Referral Guidelines for Nuclear Medicine and PET Scans Performed at Oxford University Hospitals (OUH)

This document was compiled and reviewed by the relevant Practitioner for each scan alongside Medical Physics Experts and the Superintendent for each department.

Approved: 11th November 2025

Due for Review: 11th November 2030

These guidelines are aimed at medically trained and GMC registered doctors who Refer patients for examinations involving the administration of radiopharmaceuticals to Oxford University Hospitals (OUH).

Responsibility of the Referrer (IR(ME)R)

It is your responsibility as a Referrer (under IR(ME)R) to work within your scope of practise and provide the information detailed below.

Essential information:

- Accurate, up-to-date patient identification information
- Relevant clinical history
- Clinical diagnosis
- Requested examination
- Information related to research trials (where relevant)
- Information related to pregnancy and breast/chest feeding (where relevant)
- Signature of Referrer
- Referrer name and contact details

Expected information:

- Clinical findings on examination
- Mobility status (eg requires hoist)
- Co-morbidities (where relevant)
- Medication (where relevant)

Desirable information:

- Carer or comforter requirements or other relevant radiation protection information

MDT referrals should include the name of the individual making the referral.

OUH Specific Information

We accept referrals from medically trained, GMC registered, Doctors unless specifically stated otherwise. Non-medical referrals for scans involving the administration of radiopharmaceuticals are only accepted from the doctors working for the DVLA or CAA

requesting Myocardial Perfusion Scans as evidence of fitness to hold a driving license or pilot's license.

Repeat referrals will only be accepted when clinically appropriate and the reason for repeat should be included in the referral.

We encourage Referrers to pause and check prior to making a referral [1].

PET Referral Guidelines

For PET, we accept Referrals following guidance from the Royal College of Radiologists (RCR) [2]. In addition to the indications listed in the RCR guidelines, we also accept referrals for the assessment of Y-90 distribution following Y-90 SIRT radiotherapy from Referrers listed in the protocol [3].

An indication of the dose's patients are likely to receive is given in Table 1 using the symbography from iRefer [4].

Table 1: Dose information for PET scans and symbology.

Symbol	Typical effective dose (mSv)*	Scan	Lifetime additional risk of cancer induction per exam for adults*
☢	< 1	n/a to PET CT	<1:20,000
☢☢	1–5	Additional CT performed for Y-90 SIRT Uptake	1:20,000 to 1: 4,000
☢☢☢	5.1–10	F-18 PET CT Limbs or Head only (FDG, FDOPA, Choline)	1:4,000 to 1: 2,000
☢☢☢☢	> 10	whole body, myocardial and parathyroid PET-CT (F-18: FDG, Choline, 68Ga; PSMA, Dotatate)	>1:2,000

*Cancer risk indicated in this table is averaged for adults. The risks from radiation vary considerably with age and sex, with higher risks in children and females. As risks for children are higher, the examinations indicated may need to be moved to higher risk band.

Nuclear Cardiology Referral Guidelines

We do not accept referrals for Nuclear Cardiology scans from GPs, apart from GP cardiologists working in our community cardiology clinics. We accept referrals for Nuclear Cardiology scans from Hospital Consultants and their Juniors.

Table 2 shows the referral guidelines specific to nuclear cardiology.

Table 2: Referral guidelines for nuclear cardiology.

Scan	Criteria	Radiation Dose Information

Myocardial Perfusion Imaging	Adults only:
	- To assess the presence, site and degree of coronary obstruction in patients with suspected coronary artery disease
	- To aid the management of patients with known coronary heart disease:
	  ○ to determine the likelihood of future coronary events, for instance after an acute coronary syndrome (ACS) or related to proposed non-cardiac surgery
	  ○ to guide strategies of myocardial revascularisation by determining the haemodynamic significance of coronary lesions
	  ○ to assess the adequacy of percutaneous and surgical revascularisation
	- To assess myocardial viability and hibernation, particularly with reference to planned myocardial revascularisation
	- Special indications are:
	  ○ to assess the haemodynamic significance of known or suspected anomalous coronary arteries and muscle bridging
	  ○ to assess the haemodynamic significance of coronary aneurysms in Kawasaki's disease
	  ○ to assess risk in asymptomatic patients with chronic kidney disease
	  ○ to assess the presence and extent of obstructive coronary artery disease in patients with arrhythmia. Although a common request, there are little data to support this indication
		Tc-99m Myoview or Tl-201 Chloride:
		☢☢☢ to ☢☢☢☢

99mTc cardiac amyloid scan - DPD	Adults only: - Diagnosing cardiac ATTR and differentiating it from AL amyloidosis.	☢☢☢
99mTc cardiac blood pool	Adults only:	☢☢☢

imaging (MUGA)	- To assess LV ejection fraction for monitoring chemotherapy in patients with poor echo windows. - To assess LV ejection fraction in patients being considered for an ICD/CRT device who have poor echo windows.	

General Nuclear Medicine Referral Guidelines

Table 3 indicates the Referral Criteria relevant to general nuclear medicine including adults and paediatrics. An indication of the dose patients are likely to receive is given using the symbology in iRefer and also referenced in Table 1.

Table 3: Referral criteria for general nuclear medicine scans (not including cardiology and PET).

Scan	Criteria	Radiation Dose Information
Bone scan using Tc99m labelled phosphonate	Adults: - Non-traumatic hip pain including suspected osteonecrosis of the femoral head where MRI not possible - Suspected primary bone tumour (not first line investigation) - Skeletal metastases from known primary tumour - Myelopathy: tumours, inflammation, infection, infarction - Prosthetic joint complications, >2 years after arthroplasty (not first line investigation) - Paraneoplastic Syndrome: Oncogenic osteomalacia - Arthropathy: presentation and follow-up (not first line investigation) - Metabolic bone disease - Bone pain - Pelvic or proximal femoral injury without urethral bleeding - Suspected osteomalacia with bone pain - Stress fracture – insufficiency or fatigue fracture - Suspected osteomyelitis - Wrist injury: suspected scaphoid fracture - Atraumatic thoracic spine pain of any duration - Assessment of temporomandibular joints (TMJs) Paediatrics: - Back pain in children with any of the following features: o Child under 5yrs o Fever o Tachycardia o Functional disability o Weight loss o Bruising o Adenopathy or abdominal mass	☢☢☢

	○ Duration longer than 4 weeks ○ Altered spine shape/mobility ○ Worsening pain ○ Night pain ○ Vertebral tenderness ○ Morning stiffness ○ Altered gait ○ Past history of cancer/TB Bowel/bladder dysfunction - Focal bone pain in children - Atraumatic limp/hip pain in children	
Parathyroid	- Localisation in adult patients diagnosed with primary hyperparathyroidism	
99mTc MAG3 / Renogram	Adult: - Renal vascular disease; - Renal transplant dysfunction - Hypertension in the young adult or in patients unresponsive to medication: suspected renovascular hypertension Adults and Paediatrics: - Assessment of bladder function; - Post-surgical evaluation of previously obstructed system - Follow-up of vesico-ureteric reflux by indirect micturating cystogram; - Renal trauma; - Upper urinary tract obstruction: distinguishing obstruction from a non-obstructed dilated system and to quantify the differential renal function - Acute and chronic kidney injury (renal failure) - assess drainage and establish whether failure is due to post-renal obstruction - Measurement of renal function – obstructive nephropathy and mean parenchymal transit time for renovascular disorder. Paediatrics: - Proven urinary tract infection in children with atypical or recurrent UTI to evaluate renal function. - Antenatal renal dilatation – assessment of renal tubular function including renal uptake, excretion and drainage, and can be useful for surgical planning.	
DMSA	Adults: - Renal Trauma – to confirm presence of 2 kidneys and function. - Function – differential assessment; - Measurement of relative renal function - Following urinary tract infection/pyelonephritis when there is suspected scarring or renal impairment for quantitative assessment of cortical scarring and underlying relative tubular function	

	- Acute and chronic kidney injury (renal failure) - assess relative renal function - Prior to radiotherapy - Prior to kidney donation - Prior to renal resection Paediatrics: - Proven urinary tract infection: 4-6 months following acute infection to detect renal parenchymal scars in children under 3 years with atypical UTI or all children with recurrent UTI) - Continuous wetting in children or nocturnal enuresis: detection and location of the dysplastic kidney and upper moiety of a duplex system. It is also useful to rule out renal scarring associated with bladder dysfunction/recurrent UTI. - Antenatal renal dilation – to identify cortical scarring and differential renal function	
GFR (99mTc DTPA)	- Adults: - Measurement of renal function - Renal transplant dysfunction - Prior to or post chemotherapy/ PRRT. - Living related donor studies (these patients might have a DMSA study following the GFR final sample to assess relative renal function). - Prior to Islet transplantation. - Prior to bowel transplantation. Paediatrics: - Measurement of renal function in patients contraindicated for iohexal	
V/Q (99m-Tc MAA + 99mTc DTPA for ventilation and perfusion imaging)	Adults: - Suspected Chronic Thromboembolic Pulmonary Hypertension (CTEPH)	
Q scan (99m Tc MAA for lung perfusion imaging)	Adults: - Suspected pulmonary embolism (PE) in pregnancy or breast/chest feeding following negative chest x-ray - Suspected pulmonary embolism (PE) with contrast allergy following negative chest x-ray	
	Adults: - Prior to lung volume reduction surgery	
Lung Shuntogram (MAA)	Adults: - To detect and quantify the presence of AV Malformation	

In111 Octreoscan/ Tc99m Tektrotyd	Adult patients who can't have Gallium 68 with one of the following indications: - Neuroendocrine tumour - Somatostatin expressing tumour Faecal incontinence absolute contraindication	☢☢☢☢
I123 MIBG	- Adult - Suspected functioning adrenal medullary tumour with positive biochemistry eg Phaeochromocytomas – to locate and/or determine if suitable for radionuclide therapy eg detect relapse doesnt mention staging shall we add - Neuroblastomas Paediatrics - Neuroblastoma	☢☢☢
Thyroid Uptake (Tc99m pertechnetate or I123 Nal)	Adults: - Thyrotoxicosis with negative TRAbs – to evaluate and quantify thyroid function, to differentiate forms of thyrotoxicosis, exclusion of autonomously functioning thyroid nodules and detection of ectopic thyroid - Ectopic thyroid tissue to confirm presence and site - ?Thyroiditis - ?toxic nodule Paediatrics: - Neonatal hypothyroidism – detecting ectopic thyroid or confirming absence of thyroid following ultrasound	Tc99m: ☢ I123 (peadiatric): ☢☢ I123 (adult): ☢☢☢
I123 Nal post thyroidectomy	- Assessment of residual thyroid tissue after thyroidectomy (usually after I131 Therapy); - To detect disease recurrence or metastatic disease.	☢☢☢
HIDA (iminodiacetates for biliary imaging)	Adults - Suspected bile leaks post-surgery (with spect ct) - Obstruction – medical / surgical (planar) Paediatric (planar) - Persistent neonatal jaundice (?Biliary Atresia)	☢☢
DATscan	Adults: - Movement disorders/Parkinson's disease - Dementia and memory disorders (differentiate Alzheimer's disease from lewy body dementia	☢☢
I131 Thyroid (Uptake scan following radioisotope therapy)	Follow RICL 2.5 Carcinoma of the Thyroid - Treatment Protocol Clinical information must include any known disease outside of the thyroid bed.	☢☢☢
I131 MIBG (Uptake scan following	Follow RICL 2.8 Protocol for I131 MIBG Therapy	☢☢☢

radioisotope therapy)	Clinical information must include reason for therapy eg inoperable phaeochromocytomas, inoperable paraganglioma, metastatic or recurrent medullary thyroid carcinomas, stage III or IV neuroblastoma, inoperable carcinoid tumour	
Lu177 Uptake (Uptake scan following radioisotope therapy)	Follow RICL 2.13 Lu-177 Oxodotreotide (Lutathera) Peptide Therapy Protocol or RICL 2.20 Clinical protocol for 177Lu PSMA (Pluvicto) Therapy Protocol Clinical information must include reason for therapy.	☢☢☢
Lung Shunt using 99mTc MAA for SIRT Workup	Follow RICL 2.12 Protocol for Selective Internal Radiotherapy (SIRT) using MicroSpheres	☢☢
Gastric Emptying	Adults: - Gastroparesis (Gastric stasis) - Dumping syndrome - Possible gastroesophageal reflux - Endoscopy-negative functional dyspepsia - Persistent symptoms after gastric surgery - Follow-up scans to assess response to therapy - Motility studies for drug and physiological research Paediatrics - Recurrent vomiting	☢
Sehcat	All patients referred for this test must be able to swallow capsules. Adults: - Investigate bile acid malabsorption and measurement of bile acid pool loss eg '?bile acid malabsorption' or '?bile acid diarrhoea' - Investigate chronic diarrhoea in the study of enterohepatic circulation - Chronic diarrhoea with an unknown cause, suspected or diagnosed diarrhoea-predominant irritable bowel syndrome (IBS-D) or functional diarrhoea Paediatrics: - Investigate bile acid malabsorption and measurement of bile acid pool loss eg '?bile acid malabsorption' or '?bile acid diarrhoea' - Investigate chronic diarrhoea in the study of enterohepatic circulation - Chronic diarrhoea with an unknown cause, suspected or diagnosed diarrhoea-predominant irritable bowel syndrome (IBS-D) or functional diarrhoea	☢

Meckles	Adults: - Intestinal blood loss: chronic or recurrent Paediatrics: - GI bleeding (per rectum) - detecting active bleeding sites including Meckles diverticulum	☢☢
Dacroscintigraphy / Lacrimal Drainage	Adults and paediatric, if paediatric able to tolerate scan - diagnosing impaired tear drainage or excessive tearing (epiphora) - identifying the location and extent of a tear duct obstruction - planning or assessing the success of surgical intervention	☢
Vulva Sentinel Lymph Node Location	Patients with vulva cancer: - Sentinel Node mapping prior to selective lymph node dissection in theatre. - To aid Referrer/ Surgeon to locate sentinel node quickly and efficiently.	☢
Sentinel node location – Melanoma	Patients with melanoma: - Lymphatic mapping prior to selective lymph node dissection in theatre. - To aid referrer/ surgeon to locate sentinel node quickly and efficiently.	☢
Breast Sentinel Lymph Node Location	Patients with breast cancer: - Surgery planned for excision of primary tumour and lymph nodes The referral must include the location of primary tumour specified and the site to be injected (Requested Location of radioactive injection (quadrant)).	☢
Oral and Oropharyngeal Sentinel Lymph Node Location	Patients with oral or oropharyngeal cancer: - Sentinel Node mapping prior to selective lymph node dissection in theatre - To aid referrer/ surgeon to locate sentinel node quickly and efficiently.	☢
Lymphoscintigram – lymphatic mapping	- Differentiation of lymph oedema from venous oedema - Assessment of lymphatic flow in lymph oedema - Chylous pleural effusion	☢

This document was reviewed by an MDT which included Consultant Radiologists, Consultant Cardiologists, Radiographers, Technologists, Clinical Scientists and Medical Physics Experts entitled for Nuclear Medicine and PET at Oxford University Hospitals.

References

[1] Society and College of Radiographers. *Have you paused and checked?*

IR(ME)R Referrers. Society and College of Radiographers, 2017.

Link: Have you paused and checked? An IR(ME)R Referrers checklist for referring a patient for a diagnostic | SoR

[2] Evidence-based indications for the use of PET-CT in the United Kingdom 2022, Royal College of Radiologists, Reviewed July 2022

Link: Evidence-based indications for the use of PET-CT in the United Kingdom 2022 | The Royal College of Radiologists

[3] RICL 2.12 Protocol for Selective Internal Radiotherapy (SIRT) using MicroSpheres

Available here (internal only): Ideagen Product Discovery

Request a copy by emailing radioisotopePhysics@ouh.nhs.uk

[4] iRefer - Radiation Dose

Link: Using Guidelines | iRefer