JRCPTB

Joint Royal Colleges of Physicians Training Board

Curriculum for Nuclear Medicine Training

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ROYAL COLLEGE of PHYSICIANS of EDINBURGH
ROYAL COLLEGE OF PHYSICIANS AND SURGEONS OF GLASGOW
Royal College of Physicians

Contents

1. Introduction

Nuclear Medicine uses unsealed radioisotopes to diagnose, monitor and treat many disease processes. Nuclear medicine plays a central role in directing care of patients across the entire age spectrum from neonates to the elderly, through a broad range of pathologies including cancer, dementia and cardiovascular diseases amongst many others.

Nuclear Medicine physicians take clinical responsibility for all aspects of patient care within the Nuclear Medicine department including regulatory compliance. They have all the skills required to address the challenges of delivering timely, tailored diagnostic and therapeutic care to patients, as part of the multi-disciplinary team, within both inpatient and outpatient settings.

2. Purpose

2.1 Purpose of the curriculum

The purpose of this curriculum is to meet patient and service need by ensuring that trainees develop the specialty-specific capabilities necessary to become consultant Nuclear Medicine physicians, alongside the generic professional capabilities expected of all physicians. The curriculum provides a training framework, describing the standards required to achieve a Certificate of Completion of Training (CCT) and the expected levels of progress at critical progression points during training.

Nuclear Medicine physicians manage patients and lead services involving unsealed radioisotopes. Nuclear Medicine physicians have comprehensive training gained through education and clinical experience for both the therapeutic and diagnostic aspects of nuclear medicine to allow licensing by the Administration of Radioactive Substances Advisory Committee (ARSAC) so they can lead departments as consultants. Their diagnostic expertise includes both imaging and non-imaging studies. They clinically lead teams of experts who support them in this provision including Nuclear Medicine physicists, radiopharmacists, Nuclear Medicine technologists, radiographers and nurses.

Nuclear Medicine has traditionally been a small specialty in the UK as the range of diseases which could be successfully treated with radioisotopes was previously relatively limited. This situation has changed with a recent acceleration in the development of advanced diagnostic and therapeutic radioactive tracers, and the combination of these as theragnostics, which can be used in the diagnosis, staging and tailored management of diseases. The Nuclear Medicine community predict a considerable surge in demand for Nuclear Medicine treatments and the number of Nuclear Medicine physicians who are uniquely skilled to provide these.

The curriculum aims to produce Nuclear Medicine physicians with the ability to provide care for all patients, be central members of multidisciplinary team meetings and as clinical leaders of their departments, leading on regulatory compliance. The development and training of other practitioners in aspects of Nuclear Medicine also requires consultants with

leadership, management and education skills. This curriculum aims to equip Nuclear Medicine physicians with the skills to fully engage in these roles.

The Nuclear Medicine curriculum has been developed in response to patient, population, professional, workforce and service needs. The curriculum for Nuclear Medicine has been developed with input from trainees, consultants actively involved in delivering teaching and training across the UK, service representatives and lay persons. This curriculum has been developed through the work of the Joint Royal College of Physicians Training Board (JRCPTB), the Nuclear Medicine Specialty Advisory Committee (SAC), the Royal College of Radiologists (RCR), the Nuclear Medicine Specialty Training Committee (STC), and the Education and Training Committee of the British Nuclear Medicine Society.

Scope of training

Specialty training in Nuclear Medicine is an indicative six year programme following acquisition of clinical skills during two years of Internal Medicine Training and full MRCP(UK), two years core surgical training and MRCS or three years of paediatric training and MRCPCH. Prior clinical experience and qualifications is an essential prerequisite, as Nuclear Medicine physicians need the breadth of clinical skills to holistically manage therapy patients in both inpatient and outpatient clinic contexts, as well as providing a comprehensive diagnostic service. The curriculum includes training to achieve capabilities in all aspects of Nuclear Medicine involving all body systems and patient groups with the objective of producing Nuclear Medicine physicians who at the time of CCT, will be equipped to deliver a comprehensive Nuclear Medicine diagnostic and therapeutic service.

Functional Nuclear Medicine images need to be evaluated in the light of other imaging to maximise the accuracy of interpretation as tracer uptake may be non-specific. To optimise patient care and safety, Nuclear Medicine physicians therefore need to be skilled in the interpretation not only of Nuclear Medicine investigations but also in all other aspects of clinical radiological imaging. They share the same skill set as clinical radiologists in the diagnostic aspect of their practice. To avoid replication of training provision, the JRCPTB and the RCR have collaborated closely to develop this paired dual CCT curriculum which commences with an indicative three years of clinical radiology training and the knowledge based assessment in clinical radiology, followed by three years of higher training in Nuclear Medicine and completion of the knowledge based assessment in Nuclear Medicine.

This purpose statement has been endorsed by the GMC's Curriculum Oversight Group and confirmed as meeting the needs of the health services of the countries of the UK.

2.2 High level learning outcomes – capabilities in practice (CiPs)

The Nuclear Medicine capabilities in practice (CiPs) describe the professional tasks to work within the scope of Nuclear Medicine. Each CiP has a set of descriptors associated with that activity or task. Descriptors are intended to help trainees and trainers recognise the minimum level of knowledge, skills and behaviours which should be demonstrated for an entrustment decision to be made. By the completion of training and award of a CCT, the trainee must demonstrate that they are capable of unsupervised practice in all CiPs.

The CiPs have been mapped to the GPC domains and subsections to reflect the professional generic capabilities required to undertake the clinical tasks. Satisfactory sign off requires demonstration that, for each of the CiPs, the doctor in training's performance meets or exceeds the minimum expected level for completion of training, as defined in the curriculum. The Nuclear Medicine CiPs comprise the six generic CiPs which are shared across all physician specialties and five specialty CiPs. To achieve CCT, trainees are expected to demonstrate the capabilities described by the generic and specialty-specific high level outcomes below.

Learning outcomes – capabilities in practice (CiPs)
Generic CiPs
1. Able to successfully function within NHS organisational and management systems 2. Able to deal with ethical and legal issues related to clinical practice 3. Communicates effectively and is able to share decision making, while maintaining appropriate situational awareness, professional behaviour and professional judgement 4. Is focussed on patient safety and delivers effective quality improvement in patient care 5. Carrying out research and managing data appropriately 6. Acting as a clinical teacher and clinical supervisor
Specialty CiPs
1. Advising and authorising appropriate Nuclear Medicine diagnostic and therapeutic interventions for individual patients 2. Ability to direct optimisation of imaging and non-imaging diagnostic Nuclear Medicine investigations in terms of patient preparation, data and image acquisition, post processing and display 3. Providing timely, accurate and clinically pertinent reports on all Nuclear Medicine diagnostic studies 4. Providing a safe and comprehensive radionuclide therapy service 5. Leading all the clinical aspects of the Nuclear Medicine department in terms of compliance with regulations

Dual CCT with Clinical Radiology: Learning outcomes for Clinical Radiology

Trainees in Nuclear Medicine will undertake dual training in Clinical Radiology and will complete the clinical learning outcomes set out in the curriculum for Clinical Radiology.

Output

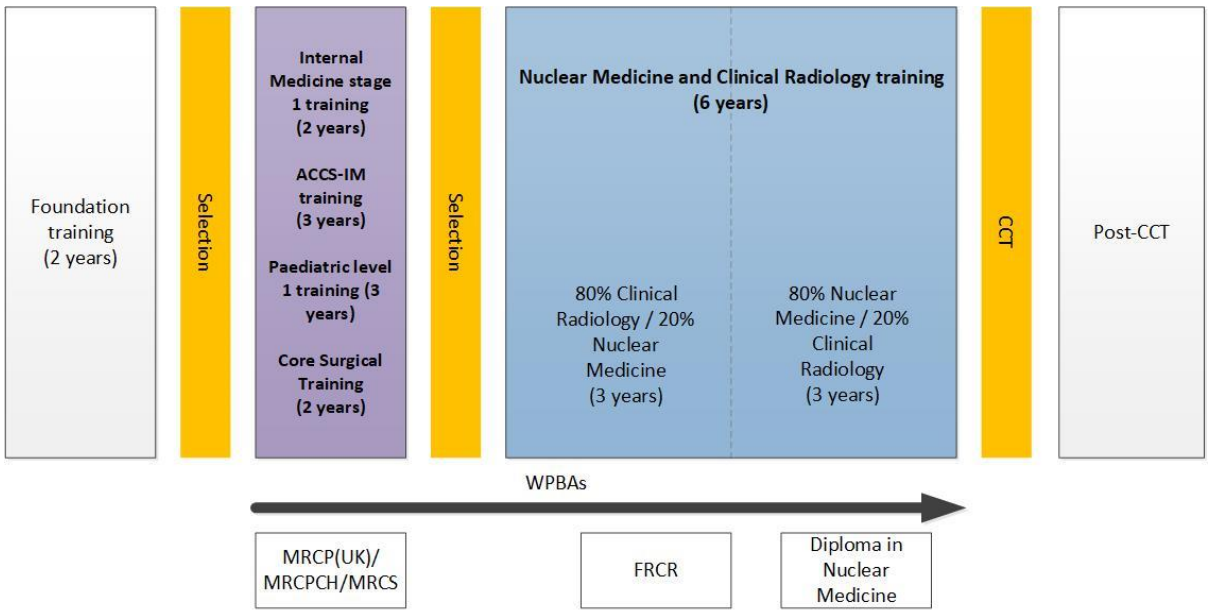
- Consultant Nuclear Medicine physicians have ultimate responsibility for the clinical aspect of Nuclear Medicine services, including regulatory compliance and must hold the appropriate licence from Health Ministers to administer radioactive substances. They take holistic clinical responsibility for all patients undergoing Nuclear Medicine investigations and therapies, in both the out-patient and in-patient settings.
- Consultant Nuclear Medicine physicians receive and process referrals for Nuclear Medicine investigations and treatments, discussing clinical cases with referrers and allied imaging professionals and advising on appropriate Nuclear Medicine interventions according to the individual patient, clinical background and the clinical question posed.
- Nuclear Medicine interventions have varying health and safety risks for the patient that need to be considered. Consultant Nuclear Medicine physicians use their clinical expertise to weigh up the relative clinical risks and benefits when advising, according to clinical information provided by referrers in order to justify and authorise the investigation or treatment.
- Consultant Nuclear Medicine physicians take responsibility for evaluating image quality and utilise the knowledge of radiopharmacists, Nuclear Medicine physicists, Nuclear Medicine technologists and radiographers to tailor and optimise image quality to maximise the diagnostic certainty of a Nuclear Medicine imaging test.
- Consultant Nuclear Medicine physicians provide timely, accurate and clinically useful reports on nuclear medicine interventions. They will discuss outcomes with referrers as required, including recommendations regarding onward investigations and other clinical management based on their expert knowledge, and effectively contribute a Nuclear Medicine imaging and therapy opinion to a multidisciplinary team meeting to help further the optimal management of the patient.

2.3 Training pathway

Nuclear Medicine is a group 2 medical specialty. Training will be in a dual CCT programme with Clinical Radiology and trainees will enter an indicative six year higher specialty training programme following two years of Internal Medicine Training (IMT) or three years of Acute Care Common Stem – Acute Medicine/Internal Medicine (ACCS-AM/IM) with full MRCP(UK). Entry is also possible for trainees who have completed three years of Level 1 Paediatrics with full MRCPCH or two years of Core Surgical Training with full MRCS, or equivalent.

The training programme will comprise an indicative three years of training focussed on Clinical Radiology (80% of the training time) during which the FRCR should be completed. The second period of training (indicative 3 years) will focus on Nuclear Medicine for 80% of the training time and trainees will complete a postgraduate diploma in Nuclear Medicine. This training pathway will deliver dual training in Nuclear Medicine and Clinical Radiology and trainees will be eligible for a CCT in both specialties.

Dual training in Nuclear Medicine and Clinical Radiology



2.4 Duration of training

Training in Nuclear Medicine will usually be completed in six years of full time higher specialist training as a dual CCT programme with Clinical Radiology.

There will be options for those trainees who demonstrate exceptionally rapid development and acquisition of capabilities to complete training more rapidly than the current indicative time although it is recognised that clinical experience is a fundamental aspect of development as a good physician (guidance on completing training early will be available on the JRCPTB website). There may also be a small number of trainees who develop more slowly and will require an extension of training in line the Reference Guide for Postgraduate Specialty Training in the UK (The Gold Guide).

2.5 Flexibility and accreditation of transferrable capabilities

The curriculum incorporates and emphasises the importance of the generic professional capabilities (GPCs) which will promote flexibility in postgraduate training, as common capabilities can be transferred from specialty to specialty.

The curriculum supports the accreditation of transferrable competencies (using the Academy framework) which will most commonly be from clinical radiology training. Radionuclide radiologists who have the necessary clinical experience (two years of IMT and full MRCP(UK), two years core surgical training and MRCS or three years of paediatric training and MRCPCH, or equivalent) may transfer from clinical radiology to the Nuclear Medicine curriculum in order achieve certification in both Nuclear Medicine and Clinical Radiology through the accreditation of transferrable competencies. This transfer between

curricula will depend on training opportunities and funding, and will be arranged in open competition through the existing national recruitment process. A gap analysis of skills and experience will be carried out to ensure training is tailored to achieve the Nuclear Medicine and Clinical Radiology curriculum requirements.

There are opportunities for clinicians from other specialities to acquire training in particular aspects of Nuclear Medicine tailored to their specialty, for example the cardiology specialty training curriculum contains mandatory core and optional advanced level elements of imaging including nuclear cardiology. The British Society of Cardiac Imaging and British Nuclear Cardiology Society are multi-professional bodies with Nuclear Medicine physicians, Cardiologists and Cardiac Radiologists as members. Similarly Endocrinologists may extend their practice to include Nuclear Medicine therapeutic interventions in patients with benign endocrine diseases.

2.6 Less than full-time training

Trainees are entitled to opt for less than full-time training programmes. Less than full-time trainees should undertake a pro-rata share of the out-of-hours duties (including on-call and other out-of-hours commitments) required of their full-time colleagues in the same programme and at the equivalent stage.

Less than full-time trainees should assume that their clinical training will be of a duration pro-rata with the time indicated/recommended, but this should be reviewed in accordance with the Gold Guide.

2.7 Generic Professional Capabilities and Good Medical Practice

The GMC has developed the Generic Professional Capabilities (GPC) framework[1] with the Academy of Medical Royal Colleges (AoMRC) to describe the fundamental, career-long, generic capabilities required of every doctor. The framework describes the requirement to develop and maintain key professional values and behaviours, knowledge and skills, using a common language. GPCs also represent a system-wide, regulatory response to the most common contemporary concerns about patient safety and fitness to practise within the medical profession. The framework will be relevant at all stages of medical education, training and practice.

Good Medical Practice (GMP)[2] is embedded at the heart of the GPC framework. In describing the principles, duties and responsibilities of doctors the GPC framework articulates GMP as a series of achievable educational outcomes to enable curriculum design and assessment.

The GPC framework describes nine domains with associated descriptor outlining the 'minimum common regulatory requirement' of performance and professional behaviour for

[1] Generic professional capabilities framework
[2] Good Medical Practice

those completing a CCT or its equivalent. These attributes are common, minimum and generic standards expected of all medical practitioners achieving a CCT or its equivalent.

The nine domains of the GMC's Generic Professional Capabilities

The nine domains and subsections of the GPC framework are directly identifiable in the curriculum. They are mapped to each of the generic and specialty CiPs, which are in turn mapped to the assessment blueprints. This is to emphasise those core professional capabilities that are essential to safe clinical practice and that they must be demonstrated at every stage of training as part of the holistic development of responsible professionals.

This approach will allow early detection of issues most likely to be associated with fitness to practise and to minimise the possibility that any deficit is identified during the final phases of training.

3. Content of Learning

The curriculum is spiral and topics and themes will be revisited to expand understanding and expertise throughout the period of training. The level of entrustment for CiPs will increase as the trainee progresses from needing direct supervision to able to be entrusted to act unsupervised.

3.1 Capabilities in practice

CiPs describe the professional tasks or work within the scope of the specialty. CiPs are based on the concept of entrustable professional activities[3] which use the professional judgement of appropriately trained, expert assessors as a defensible way of forming global judgements of professional performance.

[3] Nuts and bolts of entrustable professional activities

Each CiP has a set of descriptors associated with that activity or task. Descriptors are intended to help trainees and trainers recognise the knowledge, skills and attitudes which should be demonstrated. Doctors in training may use these capabilities to provide evidence of how their performance meets or exceeds the minimum expected level of performance for their year of training. The descriptors are not a comprehensive list and there are many more examples that would provide equally valid evidence of performance.

Many of the CiP descriptors refer to patient centred care and shared decision making. This is to emphasise the importance of patients being at the centre of decisions about their own treatment and care, by exploring care or treatment options and their risks and benefits and discussing choices available.

Additionally, the CiPs repeatedly refer to the need to demonstrate professional behaviour with regard to patients, carers, colleagues and others. Good doctors work in partnership with patients and respect their rights to privacy and dignity. They treat each patient as an individual. They do their best to make sure all patients receive good care and treatment that will support them to live as well as possible, whatever their illness or disability. Appropriate professional behaviour should reflect the principles of GMP and the GPC framework.

In order to complete training and be recommended to the GMC for the award of CCT and entry to the specialist register, the doctor must demonstrate that they are capable of unsupervised practice in all generic and specialty CiPs. Once a trainee has achieved level 4 sign off for a CiP it will not be necessary to repeat assessment of that CiP if capability is maintained (in line with standard professional conduct).

This section of the curriculum details the six generic CiPs and five specialty CiPs for Nuclear Medicine. The expected levels of performance, mapping to relevant GPCs and the evidence that may be used to make an entrustment decision are given for each CiP. The list of evidence for each CiP is not prescriptive and other types of evidence may be equally valid for that CiP.

3.2 Generic capabilities in practice

The six generic CiPs cover the universal requirements of all specialties as described in GMP and the GPC framework. Assessment of the generic CiPs will be underpinned by the descriptors for the nine GPC domains and evidenced against the performance and behaviour expected at that stage of training. Satisfactory sign off will indicate that there are no concerns. It will not be necessary to assign a level of supervision for these non-clinical CiPs.

In order to ensure consistency and transferability, the generic CiPs have been grouped under the GMP-aligned categories used in the Foundation Programme curriculum plus an additional category for wider professional practice:

- Professional behaviour and trust
- Communication, teamworking and leadership
- Safety and quality

- Wider professional practice

For each generic CiP there is a set of descriptors of the observable skills and behaviours which would demonstrate that a trainee has met the minimum level expected. The descriptors are not a comprehensive list and there may be more examples that would provide equally valid evidence of performance.

Generic capabilities in practice (CiPs)	
Category 1: Professional behaviour and trust	
1. Able to function successfully within NHS organisational and management systems	
Descriptors	• Aware of and adheres to the GMC professional requirements • Aware of public health issues including population health, social detriments of health and global health perspectives • Demonstrates effective clinical leadership • Demonstrates promotion of an open and transparent culture • Keeps practice up to date through learning and teaching • Demonstrates engagement in career planning • Demonstrates capabilities in dealing with complexity and uncertainty • Aware of the role of and processes for commissioning • Aware of the need to use resources wisely
GPCs	Domain 1: Professional values and behaviours Domain 3: Professional knowledge • professional requirements • national legislative requirements • the health service and healthcare systems in the four countries Domain 9: Capabilities in research and scholarship
Evidence to inform decision	MCR MSF Active role in governance structures Management course End of placement reports
2. Able to deal with ethical and legal issues related to clinical practice	

Descriptors	• Aware of national legislation and legal responsibilities, including safeguarding vulnerable groups • Behaves in accordance with ethical and legal requirements • Demonstrates ability to offer apology or explanation when appropriate • Demonstrates ability to lead the clinical team in ensuring that medical legal factors are considered openly and consistently
GPCs	Domain 3: Professional knowledge • professional requirements • national legislative requirements • the health service and healthcare systems in the four countries Domain 4: Capabilities in health promotion and illness prevention Domain 7: Capabilities in safeguarding vulnerable groups Domain 8: Capabilities in education and training Domain 9: Capabilities in research and scholarship
Evidence to inform decision	MCR MSF CbD DOPS Mini-CEX FRCR NMPGDip End of life care and capacity assessment End of placement reports
Category 2: Communication, teamworking and leadership	
3. Communicates effectively and is able to share decision making, while maintaining appropriate situational awareness, professional behaviour and professional judgement	
Descriptors	• Communicates clearly with patients and carers in a variety of settings • Communicates effectively with clinical and other professional colleagues • Identifies and manages barriers to communication (e.g. cognitive impairment, speech and hearing problems, capacity issues) • Demonstrates effective consultation skills including effective verbal and nonverbal interpersonal skills • Shares decision making by informing the patient, prioritising the patient's wishes, and respecting the patient's beliefs, concerns and expectations

	• Shares decision making with children and young people • Applies management and teamworking skills appropriately, including influencing, negotiating, re-assessing priorities and effectively managing complex, dynamic situations
GPCs	Domain 2: Professional skills • practical skills • communication and interpersonal skills • dealing with complexity and uncertainty • clinical skills (history taking, diagnosis and medical management; consent; humane interventions; prescribing medicines safely; using medical devices safely; infection control and communicable disease) Domain 5: Capabilities in leadership and teamworking
Evidence to inform decision	MCR MSF PS End of placement reports
Category 3: Safety and quality	
4. Is focussed on patient safety and delivers effective quality improvement in patient care	
Descriptors	• Makes patient safety a priority in clinical practice • Raises and escalates concerns where there is an issue with patient safety or quality of care • Demonstrates commitment to learning from patient safety investigations and complaints • Shares good practice appropriately • Contributes to and delivers quality improvement • Understands basic Human Factors principles and practice at individual, team, organisational and system levels • Understands the importance of non-technical skills and crisis resource management • Recognises and works within limit of personal competence • Avoids organising unnecessary investigations or prescribing poorly evidenced treatments
GPCs	Domain 1: Professional values and behaviours Domain 2: Professional skills • practical skills • communication and interpersonal skills • dealing with complexity and uncertainty • clinical skills (history taking, diagnosis and medical management; consent; humane interventions;

	prescribing medicines safely; using medical devices safely; infection control and communicable disease) Domain 3: Professional knowledge • professional requirements • national legislative requirements • the health service and healthcare systems in the four countries Domain 4: Capabilities in health promotion and illness prevention Domain 5: Capabilities in leadership and teamworking Domain 6: Capabilities in patient safety and quality improvement • patient safety • quality improvement
Evidence to inform decision	MCR MSF QIPAT FRCR NMPGDip End of placement reports
Category 4: Wider professional practice	
5. Carrying out research and managing data appropriately	
Descriptors	• Manages clinical information/data appropriately • Understands principles of research and academic writing • Demonstrates ability to carry out critical appraisal of the literature • Understands the role of evidence in clinical practice and demonstrates shared decision making with patients • Demonstrates appropriate knowledge of research methods, including qualitative and quantitative approaches in scientific enquiry • Demonstrates appropriate knowledge of research principles and concepts and the translation of research into practice • Follows guidelines on ethical conduct in research and consent for research • Understands public health epidemiology and global health patterns • Recognises potential of applied informatics, genomics, stratified risk and personalised medicine and seeks advice for patient benefit when appropriate

GPCs	Domain 3: Professional knowledge • professional requirements • national legislative requirements • the health service and healthcare systems in the four countries Domain 7: Capabilities in safeguarding vulnerable groups Domain 9: Capabilities in research and scholarship
Evidence to inform decision	MCR MSF FRCR NMPGDip GCP certificate (if involved in clinical research) Evidence of literature search and critical appraisal of research Use of clinical guidelines Quality improvement and audit Evidence of research activity End of placement reports
6. Acting as a clinical teacher and clinical supervisor	
Descriptors	• Delivers effective teaching and training to medical students, junior doctors and other health care professionals • Delivers effective feedback with action plan • Able to supervise less experienced trainees in their clinical assessment and management of patients • Able to supervise less experienced trainees in carrying out appropriate practical procedures • Able to provide clinical supervision to doctors in earlier stages of training
GPCs	Domain 1: Professional values and behaviours Domain 8: Capabilities in education and training
Evidence to inform decision	MCR MSF TO Relevant training course End of placement reports

3.3 Specialty capabilities in practice

The specialty CiPs describe the clinical tasks or activities which are essential to the practice of Nuclear Medicine. The CiPs have been mapped to the nine GPC domains to reflect the professional generic capabilities required to undertake the clinical tasks.

Satisfactory sign off will require educational supervisors to make entrustment decisions on the level of supervision required for each CiP and if this is satisfactory for the stage of training, the trainee can progress. More detail is provided in the programme of assessment section of the curriculum.

Specialty CiPs	
1. Advising and authorising appropriate Nuclear Medicine diagnostic and therapeutic interventions for individual patients	
Descriptors	**Descriptors** • Have a comprehensive understanding of Nuclear Medicine investigations and interventions pertinent to pathologies • Collaborate effectively with referrers to determine the most appropriate imaging pathway or therapeutic intervention for each patient • Exercise evidence-based practice by utilising current peer-reviewed literature to inform selection for all patient groups • Weigh up the relative clinical and radiation risk/benefit when advising on imaging or therapeutic intervention according to the clinical information provided by referrers and all available imaging • Tailor Nuclear Medicine scan protocols appropriately as per Ionising Radiation (Medical Exposure) Regulations, IR(ME)R • Prescribe diagnostic and therapeutic radiopharmaceutical doses accurately and appropriately according to accepted local Diagnostic Reference Levels (DRLs) based on Administration of Radioactive Substances Advisory Committee (ARSAC) limits • Safeguard patients, including vulnerable groups such as paediatric patients and patients with dementia, acting in accordance with current safety guidelines and legislation with respect to ionising radiation protection • Be able to advise referrers and patients regarding radiation exposure tailored to individual clinical contexts to facilitate informed decision making
GPCs	Domain 1: Professional values and behaviours Domain 2: Professional Skills • Practical skills • Communication and interpersonal skills • Clinical skills: history taking, diagnosis and medical management; consent; prescribing

	medicines safely; using medical devices safely; infection control Domain 3: Professional knowledge • Professional requirements • National legislative requirements Domain 5: Capabilities in leadership and teamworking Domain 6: Capabilities in patient safety and quality improvement Domain 7: Capabilities in safeguarding vulnerable groups
Evidence to inform decision	CbD MCR Mini-CEX Mini-IPEX MSF FRCR NMPGDip
2. Ability to direct optimisation of diagnostic Nuclear Medicine image quality in terms of patient preparation, image acquisition, post processing and display	
Descriptors	• Have understanding of Nuclear Medicine investigations and how these may be optimised • Have understanding of importance of patient preparation and pharmaceutical interventions • Work closely with physicists and Nuclear Medicine technologists to optimise image quality • Able to process and enhance image quality with various software and analysing data, including quantification • Recognise image artefacts from various sources and the importance of regular gamma camera quality control (QC) and quality assurance (QA) • Recognise the importance of national and international guidelines and their appropriate implementation at a local level
GPCs	Domain 2: Professional skills • practical skills • communication and interpersonal skills • dealing with complexity and uncertainty • clinical skills *(history taking, diagnosis and medical management; consent; humane interventions; prescribing medicines safely; using medical devices safely; infection control and communicable disease)* Domain 3: Professional knowledge • professional requirements • national legislative requirements

	• the health service and healthcare systems in the four countries Domain 5: Capabilities in leadership and teamworking Domain 6: Capabilities in patient safety and quality improvement • patient safety quality improvement Domain 8: Capabilities in education and training Domain 9: Capabilities in research and scholarship
Evidence to inform decision	CbD Mini-CEX Mini-IPEX MSF DOPS MCR FRCR NMPGDip QIPAT
3. **Providing timely, accurate and clinically pertinent reports on all Nuclear Medicine diagnostic studies**	
Descriptors	• Demonstrate sound knowledge of the normal physiological distribution of commonly used radiopharmaceuticals, normal variants and artefacts and relevant anatomy as demonstrated on diagnostic Nuclear Medicine imaging studies • Combine knowledge of physiology/function and anatomy with pathology, adopting a safe and systematic approach to interpretation of diagnostic imaging • Formulate a clinically relevant written report targeted to the referrer, providing where appropriate relevant differential diagnoses and using clinical judgement to provide recommendations for further imaging investigations, follow-up and/or management • Communicate imaging findings to the referrers (and to patients if appropriate) in a timely manner including significant, unsuspected or critically urgent findings • Demonstrate insight into personal level of expertise and appropriately refer or seek a second opinion if required • Recognise and appropriately respond to imaging findings that may raise safeguarding concerns • Demonstrate insight into diagnostic certainty and communicate this in written and/or verbal reports
GPCs	Domain 1: Personal values and behaviours Domain 2: Professional skills

	• practical skills • communication and interpersonal skills • dealing with complexity and uncertainty • clinical skills *(history taking, diagnosis and medical management; consent; humane interventions; prescribing medicines safely; using medical devices safely; infection control and communicable disease)* Domain 3: Professional knowledge • Legislative requirements Domain 5: Capabilities in leadership and team-working Domain 7: Capabilities in safeguarding vulnerable groups
Evidence to inform decision	CbD MCR Mini-CEX Mini-IPEX MSF FRCR NMPGDip
4. Providing a safe and comprehensive radionuclide therapy service	
Descriptors	• Demonstrate sound knowledge of tracer distribution, in normal and pathological conditions, of commonly used therapeutic radio-pharmaceuticals • Good understanding and use of diagnostic and therapeutic agents for tailoring a personalised management and therapy pathway for the individual patient (theragnostics) using evidence based practice • Demonstrate the ability to appropriately select patients for therapy working closely with local or regional multidisciplinary teams (MDTs) • Have strong physicianly skills in history taking and clinical examination in patients undergoing consideration for therapy for holistic care • Able to explain the radiopharmaceutical therapy and obtain informed consent for treatment • Sound knowledge of radiation effects and hazards, and effective communication with physics and radiation safety experts to provide a safe environment for the patient and staff • A sound knowledge of appropriate patient preparation, prescription, dispensing, handling and administration of therapeutic radiopharmaceuticals appropriately tailored to the patient condition and requirements • Have a sound knowledge of the efficacy and side-effects of therapy and their management

	• Working knowledge of the radiation protection measures and procedures for safe administration and treatment, to minimise radiation to the public & staff, including contamination management • Arrange for appropriately timed follow-up and further management to monitor therapy effects
GPCs	Domain 1: Personal values and behaviours Domain 2: Professional skills • practical skills • communication and interpersonal skills • dealing with complexity and uncertainty • clinical skills *(history taking, diagnosis and medical management; consent; humane interventions; prescribing medicines safely; using medical devices safely; infection control and communicable disease)* Domain 3: Professional knowledge • Legislative requirements Domain 5: Capabilities in leadership and team-working Domain 6: Capabilities in patient safety and quality improvement Domain 7: Capabilities in safeguarding vulnerable groups
Evidence to inform decision	CbD MCR PS NMPGDip DOPS Mini-CEX MSF
5. Leading all the clinical aspects of the Nuclear Medicine department in terms of compliance with regulations	
Descriptors	• Understand and apply the roles of Administration of Radioactive Substances Advisory Committee (ARSAC), the Environment Agency (EA), the Health and Safety Executive (HSE) and Medicine and Healthcare products Regulatory Agency (MRHA), and their legislative framework governing clinical study, research, production, transport, storage and disposal of radioactive substances • Understand and apply the legislative regulations of Ionising Radiation (Medical Exposure) regulations - IR(ME)R. Understand the responsibilities of the practitioner, operator and referrer which deals with justification and optimisation of each exposure • Work closely with Radiation Protection Advisor (RPA), Radiation Protection Supervisors (RPS) and Employers (University, NHS and Private)

	• Ensuring compliance with Good Clinical Practice (GCP) for all research studies • Understanding legal framework for dealing with the young, the old, the vulnerable and their/ guardians/ parents/carers • Recognise the importance of monitoring performance through audits, quality improvement projects; learning from mistakes through discrepancy, morbidity and mortality meetings and adopting a no blame culture in order to ensure high standards of care and optimise patient safety
GPCs	Domain 2: Professional skills • practical skills • communication and interpersonal skills • dealing with complexity and uncertainty • clinical skills *(history taking, diagnosis and medical management; consent; humane interventions; prescribing medicines safely; using medical devices safely; infection control and communicable disease)* Domain 3: Professional knowledge • professional requirements • national legislative requirements • the health service and healthcare systems in the four countries Domain 5: Capabilities in leadership and teamworking Domain 6: Capabilities in patient safety and quality improvement • patient safety quality improvement Domain 8: Capabilities in education and training Domain 9: Capabilities in research and scholarship
Evidence to inform decision	CbD, MCR MSF QIPAT NMPGDip

KEY

CbD	Case-based discussion	DOPS	Direct observation of procedural skills
MCR	Multiple consultant report	Mini-CEX	Mini-clinical evaluation exercise
Mini-IPX	mini-Imaging Interpretation Exercise	MSF	Multi source feedback
PS	Patient survey	QIPAT	Quality improvement project assessment tool
TO	Teaching observation	FRCR	Fellowship of the Royal College of Radiology
NMPGDip	Diploma in Nuclear Medicine		

3.4 Clinical scenarios and interventions

The table below details clinical scenarios which Nuclear Medicine interventions commonly contribute to. Radiopharmaceutical tracer uptake can be non-specific, resulting in patterns of distribution which reflect changes in pathophysiology rather than specific pathologies. Different pathologies may therefore result in similar appearances and it is the skill and experience of the Nuclear Medicine physician to narrow the differential diagnosis to help guide the referring clinician in safe patient care. It takes a great deal of experience to build up the clinical knowledge of the full range of pathologies, so while Nuclear Medicine training is competency based, a very large case of experience is generally recognised to be required to acquire this. The numbers provided here are indicative and are intended to help guide the levels of training typically required to achieve competence.

System	Type of scan	Examples of common indications	Indicative numbers
Oncological Nuclear Medicine	Whole body PET-CT, SUV quantification	PET-CT staging of tumours, primarily 18F-FDG but to also include experience in other tracers such as PSMA, choline, somatostatin analogues	800
	Whole body single photon, SPECT, SPECT-CT	Staging of bone metastatic disease	700
	Lymphoscintigraphy	Sentinel node mapping	50
Cardiovascular Nuclear Medicine	SPECT, PET cardiac scans, quantification	Myocardial ischaemia, stress/rest, gated function (MUGA), viability, sarcoid, amyloid, sympathetic innervation	500
Musculoskeletal Nuclear Medicine	Dynamic, planar, whole body, SPECT, SPECT-CT bone scans	Bone scans for musculoskeletal problems, white cell scan for infection	130
Pulmonary Nuclear Medicine	Planar, SPECT, SPECT-CT, possibly with quantification	Lung scans for pulmonary embolism evaluation, lobar quantification, shunt evaluation	140
Renal Nuclear Medicine	Dynamic, static, with quantification	Dynamic for renal function, drainage and micturating cystogram Static for renal function and parenchymal evaluation	140
Neurological Nuclear Medicine	SPECT, PET	Dementia, epilepsy, movement disorders etc.	250
Gastrointestinal Nuclear Medicine	Dynamic, static, possibly quantification	GI bleed, ectopic gastric mucosa, transit, biliary, liver & spleen parenchyma studies	60
Endocrine Nuclear Medicine	Static, SPECT, SPECT-CT, possibly quantification	Thyroid, parathyroid, adrenal pathologies	150

System	Type of scan	Examples of common indications	Indicative numbers
Infection or Inflammatory Nuclear Medicine	FDG PET-CT or single photon whole body labelled white cell scan	Pyrexia of Unknown Origin, vasculitis, activity of inflammatory bowel disease	40
Miscellaneous		e.g. Lymphoscintigraphy for oedema dacroscintigraphy for epiphora	30

Nuclear Medicine Therapies	Examples of organ systems	Examples of common indications	Indicative numbers
Benign	Thyroid	Thyrotoxicosis Non-toxic goitre	50
	Joint	Synovitis	5
Malignant	Bone	Metastasis	30
	Thyroid	Primary lesion ±metastases	20
	Neuroendocrine	Primary lesion ±metastases	10
	Liver	Liver metastases (SIRT)	5
Nuclear Medicine quantification without imaging	GFR, red cell mass, platelet non imaging studies, GFR, SeHCAT etc	N/A	50

3.5 Essential knowledge base and practical procedures

- **Nuclear Physics**: atomic structure, radioactivity, mechanisms of radioactive decay, interaction with matter, properties of radiation, half-lives, emission spectra.

- **Radiation biology:** tissue interactions, biological implications of ionising radiation (gamma rays, beta and alpha particles) from unsealed sources, hazards and benefits (therapeutic and theragnostic), optimising risk/benefit balance for diagnostic and therapeutic uses, contamination management.

- **Radiation detection and image formation**: radiation detectors, gamma cameras, collimators, associated electronic equipment, image formation, quality of single photon and positron emission images.

- **Camera quality assurance:** preparation of calibration sources and phantoms, quality assurance, routine quality control checks.

- **Principles of Nuclear Medicine image acquisition and optimisation:** planar, SPECT and PET image acquisition and processing, count statistics, reconstruction and filtering, display, principles of SPECT and PET quantification (SUV), attenuation correction, registration with other imaging modalities, dynamic study principles, tracer kinetic modelling, time activity curves, quantification.

- **Radionuclide production:** principles and mechanisms of atomic reactions, design and principles of cyclotrons, particle accelerators, nuclear reactors, radionuclide generators.

- **Radionuclide Instrumentation:** radioisotope calibrators, centrifuges, contamination monitors, QA systems, clean rooms, laminar-airflow workstations, isolators, automation.

- **Radiopharmaceutical preparation: a**septic technique, safety in the lab, elution, radiochemistry, kits, cell labelling, quality control, documentation**,** transport, supply chains.

- **Radiopharmaceutical tracer mechanisms of uptake within the body:** normal distribution, artefacts, compartmental distribution of non-imaging radiotracers, defective products, reporting systems, adverse drug reactions, extravasation.

- **Regulatory Aspects of diagnostic studies and treatments to the patient:** radiation risk and the perception of risk, The Ionising Radiations (Medical Exposure) Regulations [2017] IR(ME)R principles, measuring and recording activities administered to patients, Administration of Radioactive Substances Committee (ARSAC)'Diagnostic reference levels', departmental protocols, tailoring protocols for individual study optimisation, knowledge of national (BNMS) and international (EANM, SNM) guidelines.

- **Regulatory aspects of providing the service to the public/staff/environment and application of these to the Nuclear Medicine departmental structures and protocols:** The Health and Safety at Work Act 1974, The Management of Health and Safety at Work Regulations 1992, The Provision and Use of Work Equipment Regulations 1999, the Ionising Radiations Regulations [2017], The Medicines Act 1968(The European Communities Act 1972), Environmental Permitting Regulations 2016, The Medicines (Administration of Radioactive Substances) Regulations 1978, The Medicines (Administration of Radioactive Substances) Amendment Regulations 1995.The Radioactive Substances Act 1993, transport regulations, and any other relevant health and safety or regulations which pertain to the practice of Nuclear Medicine.

- **Clinical application of Nuclear Medicine:** knowledge of normal anatomy, physiology, radiopharmaceutical uptake of all body systems/all stages of life from neonate to geriatric, tracer uptake in different diseases and how these may be applied for both diagnosis (integrated and correlated with other imaging modalities) and therapy, for example:
    - **Pulmonary**: cancer staging and treatment evaluation, pulmonary emboli evaluation lobar functional quantification, shunt quantification
    - **Musculoskeletal**: cancer staging and treatment evaluation, evaluation of arthropathies, fractures, joint replacement complications, bone density. Bone metastases treatment. Synovitis treatment
    - **Cardiovascular**: myocardial ischaemia and function, myocardial infiltration (amyloid/ sarcoid), sympathetic innervation, cancer staging and treatment evaluation

- **Neurological**: brain perfusion and amyloid distribution for dementia diagnosis, epilepsy focus diagnosis, Parkinsonism syndromes, cancer staging and treatment evaluation
- **Gastrointestinal**: cancer staging and treatment evaluation, gastrointestinal/hepatobiliary uptake, transit and reflux studies, inflammatory bowel disease. Liver lesion therapy. Bile salt quantification
- **Genitourinary**: cancer staging and treatment evaluation, renal parenchymal function and urinary drainage/reflux, glomerular filtration rate
- **Endocrine:** cancer staging and treatment evaluation. Diagnosis of cause of endocrine hyperfunction. Treatment of thyroid cancer/ thyrotoxicosis and neuroendocrine tumours
- **Infection/inflammation**: identification of infection and inflammation
- **Blood/lymphatics:** cancer staging and treatment evaluation, vasculitis, lymphatic tract evaluation for sentinel node mapping, lymphoedema, red cell mass, plasma volume.

- **Clinical and practical skills:** in protocolling, prescribing, drawing up, measuring, and injecting patients in Nuclear Medicine taking into account the patients age, other medical conditions, other medication and special considerations (pregnancy, lactation). Managing physical or pharmaceutical interventions to influence radiopharmaceutical uptake examples include: physical or pharmaceutical cardiac stressing for the diagnosis of myocardial ischaemia, ACE inhibition challenge renography test for the diagnosis of renovascular disease, furosemide use in renography for diagnosis of obstruction, hydration of patients undergoing bone scans, thyroid blockade prior to iodine labelled radiopharmaceutical use, glucose clamp in poorly controlled diabetic patients undergoing FDG PET-CT, pharmaceutical interventions prior to use of MIBG.

4 Learning and Teaching

4.1 The training programme

The organisation and delivery of postgraduate training is the responsibility of the Health Education England (HEE), NHS Education for Scotland (NES), Health Education and Improvement Wales (HEIW) and the Northern Ireland Medical and Dental Training Agency (NIMDTA) – referred to from this point as 'deaneries'. As Nuclear Medicine is a small programme there is a single national Training Programme Director (TPD) who is responsible for coordinating the specialty training programme provided by the training centres, led by regional training programme directors. The organisation and delivery of Nuclear Medicine training is centrally overseen by the London and South East School of Medicine.

Progression through the programme will be determined by the Annual Review of Competency Progression (ARCP) process and the training requirements for each indicative year of training are summarised in the ARCP decision aid (available on the JRCPTB website).

Trainees will have a named educational supervisor. The educational supervisor and the regional TPD may be the same person.

The Nuclear Medicine training programme is run in close collaboration with the local clinical radiology department to ensure learning outcomes for dual training with Clinical Radiology can be achieved. For the initial three years, the training focus will be on Clinical Radiology and for an indicative 80% of the training time (average four days per week) the trainee will join local clinical radiology teaching, training and examination programme, working towards the learning outcomes set out in the Clinical Radiology curriculum. The trainee will spend 20% of the time (essentially one day a week) within the Nuclear Medicine department, building Nuclear Medicine knowledge, skills and experience. ARCP outcomes will be required for both specialties but will be led by clinical radiology during this period of training with nuclear medicine representation on the panel.

The focus will shift to Nuclear Medicine in the final three years of training and trainees should spend approximately 80% of the training time in nuclear medicine departments and should complete the Nuclear Medicine Post-graduate Diploma (NMPGdip). Trainees will continue to spend an indicative 20% of their training time developing their Clinical Radiology capabilities and will need to complete the Final FRCR Part B. ARCP outcomes will be required for both specialties but will be led by nuclear medicine during this period with clinical radiology representation on the panel.

The table below sets out the arrangements for the training programme.

Years	Grade	Time in NM	Time in CR	Curriculum & ePortfolio	Exams	ARCP led by
1-3	ST3-5	20%	80%	RCR CR	First FRCR Final FRCR Part A	CR regional
4-6	ST6-8	80%	20%	JRCPTB NM	Final FRCR Part B NMPGDip	NM national

4.2 Teaching and learning methods

The curriculum will be delivered through a variety of learning experiences and will achieve the capabilities described in the syllabus through a variety of learning methods. There will be a balance of different modes of learning from formal teaching programmes to experiential learning 'on the job'. The proportion of time allocated to different learning methods may vary depending on the nature of the attachment within a rotation.

This section identifies the types of situations in which a trainee will learn.

Work-based experiential learning:
The majority of Nuclear Medicine learning will be acquired in the departmental reporting rooms, therapy clinics and therapy rooms or wards with teaching and supervision by consultants. There should be appropriate levels of clinical supervision throughout training, with increasing clinical independence and responsibility.

Diagnostic study reporting sessions:
The educational objectives of reporting sessions are:

- To understand the pathophysiology of conditions
- To learn how to optimise Nuclear Medicine imaging
- Acquire the skills for the use of software required for reviewing and interpreting images
- Understanding how to interpret images for various investigations
- Acquiring skills for correct interpretation and report of diagnostic images
- Learning the use of software for reporting (including VR software) and providing clear and accurate reports for the investigations
- Correlating various imaging modalities for correct interpretation of Nuclear Medicine investigations
- Provide timely, helpful and accurate reports. To suggest or provide additional imaging if required

These objectives can be achieved in a variety of settings such as participating in routine or emergency reporting sessions, also by providing provisional reports which are then checked and discussed, and if required amended by a consultant, before verification and release to the referring clinician. The number of patients is not well defined but each session should include a good mix of various imaging procedures covering a wide range of investigations. A typical list to achieve minimum competency can be found in section 3.4.

Cardiac stressing:
The educational objectives of cardiac stressing sessions are:

- Assessing patient for administration of the correct stressing method (pharmaceutical / physical)
- Familiarity and experience in physical and pharmacological (vasodilator and stressing agents) to be able to supervise/perform the procedures
- Monitoring and management of patient during the stressing including management of complications which may arise
- Providing a safe and friendly environment for the patient

These objectives can be achieved by direct involvement in stressing patients first under supervision and later by discussion of ensuing questions and problems with the responsible consultant. The number of patients and procedures required to achieve this is not well defined but normally include 4 or more patients per session.

Participating in Nuclear Medicine procedures and imaging in the department:
The educational objectives of these sessions are:

- Full awareness of procedures for various radioactive injections, including various diagnostic and therapeutic injections (IV, intradermal, intra articular etc.)
- Aware of the procedures to reduce the risk of radiation to the patient, staff and environment

- Full awareness of various imaging and therapeutic procedures. This includes assessment of the patients for suitability for various procedures, selecting and modifying imaging to suit patient and clinical requirement

Familiarity with imaging and non-imaging processing and familiarity with devices (including gamma counters etc.) and software used. Being aware of the problems which may affect interpretation of imaging and non-imaging studies. This includes many of the Nuclear Medicine proprietary software packages which are not normally available for other imaging modalities. These objectives can be achieved in a variety of settings such as participating in patient management and participation in actual imaging at the department, and involvement in image processing once the raw images are acquired and being prepared for reporting.

Compliance with rules and regulation on administration and safe use of unsealed radioactive sources:
The educational objectives of these sessions are:

- Full awareness and familiarity with the Administration of Radioactive Substances Advisory Committee (ARSAC) requirements
- Full awareness of the Ionising Radiation (Medical Exposure) Regulations (IRMER) and its implementation
- Familiarity with local rules on radiation protection, familiarity with the role of physicists in the running of a Nuclear Medicine department (including Radiation Protection Advisor).

These objectives can be achieved in a variety of settings including hospital setting as well as through the NMPGDip course and other training sessions available.

Speciality clinics including therapy clinics
The educational objectives of attending clinics are:

- To understand the management of, assessment and follow-up of patients for radioiodine treatment for non-malignant therapies including benign thyroid disease, treatment for arthritis etc.
- To understand the management of clinics for assessment and follow up of patients undergoing radionuclide therapies for malignant conditions
- Be able to assess a patient in a defined time-frame
- To interpret and act on the referral letter for therapies
- To propose an investigation and management plan for radionuclide therapy patients
- To review and amend existing investigation plans
- To write an acceptable letter and/or report back to the referrer
- To communicate with the patient and where necessary with relatives and other health care professionals

These objectives can be achieved in a variety of settings usually in hospital settings, but can sometimes be in care facilities. The clinics are usually run by a consultant physician, but may include and be conducted by a specialist nurse, physicist and/or other qualified health care professional for advice and consultation. After initial induction, trainees will review patients

in clinic settings, under direct supervision. The degree of responsibility taken by the trainee will increase as competency increases. Trainees should see a range of new and follow-up patients and present their findings to their clinical supervisor. Clinic letters written by the trainee should also be reviewed and feedback given.

The number of patients that a trainee should see in each clinic is not defined, neither is the time that should be spent in clinic, but as a guide this should be a minimum of two hours.

Clinic experience should be used as an opportunity to undertake supervised learning events and reflection.

Multi-disciplinary team meetings
Multi-disciplinary team meetings of two types form an important component of Nuclear Medicine training. Firstly, within Nuclear Medicine with other Nuclear Medicine colleagues, nuclear physicists, radiopharmacists, Nuclear Medicine technologists or radiographers. Secondly, with clinical referral teams, radiologists and histo-pathologists who meet to discuss patient care often centred on particular clinical conditions.

Formal postgraduate teaching
Trainees will complete the FRCR and KCL NMPGDip to ensure they have the knowledge to meet the learning outcome of the curriculum. Aside from the formal teaching which these will involve, there are many opportunities throughout the year for formal and informal teaching in local teaching sessions and at regional, national and international meetings. Trainees are encouraged to attend the Annual Meeting of the British Nuclear Medicine Society.

Suggested activities include:
- Lectures and small group teaching
- Case presentations
- Research, audit and quality improvement projects
- Grand Rounds
- Critical appraisal and evidence based medicine and journal clubs
- Attendance at training programmes organised on a deanery or regional basis, which are designed to cover aspects of the training programme outlined in this curriculum, likely to be remote ‘virtual’ teaching

Independent self-directed learning
Trainees will use this time in a variety of ways depending upon their stage of learning. Suggested activities include:
- Reading, including web-based material such as e-Learning for Healthcare (e-LfH)
- Maintenance of personal portfolio (self-assessment, reflective learning, personal development plan)
- Audit, quality improvement and research projects
- Reading journals
- Achieving personal learning goals beyond the essential, core curriculum

Formal study courses

Time to be made available for formal courses is encouraged, subject to local conditions of service. Examples include management and leadership courses and communication courses, which are particularly relevant to patient safety and experience.

Due to the nature of Nuclear Medicine services, many departments have specialised services which are not available elsewhere. The trainees are encouraged (by formal arrangement) to visit other departments to gain experience and teaching on less common aspects of Nuclear Medicine or if certain services are not commonly provided at their centre. For example, GMC approved short courses of training are available in paediatric nuclear medicine at Great Ormond Street Hospital, and in Nuclear Cardiology at the Royal Brompton Hospital.

4.3 Academic training

Nuclear Medicine has particular strengths in research. All trainees are encouraged in this. The curriculum allows trainees to train in academic medicine as academic clinical fellows, in accordance with the Gold Guide. Trainees may train in academic medicine as an academic clinical fellow (ACF), academic clinical lecturer (ACL) or equivalent. Academic trainees can be recruited at any point in the training programme. The four nations have different arrangements for academic training and doctors in training should consult the local deanery for further guidance. Some trainees may opt to do research leading to a higher degree without being appointed to a formal academic programme. This new curriculum should not impact in any way on the facility to take time out of programme for research (OOPR) but as now, such time requires discussion between the trainee, the TPD and the Deanery as to what is appropriate together with guidance from the appropriate SAC that the proposed period and scope of study is sensible, likely to achieve necessary research and development approval and is funded.

4.4 Taking time out of programme

There are a number of circumstances when a trainee may seek to spend some time out of specialty training, such as undertaking a period of research or taking up a fellowship post. All such requests must be agreed by the postgraduate dean in advance and trainees are advised to discuss their proposals as early as possible. Full guidance on taking time out of programme can be found in the Gold Guide.

4.5 Acting up as a consultant

A trainee coming towards the end of their training may spend up to three months “acting-up” as a consultant, provided that a consultant supervisor is identified for the post and satisfactory progress is made. As long as the trainee remains within an approved training programme, the GMC does not need to approve this period of “acting up” and their original CCT date will not be affected. More information on acting up as a consultant can be found in the Gold Guide.

5 Programme of Assessment

5.1 Purpose of assessment

The purpose of the programme of assessment is to:

- Assess trainees' actual performance in the workplace
- Enhance learning by providing formative assessment, enabling trainees to receive immediate feedback, understand their own performance and identify areas for development
- Drive learning and enhance the training process by making it clear what is required of trainees and motivating them to ensure they receive suitable training and experience
- Demonstrate trainees have acquired the GPCs and meet the requirements of GMP
- Ensure that trainees possess the essential underlying knowledge required for their specialty
- Provide robust, summative evidence that trainees are meeting the curriculum standards during the training programme
- Inform the ARCP, identifying any requirements for targeted or additional training where necessary and facilitating decisions regarding progression through the training programme
- Identify trainees who should be advised to consider changes of career direction

5.2 Programme of Assessment

The programme of assessment refers to the integrated framework of examinations, assessments in the workplace and judgements made about a learner during their approved programme of training. The purpose of the programme of assessment is to robustly evidence, ensure and clearly communicate the expected levels of performance at critical progression points and to demonstrate satisfactory completion of training as required by the curriculum.

The programme of assessment is comprised of several different individual types of assessment. A range of assessments is needed to generate the necessary evidence required for global judgements to be made about satisfactory performance, progression in, and completion of, training. All assessments, including those conducted in the workplace, are linked to the relevant curricular learning outcomes (e.g. through the blueprinting of assessment system to the stated curricular outcomes).

The programme of assessment emphasises the importance and centrality of professional judgement in making sure learners have met the learning outcomes and expected levels of performance set out in the approved curricula. Assessors will make accountable, professional judgements. The programme of assessment includes how professional judgements are used and collated to support decisions on progression and satisfactory completion of training.

The assessments will be supported by structured feedback for trainees. Assessment tools will be both formative and summative and have been selected on the basis of their fitness for purpose.

Assessment will take place throughout the training programme to allow trainees continually to gather evidence of learning and to provide formative feedback. Those assessment tools which are not identified individually as summative will contribute to summative judgements about a trainee's progress as part of the programme of assessment. The number and range of these will ensure a reliable assessment of the training relevant to their stage of training and achieve coverage of the curriculum.

Reflection and feedback should be an integral component to all supervised learning events (SLEs and work placed based assessments (WBPAs). In order for trainees to maximise benefit, reflection and feedback should take place as soon as possible after an event. Every clinical encounter can provide a unique opportunity for reflection and feedback and this process should occur frequently. Feedback should be of high quality and should include an action plan for future development for the trainee. Both trainees and trainers should recognise and respect cultural differences when giving and receiving feedback.

5.3 Assessment of CiPs

Assessment of CiPs involves looking across a range of different skills and behaviours to make global decisions about a learner's suitability to take on particular responsibilities or tasks.

Clinical supervisors and others contributing to assessment will provide formative feedback to the trainee on their performance throughout the training year. This feedback will include a global rating in order to indicate to the trainee and their educational supervisor how they are progressing at that stage of training. To support this, workplace based assessments and multiple consultant reports will include global assessment anchor statements.

Global assessment anchor statements

- Below expectations for this year of training; may not meet the requirements for critical progression point
- Meeting expectations for this year of training; expected to progress to next stage of training
- Above expectations for this year of training; expected to progress to next stage of training

Towards the end of the training year, trainees will make a self-assessment of their progression for each CiP and record this in the ePortfolio with signposting to the evidence to support their rating.

The educational supervisor (ES) will review the evidence in the ePortfolio including workplace based assessments, feedback received from clinical supervisors (via the Multiple Consultant Report) and the trainee's self-assessment and record their judgement on the trainee's performance in the ES report, with commentary.

For **generic CiPs**, the ES will indicate whether the trainee is meeting expectations or not using the global anchor statements above. Trainees will need to be meeting expectations for

the stage of training as a minimum to be judged satisfactory to progress to the next training year.

For **specialty CiPs**, the ES will make an entrustment decision for each CiP and record the indicative level of supervision required with detailed comments to justify their entrustment decision. The ES will also indicate the most appropriate global anchor statement (see above) for overall performance.

Level descriptors for specialty CiPs

Level	Descriptor
Level 1	**Entrusted to observe only** – no provision of clinical care
Level 2	**Entrusted to act with direct supervision**: The trainee may provide clinical care, but the supervising physician is physically within the hospital or other site of patient care and is immediately available if required to provide direct bedside supervision
Level 3	**Entrusted to act with indirect supervision**: The trainee may provide clinical care when the supervising physician is not physically present within the hospital or other site of patient care, but is available by means of telephone and/or electronic media to provide advice, and can attend at the bedside if required to provide direct supervision
Level 4	**Entrusted to act unsupervised**

The ARCP will be informed by the ES report and the evidence presented in the ePortfolio. The ARCP panel will make the final summative judgement on whether the trainee has achieved the generic outcomes and the appropriate level of supervision for each CiP. The ARCP panel will determine whether the trainee can progress to the next year/level of training in accordance with the Gold Guide. ARCPs will be held for each training year. The final ARCP will ensure trainees have achieved level 4 in all CiPs for the critical progression point at completion of training.

5.4 Critical progression points

There will be key progression points at the end of the three years of 80% clinical radiology training (ST5) and on completion of specialty training. Trainees will be required to be entrusted at level 4 in all CiPs by the end of training in order to achieve an ARCP outcome 6 and be recommended for a CCT.

The educational supervisor report will make a recommendation to the ARCP panel as to whether the trainee has met the defined levels for the CiPs and acquired the procedural competence required for each year of training. The ARCP panel will make the final decision on whether the trainee can be signed off and progress to the next year/level of training [see section 5.6].

The outline grid below sets out the expected level of supervision and entrustment for the specialty CiPs and includes the critical progression points across the whole training programme. Trainees will be required to be level 4 for Clinical Radiology learning outcomes in order to be awarded a CCT in both specialties in the dual programme.

Table 1: Outline grid of levels expected for Nuclear Medicine specialty CiPs

Levels to be achieved by the end of each training year for specialty CiPs

Level descriptors
Level 1: Entrusted to observe only – no clinical care
Level 2: Entrusted to act with direct supervision
Level 3: Entrusted to act with indirect supervision
Level 4: Entrusted to act unsupervised

Specialty CiP	ST3	ST4	ST5	CRITICAL PROGRESSION POINT	ST6	ST7	ST8	CRITICAL PROGRESSION POINT
1. Advising and authorising appropriate Nuclear Medicine diagnostic and therapeutic interventions for individual patients	2	2	2		3	3	4	
2. Ability to direct optimisation of diagnostic Nuclear Medicine image quality in terms of patient preparation, image acquisition, post processing and display	2	2	2		3	4	4	
3. Providing timely, accurate and clinically pertinent reports on all Nuclear Medicine diagnostic studies	2	2	2		3	3	4	
4. Providing a safe and comprehensive radionuclide therapy service	2	2	2		2	3	4	
5. Leading all the clinical aspects of the Nuclear Medicine department in terms of compliance with regulations	2	2	2		2	3	4	

5.5 Evidence of progress

The following methods of assessment will provide evidence of progress in the integrated programme of assessment. The requirements for each training year/level are stipulated in the ARCP decision aid (www.jrcptb.org.uk).

Summative assessment

Examinations and certificates

- **Fellowship of the Royal College of Radiologists (FRCR)**

This FRCR is run by the Royal College of Radiologists and is the summative assessment of both the Nuclear Medicine and Clinical Radiology curricula. Further information is available on the website www.rcr.ac.uk. Full FRCR is required by completion of training.

- **Nuclear Medicine Post-graduate Diploma (NMPGDip)**

The NMPGDip is run through Kings College London (KCL) and is a summative assessment of the Nuclear Medicine curriculum. The KCL Nuclear Medicine MSc is an acceptable alternative, as it is a higher level qualification and incorporates all the components of the NMPGDip. Alternative knowledge based assessments may be accepted provided they have proven educational equivalence to the NMPGDip and have been approved by the Nuclear Medicine SAC and the GMC. Information about the NMPGDip, including guidance for candidates, is available on the Kings College website www.kcl.ac.uk.

The Programme Director for the NMPGDip is a member of the Nuclear Medicine SAC. This ensures that the NMPGDip meets the needs of trainees across the UK in Nuclear Medicine with regard to content, standard and accessibility of teaching material.

Formative assessment

The assessments required for the first three years of Nuclear Medicine and for the full Clinical Radiology programme are described in the curriculum for Clinical Radiology.

Supervised Learning Events (SLEs)
- Case-Based Discussions (CbD)
- mini-Clinical Evaluation Exercise (mini-CEX)
- mini-Imaging Interpretation Exercise (mini-IPX)

Workplace-based assessment (WPBA)
- Direct Observation of Procedural Skills (DOPS) – formative
- Multi-Source Feedback (MSF)
- Patient Survey (PS)
- Quality Improvement Project Assessment Tool (QIPAT)
- Teaching Observation (TO)

Supervisor reports

- Multiple Consultant Report (MCR)
- Educational Supervisor Report (ESR)

These methods are described briefly below. More information and guidance for trainees and assessors are available in the ePortfolio and on the JRCPTB website (www.jrcptb.org.uk).

Assessment should be recorded in the trainee's ePortfolio. These methods include feedback opportunities as an integral part of the programme of assessment.

Case-based Discussion (CbD)

The CbD assesses the performance of a trainee in their management of a patient to provide an indication of competence in areas such as clinical reasoning, decision-making and application of Nuclear Medicine knowledge in relation to patient care. It also serves as a method to document conversations about, and presentations of, cases by trainees. The CbD should focus on a written record of therapies and interventions such as cardiac stressing.

mini-Clinical Evaluation Exercise (mini-CEX)

This tool evaluates a clinical encounter with a patient to provide an indication of competence in skills essential for good clinical care such as history taking, examination and clinical reasoning. The trainee receives immediate feedback to aid learning. The mini-CEX can be used at any time and in any setting when there is a trainee and patient interaction and an assessor is available.

mini-Imaging Interpretation Exercise (mini-IPX)

Given the strong diagnostic imaging requirements of Nuclear Medicine practice, mini-IPX is the most common form of assessment. This method of assessment has been developed by the Royal College of Radiologists and is designed to assess a trainee's skills in interpreting an image in the context of the patient's presentation and previous imaging and to provide rapid and prompt feedback to a trainee in a particular area of diagnostic imaging. More information concerning how to use this assessment is available on www.rcr.ac.uk.

Direct Observation of Procedural Skills (DOPS)

A DOPS is an assessment tool designed to evaluate the performance of a trainee in undertaking a practical procedure against a structured checklist. The trainee receives immediate feedback to identify strengths and areas for development. DOPS can be undertaken as many times as the trainee and their supervisor feel is necessary (formative). A trainee can be regarded as competent to perform a procedure independently after they are deemed competent by an appropriate assessor (summative). Some examples of DOPS in Nuclear Medicine practice include (with appropriate documentation): radiopharmaceutical draw up, radiopharmaceutical dose calibration, radiopharmaceutical dose administration, interventions such as cardiac stressing, image post processing and quantification.

Multi-source feedback (MSF)
This tool is a method of assessing generic skills such as communication, leadership, teamworking, reliability etc., across the domains of Good Medical Practice. This provides systematic collection and feedback of performance data on a trainee, derived from a number of colleagues. 'Raters' are individuals with whom the trainee works, and includes doctors, administrative staff, and other allied professionals. 'Raters' should be agreed with the educational supervisor at the start of the training year. The trainee will not see the individual responses by 'raters'. Feedback is given to the trainee by the Educational supervisor.

Patient Survey (PS)
The PS addresses issues, including the behaviour of the doctor and effectiveness of the consultation, which are important to patients. It is intended to assess the trainee's performance in areas such as interpersonal skills, communication skills and professionalism by concentrating solely on their performance during one consultation.

Quality Improvement Project Assessment Tool (QIPAT)
The QIPAT is designed to assess a trainee's competence in completing a quality improvement project. The QIPAT can be based on review of quality improvement project documentation or on a presentation of the quality improvement project at a meeting. If possible the trainee should be assessed on the same quality improvement project by more than one assessor.

Teaching Observation (TO)
The TO form is designed to provide structured, formative feedback to trainees on their competence at teaching. The TO can be based on any instance of formalised teaching by the trainee which has been observed by the assessor. The process should be trainee-led (identifying appropriate teaching sessions and assessors).

Multiple Consultant Report (MCR)
The MCR captures the views of consultant supervisors based on observation on a trainee's performance in practice. The MCR feedback and comments received give valuable insight into how well the trainee is performing, highlighting areas of excellence and areas of support required. MCR feedback will be available to the trainee and contribute to the educational supervisor's report.

Educational supervisors report (ESR)
The ES will periodically (at least annually) record a longitudinal, global report of a trainee's progress based on a range of assessment, potentially including observations in practice or reflection on behaviour by those who have appropriate expertise and experience. The ESR will include the ES's summative judgement of the trainee's performance and the entrustment decisions given for the learning outcomes (CiPs). The ESR can incorporate commentary or reports from longitudinal observations, such as from supervisors (MCRs) and formative assessments demonstrating progress over time.

5.6 Decisions on progress (ARCP)

The decisions made at critical progression points and upon completion of training should be clear and defensible. They must be fair and robust and make use of evidence from a range of assessments, potentially including exams and observations in practice or reflection on behaviour by those who have appropriate expertise or experience. They can also incorporate commentary or reports from longitudinal observations, such as from supervisors or formative assessments demonstrating progress over time.

Periodic (at least annual) review should be used to collate and systematically review evidence about a doctor's performance and progress in a holistic way and make decisions about their progression in training. The annual review of progression (ARCP) process supports the collation and integration of evidence to make decisions about the achievement of expected outcomes.

Assessment of CiPs involves looking across a range of different skills and behaviours to make global decisions about a learner's suitability to take on particular responsibilities or tasks, as do decisions about the satisfactory completion of presentations/conditions and procedural skills set out in this curriculum. The outline grid in section 5.4 sets out the level of supervision expected for each of the clinical and specialty CiPs. The requirements for each year of training are set out in the ARCP decision aid (www.jrcptb.org.uk).

The ARCP process is described in the Gold Guide. During the first 3 years ARCPs will be led by radiology, using the RCR ePortfolio and will be arranged by regional deaneries. The panel will include a Nuclear Medicine specialist to contribute to discussions around progression in the 20% Nuclear Medicine component of training. During the final 3 years, ARCPs will be led by Nuclear Medicine chaired by the national Nuclear Medicine training programme director (or delegate) using the JRCPTB ePortfolio. The panel will include a clinical radiology trainer to contribute to discussions around progression in the 20% clinical radiology component of training and to ensure all required radiology competencies have been achieved. The evidence to be reviewed by ARCP panels should be collected in the trainee's ePortfolio.

As a precursor to ARCPs, JRCPTB strongly recommend that trainees have an informal ePortfolio review with their educational supervisor. This provides opportunities for early detection of trainees who are failing to gather the required evidence for ARCP.

The penultimate ARCP prior to the anticipated CCT date will include an external assessor from outside the training programme. This is known as a Penultimate Year Assessment (PYA) and will identify any outstanding targets that the trainee will need to complete to meet all the learning outcomes.

In order to guide trainees, supervisors and the ARCP panel, JRCPTB has produced an ARCP decision aid which sets out the requirements for a satisfactory ARCP outcome at the end of each training year and critical progression point. The ARCP decision aid is available on the JRCPTB website www.jrcptb.org.uk.

5.7 Assessment blueprint

The table below show the possible methods of assessment for each CiP. It is not expected that every method will be used for each competency and additional evidence may be used to help make a judgement on capability.

KEY

CbD	Case-based discussion	DOPS	Direct observation of procedural skills
MCR	Multiple consultant report	Mini-CEX	Mini-clinical evaluation exercise
Mini-IPX	mini-Imaging Interpretation Exercise	MSF	Multi source feedback
PS	Patient survey	QIPAT	Quality improvement project assessment tool
TO	Teaching observation	FRCR	Fellowship of the Royal College of Radiology
NMPGDip	Diploma in Nuclear Medicine		

Blueprint of assessment mapped to CiPs

Learning outcomes	**CbD**	**DOPS**	**MCR**	**Mini-CEX**	**Mini-IPEX**	**MSF**	**PS**	**QIPAT**	**TO**	**FRCR**	**NMPGDip**
Generic CiPs											
Able to function successfully within NHS organisational and management systems			√			√					
Able to deal with ethical and legal issues related to clinical practice	√	√	√	√		√				√	√
Communicates effectively and is able to share decision making, while maintaining appropriate situational awareness, professional behaviour and professional judgement			√			√	√				
Is focussed on patient safety and delivers effective quality improvement in patient care			√			√		√		√	√
Carrying out research and managing data appropriately			√			√				√	√
Acting as a clinical teacher and clinical supervisor			√			√			√		

Learning outcomes	CbD	DOPS	MCR	Mini-CEX	Mini-IPEX	MSF	PS	QIPAT	TO	FRCR	NMPGDip
Specialty CiPs											
Advising and authorising appropriate Nuclear Medicine diagnostic and therapeutic interventions for individual patients	√	√	√	√	√	√					√
Ability to direct optimisation of diagnostic Nuclear Medicine image quality in terms of patient preparation, image acquisition, post processing and display	√	√	√	√	√	√		√		√	√
Providing timely, accurate and clinically pertinent reports on all Nuclear Medicine diagnostic studies	√		√	√	√	√				√	√
Providing a safe and comprehensive radionuclide therapy service	√	√	√	√		√	√				√
Leading all the clinical aspects of the Nuclear Medicine department in terms of compliance with regulations	√		√			√		√			√

6 Supervision and feedback

This section of the curriculum describes how trainees will be supervised, and how they will receive feedback on performance. For further information please refer to the AoMRC guidance on Improving feedback and reflection to improve learning[4].

Access to high quality, supportive and constructive feedback is essential for the professional development of the trainee. Trainee reflection is an important part of the feedback process and exploration of that reflection with the trainer should ideally be a two way dialogue. Effective feedback is known to enhance learning and combining self-reflection to feedback promotes deeper learning.

Trainers should be supported to deliver valuable and high quality feedback. This can be by providing face to face training to trainers. Trainees would also benefit from such training as they frequently act as assessors to junior doctors, and all involved could also be shown how best to carry out and record reflection.

[4] Improving feedback and reflection to improve learning. A practical guide for trainees and trainers

6.1 Supervision

All elements of work in Nuclear Medicine training posts must be supervised with the level of supervision varying depending on the experience of the trainee and the clinical exposure and case mix undertaken, include the opportunity to discuss diagnostic findings and therapeutic plans with a supervisor. As training progresses the trainee should have the opportunity for increasing autonomy, consistent with safe and effective care for the patient.

Organisations must make sure that each doctor in training has access to a named clinical supervisor and a named educational supervisor. Depending on local arrangements these roles may be combined into a single role of educational supervisor. As Nuclear Medicine is a small specialty, education supervisors tend to also extend their role to regional training programme director, to ensure training opportunities are comprehensive.

The role and responsibilities of supervisors have been defined by the GMC in their standards for medical education and training[5].

Educational supervisor
The educational supervisor is responsible for the overall supervision and management of a doctor's educational progress during a placement or a series of placements. The educational supervisor regularly meets with the doctor in training to help plan their training, review progress and achieve agreed learning outcomes. The educational supervisor is responsible for the educational agreement, and for bringing together all relevant evidence to form a summative judgement about progression at the end of the placement or a series of placements. They will make arrangements if local practice does not offer adequate training opportunities. For example GMC approved short programmes are available to supplement nuclear cardiology at the Royal Brompton Hospital, and paediatric Nuclear Medicine at Great Ormond Street Hospital.

Clinical supervisor
Consultants responsible for patients undergoing diagnostic or therapeutic Nuclear Medicine studies that a trainee is involved with provide clinical supervision for that trainee and thereby contribute to their training; they may also contribute to assessment of their performance by completing a 'Multiple Consultant Report (MCR)' and other WPBAs. A trainee may also be allocated (for instance, if they are not working with their educational supervisor in a particular placement) a named clinical supervisor, who is responsible for reviewing the trainee's training and progress during a particular placement. It is expected that a named clinical supervisor will provide a MCR for the trainee to inform the educational supervisor's report.

The educational and (if relevant) clinical supervisors, when meeting with the trainee, should discuss issues of clinical governance, risk management and any report of any untoward clinical incidents involving the trainee. If the service lead (clinical director) has any concerns about the performance of the trainee, or there are issues of doctor or patient safety, these would be discussed with the clinical and educational supervisors (as well as the trainee). These processes, which are integral to trainee development, must not detract from the

[5] Promoting excellence: standards for medical education and training

statutory duty of the trust to deliver effective clinical governance through its management systems.

Educational and clinical supervisors need to be formally recognised by the GMC to carry out their roles[6]. It is essential that training in assessment is provided for trainers and trainees in order to ensure that there is complete understanding of the assessment system, assessment methods, their purposes and use. Training will ensure a shared understanding and a consistency in the use of the WPBAs and the application of standards.

Opportunities for feedback to trainees about their performance will arise through the use of the workplace-based assessments, regular appraisal meetings with supervisors, other meetings and discussions with supervisors and colleagues, and feedback from ARCP.

Trainees
Trainees should make the safety of patients their first priority and they should not be practising in clinical scenarios which are beyond their experiences and competencies without supervision. Trainees should actively devise individual learning goals in discussion with their trainers and should subsequently identify the appropriate opportunities to achieve said learning goals. Trainees would need to plan their WPBAs accordingly to enable their WPBAs to collectively provide a picture of their development during a training period. Trainees should actively seek guidance from their trainers in order to identify the appropriate learning opportunities and plan the appropriate frequencies and types of WPBAs according to their individual learning needs. It is the responsibility of trainees to seek feedback following learning opportunities and WPBAs. Trainees should self-reflect and self-evaluate regularly with the aid of feedback. Furthermore, trainees should formulate action plans with further learning goals in discussion with their trainers.

6.2 Appraisal

A formal process of appraisals and reviews underpins training. This process ensures adequate supervision during training provides continuity between posts and different supervisors and is one of the main ways of providing feedback to trainees. All appraisals should be recorded in the ePortfolio.

Induction Appraisal
The trainee and educational supervisor should have an appraisal meeting at the beginning of each post to review the trainee's progress so far, agree learning objectives for the post ahead and identify the learning opportunities presented by the post. Reviewing progress through the curriculum will help trainees to compile an effective Personal Development Plan (PDP) of objectives for the upcoming post. This PDP should be agreed during the Induction Appraisal. The trainee and supervisor should also both sign the educational agreement in the e-portfolio at this time, recording their commitment to the training process.

[6] Recognition and approval of trainers

Mid-point Review
This meeting between trainee and educational supervisor is not mandatory (particularly when an attachment is shorter than 6 months) but is encouraged particularly if either the trainee or educational or clinical supervisor has training concerns or the trainee has been set specific targeted training objectives at their ARCP). At this meeting trainees should review their PDP with their supervisor using evidence from the e-portfolio. Workplace-based assessments and progress through the curriculum can be reviewed to ensure trainees are progressing satisfactorily, and attendance at educational events should also be reviewed. The PDP can be amended at this review.

End of Attachment Appraisal
Trainees should review the PDP and curriculum progress with their educational supervisor using evidence from the e-portfolio. Specific concerns may be highlighted from this appraisal. The end of attachment appraisal form should record the areas where further work is required to overcome any shortcomings. Further evidence of competence in certain areas may be needed, such as planned workplace-based assessments, and this should be recorded. If there are significant concerns following the end of attachment appraisal then the programme director should be informed. Supervisors should also identify areas where a trainee has performed about the level expected and highlight successes.

7 Quality Management

The organisation of training programs is the responsibility of the deaneries. The Nuclear Medicine programme is small with a single national programme which oversees the programme undertaking the following roles with local deaneries:

- Oversees recruitment and induction of trainees into the specialty
- Allocates trainees into particular rotations appropriate to their training needs
- Oversees the quality of training posts
- Ensures adequate provision of appropriate educational events
- Ensures curricula implementation across regional training programmes
- Oversees the workplace-based assessment process within programmes
- Coordinates the ARCP process for trainees
- Provides adequate and appropriate career advice
- Provides systems to identify and assist doctors with training difficulties
- Provides flexible training

Educational programmes to train educational supervisors and assessors in workplace based assessment may be delivered by deaneries or by the colleges or both.

Development, implementation, monitoring and review of the curriculum are the responsibility of the JRCPTB and the SAC. The committee will be formally constituted with representatives from each health region in England, from the devolved nations and with trainee and lay representation. It will be the responsibility of the JRCPTB to ensure that curriculum developments are communicated to heads of school, regional specialty training committees and TPDs.

The JRCPTB has a role in quality management by monitoring and driving improvement in the standard of all medical specialties on behalf of the three Royal Colleges of Physicians in Edinburgh, Glasgow and London. The SACs are actively involved in assisting and supporting deaneries to manage and improve the quality of education within each of their approved training locations. They are tasked with activities central to assuring the quality of medical education such as writing the curriculum and assessment systems, reviewing applications for new posts and programmes, provision of external advisors to deaneries and recommending trainees eligible for CCT or Certificate of Eligibility for Specialist Registration (CESR).

JRCPTB uses data from six quality datasets across its specialties and subspecialties to provide meaningful quality management. The datasets include the GMC national Training Survey (NTS) data, ARCP outcomes, examination outcomes, new consultant survey, penultimate year assessments (PYA)/external advisor reports and the monitoring visit reports.

Quality criteria have been developed to drive up the quality of training environments and ultimately improve patient safety and experience. These are monitored and reviewed by JRCPTB to improve the provision of training and ensure enhanced educational experiences.

8 Intended use of curriculum by trainers and trainees

This curriculum and ARCP decision aid are available from the Joint Royal Colleges of Physicians Training Board (JRCPTB) via the website www.jrcptb.org.uk.

Clinical and educational supervisors should use the curriculum and decision aid as the basis of their discussion with trainees, particularly during the appraisal process. Both trainers and trainees are expected to have a good knowledge of the curriculum and should use it as a guide for their training programme.

Each trainee will engage with the curriculum by maintaining ePortfolio appropriate to their stage of training. The trainee will use the curriculum to develop learning objectives and reflect on learning experiences.

Recording progress in the ePortfolio

During the first indicative three years of training, the RCR ePortfolio will be used.
For the final indicative three years of training, the JRCPTB ePortfolio will be used.
A proof of completion of clinical radiology training should be loaded into the JCPTB ePortfolio for continuity at the transition.

The ePortfolio allow evidence to be built up to inform decisions on a trainee's progress and provides tools to support trainees' education and development.

The trainee's main responsibilities are to ensure the ePortfolio is kept up to date, arrange assessments and ensure they are recorded, prepare drafts of appraisal forms, maintain their

personal development plan, record their reflections on learning and record their progress through the curriculum.

The supervisor's main responsibilities are to use ePortfolio evidence such as outcomes of assessments, reflections and personal development plans to inform appraisal meetings. They are also expected to update the trainee's record of progress through the curriculum, write end-of-attachment appraisals and supervisor's reports.

Deaneries, training programme directors, college tutors and ARCP panels may use the ePortfolio to monitor the progress of trainees for whom they are responsible.

JRCPTB will use summarised, anonymous ePortfolio data to support its work in quality assurance.

All appraisal meetings, personal development plans and workplace based assessments (including MSF) should be recorded in the ePortfolio. Trainees are encouraged to reflect on their learning experiences and to record these in the ePortfolio. Reflections can be kept private or shared with supervisors.

Reflections, assessments and other ePortfolio content should be used to provide evidence towards acquisition of curriculum capabilities. Trainees should add their own self-assessment ratings to record their view of their progress. The aims of the self-assessment are:

- To provide the means for reflection and evaluation of current practice
- To inform discussions with supervisors to help both gain insight and assists in developing personal development plans
- To identify shortcomings between experience, competency and areas defined in the curriculum so as to guide future clinical exposure and learning

Supervisors can sign-off and comment on curriculum capabilities to build up a picture of progression and to inform ARCP panels.

9 Equality and diversity

The Royal Colleges of Physicians will comply, and ensure compliance, with the requirements of equality and diversity legislation set out in the Equality Act 2010.

The Federation of the Royal Colleges of Physicians believes that equality of opportunity is fundamental to the many and varied ways in which individuals become involved with the Colleges, either as members of staff and Officers; as advisers from the medical profession; as members of the Colleges' professional bodies or as doctors in training and examination candidates.

Deaneries quality assurance will ensure that each training programme complies with the equality and diversity standards in postgraduate medical training as set by GMC. They

should provide access to a professional support unit or equivalent for trainees requiring additional support.

Compliance with multi-discriminatory practice will be assured through:

- Monitoring of recruitment processes
- Ensuring all College representatives and Programme Directors have attended appropriate training sessions prior to appointment or within 12 months of taking up post
- Deaneries ensuring that educational supervisors have had equality and diversity training (for example, an e-learning module) every three years
- Deaneries ensuring that any specialist participating in trainee interview/appointments committees or processes has had equality and diversity training (at least as an e-module) every three years
- Ensuring trainees have an appropriate, confidential and supportive route to report examples of inappropriate behaviour of a discriminatory nature. Deaneries and Programme Directors must ensure that on appointment trainees are made aware of the route in which inappropriate or discriminatory behaviour can be reported and supplied with contact names and numbers. Deaneries must also ensure contingency mechanisms are in place if trainees feel unhappy with the response or uncomfortable with the contact individual
- Providing resources to trainees needing support (for example, through the provision of a professional support unit or equivalent)
- Monitoring of College Examinations
- Ensuring all assessments discriminate on objective and appropriate criteria and do not unfairly advantage or disadvantage a trainee with any of the Equality Act 2010 protected characteristics. All efforts shall be made to ensure the participation of people with a disability in training through reasonable adjustments