#### **JOB DESCRIPTION**

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| JOB IDENTIFICATION |
|  Job Title:Responsible to:Department(s):Directorate:Base:Current CAJE Reference:No of Job Holders:Last update: | Specialist Nuclear Medicine TechnologistNuclear Medicine Section ManagerMedical PhysicsDiagnostics 2 @ University Hospital Crosshouse1 @ University Hospital Ayr800-3511ThreeApril 2025 |

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| 2. JOB PURPOSE |
| To undertake a wide range of specialist technical services provided by a Nuclear Medicine Section of the Medical Physics Department covering the following areas of work:-* Full range of Nuclear Medicine (Gamma Camera) patient imaging services
* Full range of patient in vivo diagnostic and functional tests involving radiopharmaceuticals
* Therapeutic administration of radiopharmaceuticals to patients
* Safe use and keeping of radioactive substances and records
* Keeping records of investigations and radiation exposures in systems including RIS
* Supervise the departmental healthcare assistant and other healthcare staff and trainees entering the department
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| **3. DIMENSIONS** |
| * Undertaking a wide range of complex investigations as part of the services provided by one of the Nuclear Medicine sections, each of which performs approximately 1500 imaging investigations and treatments per year – see organisational chart.
* The service provides a full range of over 30 different types of imaging, treatment and other Nuclear Medicine investigations. Nuclear Medicine is a specialist imaging modality.
* Referrals are taken from all specialities in NHS Ayrshire & Arran and most specialties in NHS Dumfries and Galloway – the main patient groups coming from Oncology, Cardiology, Urology and Paediatrics.
* Although based at one acute site, the postholders based at University Hospital Crosshouse will be required to work at the University Hospital Ayr site for one or two days per week on a rota and postholders from both sites will be required to work cross-site to cover annual leave, sickness and other absence.
* The postholder may be required to deputise for the Section Manager in their absence.
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| 4. ORGANISATIONAL POSITION |
| See below. |

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| 5. ROLE OF DEPARTMENT |
| The Medical Physics Department provides a wide range of technical, scientific, procurement and management services to NHS A&A, serving most Directorates and Departments and General Practitioners across NHS A&A. The services are based at the two District General Hospitals, University Hospital Crosshouse (UHC) and University Hospital Ayr (UHA).The services, which enable NHS A&A to meet its obligations to comply with relevant national regulations and recommendations, can be summarised under three main areas, namely Medical Equipment Management Services, Nuclear Medicine Services and General Scientific and Technical Support:**Medical Equipment Management Services** ***Services Provided:***A comprehensive range of services to ensure the safe and efficient use of medical equipment, including: * Planning, replacement and undertaking full procurement programme,
* providing ongoing repair, maintenance, calibration and provision of equipment library service,
* user training, support and safety advice,
* general management to cover national requirements,
* clinical measurements including haemo and urodynamics.

***Equipment and clinical specialities covered:***Provides services for all clinical specialities in General Hospitals and Community HealthCare Divisions and to General Practitioners. Equipment covered includes:* Simple equipment in patients homes (e.g. nebulisers, ambulatory syringe pumps),
* Equipment in GP surgeries (e.g. defibrillators, ecg recorders, blood pressure monitors),
* General ward equipment (e.g. Infusion pumps, monitors, defibrillators),
* Life support and therapy equipment in theatres and ITU's (e.g. ventilators, anaesthetic machines, monitoring equipment and electrosurgery),
* Renal dialysis equipment - renal dialysis machines in renal dialysis unit, wards and in patient's homes,
* Equipment in specialist departments including imaging and endoscopy equipment.

***Staff Providing Service:***This service is provided by Bio-Engineering staff based in specialist labs at University Hospital Crosshouse, University Hospital Ayr and Ayrshire Maternity Unit.**Nuclear Medicine Services** ***Services Provided:**** Full range of Nuclear Medicine imaging services with a SPECT/CT dual-headed gamma camera at both University Hospital Crosshouse and University Hospital Ayr,
* Full range of in vivo and in vitro diagnostic and functional tests involving radiopharmaceuticals with a gamma counter located at University Hospital Crosshouse,
* Therapeutic administration of Radioactive Isotopes.

***Clinical Specialities covered:***Referrals from all clinical specialities in NHS Ayrshire & Arran and most specialties in NHS Dumfries & Galloway.***Staff Providing Service:***Scientific, technical and nursing auxiliary staff based in Nuclear Medicine Departments in Ayr and Crosshouse Hospitals.**General Scientific and Technical Support** ***Services Provided:***Include* Radiation protection advice for ionising and non-ionising radiation,
* Reporting on all Hazard and Safety Action Notices,
* Support and initiation of research and development,
* General scientific and technical advice on policy, procedures and strategy.

The department's work covers areas of rapid technological development and it is essential to remain completely up to date with the latest developments so that the department can take the lead to implement relevant new technology to the benefit of the service in Ayrshire. |

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| 6. KEY RESULT AREAS |
| **Clinical*** Check and authorise Nuclear Medicine referrals, in accordance with Ionising Radiation (Medical Exposures) Regulations (IRMER) Employer’s Procedures.
* Schedule complex imaging and non-imaging investigations in Nuclear Medicine – one appointment requires times to be scheduled for both injection and imaging with the delay between these steps different for each investigation. This requires considerable flexibility in the working day as emergency investigations and patients’ clinical and social conditions demand regular alterations to a complex schedule.
* Perform and supervise complex imaging and non-imaging investigations in Nuclear Medicine so that they are performed with optimal quality, expeditiously and with a high degree of importance attached to patient care aspects of the work
* Operate processing workstation to produce digital medical images in optimal format for reporting and to carry out computer analysis of acquired data to give quantitative results.
* When processing Nuclear Medicine images the operator is required to quantitatively analyse different organs and to do this complex image interpretation is required, e.g. drawing kidney, bladder and vascular structure outlines which is difficult when surrounding tissues look similar – analytic and judgement skills need to be used carefully to select the appropriate area against the options available.
* Dispense both diagnostic and therapeutic quantities of radioactive materials prior to administration to patients, using safe handling techniques for radioisotopes.
* Administer diagnostic quantities of radioactive materials and other pharmaceuticals, intravenously, subcutaneously, orally or by inhalation to patients.
* Administer therapeutic quantities of radio-pharmaceuticals orally to patients.
* Select the most appropriate image data acquisition method for the requested investigation, taking the patient’s clinical condition into account.
* Ensuring that procedures and radiation protection issues are explained to patients in a way they understand.

**Professional/Technical*** Ensure that radioactive waste from diagnostic tests and therapeutic procedures are dealt with in accordance with current regulations and local rules.
* Schedule and carry out routine QA work within Nuclear Medicine to ensure optimal performance of complex equipment and procedures.
* Correctly file or archive digital medical images or test results for all patients.
* Correctly record patient exposures, incoming radioactive sources and outgoing waste in database and Radiology Information System.
* Using knowledge and skills attained through experience, training and CPD, be actively involved in the training of other staff members internal and external to the department.
* Complete incident reports for any adverse events using the local incident reporting system.

**Management*** Supervision of the Nursing Assistant, including work allocation and checking.
* Contribution to the development of specialised Nuclear Medicine procedures.
* As policies and procedures are implemented within the nuclear medicine department, ensuring that all staff entering the department are aware of, understand and comply with same.
* To deputise for the Nuclear Medicine Technologist Section Manager during annual leave, sick leave or any other absence.
* Establishing and maintaining good and productive communications and working relationships with other healthcare staff.
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| 7a. EQUIPMENT AND MACHINERY |
| Carry out operations, quality assurance and safe use of the following pieces of equipment in Nuclear Medicine:* Dual-headed SPECT/CT gamma camera systems with full range of imaging capabilities including tomographic (3D), cardiac gating (ECG monitoring) and CT, value > £5,00,000
* Nuclear Medicine image acquisition workstations (Windows).
* Nuclear Medicine image processing workstations (Windows and Linux).
* Technegas generator for production of radioactive gas for ventilation imaging.
* Multi-channel analysers for accurate analysis of radioactive blood samples.
* Dose calibrator for determining the amount of radioactivity in each patient injection for all different isotopes used.
* Intra-operative gamma probe.
* Contamination monitors for detecting small amounts of radioactive contamination.
* Dose-rate meters to determine the radiation exposure to staff and public.
* 25-30 different radio-pharmaceuticals for patient investigations.
* Several test radioactive sources for quality assurance procedures.
* Fume cabinets for handling radioactive materials.
* Protective equipment eg, lead shielding and syringe shields.
* PCs for general administration and documentation.
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| **7b. SYSTEMS** |
| Statutory Ionising Radiation Regulations require stringent record keeping to cover all aspects of the receipt and disposal of radioactive materials and the administration of radioactive substances to patients. The Nuclear Medicine section manages data by detailed recording of all relevant data in computer databases and management systems. The post holder is responsible for entering accurate and adequate data which will include:* Patient data input into Nuclear Medicine gamma camera imaging system.
* Input and querying of patient data and radiation data in the departmental database for hospital statistical records and for reports to external authorities.
* Input of relevant data for receipt and disposal of radioactive substances.
* Input and querying of patient data, generated by any of the staff in the department, in the Radiology Information System.
* Viewing of and transferring patient images to PACS system.
* Filing/archiving of hard copy and electronic images and test results.

Systems and software are used on a daily basis to analyse and manipulate patient images, generate scientific measurements, access clinical information, maintain patient databases and carry out statistical analysis. |

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| 8. ASSIGNMENT AND REVIEW OF WORK |
| Requests for Nuclear Medicine investigations or treatments are generated directly to the Nuclear Medicine Dept by hospital medical and entitled nursing staff. It is the post holder’s responsibility to make appropriate appointments within the management system of the section so that such requests are scheduled appropriately.Images or quantitative results are produced for each patient to allow a clinical evaluation to be carried out by Consultant Radiologists or other Consultants specialising in Nuclear Medicine.The postholder is required to make autonomous decisions such as authorising referrals for radiation exposures, choosing the correct imaging method, how to process/analyse images and what extra images may be necessary.The post holder reports to the Nuclear Medicine Section Manager, with performance reviewed through the annual PDR process. The Consultant Physicist or Head of Department may be consulted to provide advice and training where highly complex or new scientific input is required.The Consultant Physicist or Head of Department will delegate other non-clinical tasks. The Head of the Department reviews the overall work of the department.  |

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| **9. DECISIONS AND JUDGEMENTS** |
| * Be accountable for own professional actions, working independently and exercising judgements to maintain a safe, efficient and consistently high standard of work
* Based on experience, use skills to assess previous images or a patient’s condition, often acute, and decide on appropriate method to acquire diagnostic images.
* Analytic and judgement skills are required to make clinical decisions in assessing patients’ conditions in order to optimise imaging investigations from a range of options available e.g.:
* Make a judgement on the compromise between obtaining more counts to obtain a better image or finishing investigation if patient is unable to remain still (because of pain etc) thereby degrading quality of image.
* Judge whether a patient’s kidney clearance images indicates obstruction or not in order to decide if diuretic should be administered – avoid an unnecessary administration if possible.
* Make a judgement on whether or not to proceed with an administration of radioactive substance for a patient who may not be able to complete the long investigation: balancing risk of unnecessary radioactive dose against benefit of investigation if completed.
* When acting in the role of operator, under the Ionising Radiation (Medical Exposure) Regulations, making the clinical decision whether requests for radiation exposure can be authorised under defined criteria.
* Involves making a judgement if the information provided on the request form is sufficient (and consistent with the agreed criteria) to authorise the exposure to the patient.
* Exercise judgement to plan and prioritise departmental patient workload.
* Assess and be involved in the development and implementation of specialised Nuclear Medicine procedures.
* The final decision on whether to administer or not to administer a radiopharmaceutical is the Nuclear Medicine Technologist’s responsibility.
* On a daily basis, predict and order the next day use of expensive radio-pharmaceuticals to ensure availability for emergency patients while minimising wastage.
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| 10. MOST CHALLENGING/DIFFICULT PARTS OF THE JOB |
| Autonomously using specialist imaging and non-imaging methods at a level requiring significant post-graduate training and experience.Making the clinical judgement whether there is sufficient clinical information provided on a request to authorise a radiation exposure in agreement with the Employer’s Written Procedures for the Ionising Radiations (Medical Exposure) Regulations 2017 (IRMER).Working in a small team means that at times of staff annual leave or sickness, there is considerably increased pressure over and above the normal high level created by a heavy and unpredictable workload. |

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| **11. COMMUNICATIONS AND RELATIONSHIPS** |
| Patients and Relatives/Carers* Provide information by explanation of often complex and lengthy technical procedures in a manner which can be understood by the individual, listening to and acting upon the patient’s physical and emotional requirements to encourage compliance with the imaging process.
* Provide reassurance as to the necessity of a radiopharmaceutical administration involving a risk associated with the harmful effects of ionising radiation.
* Provide advice on radiation protection issues following investigations eg the patient has to be advised on how to keep radiation exposure to other members of the public (e.g. family members) below the restrictive legal annual radiation dose limit.

Nuclear Medicine Staff* Consult physicists for advice.
* Delegate tasks to other staff and Nursing Assistant.

Medical Staff/Nursing Staff/Healthcare Staff* Communicate with referrers regarding any issues regarding appointments and ability to undertake investigations.
* Seek advice from consultant radiologists and other ARSAC certificate holding consultants.
* Query incorrect or unnecessary referrals in order to reduce or avoid unnecessary radiation dose.
* Provide advice on patient preparation for investigations.
* Provide advice on radiation protection issues following investigations.
* Provide training to student radiographers, medical students, nursing students and other healthcare professionals coming into contact with the specialist work of Nuclear Medicine.
* Communicate with consultant radiologists, ward nursing or medical staff regarding patients’ clinical care needs.

External* Daily ordering of radio-pharmaceuticals from the NHS Greater Glasgow & Clyde radio-pharmacy 24 hours to 2 weeks in advance of investigations.
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| **12. PHYSICAL, MENTAL, EMOTIONAL AND ENVIRONMENTAL DEMANDS OF THE JOB** |
| Physical Skills* Dexterity is required to draw up all pharmaceuticals in syringes while using radiation protection shielding on the bench, vial and syringe and avoiding any contamination.
* Since ~98% of radio-pharmaceutical administrations are IV then a high level of IV injection ability is required and has to be carried out with no radioactive contamination.
* Operation of complex gamma camera and software including finely controlled daily, weekly, monthly and quarterly gamma camera calibrations to ensure optimal patient image quality.
* Laboratory skills for handling blood samples, including specialised gamma counting and centrifuge techniques.
* When patients have small or large splashes/spills of radioactive urine on them, either from imaging or therapy, it requires the specialist decontamination skills of the post-holder

Physical Demands* Frequent transfer of patients from trolleys, beds and chairs onto imaging bed, requiring use of safe moving and handling skills, using aids when required.
* The majority of the day is spent standing, walking and bending to position patients.

Mental Demands* During tests, there is a requirement for intense concentration on the intervention, to optimise images/lab test/image analysis quality while ensuring that unpredictable/acutely unwell patients are stable and that radioactive substances are being handled and administered safely.
* Should the complex imaging equipment malfunction, there is often the need to quickly improvise to obtain an optimal imaging method in the circumstances.
* Giving radiation protection advice to patients with varying domestic circumstances.
* Taking appropriate actions to facilitate investigations on children and elderly patients.

Emotional Demands* Daily communication with distressed, anxious or worried patients/relatives/carers. This is particularly common in the Nuclear Medicine department where patients are very apprehensive of the complex equipment and are often being investigated for life threatening conditions.
* Occasionally having to inform a patient that they are not fit enough to undergo an investigation.
* Patients asking for results which the postholder is unable to give
* Investigating patients who have just been given very bad news and are very emotional.
* Realising during a scan that the result will categorise the patient’s illness as terminal.

Working Conditions* Constantly exposed to ionising radiation in a controlled manner, however, can frequently be required to deal with spillages of radioactive sources or of radioactive blood or urine.
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| 13. KNOWLEDGE, TRAINING AND EXPERIENCE REQUIRED TO DO THE JOB |
| A Degree in Medical Technology, Radiography or other appropriate discipline is essential. Equivalent qualifications will only be accepted if the knowledge training and experience matches the person specification required.Registration with HCPC as a radiographer or sufficient experience to be eligible for registration with the RCT, register of clinical technologists is essential at this level.Post graduate diploma or equivalent training and post qualification experience in the specialist imaging modality of Nuclear Medicine is required.The post qualification experience/training is required to enable the post holder to be proficient, and to operate at the level of specialist, in the provision of a wide range of highly specialist Nuclear Medicine diagnostic investigations and therapeutic administrations of radioactive substances. The training/experience gained includes the following competencies: * High level of expertise and training in the general principles and specific operation of complex imaging, counting and computing equipment used by the service.
* Knowledge of anatomy, physiology and disease processes sufficient to allow requests for procedures and their relevance in the optimisation of the investigation being undertaken, to be understood.
* To become highly experienced in intravenous and intra-dermal administration of radioactive substances. (Unsuccessful administration can have serious consequences).
* To gain sufficient knowledge of the risks and benefits of radionuclide procedures to enable them to authorise scans under the IRMER regulations following the guidance provided by the relevant Consultant Practitioner and to receive sufficient training to be able to act as operators under these regulations which require that formal training is provided as a condition of entitlement.
* To give advice to other specialist and non specialist staff on the specific requirements for radiation protection issues for patients who have been administered with radioactive substances and on procedures regarding contamination and to act as lead technologist in the absence of the section manager.

Good diplomacy skills and a sensitive and caring approach towards patients are required together with the ability to communicate complex information in an understandable way.Formal training in intravenous injection technique is required and certification of competence by a consultant holding an ARSAC certificate. High level of technical IT knowledge including databases and clinical applications. |

