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Grant ID: **119**

College of Radiographers Industrial Partnership Research Grants

Final Report

1. Principal Investigator	Mark Collins
2. Project Title	Clinical reasoning in Image Guided Radiotherapy: A multi-method investigation of Therapeutic Radiographers
3. Amount of Grant	£4723.90
4. Did you spend the money as indicated in your proposal (if not why)?	
Yes	
5. Did you reach your intended project outcomes (if not why)?	
Yes	
6. What are your significant findings?	

Therapeutic Radiographers were observed using one of three decision-making processes. These assume the titles simple linear process, linear repeating process and intuitive process. Participants were found to prioritise the target volume to be treated over the organs at risk. There were notably mixed opinions on the impact of general Therapeutic Radiographer, but the findings of the study align with general principles of expert performance, which claims that expertise is only improved by seeking out particular kinds of experience.

A descriptive module was developed to demonstrate the factors that impact on decision-making. The centre structure, training and the wider involvement of the multidisciplinary team were all found to be key factors that impacted on the decision-making process during Image Guided Radiotherapy. Staffing levels and communication patterns between the multidisciplinary team were found to be highly variable across the three centres. Greater communication and involvement of the multidisciplinary team was found to improve Therapeutic Radiographers' confidence in making clinical decisions.

Issues in relation to pre-registration training were highlighted, with a consensus that recent graduates do not always demonstrate the skills and experience required to make clinical decisions. A lack of education in relation to clinical decision-making was highlighted at both pre-registration and post-qualification levels.

A conceptual model to improve clinical decision-making in image interpretation during IGRT was developed.

7. Have you submitted the work for publication (if so where)?
Written up as Doctoral Thesis. Currently writing up for publication. Likely to be 2 or 3 articles.
8. Have you presented the work at a national/international event (if so where)?
Presented early findings at SoR conference in 2016. Will be submitting for presentation at ESTRO next year.
9. Please provide an executive summary of your work (two sides of A4 maximum) **N.B. If you already have a draft or final version of the proposed publication can you please attach.**

Clinical reasoning in Image Guided Radiotherapy: A multi-method investigation of Therapeutic Radiographers

Introduction

3D Image Guided Radiotherapy using cone beam computer tomography has been implemented into UK over the last decade. There is evidence to suggest that the training of Therapeutic Radiographers and the development of departmental processes may not have kept pace with the implementation.

A literature review highlighted a large range of evidence relating to ow humans make decisions in many clinical settings. The review highlighted a range of models to describe these processes, but there was a paucity of evidence relating to how Therapeutic Radiographers make clinical decisions during image interpretation in the Image Guided Radiotherapy processes.

Purpose

The study aimed to investigate the types of decision-making processes used by Therapeutic Radiographers during image interpretation in Image Guided Radiotherapy. In addition, the study aimed to investigate the factors that impact on the decision-making processes of Therapeutic Radiographers during Image Guided Radiotherapy.

Method

A multi-method approach was adopted that utilised a think aloud observational method with follow-up interviews. 13 participants were observed and interviewed across three UK radiotherapy centres. Participants were observed reviewing and making clinical decisions in a simulated environment using clinical scenarios developed in partnership with each centres' Clinical Imaging Lead. Protocol analysis was used to analyse the observational data. Thematic analysis was used to analyse the interview data. Member checking was carried out using an online presentation and questionnaire along with periodic peer debriefing by the supervisory team. Findings from the observations and semi structured interviews were then combined using a triangulation protocol.

Results

Therapeutic Radiographers were observed using a range of processes during the decision-making process. These were developed into three models and assumed the titles *simple linear process, linear repeating process* and *intuitive process.* Participants were found to prioritise the target volume to be treated over the organs at risk. There were notably mixed opinions on the impact of general Therapeutic Radiographer, but the findings of the study align with general principles of expert performance, which claims that expertise is only improved by seeking out particular kinds of experience.

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centre structure, training and the wider involvement of the multidisciplinary team were all found to be key factors that impacted on the decision-making process during Image Guided Radiotherapy. Staffing levels and communication patterns between the multidisciplinary team were found to be highly variable across the three centres. Greater communication and involvement of the multidisciplinary team was found to improve Therapeutic Radiographers' confidence in making clinical decisions. Issues in relation to pre-registration training were highlighted, with a consensus that recent graduates do not always demonstrate the skills and experience required to make clinical decisions. A lack of education in relation to clinical decision-making was highlighted at both pre-registration and post-qualification levels. A conceptual model to improve clinical decision-making in image interpretation during IGRT was developed and is presented in the thesis.

Conclusions

This research has provided new and original insight in to the decision-making processes of Therapeutic Radiographers. It has demonstrated that Therapeutic Radiographers utilise a complex processes during image interpretation in Image Guided Radiotherapy. It has shown that numerous factors affect the decisions that Therapeutic Radiographers routinely make, and that with improvements in education and radiotherapy centre infrastructure, Therapeutic Radiographers can be better placed to make safer, more effective decisions during the Image Guided Radiotherapy process.