NHS Lothian

JOB DESCRIPTION

1. JOB IDENTIFICATION

Job Title: Senior Clinical Scientist, Dosimetry/Imaging

Responsible To: Head of Dosimetry

Department: Oncology Physics

Directorate: Cancer Services

Site Location: ECC/Western General Hospital

Job Reference: 082600

No. of Job Holders: 1

Last Update: **Feb 2021**

2. JOB PURPOSE

This post is for an experienced, registered Clinical Scientist based in the Dosimetry section who undertakes advanced dosimetry tasks, is involved in the development and introduction of new developmental work in both dosimetry and imaging and takes responsibility for leading specific development and implementation projects at Edinburgh Cancer Centre (ECC).

The postholder fulfils the role of Medical Physics Operator as required by the Ionising Radiations (Medical Exposures) Regulations (IRMER) and will have the opportunity and support to work towards their Certificate of Competence as a Medical Physics Expert from RPA2000.

3. DIMENSIONS

The Oncology Physics Department currently has 44 staff consisting of 18 Clinical Scientists, 26 Clinical Technologists, all accountable to the Head of Department. The Department is responsible for all the highly complex treatment and diagnostic equipment used in radiotherapy, as well as all clinical computer equipment, with an overall capital value of approximately £20M. The current annual revenue budget for the Department is £2.6M. ECC is going through a cycle of modernisation has an anticipated workload increase of around 20% in the next few years.

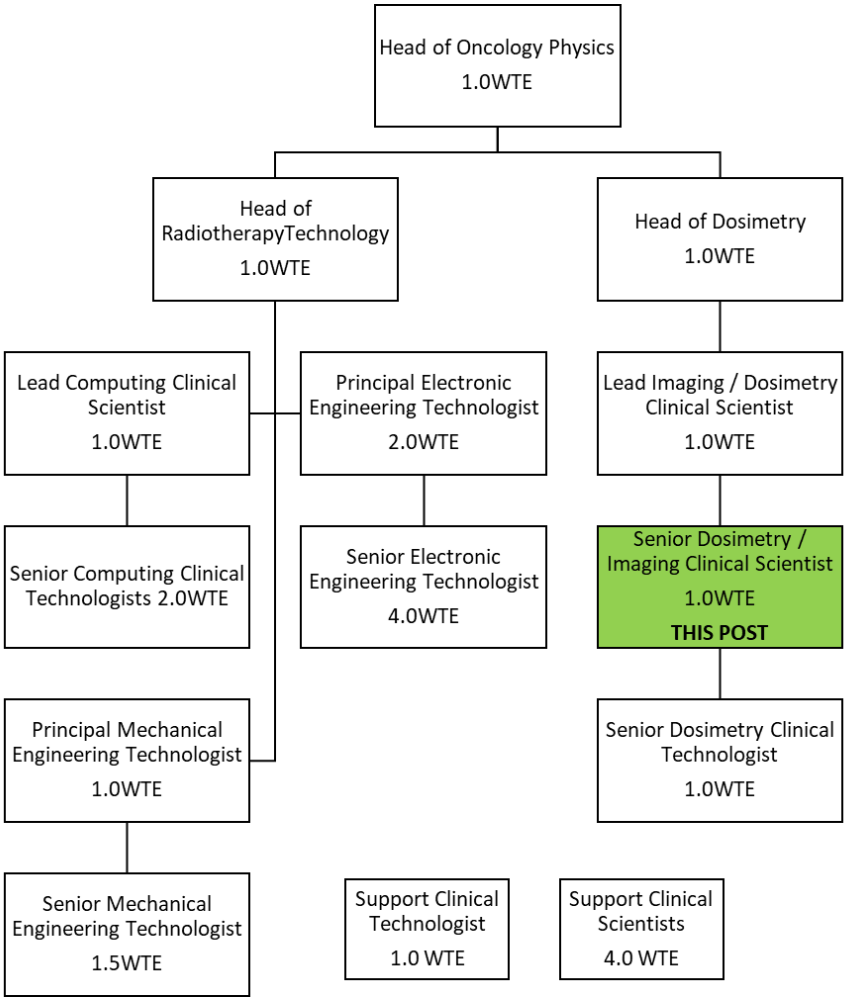
The post holder is accountable to the Head of Oncology Physics through the appropriate Head of Section.

The dosimetry section exists to ensure the accurate delivery of radiation dose to all patients undergoing radiotherapy ECC. This is achieved through extensive photon and electron beam measurements and quality control (QC) checks, all traceable to National Standards, and patient specific verifications using various methods appropriate to the treatment technique. Measurements are carried out primarily on six megavoltage linear accelerators used to treat approx 4500 patients per year.

The Dosimetry section supports the Stereotactic Radiosurgery (SRS) service at the ECC which is well established and treats patients from all over Scotland. It exists to provide a highly specialised treatment service for approx. 100 patients/year who have small (<4cm diameter) malignant and non-malignant brain tumours. ECC also provides the NHS Scotland National Specialist Service for SRS for Benign conditions, treats approx. 100 patients per year with Stereotactic Ablatative Body Radiotherapy (SABR) for lung and is expanding SABR to other treatment sites.

The dosimetry section currently consists of 2.5WTE Clinical Scientists and 1.0WTE Clinical Technologists. There are 3 WTE Support Clinical Scientists and 4 WTE Clinical Technologists who contribute to all sections in the department, who are professionally accountable to the Head of Dosimetry for dosimetric tasks. This post is a new post to provide additional scientific support and project leadership to the section.

4. ORGANISATIONAL POSITION



5. ROLE OF DEPARTMENT

The Department is part of Cancer Services at the Edinburgh Cancer Centre (ECC), which is one of the leading cancer treatment centres in the United Kingdom. It receives referrals for the full range of malignant disease from Edinburgh and the Lothians, Fife, the Borders, Dumfries and Galloway and for non-routine specialised treatments from all Health Boards in Scotland.

The Oncology Physics Department provides a fully comprehensive clinical/technical and scientific service for all their patients, working as part of a fully integrated team.

The Oncology Physics Service is an essential part of the radiotherapy process working closely with both Medical and Radiography staff and its main purpose is to ensure that all patents receive the optimum radiation treatment for their disease, delivered with the highest possible accuracy. It is also responsible for developing highly complex state of the art technology into routine clinical use.

As well as specific physics activities, Department staff have particular responsibility for quality assurance and safety of patients and staff throughout the Directorate including legislation compliance, for example in radiation protection and health and safety. The Department is highly committed to implementing research and development in all aspects of its work.

The Department operates as five sections:

1) Brachytherapy/Quality
2) **Dosimetry**
3) Radiotherapy Technology
4) Treatment Planning/Mould Room
5) Radiotherapy Development

6. KEY RESULT AREAS

General & Professional Responsibilities

1. To support NHS Lothian's values of quality, teamwork, care and compassion, dignity and respect, and openness, honesty and responsibility through the application of appropriate behaviours and attitudes.
2. Comply with legislation, including the Ionising Radiation Medical Exposure Regulations [IRMER] (2017), Ionising Radiation Regulations [IRR] (2017) and Environmental Authorisations (Scotland) Regulations [EA(S)R (2018)].
3. Monitor the latest technical and scientific developments, regularly read scientific journals and attend suitable seminars/courses and conferences as part of a personal development plan, within a quality framework. Act in a professional manner in accordance with recommendations of the directorate, NHS and appropriate regulatory bodies.

Dosimetry (50%)

4. Involved, as an Operator under IRMER 2017, in all aspects of dosimetry, including, but not limited to contribution to routine and regular quality control and assurance measurements on all linear accelerators, superficial x-ray machine and dosimetry equipment, upkeep of documentation and recalibration of equipment. This includes recommending changes in practice to the Head of Dosimetry and assisting in implementing these changes.
5. Assists in writing protocols and develop plans based either on departmental policies or National and International guidelines and help to prepare business cases and grant applications for new equipment or treatment techniques.
6. Provides advice, instruction and supervision of work carried out by dosimetry staff. Advising on appropriate use of the Oncology Management and Treatment Planning Systems and their links with Dosimetry specific systems to ensure correct transfer and recording of electronic data.
7. Able to operate all appropriate clinical equipment safely and undertake acceptance testing and commissioning measurements for new equipment and treatment techniques as appropriate to ensure patient safety and treatment in support of the Head of Dosimetry.
8. Troubleshoot, investigate and give advice to other staff for in-vivo dosimetry measurements including transit dosimetry and diodes as appropriate. Participates in the patient specific verification programme, including dose verification measurement and calculations on plans prepared for patients undergoing complex treatment techniques.

Clinical Scientific Modernisation, Research & Development (40%)

9. Interpret national and international guidelines, scientific papers etc in order to undertake the physics research and development work needed to implement new techniques or the expansion of existing programmes in the department e.g. 4D techniques & adaptive RT, Imaging, Transit dosimetry and Clinical Trials. The department is involved in several radiotherapy clinical trials at any one time, most of which require specific start up QA, patient QA and some trial specific dosimetry QA.
10. Develop Oncology Physics protocols, procedures & quality assurance programmes to facilitate the clinical implementation of these techniques. Collaborating with therapy radiographers & clinical oncologists in developing ECC strategies, policies & clinical protocols to assist the clinical implementation of these techniques. Overseeing the clinical implementation of the new technique & support that implementation by providing training of clinical staff, oncology physics staff in particular.
11. Write up developmental work for submission to peer-reviewed journals & present own or team work at National & International conferences

Modernisation Development Project Management (5%)

12. While ensuring all projects comply with legislation requirements and in support of the Head of Section, collaborate with colleagues in other sections but take a lead role in developing & introducing new advanced radiotherapy techniques in line with clinical demand & with national & international progress including (but not limited to) use of dosimetry and imaging in the radiotherapy process.

Teaching & Training (5%)

13. Participate in the training postgraduate Medical Physicists and Clinical Technologists in training as part of a national training programme. Lecture/ train/ demonstrate to other staff groups and new staff, as required, on an informal basis. Participate in the supervision of postgraduate students, as appropriate. Train dosimetry staff in existing and new tasks.

7a. EQUIPMENT AND MACHINERY

Many items of equipment have value >>£40,000

Standard: PC, calculator,

Complex: Monitor unit verification programs medical device, Treatment Planning Systems, Oncology Management System medical devices, immobilisation equipment.

Numerous photon and electron beam measurement systems from simple (e.g., diodes) to highly complex (electronic portal imaging systems).

Highly complex: Treatment verification system (patient image and radiotherapy treatment parameters) medical device. Multiple specialised hardware & software for dosimetry measurement acquisition and analysis. Treatment & imaging machines (linacs, kV, brachytherapy, CT scanners) and similar.

Commercial packages such as Word and Excel are used for report writing, minute taking and statistics.

7b. SYSTEMS

Able to input and extract patient and treatment information from the ARIA oncology management system. Assist Lead Clinical Scientist / Head of Section with preparation of and input of data into planning systems. Update patient treatment records with measured doses/changes in treatment set-up.

Ensure that written records are kept of all dose measurements and QC carried out and information is stored on computer as appropriate. Ensure that all records can be audited.

Create graphs and beam data tables as appropriate, for beam data analysis.

Write and adapt computer programmes to record and display the QC work of the section and to provide independent dose checks where appropriate.

8. ASSIGNMENT AND REVIEW OF WORK

Own daily work is prioritised and self-managed according to the needs of the immediate clinical service, or long-term service development. Section objectives are set by the Heads of Sections.

Personal objectives are set by the postholder and the Heads of Sections and are reviewed annually, through both a personal development plan and the Department's ISO9001 Quality System.

QC checks and are scheduled according to weekly/monthly/yearly plans, developed as part of the overall QA programme and also on a demand basis.

Judgement on quality of individual clinical plans to determine if it is sufficiently acceptable for treatment or requires to be referred back to the planner or clinician.

Developmental work is assigned by the appropriate Lead Clinical Scientist/Head of Section, but execution of appropriate tasks is self-lead.

9. DECISIONS AND JUDGEMENTS

Make quick decisions, often under clinical pressure, on additional equipment checks for safety or accuracy reasons, in the absence of the Lead Clinical Scientist/Head of Section.

Check machine data which impacts all patient treatments and assess issues with data from CT and treatment planning system from any software problem or software update.

Make quick decisions on issues with patients on treatment, often requiring a highly individualised approach to ensure safe and accurate treatment.

Identify ways to improve treatments and processes through the investigation of new technology and methods, discuss with the Lead Clinical Scientist/Head of Section/ Clinical Oncologists/ radiographers, as appropriate and implement changes.

To propose and participate in appraisals of new clinical services.

Assess the training and educational needs of self.

10. MOST CHALLENGING/DIFFICULT PARTS OF THE JOB

Writing procedures for complex tasks in a simple and unambiguous manner, for use by other staff within physics and for other clinical groups (such as radiographers) whilst appreciating the different perspectives, priorities and levels of technical expertise of the different staff groups. Training other staff and delegating new work as appropriate.

Understanding complex National and International Standards and protocols for the safe delivery of radiation dose and incorporating this information to optimising the QC programmes according to changes in technology and clinical demands.

Managing an intense workload and be able to prioritise activities when competing demands are made on time, balancing the out of hours working required with flexible working to maintain a good work-life balance. Motivated to deliver on a range of modernising development projects within the limited timescale of the contract which will be a major challenge.

Maintaining accurate, consistent work on highly complex dosimetry data acquisition & analysis despite being interrupted to attend to problem solving for other patient treatment related issues.

11. COMMUNICATIONS AND RELATIONSHIPS

Internal
Liaison with other Clinical Scientists, Clinical Technologists, Radiographers and Clinical Oncologists on a daily basis, in terms of dosimetry and imaging, and their impact on the design and safe delivery of radiotherapy.
Monthly physics departmental to discuss administrative information.
Monthly section meetings to discuss the allocation of work and the progress within overall section aims.
Quarterly Development Meetings to monitor progress of R&D projects within Dosimetry and Imaging.

External
Liaison with a variety of companies regarding pricing and specifications for new equipment, training for new equipment or software and providing feedback on the use of their products and any problems which have arisen.
Presenting scientific papers at National and International meetings (20-200 people) approximately annually, depending on suitability of work to be presented and meeting topics.
Presenting lectures for radiographers, medics, physics staff (5-25) approximately twice a year.
Liaising with external clinical trial coordinator regarding QA requirements and results.

12. PHYSICAL, MENTAL, EMOTIONAL AND ENVIRONMENTAL DEMANDS OF THE JOB

PHYSICAL SKILLS AND EFFORT

Using VDU equipment for long periods for most work, sitting in restricted position.
Understanding of hazards posed by, and precautions needed with: Ionising radiation, Lasers and Electrical hazards
When undertaking repetitive measurements e.g. routine quality assurance (4-6 times per month) or when commissioning a linac (daily for 3-6 months every 1-2 years), able to stand and/or walk for an entire shift, or sit for the whole shift when analysing data.
Able to position heavy equipment, such as water tank (40kg), stereotactic collimators (2kg) or phantoms (5kg) to within 1mm and small detectors (4-7mm) to sub-millimetre accuracy for experimental work.
Able to push trolleys of heavy equipment (20kg) along a corridor with an incline approx 2x week
Attend at treatment simulation or treatment units as required (potentially long periods of standing).

MENTAL DEMANDS

Frequent concentration required for prolonged periods in all aspects of work which may be subject to interruption to undertake urgent clinical tasks or solve a problem.
As a bleep carrier, to respond to urgent treatment problems (several daily), make rapid decisions and implement essential action.
Concentration required when working to clinically defined deadlines (which may change at short notice) with respect to dose verification measurements.
Production of documents and reports for specialists, non-specialists and patients.

EMOTIONAL DEMANDS

Occasional (2/yr) exposure to patients with distressing visible disease through dose verification measurements.

ENVIRONMENTAL CONDITIONS

Often working with dirty/dusty equipment in a lab or linac bunker with minimal natural light.
Working with ionising radiation.

13. KNOWLEDGE, TRAINING AND EXPERIENCE REQUIRED TO DO THE JOB

1st or 2nd class honours degree in physics or a relevant subject
Educated to SCQF level 11 e.g. MSc in medical physics
IPEM certificate of completion of post qualification higher training or equivalent
Registration as a Clinical Scientist with Health Care Professions Council (HCPC). Registration is usually obtained following completion of 4 years of post-graduate training under a national scheme organised by the IPEM that includes a postgraduate degree (MSc).
Proven additional specialist knowledge and application of that knowledge evidenced by appointment in a radiotherapy department as an entry level registered Clinical Scientist post.
Evidence of advanced training: e.g. Dublin planning course, ESTRO training courses e.g. IMRT, IGRT, 4D RT etc, National Physical Laboratory Dosimetry course
Evidence of working with advanced treatment planning techniques for specialized radiotherapy treatments.
Understand the complexity and potential problems associated with imaging systems such as CT and MR and their use in planning and dosimetry
Understand National and International Standards in dosimetry to ensure the continued safe running of the department and to provide advice in the absence of the Head of Section
Experience of delivering projects
Knowledge and experience at the level required to act as a Medical Physics Operator under IRMER within the field of radiotherapy
Good understanding of patient and staff risks arising from the use of radiotherapy.
Good understanding of relevant legislation, national standards, professional and other guidelines

Working Knowledge of:

Health & Safety at Work, etc Act, 1974 [HSAW 1974]
Ionising Radiations Regulations, 2017 [IRR 17]
Ionising Radiation (Medical Exposure) Regulations, 2017 [IRMER 2017]
Environmental Authorisations (Scotland) Regulations [EA(S)R] (2018)

Medical Device Regulations:
The EU Regulation on Medical Devices 2017/745
The EU Regulation on In Vitro Diagnostic Medical Devices 2017/746

Approved Code of Practice and practical guidance on the on the Ionising Radiations Regulations, 2017
Medical & Dental Guidance Notes for Use of Ionising Radiation (under review)
IPEM Codes of Practice for Radiotherapy Dosimetry,
British Standards for Radiotherapy Equipment, 2020

14. JOB DESCRIPTION AGREEMENT	
Job Holder's Signature: Head of Department's Signature:	Date: Date: