 |

**CbD**

| | Examples of possible subjects for CbD. Note that these are not prescribed within the Learning Guide | Examples of possible evidence | Competencies which may share evidence with this CbD |
|---|---|---|---|
| RADS CbD | Discussion of relevant ionising and non-ionising radiation legislation | • Ionising and non-ionising audit reports reflecting awareness of relevant legislative requirements | RADS-C-1, RADS-C-11 to 13 |
| | Discussion of an optimisation project that has been carried out | • Report concerning measurement and consequent optimisation of patient dose e.g. patient dose audit | RADS-C-14 to 16 |
| | Discussion of ionising/non-ionising radiation room design requirements | • Ionising Radiation room shielding plan and room design - including relevant references<br>• Non-Ionising Radiation room design report - including relevant references | RADS-C-2 to 5 |
| | Discussion of equipment testing requirements, methods and equipment | • Equipment QC testing reports | RADS-C-6-10 and RADS-C-17-21 |
| | Discussion of radiation incidents, including calculation of patient dose, relevant legislation, references and follow-up actions | • Incident reports | RADS-C-22 to 25 |
| | Discussion of radiation monitoring requirements | • Personnel dose reports<br>• Environmental dose reports | RADS-C-9 |

**Competencies**

| Learning Outcome Subject | Code | Competency | Examples of evidence | Other competencies which may be demonstrated by this evidence |
|---|---|---|---|---|
| New Facilities | RADS-C-1 | Undertake risk assessment for a radiation facility | •Undertake a risk assessment | |
| | RADS-C-2 | Undertake room design from first principles for a diagnostic x-ray facility and surgical laser facility | •Produce a room design for a DR facility including control features, with reference to the relevant standards, guidance and regulations<br>•Produce room design including control features for lasers with reference to the relevant standards, guidance and regulations | •INIR-C-12 |
| | RADS-C-3 | Specify the design and control features for each of the facilities | •Produce a room design for a DR facility including control features, with reference to the relevant standards, guidance and regulations<br>•Produce room design including control features for lasers with reference to the relevant standards, guidance and regulations | •INIR-C-12,13 |
| | RADS-C-4 | In conjunction with the user, develop the local rules procedures for the new facilities | •Meet with user to discuss and record details for Local Rules document e.g. carry out an audit<br>•Produce a Local Rules document for a diagnostic radiology and a laser facility with reference to the relevant standards, guidance and regulations | •RADS-C-22, 26<br>•INIR-C-12 , 13 |
| Facility Safety Assessment | RADS-C-5 | Compare the design features and control systems of a facility with the specified design | •Carry out an audit to ensure that all features and systems comply with recommended room design principles<br>•Carry out shielding measurements to verify specified level of lead shielding | |
| | RADS-C-6 | Calibrate and test equipment that measures radiation and obtain measurements required and the safety features to be tested as part of the critical examination | •Carry out critical exam and commissioning checks on X-ray room including AEC and DAP calibration, and write a report<br>•Carry out calibration of an ionisation chamber or radiation monitor and use to carry out critical examination of equipment or assessment of shielding | •RADS-C-6 to 10<br>•RADS-C-17 to 21<br>•IIR-C-19 , 21, 23 |
| | RADS-C-7 | Compare the results of the critical examination with relevant legislation, standards and guidance | •Carry out critical exam and commissioning checks on X-ray room including AEC and DAP calibration, and write a report including reference to the relevant standards, guidance and regulations | •RADS-C-6 to 10<br>•RADS-C-17 to 21<br>•IIR-C-19 , 21, 23 |
| | RADS-C-8 | Report findings of the critical examination and make recommendations for improvements within specified timescale | •Carry out critical exam and commissioning checks on X-ray room including AEC and DAP calibration, and write a report | •RADS-C-6 to 10<br>•RADS-C-17 to 21<br>•IIR-C-19 , 21, 23 |
| | RADS-C-9 | Confirm acceptability of radiation levels within the defined area or distance from the source | • Carry out environmental monitoring to ensure acceptable radiation levels in a specified area<br>•Carry out radiation leakage measurements at critical examination | |
| | RADS-C-10 | Confirm that warning devices, interlocks and safety cut-off mechanisms are fully operational | •Carry out critical exam and commissioning checks on X-ray room, and write a report | •RADS-C-6 and 7 |
| Radiation Safety Audits | RADS-C-11 | Assess audit reports, action plans and outcomes against legislative requirements | •Carry out a radiation audit and compile an audit report, discuss the outcome and actions with reference to legislative requirements<br>•Review a standard audit document pro-forma with reference to relevant legislation | RADS-C-12 & 13 |
| | RADS-C-12 | Undertake a simple audit of an area where radiation is used according to local standard operating procedures. | •Carry out a radiation audit and compile an audit report with recommendations and dates for future actions<br>•Review equipment and methods for measuring occupational radiation exposure (personal dosimetry, etc.)<br>•Review dosimetry records for a group of staff (e.g. Cardiology Staff) | RADS-C-11 & 13 |
| | RADS-C-13 | Report findings; specify degree of compliance, recommendations for further action and date of follow-up review | •Carry out a radiation audit and compile an audit report with recommendations and dates for future actions<br>•Review equipment and methods for measuring occupational radiation exposure (personal dosimetry, etc.)<br>•Review dosimetry records for a group of staff (e.g. Cardiology Staff) | RADS-C-11 & 12 |
| Optimisation | RADS-C-14 | Participate in, or review, patient dose audit data to assess optimisation including the use of diagnostic reference levels | •Review methods for patient dose assessment<br>•Review requirements for diagnostic reference levels and look at method for establishing DRLs in IPEM Report 88<br>•Calculate DRLs for diagnostic x-ray and CT examinations using appropriate metrics | •IIR-C-14 |
| | RADS-C-15 | Undertake measurements to assess patient dose and image quality in a plain x-ray or fluoroscopy room | •Review X-ray equipment features relating to optimisation<br>•Evidence of performance IQ measurements in a DDR room (e.g. TO20 test object, different kV, mA parameters, grid in/out) including understanding of optimisation and the relationship between IQ and patient dose | |
| | RADS-C-16 | Review the outcome of image quality and patient dose measurements and recommend optimisation strategies | •Review X-ray equipment features relating to optimisation<br>•Evidence of performance IQ measurements in a DDR room (e.g. TO20 test object, different kV, mA parameters, grid in/out) including understanding of optimisation and the relationship between IQ and patient dose | |

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| **Measure Radiation Levels** | RADS-C-17 | Select appropriate monitor or dosemeter for the type(s) of radiation to be measured for a range of ionising and non-ionising radiation | •Carry out x-ray equipment testing using a range of dosemeters and discuss why different dosemeters are suitable for different measurements<br>•Carry out shielding or environmental measurements and discuss which monitors are suitable for detecting different types of radiation e.g. shielding using a radioactive source, spill clear-up, area monitoring in areas where radioactive substances are used<br>•Tutorial on laser power meters and various detectors, spectoradiometers/radiometers and gauss meters | •IIR-C-18<br>•INIR-C-9 |
| | RADS-C-18 | Ensure selected device is in working order and within calibration | •Carry out testing on a range of CT & diagnostic x-ray equipment, record the results and make recommendations based on the results | •IIR-C-17 |
| | RADS-C-19 | Perform the full range of measurement activities specified, using a range of recording methods | •Carry out critical exam and commissioning checks on X-ray room including AEC and DAP calibration, and write a report<br>•Carry out testing on a range of CT & diagnostic x-ray and equipment, record the results in a report format and make recommendations based on the results | •RADS-C-6 to 8<br>•RADS-C-17 to 21<br>•IIR-C-19 , 21, 23 |
| | RADS-C-20 | Record the results of measurements accurately and in correct format | •Carry out critical exam and commissioning checks on X-ray room including AEC and DAP calibration, and write a report<br>•Carry out testing on a range of CT & x-ray equipment, record the results in a report format and make recommendations based on the results | •RADS-C-6 to 8<br>•RADS-C-17 to 21<br>•IIR-C-19 , 21, 23 |
| | RADS-C-21 | Interpret the significance of measurements and draw conclusions | •Carry out critical exam and commissioning checks on X-ray room including AEC and DAP calibration, and write a report<br>•Write a summary of legislation and guidance (IPEM reports, MDGN, IRR99, Dept Protocols etc.)<br>•Carry out testing on a range of CT & diagnostic x-ray equipment, record the results in a report format and make recommendations based on the results | •RADS-C-6 to 8<br>•RADS-C-17 to 21<br>•IIR-C-19 , 21, 23 |
| **Contingency Plans** | RADS-C-22 | Critically appraise contingency plans within local rules | • Critically review the local rules with a view to comparing against the Environment Agency's need to have contingency plans in place<br>•Assess local rules against requirements of relevant standards, guidance, regulations and ICRP Principles | •RADS-C-4<br>•RADS-C-26 |
| | RADS-C-23 | Identify and plan an exercise to rehearse contingency plans (e.g. a contamination incident, loss of source) | • Assist with organising and running an exercise to rehearse contingency plans – this can be done by simulating a spill in one of the wards and train ward staff/Physics staff | |
| | RADS-C-24 | Analyse recent radiation incidents and summarise the types and causes of incidents | •Produce a dose report for a patient dose greater than intended<br>•Carry out a foetal dose assessment<br>•Review most recent CQC annual IRMER report | •RADS-C-25<br>•IIR-C-24 and 25 |
| | RADS-C-25 | Participate in the investigation of a radiation incident | •Produce a dose report for a patient dose greater than intended<br>•Carry out a foetal dose assessment<br>•Review most recent CQC annual IRMER report | •RADS-C-24<br>•IIR-C-24 and 25 |
| **Policy and Procedures** | RADS-C-26 | Perform a critical appraisal of the content of local rules against legislative requirements for ionising and non-ionising radiation settings | •Assess local rules against requirements of relevant standards, guidance, regulations and ICRP Principles<br>•Assess local rules for Artificial Optical Radiation Risk Assessment against relevant standards, guidance and regulations<br>•For Laser and MRI local rules assess against relevant standards, guidance and regulations | •RADS-C-4<br>•RADS-C-22<br>•INIR-C-12 |

**DOPS**

| | DOPS | Examples of evidence which may relate to this DOPS | Competencies which may share evidence with this DOPS |
|---|---|---|---|
| RT DOPS | Perform a radiation survey of a treatment room | Observed doing the survey safely and results assessed by registered physicist | RP-C-2 |
| | Produce and evaluate a simple treatment plan | Observed and discussion with a registered physicist | RP-C-12, 13, 14, 15 |
| | Measure the radiation output of a treatment machine | Carry out necessary measurements under observation, and calculate final output manually (i.e. not using a formula in a spreadsheet) | RP-C-5 |

**CbD**

| | Examples of possible subjects for CbD. Note that these are not prescribed within the Learning Guide | Examples of possible evidence | Competencies which may share evidence with this CbD |
|---|---|---|---|
| RT CbD | Manual Calcs | Competency evidence e.g. spreadsheet of manual calc examples | RP-C-16 |
| | Picking the best Conformal Plan | Competency evidence e.g. treatment plans for different sites | RP-C-13 |
| | Beam profiles at different depths/qualities | Competency evidence e.g. analysis of profiles at different depths | RP-C-7 |
| | Risk assessment | Competency evidence e.g. risk assessment | RP-C-3 |
| | Consistency Checks | Competency evidence e.g. consistency checks | RP-C-1 |
| | Linac QC | Competency evidence e.g. Linac QC | RP-C-9 |
| | Patient pathways: setup / planning / verification steps for different treatment sites | Competency evidence | RP-C-10, 11, 12, 13, 14, 15 |

**Competencies**

| Learning Outcome Subject | Code | Competency | Examples of evidence | Other rotational competencies which may be demonstrated by this evidence |
|---|---|---|---|---|
| Radiation Protection Applied to Radiotherapy | RP-C-1 | Assist with the safe handling and operation of small sealed sources in the department, including the performance of strontium-90 consistency checks on dosimetry equipment | • Report showing participation in strontium 90 consistency checks, including understanding of the need, safety concerns and equipment involved in taking these readings | RP-C-4, 5, 6, 7, 8, 9<br>RADS-C-6 (Partial) |
| | RP-C-2 | Perform a radiation protection room survey and discuss the results with your training officer | Survey and risk assessment (including risk assessment of dose to various staff groups, safety procedures etc.)<br>Example ideas:<br>• New treatment room during commissioning (where possible);<br>• Routine (e.g. annual) radiation room survey ;<br>• Survey for use of FFF in pre-existing bunkers;<br>• Survey of a brachytherapy bunker | RP-C-3 |
| | RP-C-3 | Perform a radiation risk assessment and discuss the results with your training officer | | RP-C-2<br>RT3-4 (RT Specialism) |
| Dosimetry and Treatment Equipment | RP-C-4 | Operate treatment equipment safely and evaluate the operation of the interlocks | • Report showing participation in output measurements including understanding of the need, safety concerns and equipment involved in taking these readings and the tolerance appropriateness<br>•Report showing participation in consistency checks including understanding of the need, safety concerns and equipment involved in taking these readings and the tolerance appropriateness<br>• Report showing participation in QC including understanding of the need, safety concerns and equipment involved in taking these readings and the tolerance appropriateness<br>• Report describing the tests (according to COP) carried out and a justified description of the equipment used;<br>• Report on strontium 90 checks;<br>• Report describing the tests carried out and a justified description of the equipment used;<br>• Report describing the relevant interlocks tested, describing their purpose (legislation), labelled floor plan | RP-C-1, 5, 6, 7, 8, 9<br>RADS-C-6 (Partial) |
| | RP-C-5 | Select an appropriate dosemeter and measure standard output, including assessment of the constancy and leakage of the measurement system and its significance | | RP-C-1, 4, 6, 7, 8, 9<br>RADS-C-6 (Partial) |
| | RP-C-6 | Relate standard output measurement to the relevant code of practice (MV/kV electron) | | RP-C-1, 4, 5, 7, 8, 9<br>RADS-C-6 (Partial) |
| | RP-C-7 | Measure a beam profile at the depth of the maximum dose and reference depth, and calculate the field size, penumbra, flatness and symmetry. Explain the differences and relate to the beam specification | • Report describing measurements (with water tank/ diode array/ ion chamber array), results and explanations, spreadsheet showing analysis of data;<br>• Measurements at two depths may be better in a water tank | RP-C-1, 4, 5, 6, 8, 9<br>RADS-C-6 (Partial)<br>Possible delay until radiotherapy specialism: RT1-1, RT1-2 |
| | RP-C-8 | Critically evaluate the function of the ionisation chamber in the linear accelerator and its importance for correct treatment delivery | | RP-C-1, 4, 5, 6, 7, 9<br>RADS-C-6 (Partial) |
| | RP-C-9 | Assist with routine quality control on external beam radiotherapy equipment, including items such as light to radiation, quality index) and evaluate the appropriateness of action/tolerance levels | See above: RP-C-4 | RP-C-1, 4, 5, 6, 7, 8<br>RADS-C-6 (Partial) |
| Treatment Planning | RP-C-10 | Assess available immobilisation techniques and identify treatment sites that would most benefit | • Evidence of immobilisation in RT including of understanding of tolerances and choice of aids<br>• Evidence of RT patient pathway for typical RT patient | |
| | RP-C-11 | Import images for treatment-planning purposes. Evaluate the interactions between data systems and be able to critically assess the essential information, e.g. image quality assurance, slice requirements, etc. | • Presentation on RT patient pathway for typical RT patient<br>• Report incorporating evidence of understanding:<br>o Description of importing method, evidence (statement from appropriate person) of importing;<br>o Evaluation of the checks done on importing (including network errors);<br>o Screen shots of contours for 3 sites and a justification as to the margins;<br>o Screenshots of MV treatment plans created for three sites explaining choices made;<br>o Evidence that the plans meet departmental constraints;<br>o Evidence of discussion with supervisor about the nature of these constraints;<br>• Comparison of multiple plans for each site and discussion of pros and cons of technique (e.g.. 3f vs. 4f prostate, wedge vs. fFiF breast) | RP-C-12, 13, 14, 15, 16, 17 |
| | RP-C-12 | Generate outlines for anatomical structures and geometrical volumes to aid planning based on CT data sets | | RP-C-11, 13, 14, 15, 16, 17 |
| | RP-C-13 | Design treatment plans for two to four field treatments for a range of sites in accordance with the International Commission on Radiation Units and Measurements Guidance and local clinical protocols (explain choice of modality/energy, beam arrangement, and compensation) | | RP-C-11, 12, 14, 15, 16 , 17 |
| | RP-C-14 | Appraise treatment plans, making use of dose volume information and dose constraints for organs at risk and the target volume | | RP-C-11, 12, 13, 15, 16, 17 |
| | RP-C-15 | Produce a range of routine MV photon treatment plans | | RP-C-11, 12, 13, 14, 16, 17 |
| | RP-C-16 | Perform manual calculations for basic treatment techniques, taking into account field size, wedge factor, change of FSD, off-axis, etc. | Could be incorporated into RP-C-11-15<br>• Manual calculation examples used in the department including explanations of terms and tolerances;<br>• Spreadsheet showing and explaining manual calcs for their plans. Evaluation of their results vs. TPS;<br>• Use of example calcs (not trainee's plans) may be required to demonstrate differences with wedge, FSD etc. | RP-C-11, 12, 13, 14, 15, 17 |
| | RP-C-17 | Perform and discuss routine quality assurance checks on the treatment planning/Vsim system and the radiotherapy network | Could be incorporated into RP-C-11-15<br>• Short report on TPS QA including understanding of constraints;<br>• Screenshots of QA spreadsheets | RP-C-11, 12, 13, 14, 15, 16 |

| Learning Outcome Subject | Code | Competency | Examples of evidence | Other competencies which may be demonstrated by this evidence |
|---|---|---|---|---|
| Professional Practice | PP1-C-1 | Treat each patient as an individual, respecting their dignity and confidentiality and upholding the rights, values and autonomy of every service user | Evidence of assisting with patient facing related problems such as set up, individual feedback, device for a patient, etc. Trust Information Governance Training (if covers privacy and dignity) | PP1-C-9 |
| | PP1-C-2 | Discuss personal values, principles and assumptions, emotions and prejudices, and how these may influence personal judgement and behaviour, and identify how you will practice in accordance with Good Scientific Practice | Difficult to do this one without a reflective learning piece of work, looking at the students own personal values and their impact. Should mention Good Scientific Practice within the NHS Constitution. Workshop-style discussion with examples in media to lead as talking points - could be completed during trainee meeting. Some parts of the multi-source feedback test on OLAT may help - i.e. recognising personal values at the start and end of training and how they have changed/progressed | |
| | PP1-C-3 | Communicate effectively with the public, service users and other healthcare professionals, adapting communication style and language to meet the needs of listeners | Examples such as outreach work for schools/students, feedback to colleague about national meetings, feedback to other staff, posters, proferred papers, internal Trust publications and writing, etc. University presentations to the public | PP1-C-6 |
| | PP1-C-4 | Give and receive feedback sensitively to or from a peer or colleague | Complete the MSF tool within OLAT (preferably twice so improvement can be shown), and give examples where feedback has been sought/delivered such giving local seminars, instructing others, etc. | PP1-C-5 |
| | PP1-C-5 | Obtain, analyse and act on feedback from a variety of sources and use it to consider personal impact and change behaviour | Using the MSF complete a summary review and action plan on areas of improvement for personal behaviours and impressions. Also react to feedback from assessors of practical and written work | PP1-C-4 |
| | PP1-C-6 | Present complex ideas in understandable terms in both oral and written formats | Evidence of presenting Healthcare science to students, school, the public and/or at multidisciplinary team meetings where various different professionals are in attendance | PP1-C-3 |
| | PP1-C-7 | Use effective negotiation skills, including influencing colleagues | Evidence of obtaining time on a machine, liaising with a department to share resources, negotiating time frames and resources (could be something done whilst setting up the Elective). Group projects at university | |
| | PP1-C-8 | Work constructively and effectively as a member of a multidisciplinary team | Attendance and participation in team meetings, MDTs, to show professional attitude and demonstrating value of being present (e.g. bringing a case for discussion at a radiotherapy imaging review MDT or department meeting, discussing a research proposal). Must indicate the value of being there rather than just presence | PP1-C-7 |
| | PP1-C-9 | Comply with relevant guidance and laws, to include those related to:<br>- your scope of practice<br>- research ethics and governance<br>- patient confidentiality<br>- data protection<br>- equality and diversity<br>- use of chaperones<br>- informed consent | Trust induction training/online resources may have modules to cover some of these. Some University modules on research ethics and governance, any GCP training and equality and diversity modules. Good Scientific Practice and your local Research Ethics Committee should cover other areas | PP1-C-20 |
| | PP1-C-10 | Contribute to the education and training of colleagues | Give a training lecture to another staff group, offer to help more junior STPS, take part in NSHCS improvements. Contribute to MR / radiation safety training of staff, present new or updated guidance to peers or other staff groups | |
| | PP1-C-11 | Take responsibility for your learning and demonstrate a commitment to continuing professional development | Training plan - normally in spreadsheet form that could be evidence for this. Any specific evidence of showing commitment to certain areas, over and above that required, e.g. additional lectures, additional training to improve skills, wider reading, attending conferences/meetings/workshops etc. | PP1-C-12, PP1-C-14 |
| | PP1-C-12 | Meet commitments and goals in your professional practice, using a range of organisational and planning tools | Training plan - normally in spreadsheet form that could be evidence for this. Any specific evidence of showing commitment to certain areas, over and above that required, e.g. additional lectures, additional training to improve skills, wider reading, attending conferences/meetings/workshops etc. Evidence of responding to line management requests for work completion, hitting University deadlines, showing how to manage time effectively | PP1-C-11, PP1-C-14, PP1-C-15 |
| | PP1-C-13 | Reflect on your practice and generate a reflective diary that demonstrates how you utilise the skills required of an independent learner and your commitment to continuing your professional development | Could be completed after each short rotation and periodically during specialism training. Could use a template style for each one including: Initial Aims, What I learned, Reflection on what I learned vs. Initial Aims, Further Actions. Reflective diary in OLAT which can be used for this. CPD log (IPEM have a template) | PP1-C-15 |
| | PP1-C-14 | Take responsibility for keeping your professional and scientific knowledge and skills up to date | Training plan - normally in spreadsheet form that could be evidence for this. . Background reading/presenting specific topic to staff group/ attending scientific meeting / conference / workshops | PP1-C-11, PP1-C-12 |
| | PP1-C-15 | Develop an action plan based on your experiential learning and reflection on completion of the STP | This can be done at the end of STP, when the OSFA's are coming up and the final competencies are being uploaded. (see PP1-C-13) Reflective log, comparing results of first MSF with second and documenting improvements (from comments made by assessors). Creating a revision or action plan by identifying individual weaknesses and areas for improvement for future | PP1-C-13 |
| Clinical Practice | PP1-C-16 | Use a range of ICT within the workplace for service delivery, research, audit and innovation, including data filing and archiving:<br>- word processing<br>- databases<br>- statistics packages<br>- PowerPoint<br>- internet<br>- email | Cross reference any competencies which show a particular software used at it's best by the student. Some knowledge of databases and statistics packages may have to be gained in addition if not covered on the MSc or in the work place. Otherwise, it is likely that the trainee has plenty of evidence to show high level skills throughout all the competency submissions | |
| | PP1-C-17 | Under supervision, demonstrate that you can obtain and present a patient history from a normal volunteer or consenting patient in order to better understand the clinical decision making process in your clinical practice | Consent a Nuclear Medicine patient (rotation), take part in an MDT and present a patient history for a doctor, shadow a clinical colleague taking consent. Sit in on a Radiotherapy first appointment. Take consent for the CT component of Radiotherapy, e.g. for a contrast CT scan, identifying which answers would prohibit the test from commencing. Evidence which shows an attempt to understand the patient experience with any of the services the host department provides and/or evidence which shows how the department responds to patient's needs could be considered sufficiently in the spirit of this competency to be suitable without actually taking a history | |
| | PP1-C-18 | Apply current regulations with respect to patient safety and safe systems within the workplace. To include, as appropriate to scope of practice:<br>- risk management<br>- biological specimen handling<br>- COSHH<br>- RIDDOR<br>- radioactivity<br>- fire safety<br>- electrical safety<br>- moving and handling<br>- display screen equipment<br>- incident reporting<br>- infection control | Trust induction training. Any of the competencies covering regulations. Cross reference any specific competencies which address legislation as appropriate to the specialism. Basic Health and Safety legislation should be included, with specifics in the rotations and specialisms. Updating local rules/risk assessments | |
| | PP1-C-19 | Use clinical coding and medical terminology in accordance with stated guidance, as appropriate to scope of practice. | Write up demonstrating understanding of simple clinical coding, coding used for statistics and payment information, medical terminology when doing Case Based Discussions and communicating with clinical staff | |

| | | | | |
|---|---|---|---|---|
| **Clinical Practice** | PP1-C-20 | Keep accurate records in accordance with current guidelines and the legal framework for data security. | Show evidence of documentation completed by trainee within the department that has been accurately and securely completed and kept, e.g. patient information, additional calculation forms, patient dose audits, physics optimisation work, clinical or research trial forms which need to go outside of the Trust (e.g. national audit and feedback), departmental quality documentation and the safe upload into digital storage for access and retrieval. Possible tie-in with MSc project | PP1-C-9, RT4-7 |
| | PP1-C-21 | Use, in your practice:<br>- standard operating procedures<br>- protocols<br>- clinical guidelines | Refer to any particular competencies which demonstrate the trainee has adhered strictly to the SOP or protocol. Possible to relate this to any documentation that they have reformed as part of their training (i.e. identifying that the SOP needed adjusting and re-writing or changing the format). Development, contribution to or use of safety and/or QA protocols and SoPs. MR safety guidelines for scanning will include consideration of clinical guidelines | |
| | PP1-C-22 | Continuously improve your practice through good practice in:<br>- identifying common sources of error<br>- identification of risk<br>- reporting critical incidents | Incident reporting and Risk Assessments in specialism. Using Datix or other reporting system. A short summary report detailing common errors or risks in the area of work and suggestions and/or implementation of ways of reducing them, e.g. paperless, password protected spreadsheets, double checks, methods of avoiding major errors. If the trainee has written and implemented any check software or consistency feedback loops in other work, this would be good evidence | RT2-10, RP-C-3, INIR-5-2, INIR-5-8 |
| **Research and Innovation** | PP1-C-23 | Participate in innovation, research, service development and audit activities complying with guidance and laws relating to research ethics | Guidance on research ethics during MSc. Participation in any clinical trial work within the department. Evidence of any project where the trainee has added to service development. Cross reference to other specialism competencies | PP1-C-9, RT2-2 |
| | PP1-C-24 | Contribute to service and quality improvement and productivity in the work-base and embed evidence-based developments within routine practice | Cross reference to any competencies (likely to be in the specialism) where trainee has reviewed the literature and changed a process of procedure as a result, showing benefit(s) to service from work done, and/or CPD record | RT2-2 |
| | PP1-C-25 | Undertake a literature review and prepare and present to peers a critical analysis of a publication from the scientific literature | MSc. Project literature review and/or local journal club. Presenting university coursework (critical appraisal of emerging technology or critical analysis of a publication from the scientific literature) to staff group at local training centre | |
| | PP1-C-26 | Prepare and deliver an oral scientific communication to peers at a local, national or international meeting | MSc Project Presentation. Local seminar clubs, national meetings, MPEC (doesn't always have to be an international meeting, but something outside of the department should be included) | |
| **Clinical Leadership** | PP1-C-27 | Lead in your clinical role through appropriate application of:<br>- self-management<br>- self-development<br>- integrity<br>- self-direction<br>- problem solving<br>- dealing with complex issues<br>- making sound judgements in the absence of complete data | Cross reference to any specialism competency where the trainee has been signed off for some routine work within the department and which demonstrate elements of self-management. Specific examples of doing something to an SOP, but finding a problem or issue and resolving it. MSc project - resolution of problems encountered. Consideration of safety issues in MR and US, e.g. staff exposure to magnetic fields, health effects of US heating/contrast media use, can constitute making decisions in the absence of complete data | EL-C-1, EL-C-2, EL-C-3 |
| | PP1-C-28 | Identify potential areas for change and accept change identified by others, working across different provider landscapes as required | MSF results and discussion with Training Officer. Short report on implementation of new techniques, perhaps enforced upon the department externally, e.g. increase in IMR, new technique or methodology, service improvements which the trainee has been involved in, critical appraisal work within the specialism identifying areas for improvement, visiting other departments to see other ways of doing things and implementing positive change. Any recommendation, or help implementing a recommendation, for changing how a service operates should count | PP1-C-4 |