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Module Specific Information

Breast Radiology

Clinical Supervisor: Dr Sophia Sakellariou (s.sakellariou@nhs.net)

Trainers: Dr Sophia Sakellariou, Dr Fotios Constantinidis

The trainee will see the full range of diagnostic techniques, including mammography, US and MR, in the investigation of symptomatic breast disease and learn breast interventional techniques. Practical procedures performed in the Department include US guided FNA/ core biopsies and stereotactic breast techniques.

The trainee will attend the weekly Breast MDT and develop a clear understanding of the importance of the multidisciplinary approach to the management of breast carcinoma. If breast cancer screening experience is required this could be arranged at the Breast Screening Unit. The trainee will also have general cross sectional imaging sessions in CT & MR and plain film reporting sessions.
Chest Radiology QEUH/NVH

Clinical Supervisor: Dr David Stobo (David.Stobo2@ggc.scot.nhs.uk)

Trainers: Dr David Stobo, Dr Gordon Cowell, Dr Mike Gronski, Dr Sean Kelly

South West Glasgow boasts Scotland’s largest Respiratory Medicine unit, with 19 Consultant Physicians and 120 specialty inpatient beds in the Queen Elizabeth University Hospital.

This module offers the trainee experience in all aspects of thoracic imaging. Diagnostic imaging opportunities include CT lists with dedicated lung cancer staging and HRCT slots and a weekly session in the West of Scotland PET Centre, Gartnavel General Hospital. There is ample opportunity to gain confidence in CT-guided chest biopsy, with a dedicated weekly list for this work. Observing a Thoracic Surgical list and a Bronchoscopy list during the block is also encouraged.

There are two Lung Oncology Multidisciplinary Teams in South West Sector which meet weekly. Trainees undertaking this block will attend the New Victoria Hospital meeting, giving the opportunity to interact with and present cases to friendly and enthusiastic clinical colleagues. There will also be the opportunity to attend the monthly regional Interstitial Lung Disease and Mesothelioma meetings.

A specimen rota is given below. There is scope to adapt this to meet individual requirements, including experience of cardiac CT in the Golden Jubilee National Hospital if desired. Although the Thursday afternoon ultrasound list is predominantly a service commitment, ultrasound-guided biopsies from the Lung Oncology MDTM are undertaken at this time and the trainee will be encouraged to participate.

Specimen Rota

<table>
<thead>
<tr>
<th>Monday (NVH)</th>
<th>Tuesday (QEUH)</th>
<th>Wednesday (NVH)</th>
<th>Thursday (QEUH)</th>
<th>Friday (QEUH/GGH)</th>
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<tbody>
<tr>
<td><strong>Morning</strong></td>
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<tr>
<td>HRCT (GC)</td>
<td>Duty</td>
<td>MDTM (All)</td>
<td>Study</td>
<td>CT Biopsy (All)</td>
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<tr>
<td>PFR</td>
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<tr>
<td><strong>Afternoon</strong></td>
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<tr>
<td>MDT Prep</td>
<td>Study</td>
<td>CT (MG)</td>
<td>US</td>
<td>PET-CT (DS)</td>
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<td>CT (DS)</td>
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Suggested Reading List

Chest Radiology QEUH/GGH

Clinical Supervisor: Dr Mike Sproule (Michael.Sproule@ggc.scot.nhs.uk)

Trainers: Dr Mike Sproule, Dr Simon Sheridan, Dr Pete Garmany

The components of this module are;

1. Diagnostic CT with an emphasis on HRCT.
2. Image guided biopsies and drainages which mainly occur in a dedicated CT list on Tuesday morning.
3. Chest clinic plain film reporting
4. Clinical-radiological meetings: the principle meetings are the thoracic oncology MDTM and the respiratory medicine meeting. In addition, there is an interstitial lung disease, radiotherapy planning and pulmonary hypertension meeting.
5. There are also two study/research sessions and four general radiology sessions.

The department of respiratory medicine at the QEUH comprises thirteen consultants and is a regional centre for airways disease, interstitial lung disease and cystic fibrosis. The Beatson Oncology Centre is the cancer centre for the West of Scotland and also has close links with the radiology department. Although there is no direct PET/CT reporting in this module, there is nonetheless considerable exposure to PET/CT. The regional thoracic surgery service is located at the Golden Jubilee National Hospital but most of the imaging and radiological interventional procedures are performed at the QEUH or GGH. The national service for the investigation and treatment pulmonary hypertension (The Scottish Pulmonary Vascular Unit) is also located at the Golden Jubilee National Hospital. The imaging is provided by the trainers of this module and any trainee with an interest would be welcome to participate.

There are three consultants with an interest in respiratory radiology who between them have five diagnostic CT lists in addition to the dedicated biopsy list.

Specimen rota

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<thead>
<tr>
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<th>Monday</th>
<th>Tuesday</th>
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<th>Thursday</th>
<th>Friday</th>
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</thead>
<tbody>
<tr>
<td><strong>AM</strong></td>
<td>Chest clinic plain film reporting</td>
<td>CT Bx: QEUH</td>
<td></td>
<td></td>
<td>Thoracic oncology MDTM: GGH</td>
</tr>
<tr>
<td><strong>Lunch time</strong></td>
<td>Respiratory medicine meeting: QEUH</td>
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<tr>
<td><strong>PM</strong></td>
<td>Diagnostic CT: GGH</td>
<td>Diagnostic CT: QEUH</td>
<td>Diagnostic CT: GGH</td>
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</tbody>
</table>
Gastro-Intestinal Radiology (Lower)

Clinical Supervisor: Dr Amit Patel (Amit.Patel@ggc.scot.nhs.uk)

Trainers: Dr Amit Patel, Dr Kirsty Slaven, Dr Andrew Downie, Dr Edit Gyomber.

There is a huge amount and variety of gastroenterological radiology at the Queen Elizabeth University and New Victoria Hospitals. This comes mainly from the Departments of General Surgery and Gastroenterology. The visiting StR would be mainly involved with diagnostic imaging. Image guided procedural work (biopsy and drainages) will also be core to this block.

The StR will be involved with imaging (US/ CT/ MRI) of commonly encountered GI diagnoses: upper and lower GI malignancy, hepato-biliary and pancreatic disease, small bowel pathology, acute abdominal conditions and general surgical post operative problems. There are regular clinic-radiological (Surgical/IBD) and Multidisciplinary Team (colorectal MDT) meeting. The StR will be encouraged to take these meetings under close consultant supervision.

The spectrum of imaging will include CT (all regions, including CT enterography and colonography), MRI (emphasis on rectal carcinoma staging, assessment of fistula in ano, MRCP, liver lesion characterization and MR enterography) and abdominal ultrasound.

Interventional involvement will primarily include biopsies/ drainages (US/ CT/ fluoroscopy guided). More involved interventional work such as GI stenting (oesophagus/ stomach/ duodenum/ colon/ rectum), biliary intervention (PTC, biliary drainage and stenting), RIG placement etc can be considered, but often depends on the presence of an interventional fellow.

Example weekly rota

Monday  
AM  GGH CT KS  
PM  GGH MRI KS  
Tuesday  
AM  Study  
PM  US QEUH AP  
Wed  
AM  CTC NVH AP  
PM  Study  
Thurs  
AM  PFR NVH/MDT prep QEUH KS/AD alt  
PM  MRI NVH AP/Colorectal MDT QEUH KS/AD alt  
Fri  
AM  Duty QEUH AP  
PM  CT QEUH AP
Gastro-Intestinal Radiology (Upper/Hepatobiliary)

Clinical Supervisor: Dr Oliver Cram (Oliver.Cram@ggc.scot.nhs.uk)

Trainers: Dr Oliver Cram, Dr Stuart Ballantyne, Dr Des Alcorn, Dr Edit Gyomber, Dr Kirsty Slaven

Specialist medical and surgical gastrointestinal services including gastrointestinal oncology are provided at Gartnavel General Hospital.

The monthly GI workload includes: 120 – 200 fluoroscopic examinations; 350 – 400 ultrasound examinations (mostly abdominal), and 16 – 20 ultrasound guided liver biopsies. There is extensive use of fast multi-slice CT with a minimum of 2 sessions/week of mainly GI CT. CT colonography is performed on 16 and 64-slice CT scanners at GGH and also at WIG (24 – 30/m dis month)

A 1.5T Philips MRI scanner was introduced in 2003 with a minimum of 4 sessions/week of GI imaging including both diagnostic and oncology work. Examinations include MRCP (25/month), liver MR (16 – 20/month) and MR enteroclysis (12-16/month). Pelvic investigations include pre-op assessment rectal cancer and pelvic sepsis/fistula-in-ano studies. A second 1.5T GE MR scanner was installed in the new Beatson Oncology Centre in spring 2007 and CT-PET in autumn 2007.

The city’s main interventional facility is in this department and this provides ample scope for experience in stenting procedures of the oesophagus and biliary tract, as well as opportunities for angiographic studies.

Four sessions each week will be allocated to GI work. This will usually include:
1 ultrasound session
1 CT session
1 Fluoroscopy session
1 MRI session

Other sessions will be allocated to general reporting, general ultrasound, and vascular/interventional radiology. 2 sessions will be allowed for research and audit etc. The trainee(s) will have the opportunity to participate in a variety of weekly clinical meetings including oesophago-gastric and colorectal MDT meetings, surgical CRC and medical gastroenterology meeting.
Head & Neck Radiology

**Clinical Supervisor:** Dr Ian McLaughlin *(Ian.McLaughlin@ggc.scot.nhs.uk)*

**Trainers:** Dr Ian McLaughlin, Dr Ian McCrea, Dr Clare Fenlon, Dr Ayman Elsayed

Busy ENT and OMFS Departments are based at the QEUH and INS with ENT beds for South and West Glasgow and Clyde based at the QEUH and OMFS beds based at the INS.

The trainee will see the full range of diagnostic techniques (including US, CT and MR) in the investigation of head and neck disease and learn head and neck interventional techniques. Practical procedures performed in the Department include US guided FNA & core biopsies. The trainee will also have general cross sectional imaging sessions in US, CT & MR and plain film reporting.

The trainee will attend the weekly Head and Neck MDT at the INS and develop a clear understanding of the importance of the multidisciplinary approach to the management of head and neck cancers.

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<tbody>
<tr>
<td>AM</td>
<td>MR (IMC) NVH</td>
<td>CT (IM) INS</td>
<td>11-1 US Neck Biopsy VNH</td>
<td>MDT INS MRI (IM) QEUH</td>
<td></td>
</tr>
<tr>
<td>PM</td>
<td>CT (IMC) NVH</td>
<td></td>
<td>MDT prep</td>
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</table>
Magnetic Resonance Imaging

Clinical Supervisor: Dr Gordon Cowell (gordoncowell@nhs.net)

Trainers: Dr Gordon Cowell, Dr Jo McNeil, Dr Amit Patel, Dr David Stobo

MRI reporting is split between the QEUH and NVH, with ample opportunity for the trainee to gain exposure to a wide range of MRI studies, including gastrointestinal, genitourinary, neurological, vascular, breast and musculoskeletal imaging. The trainee will attend 4 to 5 MRI varied sessions per week, each list reflecting the personal competencies of the supervising consultant. Trainees will be directly supervised at all times, but trainees may work under indirect supervision if this is appropriate and of benefit to the trainee. Input into an MDT meeting is also recommended, with regular haematology, colorectal, breast and respiratory meetings taking place.

Level 1 and 2 competencies to be attained can be planned prior to commencing the block to maximise training opportunities.

MRI based audit is encouraged, and there is regular teaching for pre- and post-fellowship trainees, including an interesting cases meeting on a Friday morning.

Contribution to the general workload of the department comprises 3 to 4 sessions per week, with plain film reporting, ultrasound and CT.

Suggested Reading List

**Urological Radiology**

**Clinical Supervisor:** Dr John Morrison (*John.Morrison@ggc.scot.nhs.uk*)

**Trainers:** Dr John Morrison, Dr Des Alcorn, Dr Grant Baxter, Dr Amit Patel

**Other consultants involved with training:** Alan Ramsay, Dr David Kay

*Module Overview*

This module will provide a large and varied uroradiology experience. There is a large urology department based at QEUH with consultants producing cases in all aspects of uroradiology other than urolithiasis which is now based at GRI.

A large proportion of the workload is oncological. This results in US, CT and MR techniques for both diagnosis and staging of all urological malignancies. CT renal colic and CT IVUs are well established. Further imaging includes MR for bladder/prostate/renal malignancy with experience in associated nuclear medicine imaging available. There will be experience in urethral, bladder and ureteric fluoroscopic techniques.

Appropriate interventional experience will be possible with the department performing all associated urological interventional procedures including nephrostomy, ureteric stenting and gonadal vein embolisation. Percutaneous embolisation experience at GRI and percutaneous ablation experience at GGH may be possible to arrange.

There are close ties with the urology department with weekly CPC meetings and a weekly oncology MDT. Trainee will be expected to take part in meetings by chairing the CPC meeting and taking a portion of the MDT dependant on experience.

The module fulfils Level 1 competency (new 2010 RCR Curriculum).

*Rota*

- 2/3 sessions CT
- 1/2 sessions MRI
- Interventional sessions if appropriate
- 1 US session

The weekly rota will remain flexible to allow the trainee to attend the sessions most appropriate to their training.
Vascular & Interventional Radiology

Not available as stand alone module – Fellowship trainees only.

Clinical Supervisor: Dr Alan Ramsay

Trainers: Dr Alan Ramsay (Interventional Educational Supervisor), Dr. Ram Kasthuri, (IR Clinical Lead), Professor Jon Moss, Dr. Menelaos Philippou, Dr. Iain Robertson, Dr. Sivanathan Chandramohan, Dr. Andrew Christie, Dr. Andrew Downie.

Introduction

Training will be provided in a broad range of interventional techniques, with consultant advice and supervision available at all times. The clinical setting of procedures will be emphasized in addition to technical expertise. All consultants are committed to teaching.

The Queen Elizabeth University Hospital provides almost all major specialties with General Surgery, Urology, Vascular Surgery and Renal Medicine, supplying a substantial proportion of the workload.

City-wide vascular services are now centralised at QEUH, and a significant number of patients from the surrounding region are sent to the IR unit for specialist care.

The main IR department at QUEH, provides care within two adjoining high-quality IR theatres, with a shared control room. This is a high throughput unit, with consultants closely working together to provide a comprehensive service.

There is a close working relationship with the vascular surgical unit, with frequent combined cases performed within two "Hybrid" theatres, in the surgical floor on Level 2, with full IR capabilities.

IR lists are also performed at Glasgow Royal Infirmary, and also Gartnavel General Hospital, where a service remains to support The Beatson Oncology Unit.

Teaching has become a larger part of the departments activity, with three current Interventional Radiology Fellows in post, completing a three-year programme from ST4 to ST6.

Opportunities exist for supported research and audit projects, at all levels of Radiology training.

Procedures Performed

- Vascular procedures
- Angiography, transluminal & subintimal angioplasty & arterial stenting
- Thoracic and abdominal aortic and iliac aneurysm stent-grafting
- Thrombolysis & thrombus aspiration
- Dialysis fistula intervention
- Embolization including varicocoeles, uterine fibroids, & haemorrhage
- Venous access, caval filters and stents
- Image-guided tumour ablation techniques

Urology Intervention
- Percutaneous nephrostomy & nephrolithotomy, endopyelotomy
- Ureteric stenting, urethral dilatation, cyst aspiration & ablation
- RFA of renal tumours
- Biliary
- PTC, biliary drainage & stenting
- Duct stone extraction
- Percutaneous cholecystostomy

Other

- Ultrasound and CT guided biopsy & drainage
- Oesophageal, gastro-duodenal and colonic stenting
- Percutaneous gastrostomy, & pseudocyst drainage & cystogastrostomy
- Percutaneous vertebroplasty

Non-Invasive Imaging to support IR ACTIVITY - the trainee will have the opportunity to learn about non-invasive Vascular imaging, including Doppler Ultrasound Vascular MRA, and CT angiography. The interventional service is undergoing active expansion and new procedures are continually being introduced. A Vascular Laboratory including colour Doppler ultrasound is in operation providing pre-procedure assessment and long-term follow up.

Equipment at QEUH

Two flat-panel detector interventional tables, one with high quality rotational angiography capability.

Two hybrid IR Theatres.

Audit and Research

These are actively encouraged, and there is considerable scope for audit of the interventional service. We participate in multicentre trials (recently REST & BASIL) and registries. There are weekly audit/teaching sessions, surgical and respiratory meetings, weekly vascular radiology/ surgery and fortnightly urology conferences. Study time is protected within the work programme. Facilities for registrars have been upgraded to include a PC with DVD, CD re-writer, scanner, printer, Medline and Internet/email access in a quiet study room. There is a comprehensive library.

Teaching

This will be mainly by involvement in clinical cases and "hands-on" instruction. There is a FRCR 2A Cardio-vascular and Intervention preparation course. A "Taster-Week" programme exists for Foundation-Year Doctors.

Rota

Protected IR exposure sessions are arranged for all year 1-3 Radiology trainees. Junior Radiology staff pre-IR Fellowship are not directly involved in IR on-call, but are welcome to be involved in interesting cases, as they arise.
Non-Vascular Intervention

**Clinical Supervisor:** Dr David Kay *(David.Kay@ggc.scot.nhs.uk)*

Trainees who undertake this block should gain an awareness of the role of non-vascular interventional radiology in the Department. Whilst some of the more "cutting edge" techniques such as tumour ablation will be available, the majority of the learning objectives will relate to CT and ultrasound guided biopsy/ drainage. The trainee will attend the appropriate MDTs and be involved in the decision making process/ patient pathway. The block will also comprise an acute CT list at the QEUH with Consultant supervision.

The aim of the block is to increase the trainee’s confidence when performing biopsies/drainage with the hope that by the end of the attachment, they are largely autonomous. The trainee will also gain exposure to tumour ablation techniques which is a rapidly evolving area in the field on interventional oncology.
Nuclear Medicine Including PET-CT

Clinical Supervisor: Dr Iain Andrews (Iain.Andrews@ggc.scot.nhs.uk)

Trainers: Dr Iain Andrews; Dr Sai Han

Dedicated Sessions: Four sessions/week

- Nuclear Medicine reporting 2 sessions/ week
- PET/CT reporting 2 sessions/ week

General Sessions: CT, MRI, US, Plain Film Reporting

The Nuclear Medicine Department in GGH serves a range of Clinical Services including the Beatson West of Scotland Cancer Centre, Scotland’s largest oncology centre. The department is a purpose built, state of the art facility. It houses a number of gamma cameras including a SPECT-CT scanner.

The PET/CT department (West of Scotland PET Centre) hosts 2 scanners, generating about 4,000 scans per annum, and is one of the busiest PET centres in the UK. FDG is produced on site, in a state of the art cyclotron facility. The production of various non FDG tracers is in development. The department is involved in many research projects which are managed by the local PET Research and Development Group, and opportunities to get involved are available.

Learning Objectives:

- Basic understanding of instrumentation, processing and display
- Understand the strengths and weaknesses of NM and know where it fits in imaging algorithms
- Be familiar with physical and biological behaviour of commonly used radiopharmaceuticals
- Be aware of radiation protection both in terms of legislation and ‘on the shop floor’
- Be able to identify and describe common pathology on NM images (from gamma camera imaging, hybrid imaging and PET), to structure a differential diagnosis and to advise clinical colleagues on further examinations

This block can be taken in isolation or as part of subspecialty training in Nuclear Medicine.
Musculoskeletal Imaging QEUH/NVH

Clinical Supervisor: Dr Glen McKenzie (Glen.McKenzie@ggc.scot.nhs.uk)

Trainers: Dr Glen McKenzie; Dr Colin Campbell

Module Overview

This module will give you experience of modern imaging methods, especially MRI, in the diagnosis of musculoskeletal disorders. The full spectrum of imaging in joint derangement, soft tissue and bony abnormalities will be covered. You will be given the opportunity to learn CT and MR arthrography of shoulders and hips and, if you wish, relevant Nuclear Medicine techniques. Your rota will include one session/week of musculo-skeletal ultrasound, including interventional procedures. The majority of the MSK work will take place at the New Victoria Hospital.

Rota

- 2 sessions MRI including up to 6 arthrograms/week
- 1 sessions CT/Nuclear Medicine
- 1 session MSK US (likely at QEUH)
- 4 sessions General Work (likely at QEUH)
Musculoskeletal Imaging QEUH/GGH

Clinical Supervisor: Dr Khalid Ali

The MSK module offers exposure in acute and elective musculoskeletal imaging in modalities including plain films, ultrasound, CT and MRI including arthrography. The full spectrum of imaging in joint derangement, bone and soft tissue abnormalities will be covered including trauma and sarcoma cases. The MSK radiology service has a large volume of referrals from Orthopaedics, including acute cases from A&E, as well as from Rheumatology and General practice.
Trainees are encouraged to attend and present cases at the national Sarcoma MDT on Monday afternoons.

Trainees will have direct Consultant training and supervision in procedures including MR shoulder/hip arthrography and ultrasound guided joint/bursa injections. Ultrasound and CT guided soft tissue/bone biopsies will also be performed. There will be the opportunity for the trainee to participate in audit.
Radiology Research

Clinical Supervisor: Dr Gordon Cowell (gordoncowell@nhs.net)

This block will provide the trainee with an introduction to research in radiology. Given the relatively short duration of the attachment, a predetermined project using existing data will be undertaken, ideally complementing preexisting research interests of the department but attempts to match any project to the interests of the trainee will be made. In addition to the trainees routine study sessions, a further two to three sessions will be allocated to on-site research. Other general sessions will be incorporated into the weekly rota to maintain skills and help with the departmental workload.

The minimum aim of the block would be for poster or oral presentation at a national/international meeting, preferably with submission of a manuscript to a journal in addition. Further research training through the Glasgow Clinical Research Facility is available in targeted areas. Arrangements can be made for the trainee to undertake a day’s training in Good Clinical Practice if/as required.

Trainees who have selected this block should make contact with the supervisor several months in advance to discuss potential projects. Preference will be given to trainees who have achieved FRCR.