

SMPCETS Open Day 2025

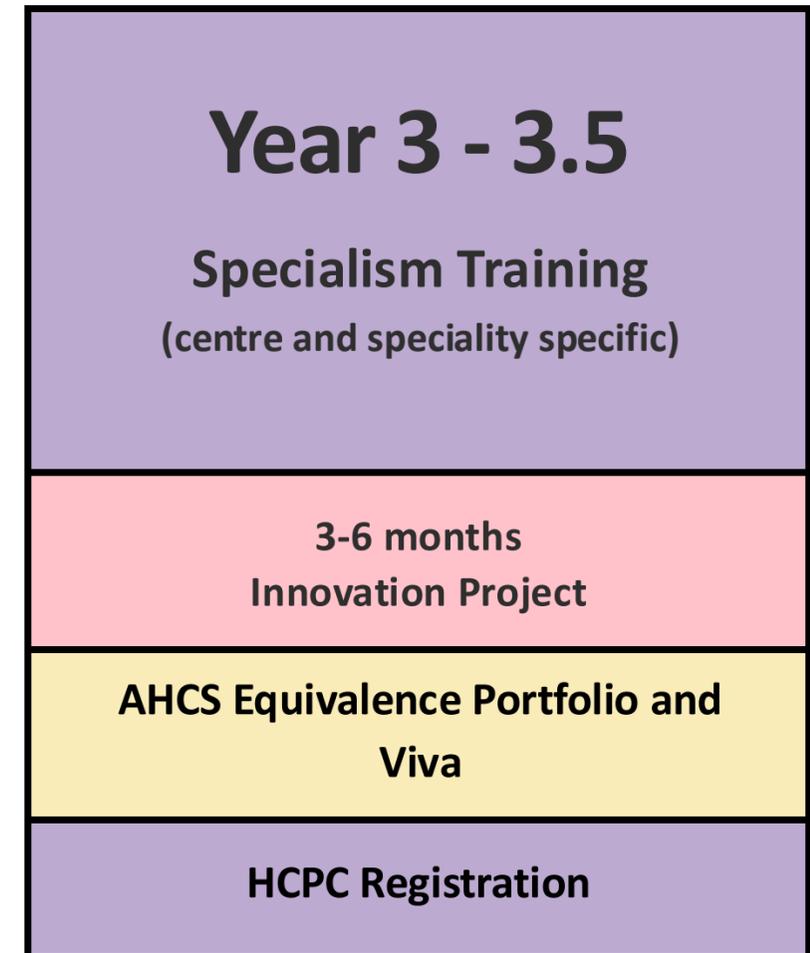
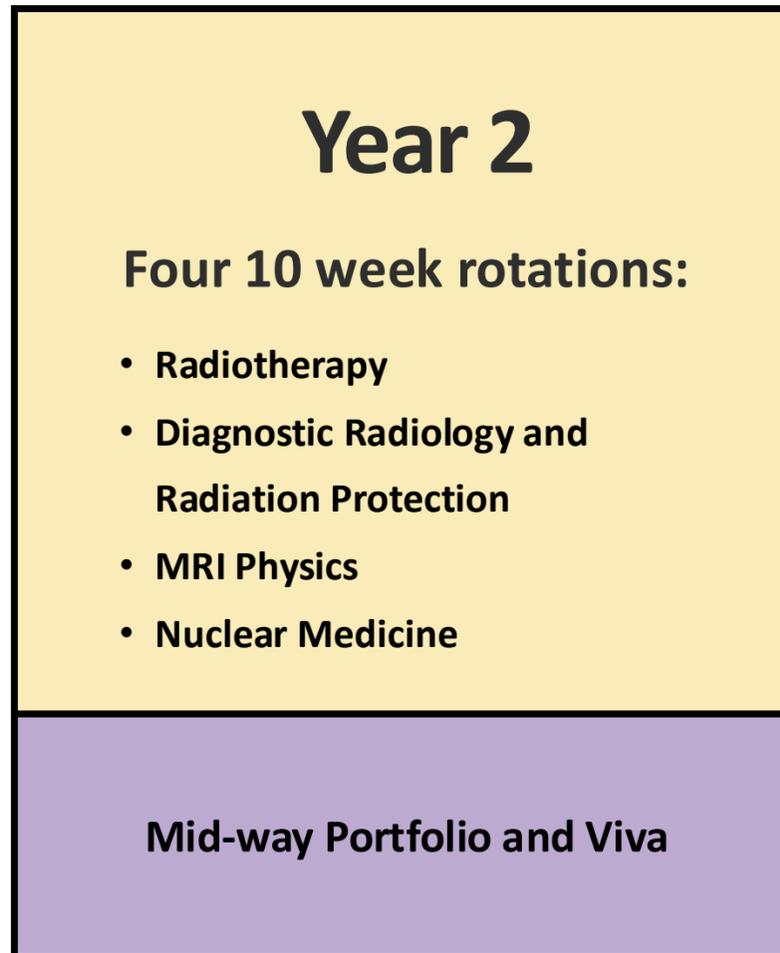
Foundation Year as a Medical Physics Trainee

Eirin Beese

Trainee Clinical Scientist in MRI Physics

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Medical Physics



Foundation Year Timeline

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Placement 1	Placement 1													
Placement 2			Placement 2											
Acquaintanceship(s)														
Placement 3							Placement 3							
Placement 4									Placement 4					
Portfolio Submission														
Midway QA Viva														

Ultrasound Week in Edinburgh

Title	Date	Details	Self-study	Deliverables	Supervisor	Sign-off status
MRI Safety	09/12/2022	<p>MR Safety</p> <ul style="list-style-type: none"> - Assistance with MRI implant safety assessments (n~5), to be safety evaluated for 1.5T and 3.0T throughout placement. - Familiarise with governance framework for generic implant safety policies - Discuss and perform MRI site safety audit (individual task) - * Site Audit Mini-project (address backlog) - Comparison of safety issues at 1.5T, 3T and 7T - Review risk assessment - Incident review - Discuss safety aspects for RHC (PHB - safety for patient and staff, dept layout and equipment, training of staff) 	<p>Familiarity with MRI Safety</p> <ul style="list-style-type: none"> - MHRA guidelines - Local rules - Review safety lecture 	<ul style="list-style-type: none"> - Updated risk assessment - Discussion of safety assessment conclusions, MHRA guidelines and general safety questions - Awareness of safety issues around magnets, gradients, RF, cryogenics, comparison of safety issues at 1.5T, 3T and 7T, safety guidelines 	john.mclean@ggc.scot.nhs.uk	Approved
Introduction and Basic MRI Sequences	09/19/2022	<ul style="list-style-type: none"> - QEUH Campus, MRI Unit and ICE Tour (JF/JMcL) - Meet staff, complete personal safety questionnaire, patient confidentiality discussion (JF/JMcL) - Explain aspects of MRI Physicist role in the context of the training plan and how MRI Physics fits into the NHS structure (JF/JMcL) - Supervised operation of the MRI Scanner (direct observation). - Imaging of fruit phantoms in order to illustrate T1W, T2W and PD contrast. - Imaging of T2 decay phantoms and calculation of T2 values 	<p>Spin Echo, Gradient Echo, Inversion Recovery, Contrast, SNR Trade-offs</p> <ul style="list-style-type: none"> - Review introductory lectures - Self-directed reading online (e.g. imaio5, mri-q, revisemri) and MRI textbooks 	<ul style="list-style-type: none"> - Discussion and Self Study - Write up of fruit scanning and Q2 calculations 	sarah.allwood-spriers@ggc.scot.nhs.uk	Approved
MRI Theory	09/26/2022	<p>MRI Theory</p> <ul style="list-style-type: none"> - k-space investigation - T1 and T2 measurements 	<p>Proton NMR experiment, MRI experiment</p> <ul style="list-style-type: none"> - Review NMR lecture - Self-directed reading on theory of basic NMR (flip angles, FID, T1 and T2 relaxation). - Self-directed reading on the fundamentals of MR Imaging (RF pulses, spatial encoding, slice selection, k-space, image formation). 	<ul style="list-style-type: none"> - Discussion and Self Study assessment - k-space investigation summary - Report on Q1 and Q2 analysis 	maria.lopez-gonzalez@ggc.scot.nhs.uk	Approved
Routine Clinical Applications	10/03/2022	<p>Routine Clinical Applications</p> <ul style="list-style-type: none"> - Case studies of normal or diseased examples to highlight anatomy and/or pathology of three major clinical areas from: neuro (brain or spine), musculoskeletal (knee, hand, shoulder) or body (liver or MRCP). 	<p>Advanced Sequences, Suppression Techniques</p> <ul style="list-style-type: none"> - Self-directed reading around spoiled GE, steady state GE, fast SE, partial-Fourier and single-shot SE techniques 	<ul style="list-style-type: none"> - Discussion and Self Study assessment - Case studies 	pauline.hallbarrientos@ggc.scot.nhs.uk	Approved

Training Plan

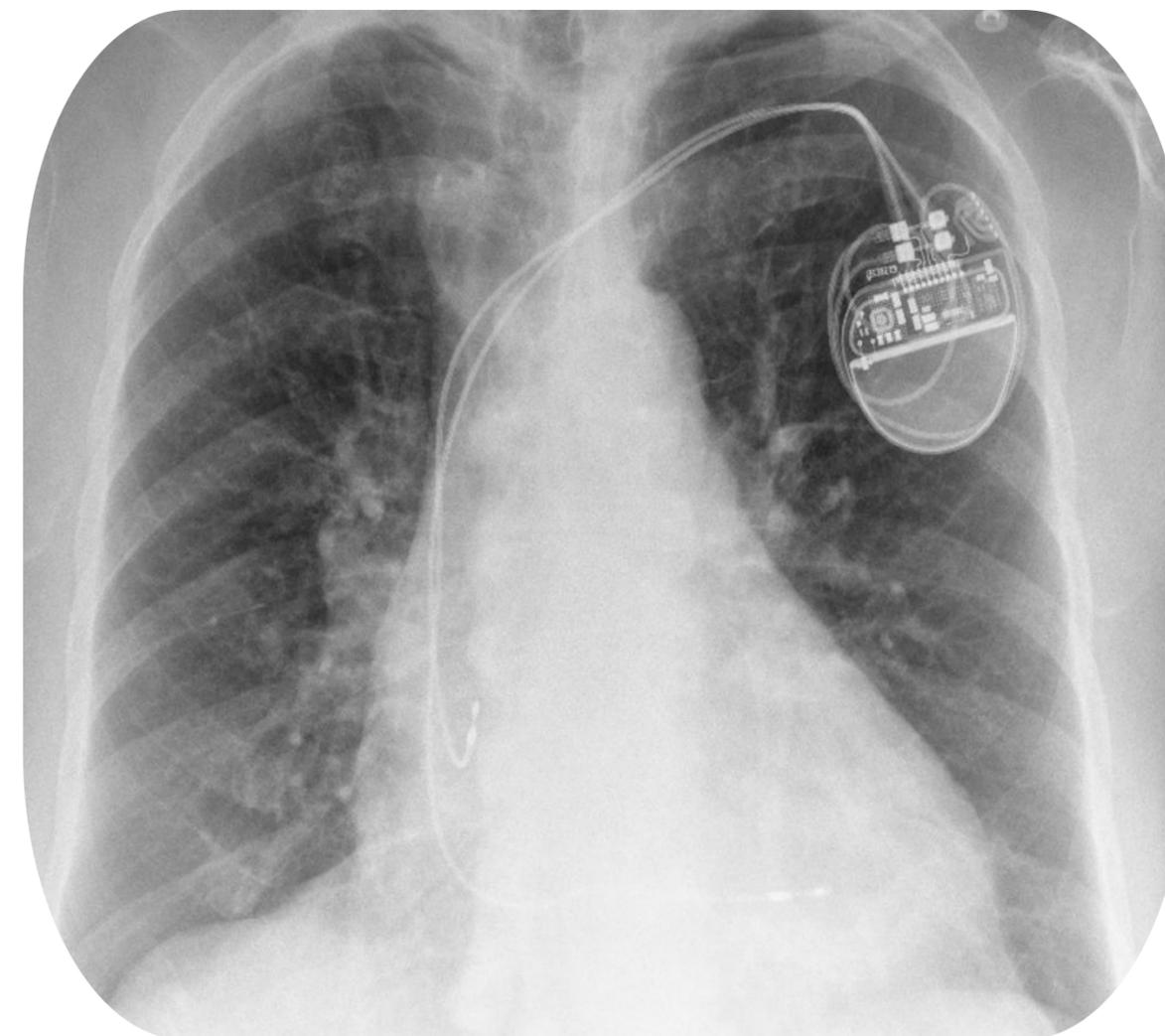
- Based on Minimum Deliverable Content (MDC)
- Electronic sign-off of competencies from supervisors

MRI

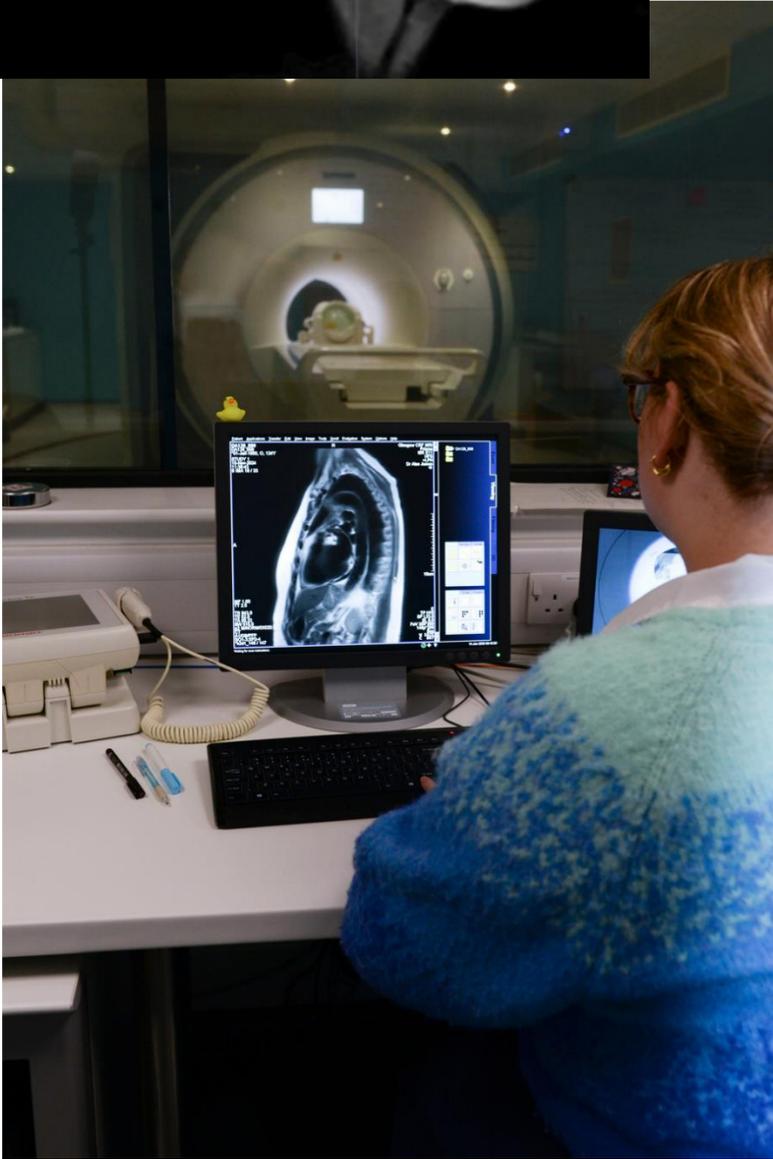
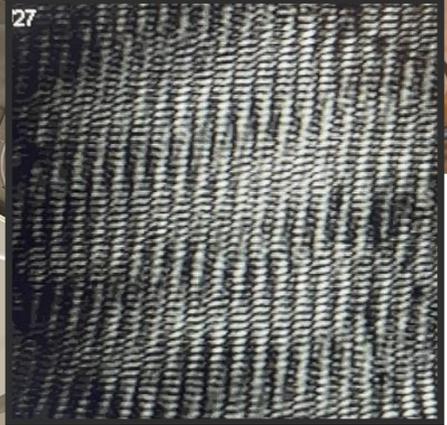
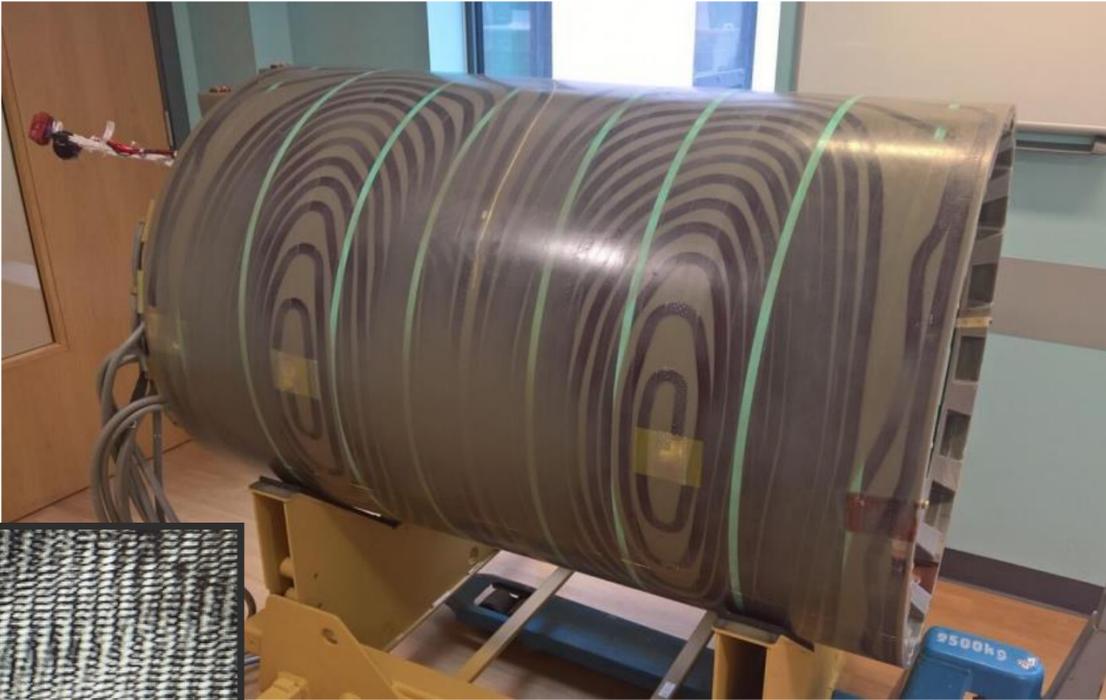
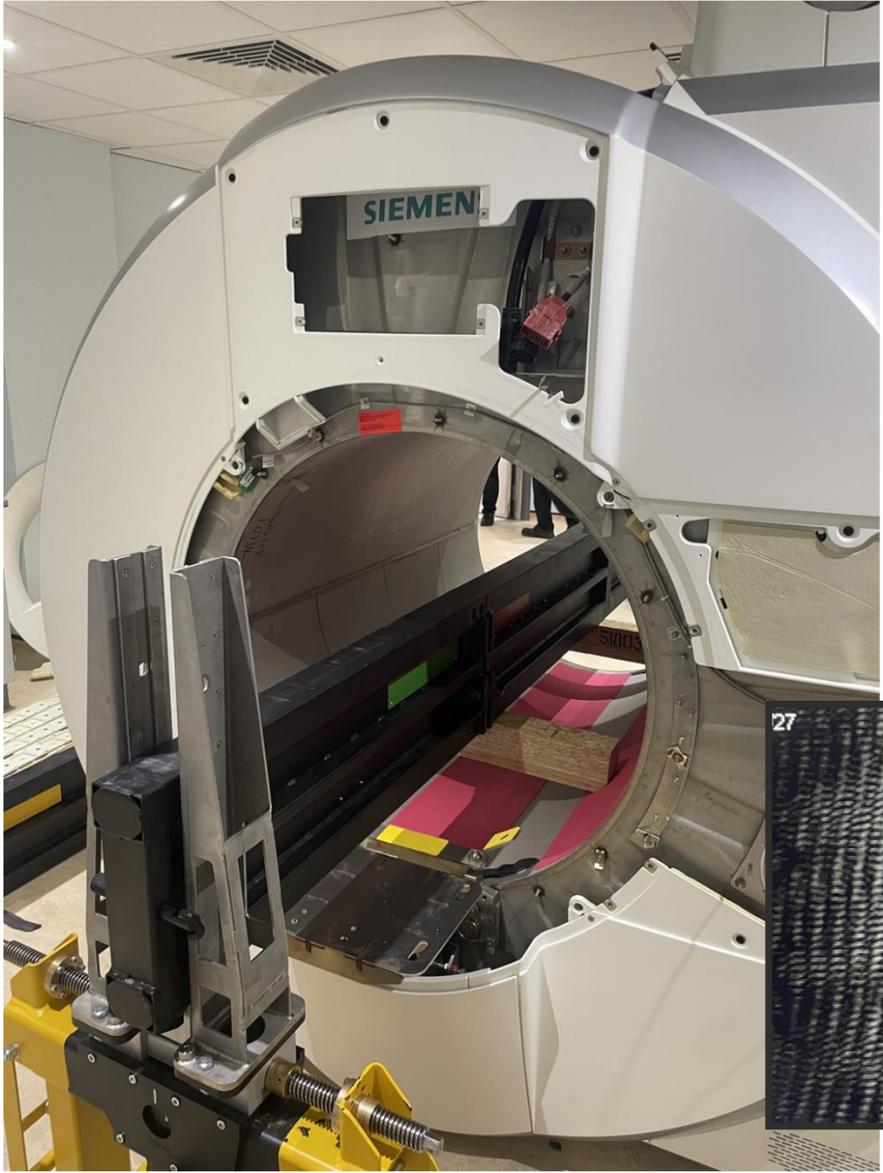
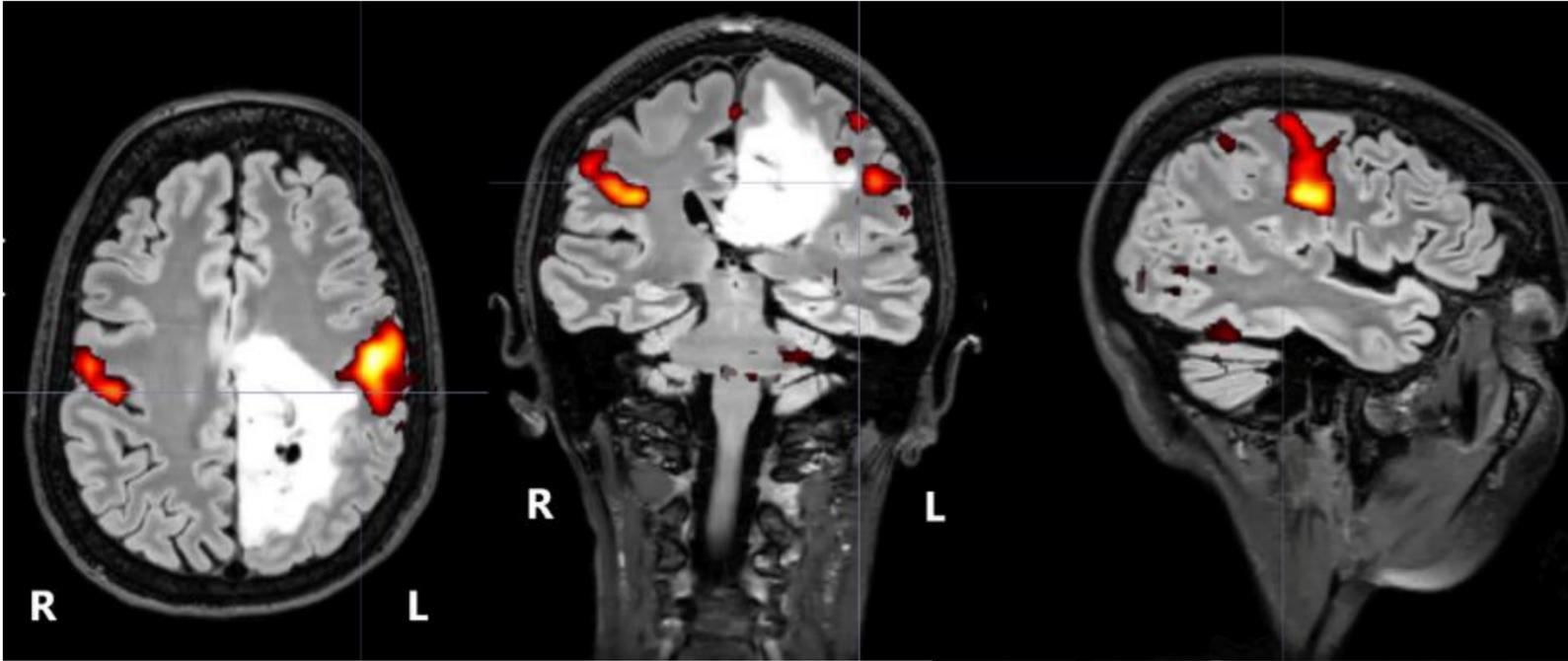


Table 1-1. Valid Combinations of Pacemaker Pulse Generators and Leads to Use in 1.5 T and 3 T Environments

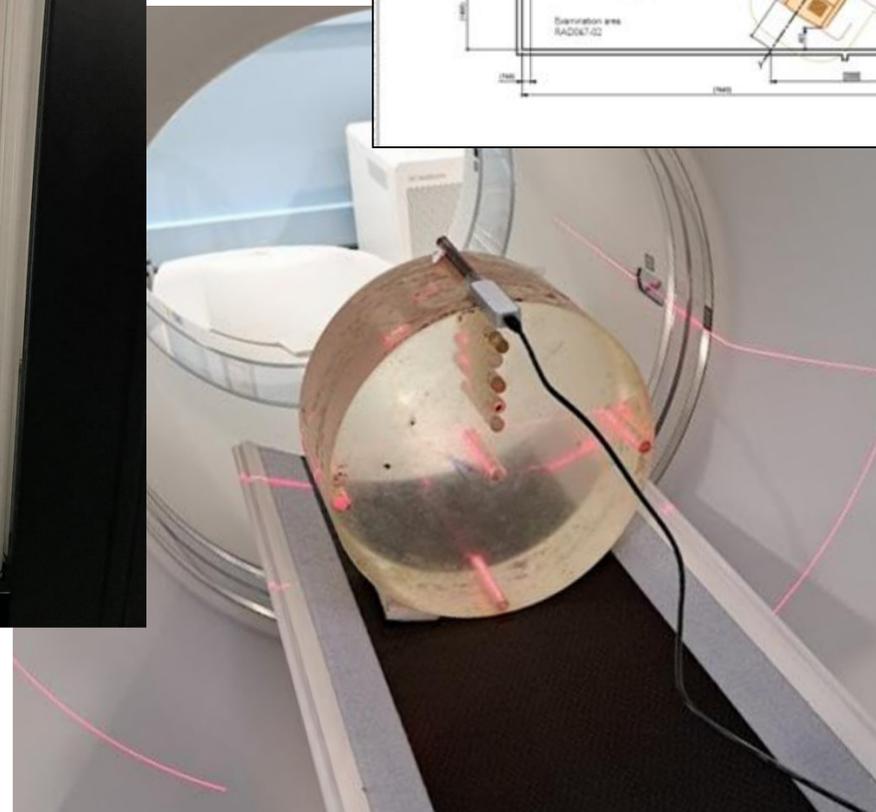
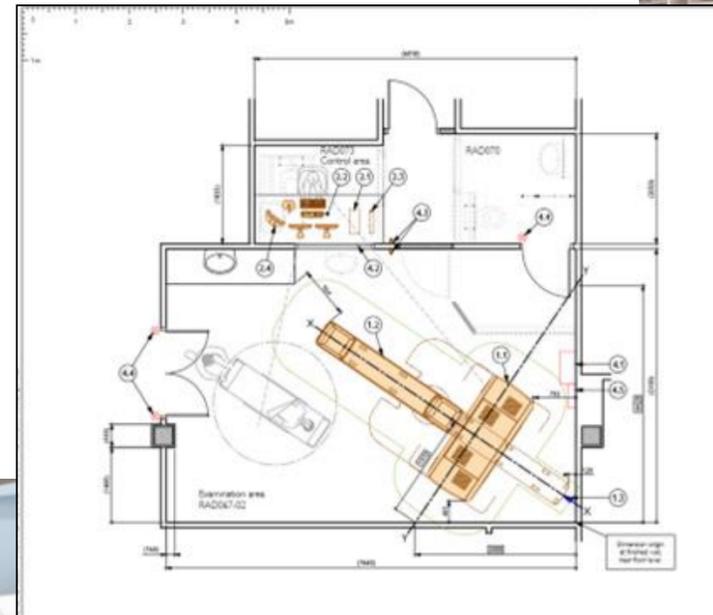
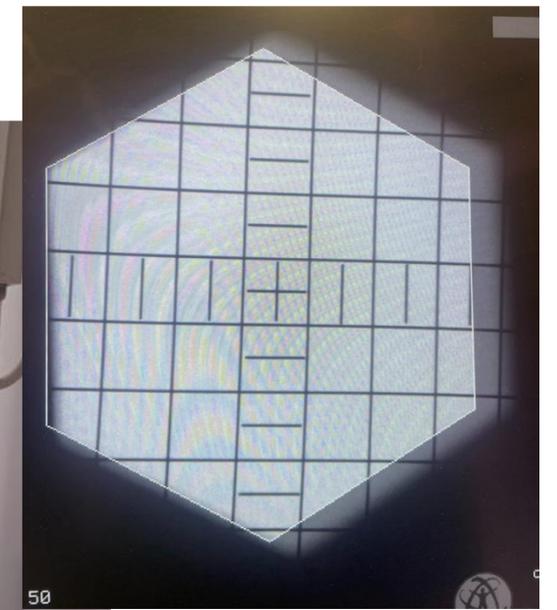
	INGEVITY MRI / INGEVITY+ Leads only	FINELINE II Leads only	Combination of one INGEVITY MRI / INGEVITY+ Lead and one FINELINE II Lead
ADVANTIO MRI Pulse Generator INGENIO MRI Pulse Generator VITALIO MRI Pulse Generator FORMIO MRI Pulse Generator	1.5 T scanner only. 3 T scanner not allowed. <i>Normal Operating Mode or First Level Controlled Operating Mode.</i>	1.5 T scanner only. 3 T scanner not allowed. <i>Normal Operating Mode only.</i>	1.5 T scanner only. 3 T scanner not allowed. <i>Normal Operating Mode only.</i>
ESSENTIO MRI Pulse Generator PROONENT MRI Pulse Generator ACCOLADE MRI Pulse Generator	1.5 T or 3 T scanner allowed. <i>Normal Operating Mode or First Level Controlled Operating Mode.</i>	1.5 T or 3 T scanner allowed. <i>Normal Operating Mode only.</i>	1.5 T or 3 T scanner allowed. <i>Normal Operating Mode only.</i>



MRI



Health Physics



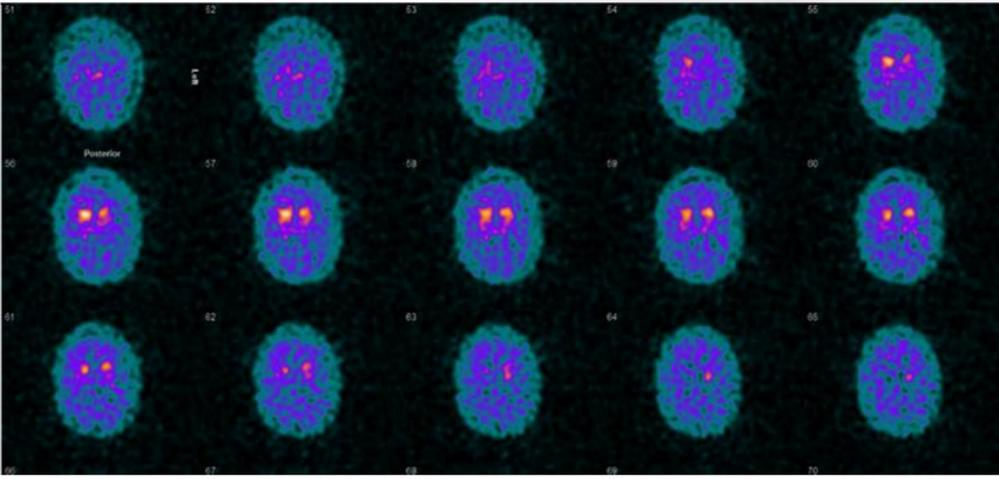
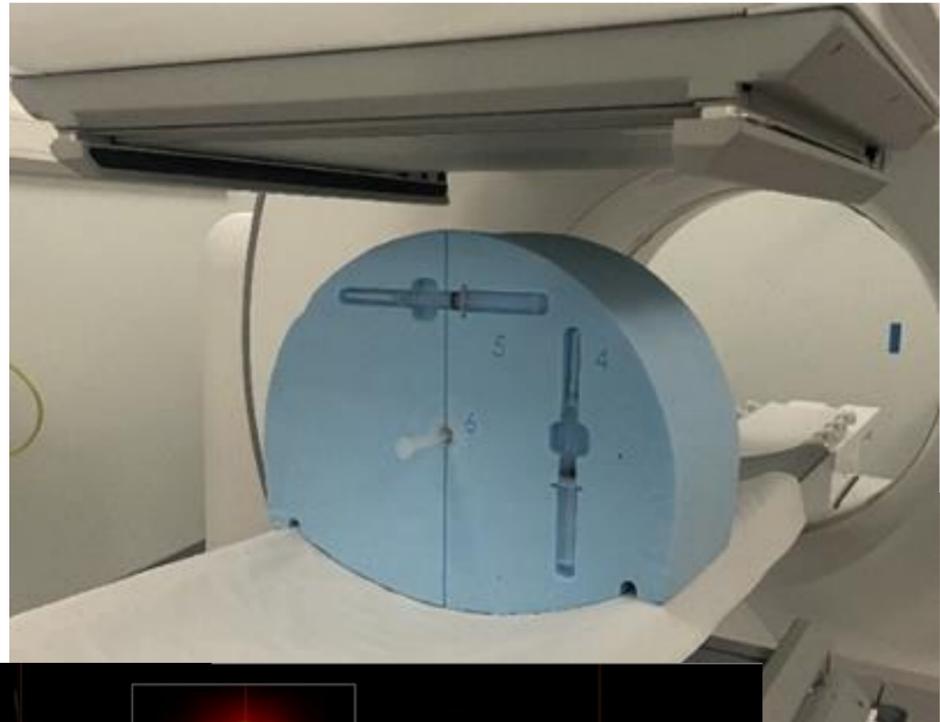
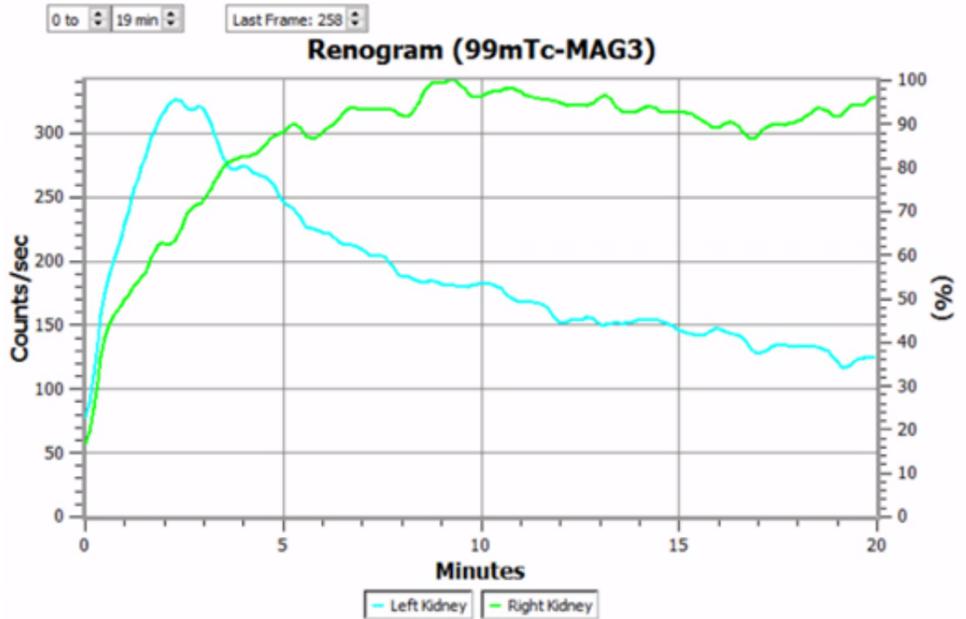
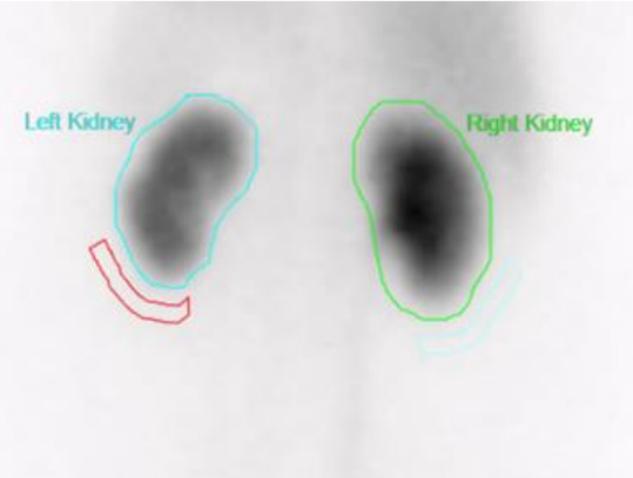
1. Summary of Results

Radiation Protection Checks	Unacceptable	See 2.1, 2.2 & 2.3
kVp Accuracy	Unacceptable	See 2.4
Timer Accuracy	Acceptable	
Total Tube Filtration	Acceptable	
Output Reproducibility	Unacceptable	See 2.5
Output Repeatability	Acceptable	
LBD Alignment	Acceptable	
AEC	Acceptable	
DAP	Acceptable	
Tube leakage	Acceptable	
DAP Calibration Factor: 1.03		

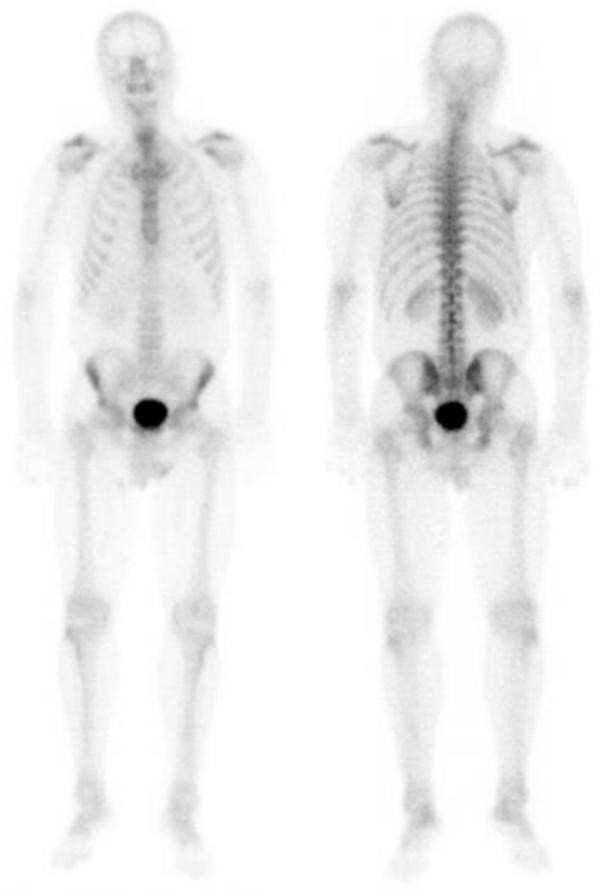
2. Conclusions & Recommendations

- 2.1 Documentation (such as Local Rules, Exposure and DRL charts, standard fault log, records of staff holding patients) should be made available asap and radiographer QA needs to be established.
- 2.2 Emergency Power Offs are labelled, but not to AXREM compliance. Installers are organising the additional signage required to be placed before unit is in use.
- 2.3 Unauthorised use is possible through console unit, if selecting Image Plate only exposure as this bypasses the DR console.

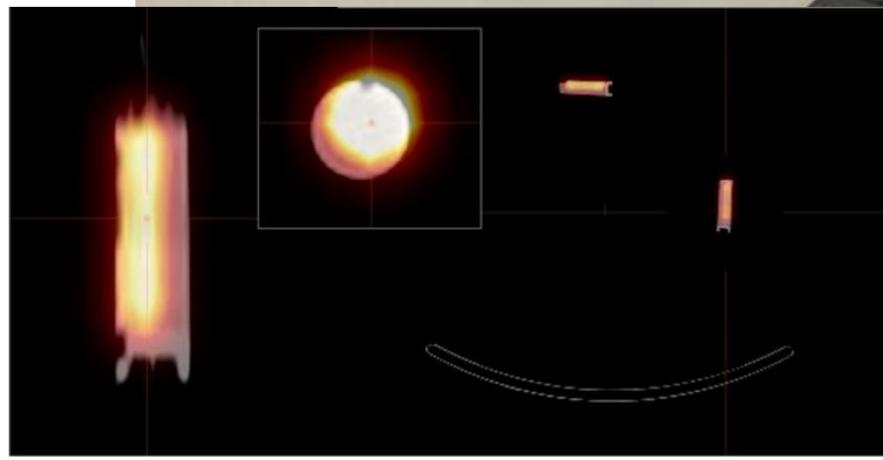
Nuclear Medicine



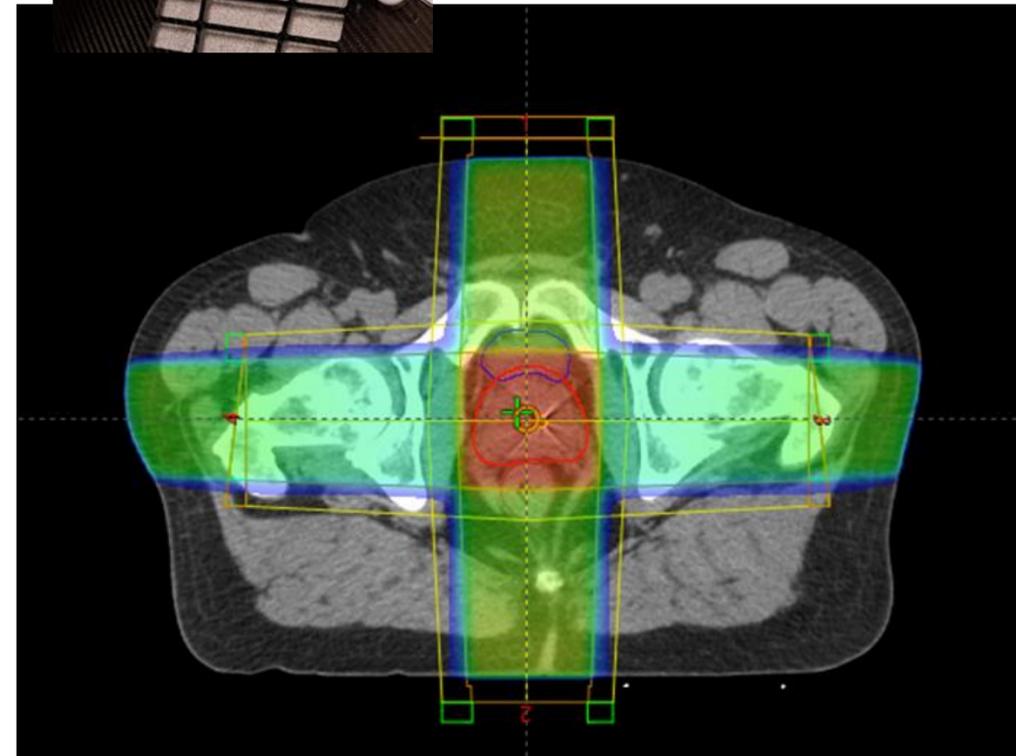
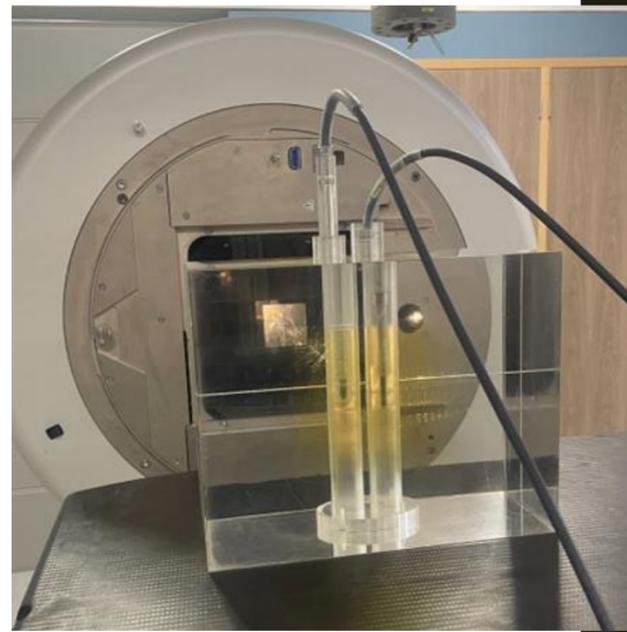
WHOLEBODY BONE SCAN



R Anterior L L Posterior R



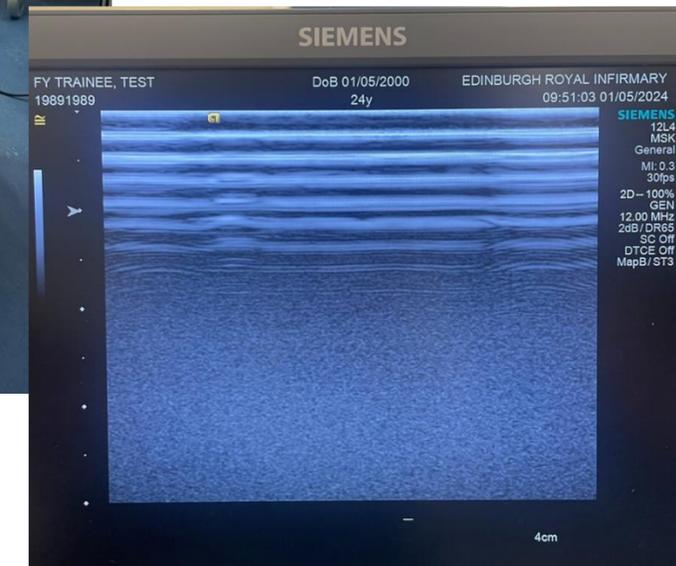
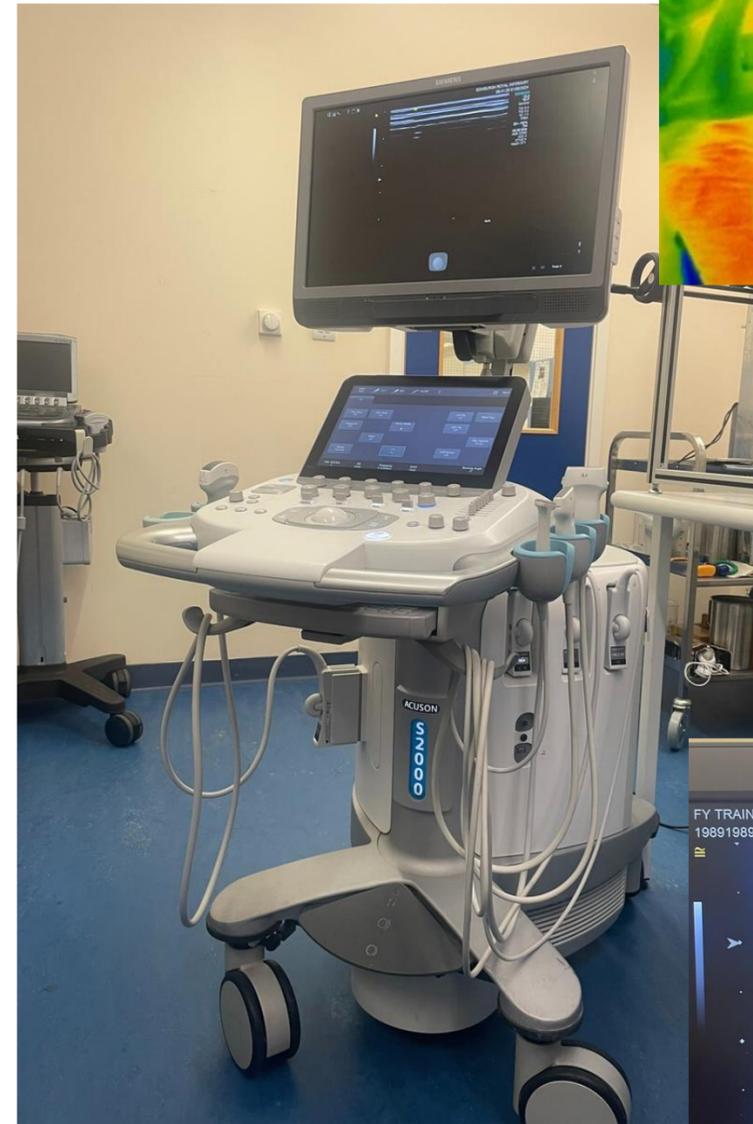
Radiotherapy



Photon Biannuals		Photon_Biannuals (Rev.221229)		
Clear		Load		
Date of Measurement: 27-Jun-24		Measured by: CLJS/CS/EB<GLC><GL		
		Treatment Room: Room G 17		
		Energy: 06 MV FFF Photo		
Output PASS		Perspex Block Factor PASS		
Dosemeter: D37	Temp: 22 °C	Temp: 22 °C		
N ₀ : 5.68	Pressure: 746.41 mmHg	Pressure: 746.3 mmHg		
Temp: 22 °C	TPC: 1.025	TPC: 1.025		
Pressure: 746.41 mmHg	MU: 200	MU: 200		
TPC: 1.025	Readings: 28.61 28.57 28.57 28.57	Readings: 28.61 28.57 28.57 28.57		
%dd: 84.7	Px Factor: 1.203	Px Factor: 1.203		
MU: 200	Expected: 1.211	Expected: 1.211	Difference: -0.62	
Readings: 29.13 29.12 29.12	Beam Profile Analysis PASS			
Output: 1.002 cGy/MU	Flatness		Symmetry	
			Max Difference (%)	
TPR₂₀¹⁰ PASS	X	Y	X	Y
Readings (10 cm): 26.03 26.00 26.00	Gantry 0°:	125.26 123.85	100.31 100.82	
Readings (20 cm): 16.40 16.36 16.36	Gantry 90°:	126.05 123.84	100.20 100.81	0.69 0.36
TPR ₂₀ ¹⁰ : 0.630	Gantry 180°:	125.71 124.21	100.24 100.77	0.37 0.59
Expected TPR ₂₀ ¹⁰ : 0.624	Gantry 270°:	125.95 123.87	100.33 100.75	0.62 0.18
Difference: 0.82	Doserate Equivalence for FFF PASS		Comments:	
Readings (800 MUm ⁻¹): 28.62 28.56 28.57			Analyse four profiles	
Readings (Clinical DiR): 28.61 28.57 28.57 28.57			Save	
Ratio: 1.000				

Acquaintanceships

Rehabilitation Engineering & Ultrasound





Scottish Medical Physics Training Scheme Foundation Year Portfolio

September 2023 – September 2024



Eirin Beese

MSc in Medical Physics
BEng (Hons) in Biomedical Engineering

Department of Clinical Physics and Bioengineering
NHS Greater Glasgow and Clyde

This portfolio complies with the requirements of NHS Greater Glasgow and Clyde for patient data protection for teaching purposes. This portfolio is not in the public domain. All of the work in the portfolio is my own, except where other sources are specifically acknowledged.

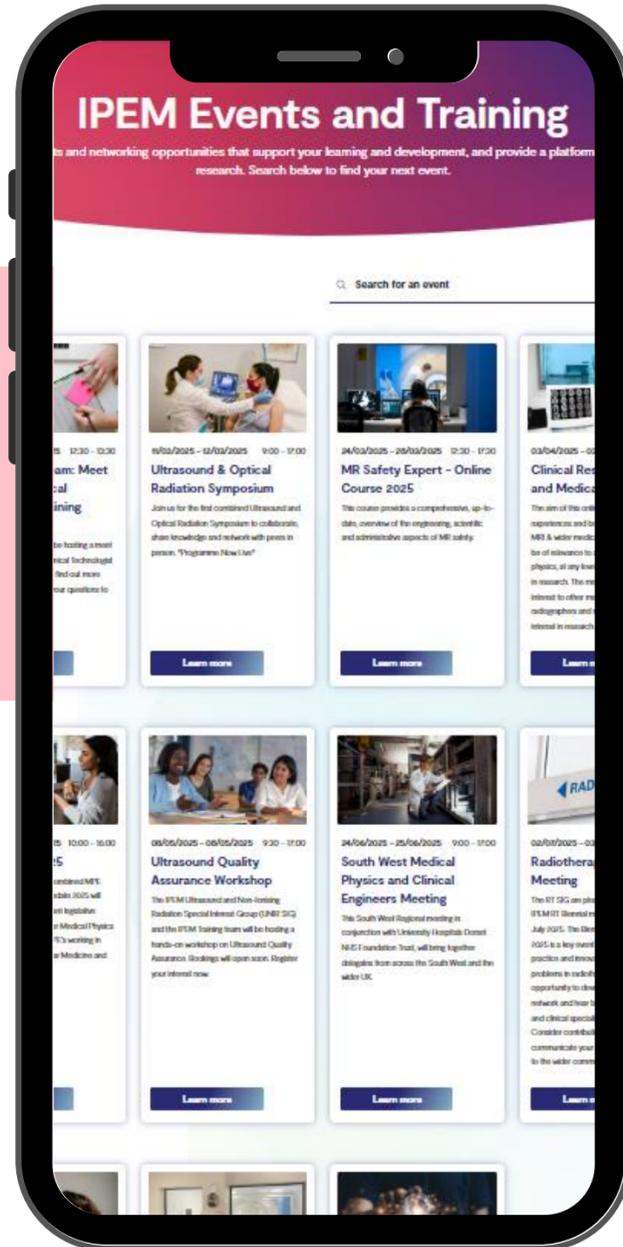
FY Portfolio

- Examples of work done throughout FY:
 - 15 pages per placement (+ Training Plan)
 - 3 pages per acquaintanceship
- LaTeX and Word templates available from Trainee Network.
 - Make sure to follow most up-to-date formatting guidance.
- “Best bits” – don’t need full write up, background, method, references etc.



Midway QA Viva

- It's a check to ensure the trainee is progressing as expected – not a pass/fail exam!
- The panel consists of 3 assessors (from the different specialisms covered in Foundation Year).
- Questions are specific to the trainee's portfolio and training plan.



Conferences



**THE SOCIETY FOR
RADIOLOGICAL PROTECTION**



Any questions?

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