

Guide for STP Trainees : Imaging with Ionising Radiation - Rotation



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.	

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	<ul style="list-style-type: none"> Report of regular QA including extrinsic and intrinsic uniformities (with various isotopes), centre of rotation and sensitivity For SPECT/CT report of similar tests as those on the gamma cameras with additional CT tests 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	<ul style="list-style-type: none"> Report of phantom acquisitions (e.g. Williams phantom) using different acquisition parameters and manipulating display. 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Report detailing purpose of patient investigations, including a case study with results and clinical implications 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	<ul style="list-style-type: none"> Report explaining importance of infection control procedures and practical observations Written confirmation of Infection control discussion with departmental nurses Certificate from mandatory training 	
Radiopharmacy	IIR-C-9	Analyse data from non-imaging tests to give quantitative physiological information	<ul style="list-style-type: none"> Report/presentation covering the non-imaging test: purpose, results and implications of test outcome for patient. Examples of non-imaging tests: GFRs, SeHCATs 	
	IIR-C-10	Measure and record air pressures in the rooms of a radiopharmacy	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Short explanation of tests performed including results obtained whilst trainee was in Radiopharmacy Lab report detailing radiopharmacy visit 	IIR-C-10, 11, 12, 13
	IIR-C-12	Prepare a technetium-99m radiopharmaceutical kit	<ul style="list-style-type: none"> Report of the preparation of technetium-99m radiopharmaceutical kits including copy of production sheet for a particular day Lab report detailing radiopharmacy visit 	IIR-C-10, 11, 12, 13
	IIR-C-13	Measure the radiochemical purity of a technetium-99m labelled radiopharmaceutical	<ul style="list-style-type: none"> Short explanation of the radiochemical purity test and result sheet Lab report detailing radiopharmacy visit 	IIR-C-10, 11, 12, 13
Radiation Protection	IIR-C-14	Perform routine quality assurance measurements on a radionuclide calibrator	<ul style="list-style-type: none"> 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
	IIR-C-15	Handle sealed and unsealed radioactive sources, demonstrating the application of the principles of time, distance and shielding to minimise radiation dose	<ul style="list-style-type: none"> Evidence of safe phantom filling for QC demonstrating knowledge of radiation protection 	DOP

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	<ul style="list-style-type: none"> •Carry out critical exam and commissioning checks on different X-ray modalities including AEC and DAP calibration, and write a report •Review calibration requirements and methods for X-ray QC equipment •Perform ion chamber/solid state comparison 	<ul style="list-style-type: none"> •RADS-C-6 to 8 •RADS-C-17 to 21 •IIR-C-19 , 21, 23
	IIR-C-17	Change image acquisition parameters and review the effect of the measurements made using quality control equipment	<ul style="list-style-type: none"> •Review X-ray equipment features relating to optimisation •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 	<ul style="list-style-type: none"> •RADS-C-15 and 16 •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	<ul style="list-style-type: none"> •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 •Review X-ray equipment features relating to optimisation <p>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</p>	<ul style="list-style-type: none"> •RADS-C-6 to 8 •RADS-C-17 to 21 •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		<ul style="list-style-type: none"> •RADS-C-6 to 8 •RADS-C-17 to 21 •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	<ul style="list-style-type: none"> •Review methods for patient dose assessment •Review requirements for diagnostic reference levels and look at method for establishing DRLs in IPEM Report 88 •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	<ul style="list-style-type: none"> •A dose report for a patient dose greater than intended •A foetal dose assessment report •A dose and risk assessment for a research study •A Skin dose report •A report describing software packages used for dose calculations 	<ul style="list-style-type: none"> •RADS-C-24 and 25 •IIR-C-25
	IIR-C-25	Calculate the risks and the risk factors associated with patient dose	<ul style="list-style-type: none"> •A dose report for a patient dose greater than intended, describing the radiation risk •A report on a foetal dose assessment, describing the radiation risk •A dose and risk assessment for a research study 	<ul style="list-style-type: none"> •RADS-C-24 and 25 •IIR-C-24