

**NHS GREATER GLASGOW & CLYDE**

**JOB DESCRIPTION**

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| 1. **JOB IDENTIFICATION** | |
| **Job Title:**  **Responsible to:** | Specialist Dosimetrist (Senior Practitioner Clinical Technologist)  Lead Dosimetrist |
| **Department:** | Radiotherapy Physics, Beatson West of Scotland Cancer Centre, Gartnavel & Monklands Hospitals, Diagnostic Directorate, Acute Services Division |

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| 1. **JOB PURPOSE** |
| The Specialist Dosimetrist contributes to the work of a team of Dosimetrists in the Clinical Planning and Imaging Section of Radiotherapy Physics. The postholder contributes to the daily technical work allocated in the Section, principally to the planning and checking of routine radiation treatments, designed for individual radiotherapy patients at the Beatson West of Scotland Cancer Centre and the delivery of brachytherapy treatments. |

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| 1. **ROLE OF THE DEPARTMENT** |
| Radiotherapy Physics provides a comprehensive clinical physics service to the Beatson West of Scotland Cancer Centre, which is one of the largest UK cancer treatment centres providing radiotherapy treatment for more than 7,000 patients per annum in the west of Scotland. Its main base is at Gartnavel General Hospital, Glasgow with a Satellite Facility located at Monklands Hospital in Airdrie.  The Department of Clinical Physics and Bioengineering (DCPB) provides specialist medical physics and clinical engineering services to NHS Greater Glasgow & Clyde and other West of Scotland Health Boards. These include Medical Equipment Management, Clinical Engineering, Imaging Physics (Nuclear Medicine and MRI), Core Services (Health Physics, Radionuclide Dispensary and PET Radiopharmaceutical Production Unit) and Radiotherapy Physics. It is one of the largest medical physics and clinical engineering departments in the UK, comprising over 350 staff. |

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| 1. **ORGANISATIONAL POSITION** |
| Based at Beatson (Gartnavel), the Specialist Dosimetrist, whose organisational position is shown on the attached Organisation Chart, will rotate to work at the Beatson (Monklands) according to a published rota and is:  * 1. Accountable to the Chief Executive through the General Manager, Diagnostic Directorate and the Head and Deputy Head of Radiotherapy Physics, the Clinical Scientific Lead and the Planning Services Manager.   2. Responsible for the duties specified below through the Planning Services Manager and Lead Dosimetrists, contributing to the work of the Dosimetrist Teams and Clinical Physicists in Treatment Planning and Brachytherapy Physics. |

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| 1. **SCOPE AND RANGE** |
| Referrals for radiotherapy treatment across a wide range of malignant disease, originate from seven Health Boards (Ayrshire and Arran, Borders, Dumfries and Galloway, Forth Valley, Greater Glasgow & Clyde and Lanarkshire) and for non-routine specialised treatments from all the Scottish Health Boards.     * 1. Radiotherapy Physics consists of Clinical Physicists, Dosimetrists and Clinical Technologists organised in distinct groups: Treatment Delivery, Clinical Planning & Imaging, Brachytherapy Physics, Teaching & Development and the Clinical Physicist Pool. Radiotherapy Physics has its own program of ongoing scientific research and development.   2. External beam radiotherapy treatments are provided using eleven linear accelerators at the Beatson (Glasgow) and two accelerators based in Monklands, which together with CT simulators and treatment simulators, treatment verification systems and a low energy x-ray treatment unit have a capital value in excess of £50M.   3. Radiotherapy Physics staff work closely with Multidisciplinary Teams of Clinical Oncologists, Radiographers and Nurses. Radiotherapy Physics staff support a wide range of specialist clinical services by carrying out a wide range of duties across radiotherapy treatment planning, brachytherapy physics, radiation dosimetry, equipment management, quality assurance, medical imaging and supporting networked radiotherapy patient information systems. Staff lead and support clinical developments and research, and provide education for multidisciplinary staff, trainees and students.   4. Within Clinical Planning & Imaging, Dosimetrists are organised into site specific team, providing a comprehensive technical service for the planning, validation and quality assurance of routine and highly complex radiation treatment plans for individual Beatson patients. Staff will be involved in the delivery of brachytherapy treatments, handling of radioactive source, and support service development. Staff will lead and support clinical developments and research, and provide education for multidisciplinary staff, trainees and students.   5. Work carried out within the Service complies with the Beatson’s ISO 9001:1015 Quality Management System and with legislation, including the Ionising Radiation Regulations (2017) and the Ionising Radiation (Medical Exposures) Regulations (2017), and staff participate in the ongoing development of quality systems and procedures. |
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| 1. **MAIN DUTIES/RESPONSIBILITIES** |
| The Specialist Dosimetrist, delivers specialist technical support to the Beatson and contributes to the smooth operation of the services provided by Clinical Planning and Imaging. The postholder:   1. **Managerial**    1. Participates in a team of Dosimetrists (Clinical Technologists) and contributes to its management by assisting the Lead Dosimetrist including deputising for them when required and helping to ensure that work undertaken is carried out efficiently and to a high standard.    2. Contributes to the technical support services provided in accordance with local and national requirements, assists with the implementation of quality standards and acts in accordance with written protocols within the Beatson’s Quality System.    3. Participates in team rotas, and is allocated work undertaken within Clinical Planning, contributing to the management of patient workflow and the wide range of specialist support required for image interpretation, tumour localisation; the preparation and calculation of routine treatment plans (external beam and brachytherapy), radiation field placement, in-vivo patient radiation dosimetry and quality control testing of radiotherapy equipment summarised in Section 6. In addition, this includes the preparation and provision of specialised radioactive sources for patient treatments, supporting the programming and operation of highly complex Remote Afterloaders for delivery of patient brachytherapy treatments, and supporting stock control of radioactive sources.    4. Provides information on the clinical status of the radiotherapy and brachytherapy equipment and supports the security and provision of radioactive sources used to deliver radiation treatment, in compliance with the requirements of extant legislation. Ensures high standards of technical service with emphasis on radiation safety, record keeping and security of all equipment, with reference to approved safety procedures. Participates in quality assurance procedures and ensuring that all associated documentation is kept up to date.    5. Ensures high standards of communication particularly when dealing with complex and sensitive clinical information about the planning of radiotherapy treatments.    6. Participates in the multidisciplinary Clinical Team, where designated, and is responsible for the management of workflow allocated both individually and to the collected Team. 2. **Clinical Technical**    1. Acts as an Operator, under the Ionising Radiation (Medical Exposures) Regulations (2017), with responsibility for complying with the employer’s procedures for work with ionising radiation.    2. Where deemed competent, prepares highly complex external beam and brachytherapy treatment equipment, and treatment planning systems for daily clinical use by checking safety features, ensuring correct technical operation, undertaking quality assurance, according to standard operating procedures and documenting work undertaken in appropriate records.    3. Works with the Beatson’s Radiotherapy Booking Office to help ensure the efficient co-ordination of patient treatment planning appointments.    4. Where deemed competent, undertakes routine, manual and computerised dosimetric and planning calculations. Generates choices of clinically acceptable treatment plans for individual patients receiving radiotherapy or brachytherapy in accordance with Clinical Protocols and Physics Quality Procedures.    5. Contributes to the routine technical work involved in the provision of Brachytherapy Physics that may involve highly complex remote manipulation and the indirect handling of sealed and solid radioactive materials.    6. Where designated and approved, programs and initiates operation of the Remote Afterloaders for direct delivery of patient brachytherapy treatments according to the approved treatment plan.    7. Participates in patient treatments within theatre and ward areas, involving sterile work, providing technical support during brachytherapy treatments and delivers sterile radioactive sources for patient administrations.    8. Helps to ensure that test equipment is maintained and checked according to Physics Quality Procedures, with emphasis on dosimetry and dose monitoring equipment, and participates in spares, source and stock control.    9. Helps to ensure that all equipment faults are reported to senior staff for continuing safe operation and performance of relevant equipment within manufacturers’ published technical specifications. Contributes in appropriate quality control testing prior to returning equipment to clinical use in consultation through the Clinical Scientific Lead.    10. Interprets highly complex patient treatment planning referrals, gives complex technical advice to medical staff on appropriate treatment planning techniques. Helps to ensure that all the patient information required for treatment planning (medical images, data and documentation) is available, properly organised and prepared for use with the treatment planning software. This includes manipulating computer images and outlining anatomical structures, patient surfaces, tumour volumes and organs at risk in accordance with agreed protocols.    11. Where deemed competent, provides a wide range of specialist support in the preparation, calculation, checking and approval of treatment plans (external beam and brachytherapy) in accordance with Clinical Prescriptions and undertaking image interpretation, tumour localisation and outlining of organs at risk. Undertakes routine and complex, manual and computerised dosimetric calculations. Generates choices of clinically acceptable treatment plans for individual patients receiving external beam radiotherapy protocols.    12. Attends the set-up of patients on radiotherapy equipment, as required, to assist in the selection of the appropriate simulation and treatment technique.    13. Assists with the assessment of radiation doses received by patients during radiotherapy treatment under the supervision of a Clinical Scientist. This involves participating in in-vivo patient dosimetry using thermoluminescence dosimeters and solid state devices and includes preparing equipment for use, taking patient measurements and contours as required, anatomical placement of measuring devices, measuring radiation doses received and calculating and communicating results.    14. Participates in routine quality assurance testing for radiotherapy equipment.    15. Helps maintain the Section’s information systems, patient databases and paper record systems. Participates in organising, storing, filing and retrieving patient-related data and medical images.    16. Ensures that the work undertaken complies the Radiotherapy Physics Quality System, Health and Safety at Work etc, Act and with other legislation, national quality standards and Trust Procedures, as appropriate. Assists with the production of written protocols for localisation, simulation, treatment planning and radiotherapy treatments as part of the Department’s ISO Quality System. Participates fully in implementing and maintaining this system.   **D. Teaching and Training**   * 1. The post holder will ensure that they maintain and develop appropriate experience and specialist knowledge by undertaking suitable training, work rotation, and through the Knowledge and Skills Framework (KSF), Continuing Professional Development (CPD) and Personal Development Planning (PDP).   2. Participates in programmes for the training and continuous development for Dosimetrists, as required to ensure their on-going career development and to comply with extant legislation and quality standards.   3. Contributes to the training and of Dosimetrists, Clinical Technologists, Radiographers, other staff and students who may be attached to Treatment Planning and Dosimetry for training purposes.   **E. Research and Development**  Research and development are essential for continuous service improvement and to ensure that the potential of complex new equipment, facilities and treatment modalities is fully realised. The postholder:   * 1. Supports with appropriate research and development projects in radiotherapy, as requested through the line management structure and in accordance with corporate direction.   2. Assists with the technical development and commissioning of new treatment planning techniques including introduction of new equipment, protocols and software.   **F. Professional**   * 1. Undertakes the personal development necessary to maintain the high quality of the service provided and participates in service developments. This includes attending suitable seminars and manufacturers’ specialist courses in order to keep up to date with the latest technical developments and the application of clinical technology in radiotherapy. |

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| 1. **SYSTEMS AND EQUIPMENT** |
| Specialist Dosimetrists must have practical knowledge and specialist understanding of the operation, function and broad operating principles of the majority of the following complex radiotherapy equipment and systems:   * 1. All equipment related to radiation treatment delivery including linear accelerators with multileaf collimators, remote Afterloading systems, dosimetry calibration systems, radiation room safety systems and laser alignment systems.   2. Patient radiotherapy treatment recording and verification systems, including associated networked systems used to manage and store patient treatment data and medical images.   3. Other radiation treatment equipment including kilovoltage x-ray equipment, brachytherapy afterloading equipment, therapeutic radiation sources and associated handling equipment.   4. Equipment used in the design of patients’ radiation treatments including x-ray treatment simulators, CT simulators, diagnostic x-ray equipment, digital x-ray systems and electronic contouring systems and other medical equipment imaging systems such as CT, MRI and PET scanners   5. Complex networked computerised Radiotherapy Treatment Planning systems used to prepare 3D and 4D treatments.   6. Complex computerised systems and dedicated software applications used to support Radiotherapy Treatment Planning, including those produced in house by Radiotherapy Physics staff   7. Radiation treatment measurement systems including in vivo radiation dosimetry and quality assurance equipment including ion chambers, thermoluminescence dosemeters and readers, solid state dosimeters and other dosimetry equipment.   8. Radiation treatment measurement systems including in vivo radiation dosimetry and quality assurance equipment including ion chambers, thermoluminescence dosemeters and readers, solid state dosimeters and other dosimetry equipment.   9. Networked computer technologies, including the Radiotherapy R&V Management system, PC systems, critical data archiving systems, medical image digitisers and computer peripherals.   10. Networked databases, spreadsheets and a range of quality assurance and medical equipment software and systems used extensively by Radiotherapy Physics staff   11. Software systems include Microsoft Word, Excel, Access and PowerPoint.   12. ISO9001:2015 Quality Management System and associated documentation. |
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| 1. **DECISIONS AND JUDGEMENTS** |
| The Dosimetrist in Clinical Planning and Imaging is expected to use his/her own initiative to prioritise action and make the decisions and judgements required to:   * 1. Designs and prepares optimal radiation treatment plans involving technical analysis and interpretation of complex multifaceted patient data to tailor plans to the specific requirements of individual patients.   2. Make the final decision in the programming and initiation of Remote Afterloader equipment for patient treatments according to the approved treatment plan, where the postholder is designated by the Consultant Clinical Oncologist (ARSAC holder) to undertake such a task.   3. Contribute to the preparation of operating procedures relevant to Treatment Planning including those required to support new and amended techniques and equipment.   4. Provide effective technical support to the Lead Dosimetrist.   5. Prepare radioactive sources for individual patient treatments to clinical specification and help ensure that radioactive sources may only be issued for use by medical staff who hold appropriate certificates, or supporting documentation, for such treatments.   6. Participate in brachytherapy stock control. |

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| 1. **COMMUNICATIONS AND RELATIONSHIPS** | |
| The postholder works closely with the Lead Dosimetrists, Planning Services Manager and Clinical Physicists and communicates internally and externally as follows: | |
| **People/Organisation** | **Purpose** |
| Radiotherapy Physics Staff | 1. Communicates frequently with Clinical Scientists, Dosimetrists on treatment planning matters including discussing decisions often of a complex and some of a highly complex nature where thorough justification is essential. 2. Participates in Dosimetrist Team discussions on routine and service matters. 3. Helps set standards when appropriate and provides supporting documentation. 4. Participates in Treatment Planning meetings. 5. Communicates as necessary with radiation dosimetry staff on the calibration of radiation treatment equipment, results of quality assurance and safety issues. |
| Therapy Radiographers | 1. Communicates frequently on the preparation, workflow, scheduling, specification and approval of patient treatment plans. This may include helping to manage changes in workflow to accommodate eg major equipment breakdowns to minimise the adverse effect on patient treatments. 2. Communicates frequently regarding requested amendments to treatment plans, often of a complex nature. 3. Communicates to gain a clear understanding of problems with patient simulations and treatments eg. Attends patient setups and advises on optimum planning solutions. 4. Assists with technical developments and new procedures in clinical practice. 5. Arranges treatment equipment handover as appropriate. |
| Mould Room Staff | 1. Communicates frequently to advise on the requirements for patient immobilisation equipment and preparation of radiation shielding, determined by treatment planning staff. |
| Nursing Staff | 1. Communicates as required about brachytherapy treatment planning. |
| Clinical Oncologists | 1. Communicates and provides frequent technical advice on technical aspects of treatment planning, including patient scheduling, treatment techniques, localisation, radiation dose distributions, the selection of optimal treatment plans, use of treatment equipment, protocols and technical developments. |

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| 1. **PHYSICAL DEMANDS OF THE JOB** |
| * 1. Frequent requirement to maintain high levels of intense concentration over long periods when using highly complex computerised treatment planning systems, which demands maintaining a controlled posture throughout.   2. Demonstrate highly developed physical accuracy and hand eye co-ordination to millimetre accuracy for mark up and adjustment of patient immobilisation devices and utilise highly developed keyboard skills when preparing/altering patient treatment plans. This also applies to quality assurance of radiotherapy equipment. High level of analytical and judgement skill is required when evaluating complex computerised treatment plans and dose volume histograms.   3. Mental agility, numerical competency and advanced spatial awareness, with ability to visualise three dimensional structures and radiation dose distributions.   4. Requirement to exert moderate physical effort for manual skills when undertaking routine quality control checks on treatment and simulation equipment (frequently at height), involving manual handling of heavy equipment including x-ray shielding blocks.   5. Frequent requirement for high precision machine control checks, QA measurements and associated safety critical adjustments requiring fractional millimetre accuracy and manual dexterity.   6. Work in close proximity to highly radioactive sources and equipment, where the consequences of an error in judgement or inadvertent loss of a source may be significant to the individual, or other members of staff or the public.   7. Requirement to change tasks, often at short notice that arises in a busy, demand led service in which he/she manages competing priorities, short timescales and significant associated clinical pressures.   8. Frequent exposure to distressing or emotional circumstances in clinical areas where cancer patients are planned and receive radiation treatment.   9. Frequent requirement to respond to the effects of treatment equipment problems on patients treatment plans, make rapid decisions and implement essential actions.   10. Occasional requirement for decisions in emergency situations requiring stressful communications with medical staff, radiographers and patients. |

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| 1. **MOST CHALLENGING/DIFFICULT PARTS OF THE JOB** |
| The challenges are:   * 1. Contributing effectively to the daily activities of the Dosimetrist Team to achieve an effective outcome for individual patients and when clinical pressures are applied by users to prioritise clinical urgencies.   2. Helps to ensure that all radiotherapy treatment plans are prepared accurately according to clinical specification, written protocols and designed to meet the specific individual requirements   3. Helps to maintain an effective service which delivers to specification and on time in a rapidly changing environment characterised by competing, changing priorities and timescales.   4. Maintains specialist knowledge continuously, across a broad range of highly technical areas in line with constantly changing technical developments in treatment planning and dosimetry. |

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| 1. **KNOWLEDGE, TRAINING AND EXPERIENCE REQUIRED TO DO THE JOB** |
| **Qualifications**  ESSENTIAL:  A Degree in Medical Technology, BSc in Therapeutic Radiography or other relevant discipline is essential. An HNC/HND or equivalent qualifications in Applied Physics or Electrical and Electronic Engineering will be accepted provided the knowledge, training and experience profile matches the requirements of the post.  DESIRABLE:  Registration on the Voluntary Register for Clinical Technologists (VRCT) held by the Institute of Physics and Engineering in Medicine (IPEM) or state registered with Health Professions Council is desirable. Membership of IPEM at an appropriate level is desirable. Knowledge and Training ESSENTIAL:  Staff at this level require advanced skills, knowledge and understanding gained by professional qualifications, training and practical experience. This will encompass:   * 1. A specialist knowledge, training and understanding of the operating principles and application of radiotherapy equipment, radiotherapy treatment planning, associated physiology and anatomy, medical imaging (including CT, MRI and PET), quality control and safety testing and a working knowledge of relevant legislation, national standards and quality systems.   2. Knowledge of the operation, function and purpose of medical equipment, including computerised systems, radiotherapy treatment equipment, computerised treatment planning systems, radiation dosimetry equipment and their main principles of operation and use, including quality control and safety testing and knowledge of relevant legislation, national standards and quality systems.   3. An in-depth understanding of the risks arising from errors in the preparation, planning, calculation and checking of radiotherapy treatment plans and of the measures required to manage these risks, and an understanding patient and staff risks arising from equipment failure or QA failures and how these can be minimised.. Knowledge of associated protocols and practices is essential.   DESIRABLE   * 1. Evidence of continuing commitment to Continuing Professional Development (CPD) by the ongoing attendance at relevant study days, short courses and presentations for generic and specific competency on a wide range of highly complex medical equipment and their impact on clinical management, fulfilling the requirements of the Health Professions Council (HPC) as appropriate.  Experience Relevant post-qualification experience is required for Degree and HNC/HND holders, with experience preferably as a Practitioner Dosimetrist (Clinical Technologist). Relevant experience includes:   * 1. Practical technical experience and training in a broad range of radiotherapy treatment plans including those taking advantage of the highly complex technical features available on current treatment equipment. This is evidenced through successful completion of training courses, clinical experience and on-going in-house training.   DESIRABLE   * 1. Experience of participating in teams, contributing to managing resources, effective communication, writing standard operating procedures and knowledge of working policies and procedures.   2. Experience of the application of radiotherapy and medical equipment in healthcare.   3. Training of staff as individuals or in groups.   4. Giving presentations to other staff.   5. Knowledge of relevant legislation, national standards, professional and other guidelines, including workplace practice, quality management, health and safety legislation. This includes the: Health & Safety at Work, etc Act, 1974 [HSAW 1974], International Commission on Radiation Units, (including Standards 50, 62 and 72), British Standards for Radiotherapy Equipment, Ionising Radiations Regulations, 1999 [IRR 1999], Ionising Radiation (Medical Exposure) Regulations, 2017 [IRMER 2017], Medical and Dental Guidance Notes for Use of Ionising Radiation, 2017. |

Director (Diagnostics Directorate)

Senior Practitioner & Practitioner Physicists

(Pool physicists)

Lead/ Senior Dosimetrists

Senior Computer Scientist

Operational Lead (Lanarkshire Beatson)

Scientific Lead (Dosimetry & Equipment)

(Treatment Delivery)

Clinical Scientific Lead (Clinical Planning & Imaging

Clinical Director (Specialist Oncology Services)

General Manager (DCPB)

Scientific Director (DCPB)

Head of Radiotherapy Physics

Deputy Head of Radiotherapy Physics

Department Administrator

Information

Analyst

Radiotherapy Information

Manager

Lead Physicist Dosimetry

Quality/

Project Management

Technical Services Manager

Clinical Radiotherapy Systems

Manager

Senior Radiotherapy Equipment Technologists

Brachytherapy Principal Physicist

Head of Radiotherapy Imaging 

Planning Services Manager

Dosimetry Principal Physicists

Planning & Imaging Principal Physicist

Head of Treatment Planning

Radiotherapy Equipment

Technologists

**Dosimetrists**

**(this post**)