

SAFE EUROPE PROJECT

Results WP3



LIST OF COMPETENCIES OF THE THERAPEUTIC RADIOGRAPHER WORKING ON THE LINEAR ACCELERATOR: THEMATIC ANALYSIS OF THE LITERATURE.

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Introduction

This list of competencies of the therapeutic radiographer working on the linear accelerator was created by collating the competencies of these professionals identified within existing literature. In addition to scientific publications, international guidelines and recommendations were evaluated. This list was created using a rigorous research methodology. Details on the methodology can be found in the following research publication:

Couto, J. G., McFadden, S., McClure, P., Bezzina, P., & Hughes, C. (2019). Competencies of therapeutic radiographers working in the linear accelerator across Europe: A systematic search of the literature and thematic analysis. *Radiography*. <https://doi.org/10.1016/j.radi.2019.06.004>

SAFE EUROPE project

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The consortium includes 7 organisations (universities, an oncology hospital, professional associations and a federation of associations) with the aim of improving education and training of therapeutic radiographers across Europe.

More information and results from other work-packages can be found on the SAFE EUROPE website: <https://www.ulster.ac.uk/research/topic/nursing-and-health/centres/health-and-rehabilitation-technologies/safe-europe/about>

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List of competencies of the Therapeutic Radiographer working on the linear accelerator

During the assessment of the literature, the competencies were identified, and a thematic analysis was performed. The competencies identified in the literature were listed and the duplicates were removed, resulting in a total of 170 competencies as shown on the table below.

According to the literature, it is recommended that these competencies should be developed by TRs practising in the linear accelerator, across Europe. Differences in regulation of the profession leads to variation in the competencies developed and practised by TRs in each country, therefore, the competencies identified in this list are not country-specific but may be used to develop education in the pan-European setting. A recommendation is that the competencies on the list should be endorsed by education institutions across Europe.

More details on the results and conclusions of the study can be found in the following research publication:

Couto, J. G., McFadden, S., McClure, P., Bezzina, P., & Hughes, C. (2019). Competencies of therapeutic radiographers working in the linear accelerator across Europe: A systematic search of the literature and thematic analysis. *Radiography*. <https://doi.org/10.1016/j.radi.2019.06.004>

Dimensions (themes)	Competency
QUALITY AND RISK MANAGEMENT	
Risk Management	– Perform risk and hazard analysis in the workplace
	– Reduce risks and hazards for patients and staff
	– Ensure appropriate workload for safe practice
	– Report incidents and near-misses
Quality Improvement	– Contribute to the continuous improvement of practice
	– Analyse errors and near-misses and ensure prevention of future events
	– Develop technology and its application into practice
Radiation Protection	– Recognise the radiation hazards in the workplace
	– Ensure protection of staff and public against radiation
	– Ensure protection of patients against radiation
	– Adhere to the use of personal dosimeters
	– Know and adhere to legislation regarding radiation protection

Justification	<ul style="list-style-type: none"> – Be able to select a suitable treatment, based on own analysis – Critically question radiological referrals – Refuse to carry out an exposure which, in one’s professional opinion, is inadvisable
Optimisation	<ul style="list-style-type: none"> – Maintain ALARA principle – Minimise dose to normal tissues
Carry out audits	<ul style="list-style-type: none"> – Develop and implement audit programmes
Evidence-Based Practice	<ul style="list-style-type: none"> – Apply relevant scientific evidence into practice – Take decisions based on scientific evidence – Apply results of research into practice
Individual Professional Development	<ul style="list-style-type: none"> – Continuously assess their own competencies, knowledge and skills – Ensure their own professional development
Development of the profession	<ul style="list-style-type: none"> – Contribute to the profiling of the profession – Contribute to the content-related development of the profession
Protocols, Standards, Guidelines and Regulations	<ul style="list-style-type: none"> – Implement professional standards into professional practice – Adhere to legal regulations – Follow national and international guidelines – Implement institutional protocols into practice
Application of Knowledge	<ul style="list-style-type: none"> – Be able to apply necessary knowledge into critical analysis and decision making
DECISION MAKING AND CRITICAL ANALYSIS	
Critical Analysis	<ul style="list-style-type: none"> – Critically analyse results from any procedure – Critically analyse results from research and literature – Continuously question practice
Decision Making	<ul style="list-style-type: none"> – Make decisions within the remits of own competencies – Be aware of the process of decision making – Take decisions to improve patient outcome – Be able to apply corrective actions
MANAGEMENT AND LEADERSHIP	
Management	<ul style="list-style-type: none"> – Plan the workload of the treatment unit for safe practice – Set priorities – Manage the use of resources – Assess educational needs – Identify factors of burnout – Promote transparency – Participate in project management
Leadership	<ul style="list-style-type: none"> – Contribute to team development – Contribute to conflict resolution – Promote expertise of colleagues

	<ul style="list-style-type: none"> – Promote openness to discussion – Give feedback to colleagues – Lead new initiatives and projects
Efficiency	<ul style="list-style-type: none"> – Practise efficiently – Ensure organisation of the treatment unit is optimum – Ensure an interruption-free environment
PATIENT CARE	
Patient Dignity	<ul style="list-style-type: none"> – Adopt a holistic approach to the patient – Maintain a respectful approach – Take patient’s perspective into account during practice and decision making – Show intercultural awareness – Respect patient’s privacy – Demonstrate care towards the patient – Act as an advocate for the patient – Empower the patient to be involved in their treatment
Patient Identification	<ul style="list-style-type: none"> – Perform appropriate patient identification
Patient assessment	<ul style="list-style-type: none"> – Identify patient requirements and concerns – Assess patient physically – Assess patient psychologically – Assess treatment side effects – Assess social aspects of patient interaction – Develop patient assessment protocols
Management of Side-Effects	<ul style="list-style-type: none"> – Give advice with regard to management of side effects – Refer to other professionals when advisable
Patient Information	<ul style="list-style-type: none"> – Give information prior to treatment – Give information during treatment – Adapt the information for individual patient needs – Explain the radiotherapy process to the patient – Develop patient information material
Consent	<ul style="list-style-type: none"> – Seek consent prior to any procedure
Follow up	<ul style="list-style-type: none"> – Give information after the last treatment – Perform patient review after the last treatment
First Aid	<ul style="list-style-type: none"> – Provide first aid to patients, if necessary
Infection Control	<ul style="list-style-type: none"> – Perform appropriate infection control prior, during and after each procedure
TEAM WORK AND MULTI-DISCIPLINARITY	
Team Work	<ul style="list-style-type: none"> – Promote collaboration – Promote expertise of other colleagues
Multi-disciplinarity	<ul style="list-style-type: none"> – Be involved in a multi-disciplinary approach to the patient – Work with other professionals to improve practice

	<ul style="list-style-type: none"> – Recognise limits of the therapeutic radiographers' roles – Seek other professionals' expertise when required
Peer review	<ul style="list-style-type: none"> – Implement and participate in the peer-review processes – Analyse the results of peer-reviewing
COMMUNICATION	
Communication with other TRs	<ul style="list-style-type: none"> – Provide the necessary information to colleagues – Establish appropriate verbal and non-verbal communication with other TRs – Advise other members of the team
Communication with multi-disciplinary team	<ul style="list-style-type: none"> – Provide other professionals with necessary information – Establish appropriate verbal and non-verbal communication with other professionals – Advise other professionals
EDUCATION	
Education of other members of staff	<ul style="list-style-type: none"> – Teach and supervise staff to develop their expertise – Transmit new knowledge to other staff members – Participate in the education of other professionals
Education of students	<ul style="list-style-type: none"> – Teach and supervise students – Transmit knowledge to students – Be responsible for the student's acquisition of clinical skills
PHARMACOLOGY	
Administration of pharmaceuticals	<ul style="list-style-type: none"> – Administer pharmaceuticals to patient – Critically assess the pharmaceuticals prescribed – Take responsibility for pharmaceuticals-related tasks
Response to complications	<ul style="list-style-type: none"> – Respond to complications of the administration of pharmaceuticals – Seek advice from other professionals when necessary
PROFESSIONAL AND ETHICAL PRACTICE	
Autonomy	<ul style="list-style-type: none"> – Practise autonomously – Perform decision making autonomously
Responsibility	<ul style="list-style-type: none"> – Take responsibility for the tasks performed
Limitations	<ul style="list-style-type: none"> – Develop self-awareness – Recognise limitations of their scope of practice – Seek advice when necessary
Accuracy	<ul style="list-style-type: none"> – Practise with high levels of accuracy – Accurately prepare and administer radiotherapy treatments – Accurately complete documentation and reports
Best Practice	<ul style="list-style-type: none"> – Practise following the highest scientific, ethical and moral standards – Ensure all aspects of their practice are optimum
Confidentiality	<ul style="list-style-type: none"> – Maintain confidentiality at all times

Ethics	<ul style="list-style-type: none"> – Demonstrate ethical approach to the patient – Take decisions ethically – Deal with ethical issues in the workplace
Good Character	<ul style="list-style-type: none"> – Exemplify good character within a professional context – Internalise professional standards in private life
Professional appearance and manner	<ul style="list-style-type: none"> – Project a professional image at all times – Ensure a professional manner and appearance
Self-reflection	<ul style="list-style-type: none"> – Practise self-reflection on a regular basis
RESEARCH	
Carry out research	<ul style="list-style-type: none"> – Initiate and develop research ideas – Carry out research independently and as part of a multi-disciplinary team
Clinical Trials	<ul style="list-style-type: none"> – Participate in national and international clinical trials
Dissemination of research results	<ul style="list-style-type: none"> – Present and publish results of research
Implement results of research	<ul style="list-style-type: none"> – Implement the results of research into practice
RECORDING AND HANDLING OF DATA	
Record data	<ul style="list-style-type: none"> – Maintain and update records of any relevant information – Record patient's side effects – Document any information in a coherent way
Handle and archive data	<ul style="list-style-type: none"> – Administer and archive data
FILE VERIFICATION	
Assess patient's file	<ul style="list-style-type: none"> – Revise the file prior to irradiation – Report errors
Plan analysis	<ul style="list-style-type: none"> – Assess dose distribution in the radiotherapy plan – Evaluate the dose volume histogram – Evaluate other plan options – Assess plans for clinical acceptability
Verify prescription	<ul style="list-style-type: none"> – Interpret treatment prescriptions – Verify treatment prescription and report discrepancies – Compare the plan with the prescription
Data transfer	<ul style="list-style-type: none"> – Carry out necessary data transfer checks
POSITIONING AND IMMOBILISATION	
Critically assess immobilisation	<ul style="list-style-type: none"> – Confirm appropriate immobilisation considering aim of treatment and patient condition
Reproduce immobilisation	<ul style="list-style-type: none"> – Position the patient according to planning and simulation

Accuracy	–	Ensure accuracy in positioning
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Patient comfort	–	Promote patient comfort, as much as possible
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DELIVERY OF TREATMENT

Choice of devices	–	Choose the appropriate therapeutic, imaging and ancillary devices
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Parameters check	–	Check if appropriate treatment parameters were selected
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Treatment administration	–	Administer treatment accurately and safely
	–	Apply best practice at all times
	–	Interrupt treatment, if required, in an emergency

Patient observation	–	Constantly observe the patient during treatment
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Avoid treatment gaps	–	Avoid radiotherapy treatment gaps
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VERIFICATION OF PATIENT SETUP

Image acquisition	–	Select the appropriate image modality
	–	Acquire planar (2D) images
	–	Acquire volumetric (3D) images

Image interpretation	–	Analyse verification images: <ul style="list-style-type: none">○ Analyse planar (2D) verification images*○ Analyse volumetric (3D) verification images*
	–	Make decisions regarding the action to take following image analysis, within the protocols
	–	Follow patient setup verification protocols
	–	Develop patient setup verification protocols
	–	Analyse images to evaluate the result of radiotherapy treatments

* The sub-theme “Image interpretation” was further divided to include two sub-themes: Analysis of 2D and 3D images.

EQUIPMENT QUALITY ASSURANCE

Perform QA	–	Perform daily QA of the linear accelerator
	–	Perform QA of imaging systems
	–	Carry out <i>in vivo</i> dosimetry

Evaluate and report results of QA	–	Evaluate results of QA procedures
	–	Take corrective actions in view of QA results
	–	Report inconsistencies in QA procedures
