



The ROYAL MARSDEN
NHS Foundation Trust

Overview of radiography research

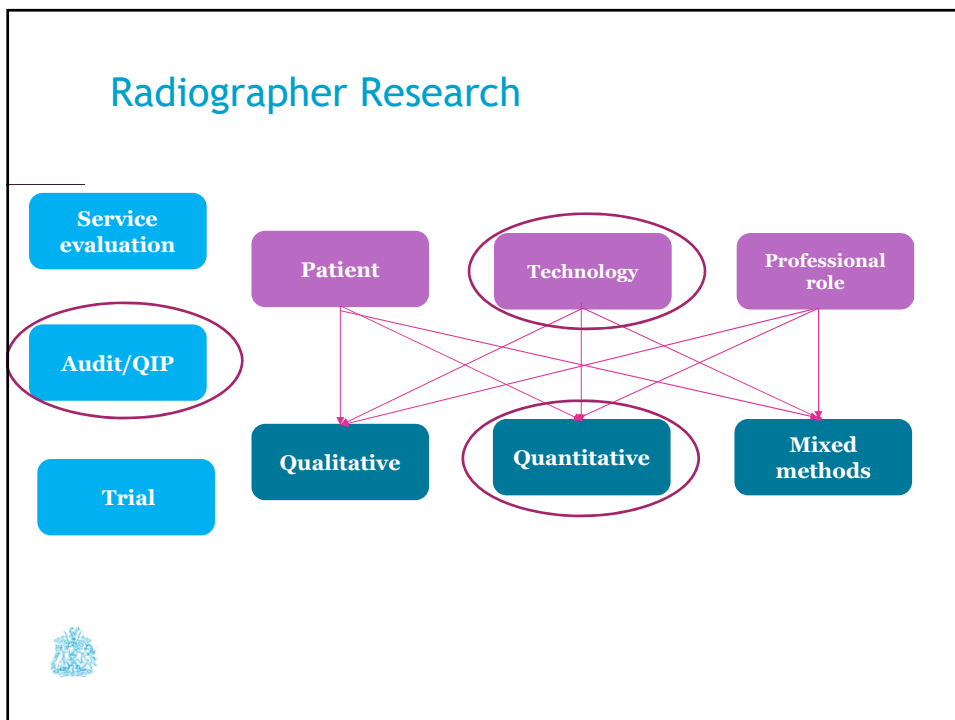
Helen McNair DCR(T), PhD
Lead research radiographer
NIHR/HEE Senior Clinical Lecturer

 In partnership with  The Institute of Cancer Research

FUNDED BY  National Institute for Health Research

 Biomedical Research Centre at The Royal Marsden and the ICR

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Changing primary care requesting practices for MRI knee: A quality improvement project

Aim: to develop new referral pathway to reduce the number of inappropriate knee referrals.

Methods: retrospective analysis of referrals over 2 month
 New referral pathway implemented (worked with clinical commissioning group)
 Repeat data analysis

Results: The number of patients having an MRI knee without a prior plain radiograph reduced from 55/118 (47%) to 14/69 (20%)



Robinson, E et al , 2023. *Radiography*

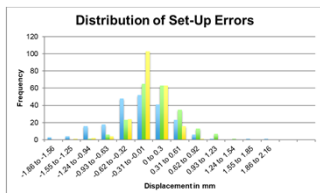
3

Retrospective audits for radiotherapy in cervical cancer

Set up Accuracy
 Patients Pelvic Radiotherapy
 for Gynaecological
 Malignancies

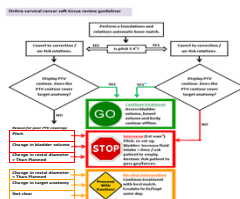
Radiographer decision on CTV
 coverage and action

Radiographer decision on plan
 of the day



Standard
 National guidance document

2012



Standard
 Doctors decision off line

2015



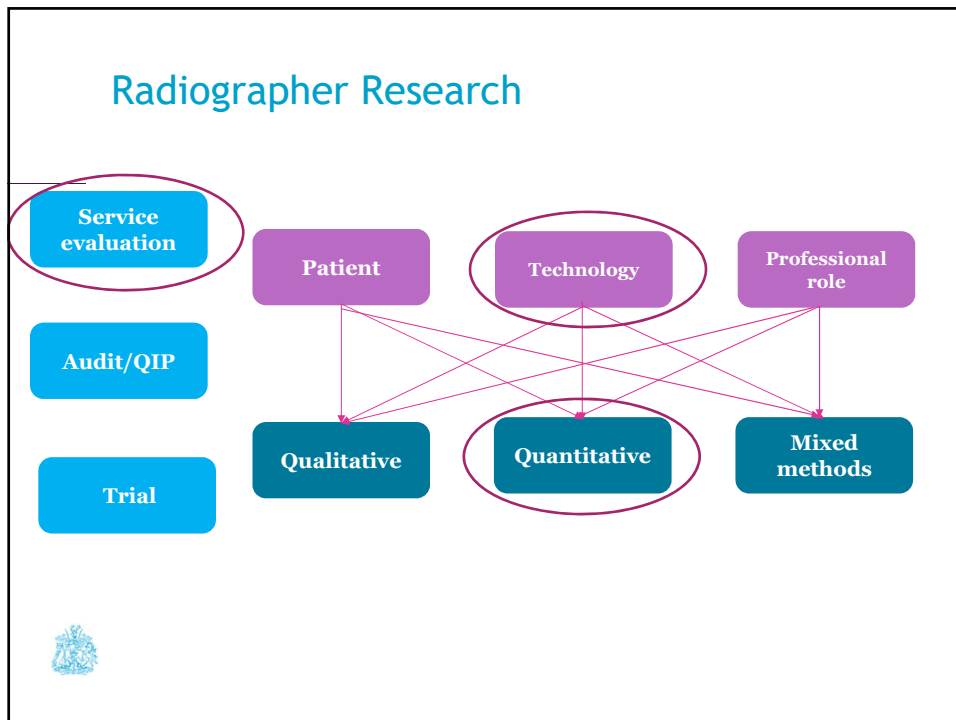
Standard
 Doctors decision off line

2022

Courtesy of Naomi Hopkins, Sophie Alexander

Alexander, S.E et al, 2019. *TIPSRO*

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5

The radiation dose, clinical and anatomical implications of erect lumbar spine radiography: A single centre pre-post implementation evaluation

Aim: Describes the single-centre implementation and evaluation of erect PA and lateral projections

Method: observational study pre- and post-implementation of an erect imaging protocol. Patient BMI, image field size, source image and source object distances & dose area product assessment of radiographic spinal alignment and disc space demonstration. Effective dose

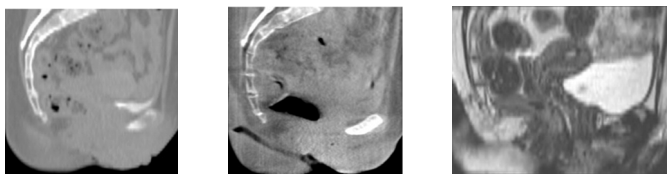
Result: Confirmed clinical and radiation dose benefits from imaging the lumbar spine in an erect position

Bradley, C. & Snaith, B, 2023. Radiography

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Comparison of radiographer interobserver image registration variability using cone beam CT and MR for cervix radiotherapy

Aim- Assess registration using CT and CBCT to MRI and MRI



CT

CBCT

MRI

Methods- 30 registrations by 5 radiographers
Bland Altman analysis

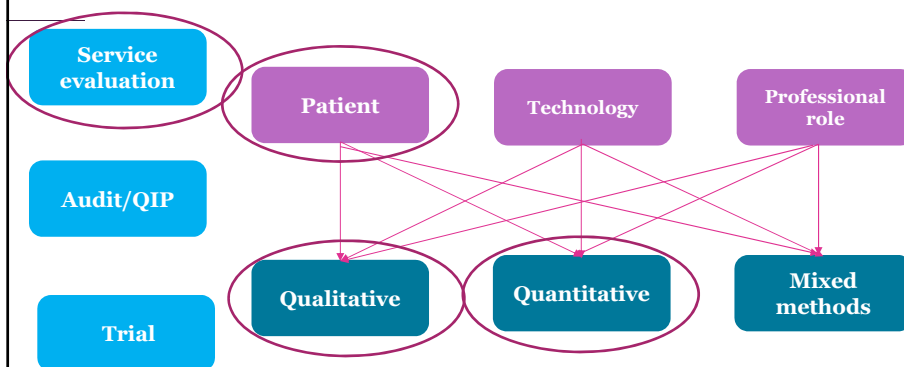
Results- quantified interobserver variation
Similar



Rodgers, J et al, 2020. BJR

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Radiographer Research



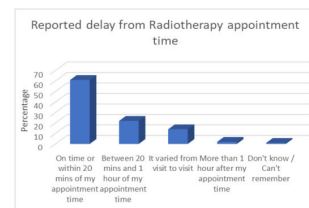
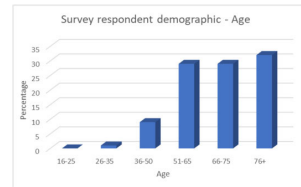
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The Patient's perspective: A review of the results from a radiotherapy patient experience survey in the North-West of England

Aim: Provide an up to date understanding of patient experience

Method: National Radiotherapy Patient Experience Survey used

Qualitative and Quantitative Descriptive statistics Thematic analysis of free text



Hutton, D et al, 2023. Radiography

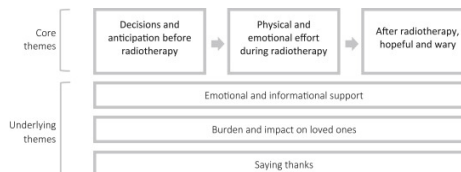
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Patients' experiences of radiotherapy: Insights from Twitter

Aim: Experience of undergoing radiotherapy from a novel digital data source.

Method: Content analysis Themes

Results: 442 tweet 6 themes



“Starting to freak out a little about my initial radiotherapy appointment tomorrow. Nobody has really told me what to expect”

“Completed all 25 Radiotherapy sessions. Sore, but triumphant! Mega thanks to [department name] #BeatCancer”



Meeking K, 2020. Radiography

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Breast cancer radiotherapy research



Participatory Co-design

1. Initial Exploration of work: Understanding the process and the experiences Patient Diaries.
2. Discovery Process: Allows designers and users to clarify the users' goals and values and to agree the desired outcome- Product specification from patient focus groups, HCP blogs and interviews.
3. Prototyping: designers and users iteratively shape technological detail- 5 workshops with 19 key stakeholders

BRIG Survey DIBH Experiences

Themes	Common (challenging) barriers	Times cited (n)
Patient Factors	Ability to maintain breath hold	20
	Issues related to communication & understanding e.g. language barriers etc.	9
	Reproducibility of breath hold	7
	Patient compliance	4
Departmental Capacity	Machine/ resource capacity	13
	Staff capacity and training	11
	Time pressures - due to increased appointment time	10
Technical challenges	DIBH for SCR patients	3
	DIBH for patients with larger breasts requiring immobilisation	2

Between 12-21% of patients are reported to find DIBH challenging^{1,2}

Co-design: patient representatives and healthcare professionals

Aim: to develop a series of resources for patients to facilitate breath hold techniques

Heidi Probst | Sheffield Hallam University (shu.ac.uk)

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Patient drinking compliance

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Radiotherapy – Patient preparation Summary of bladder filling instructions for different treatment sites

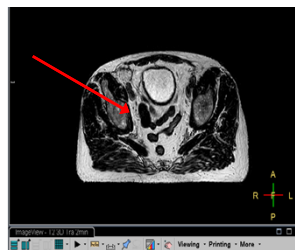
- All patients must be asked to empty their bladder before commencing these filling instructions.
- Please note there are bladder filling patient information sheets available on the intranet to be given to the patients when they are seen in clinic.
- All information sheets encourage patients to drink the volume of water within 10 minutes of emptying their bladder.

Treatment site	Volume of water to be consumed	Time (from time patient commenced drinking)
Prostate (including PACE trials)	2 Cups (approx. 350ml)	1 hour
Cervix / Endometrium	2 Cups (approx. 350ml)	1 hour
Rectum	4 Cups (approx. 700ml)	1 hour
MRI/linac Prostate	2 Cups (approx. 350ml)	CT - 45 minutes Treatment - 30 minutes
MR Linac Cervix / Endometrium	2 Cups (approx. 350ml)	CT - 45 minutes Treatment 30 minutes
MRI/linac Rectum	4 Cups (approx. 700ml)	CT - 45 minutes Treatment 30 minutes
Cyberknife Pelvis	2 Cups (approx. 350ml)	45 minutes

For other trials please check the trial protocol
NB* During hot periods in summer months please ask patients to drink an extra cup of water for each site

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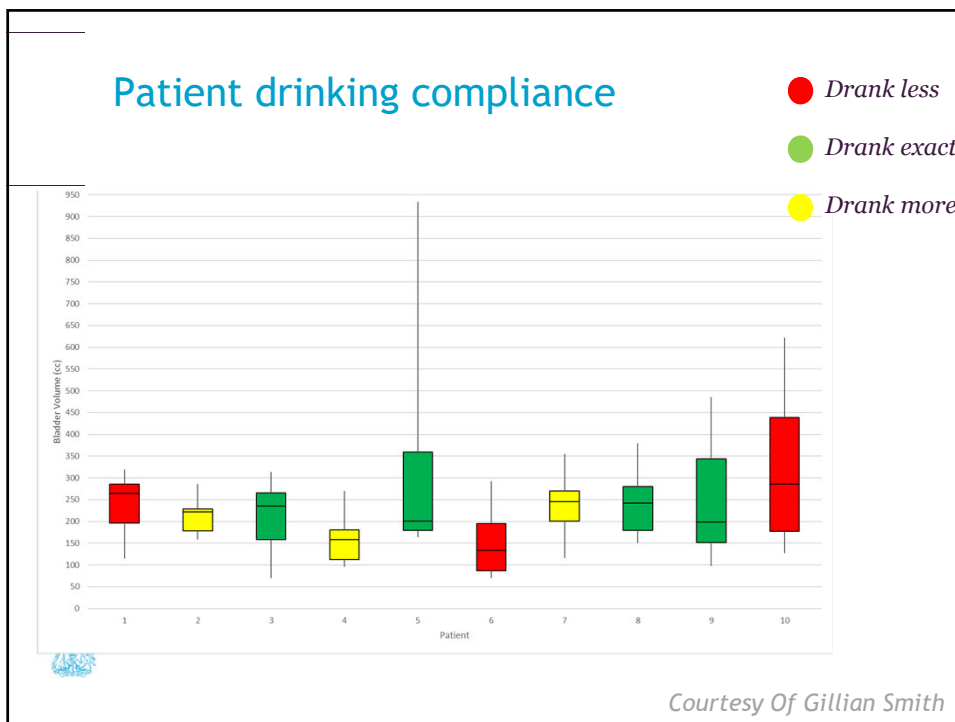
Mean 142cc



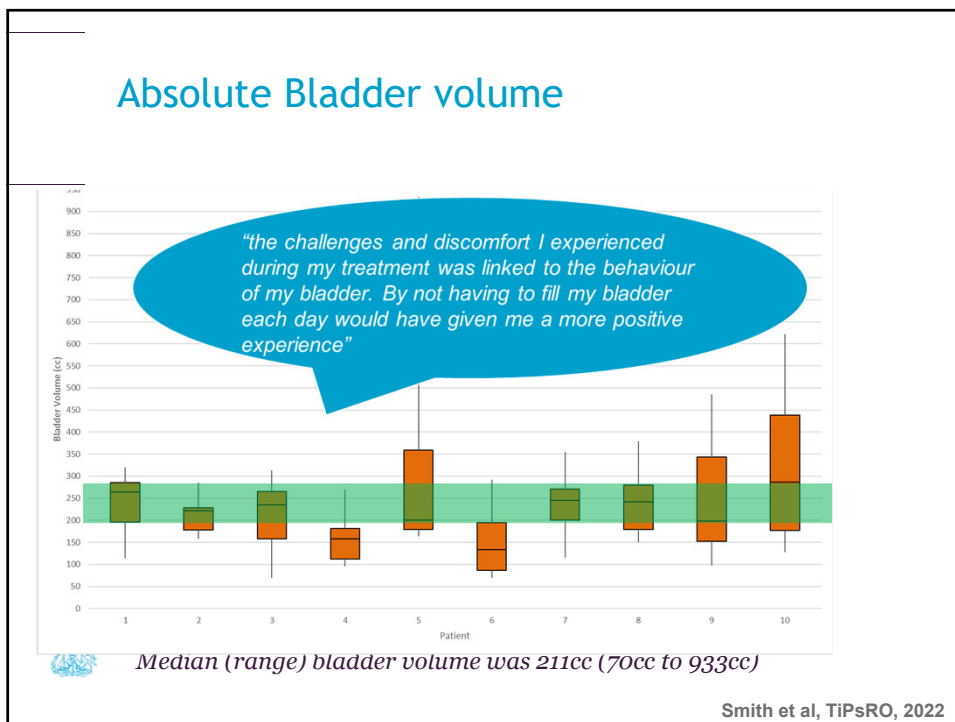
Mean 266cc



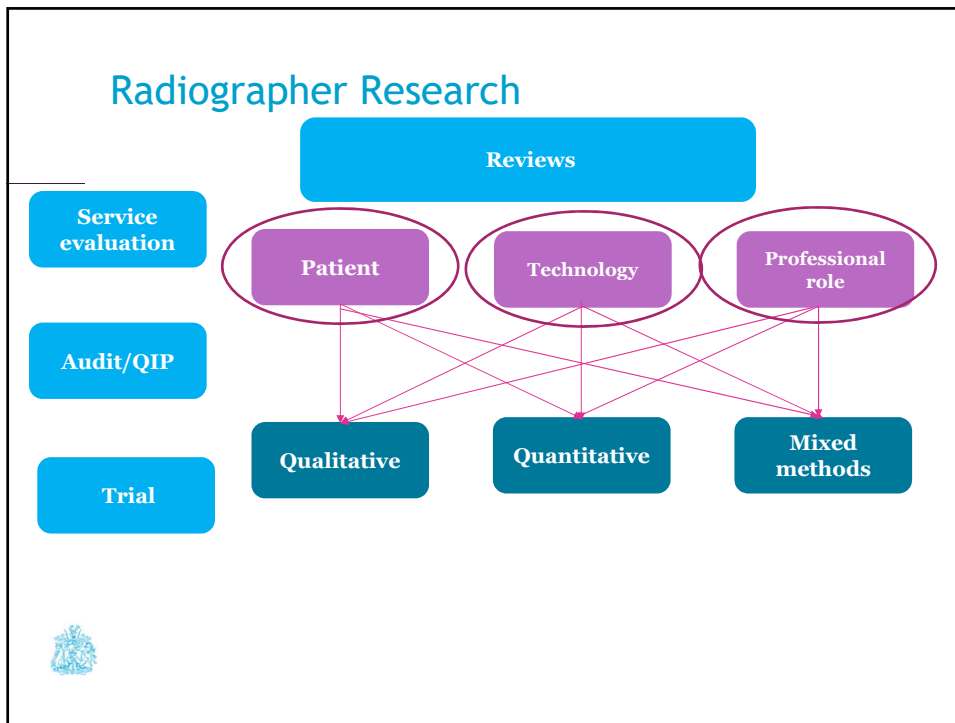
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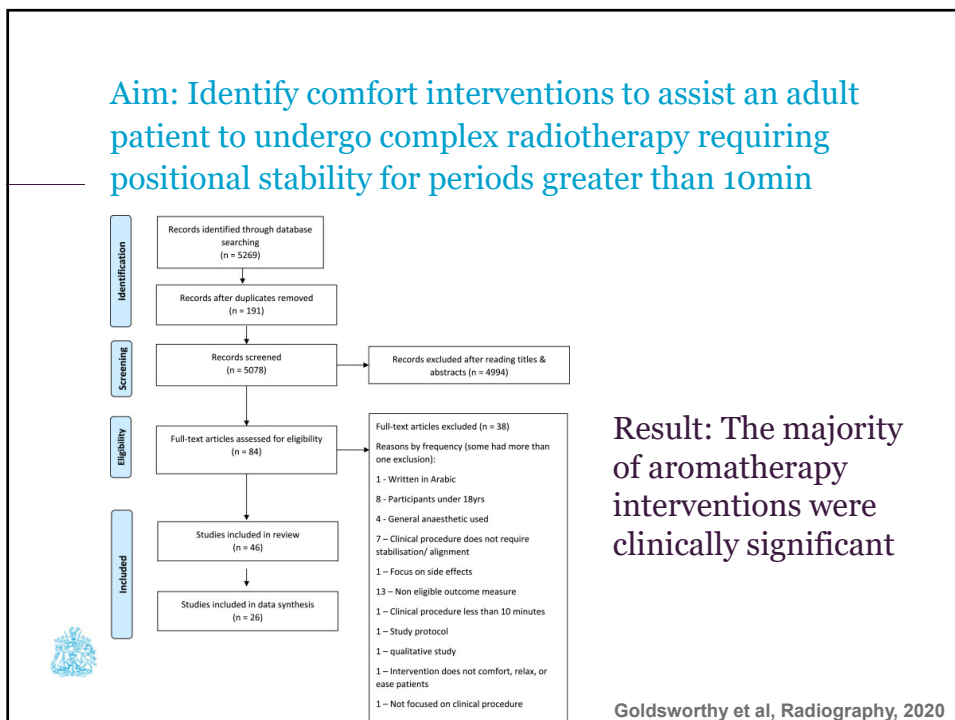
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What use

Summary of Grid-less images compared to software corrected grid-less images.

Studies	Organs	Image quality evaluation
[53]	Chest phantom	Visual grading analysis: The image quality (IQ) of Grid-less images were improved after applying scatter correction.
[1]	Bedside chest	Visual grid analysis: the IQ of corrected grid-less images were higher than grid-less images for all anatomic landmarks and overall image quality. The region with the highest preference was the unobscured lung (mean, 4.4), followed by the thoracic spine (mean, 4.3), and the overall appearance (mean, 4.1).
[33]	Chest phantom	Quantitative measurement: the CNR value of the scatter-corrected image was approximately 7.2, which is almost 2.3 times larger than image without grid.
[38]	Pelvis and cervical spine	Visual grading analysis: The grid-less images without ISC were scored significantly lower than anti-scatter grid images (VGC = 0.389, P = 0.005). Adding ISC to grid-less images improved the image quality to nearly the same level compared to anti-scatter grid images (VGC = 0.498; P = 0.963).
[39]	Chest, knee, pelvis, and shoulder	Visual grading analysis: the IQ of ISC images were higher than grid-less images. The image-improving impact was considerable: chest = 0.64, p < 0.01, knee = 0.61, p < 0.01, pelvis = 0.60, p < 0.01, and shoulder = 0.59, p < 0.01).
[26]	CDRAD-contrast detail phantom	The image quality of the scatter correction software increased by = 32 % compared to the grid-less images.

Regarding the specific imaging?

total records were identified after screening titles from the references using Google Scholar

Records excluded (n=294)

Abstracts excluded (n=17 do not meet inclusion criteria)

Reasons:

- 5 Wrong intervention
- 3 wrong setting
- 1 animal study
- 3 wrong languages
- 2 conference papers
- 1 Poster

Full text excluded (n=2 do not meet inclusion criteria)

Reasons:

- 2 Wrong intervention

Sayed et al , EJR, 2022

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Advanced practice roles of therapeutic radiographers/radiation therapists: A systematic literature review

Aims: to identify roles and activities performed by TR/RTTs at advanced level practice

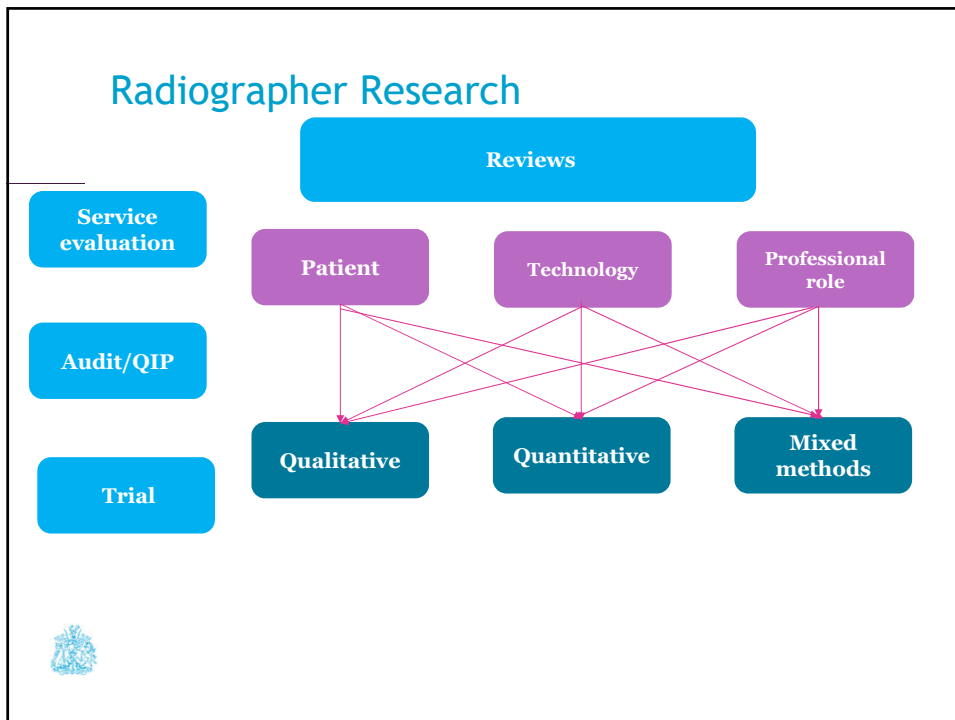
87 papers

Scope of practice

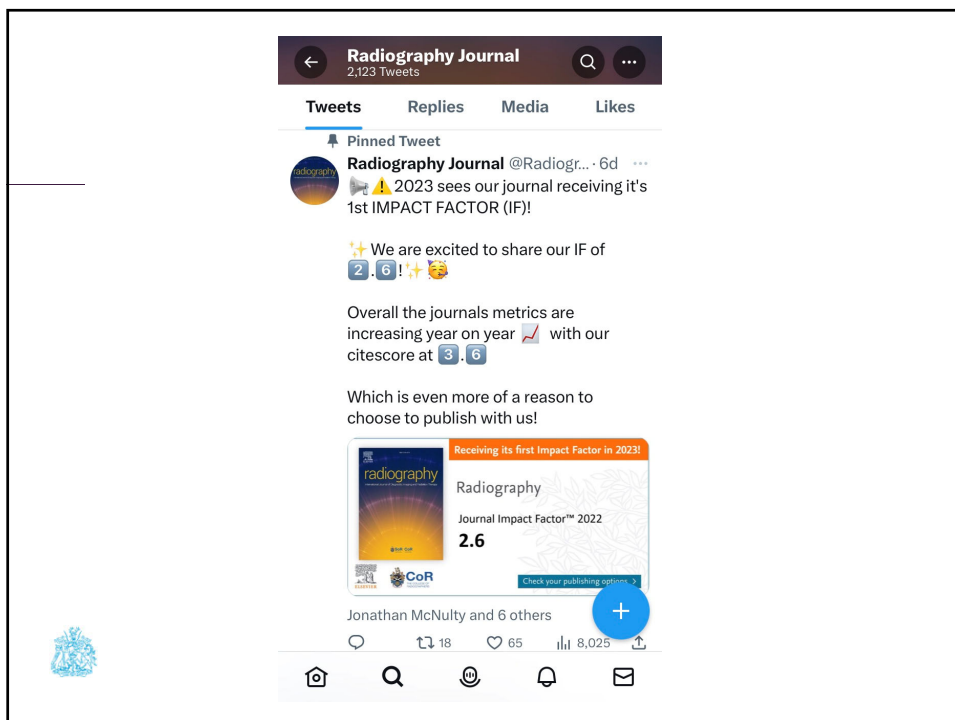
Role	Number of studies
Information & support	24
On-treatment review	15
Pre-treatment	12
Image review	12
Practice development	6
Follow-up	6
Clinical research	5

Oliveria et al ,Radiography, 2022

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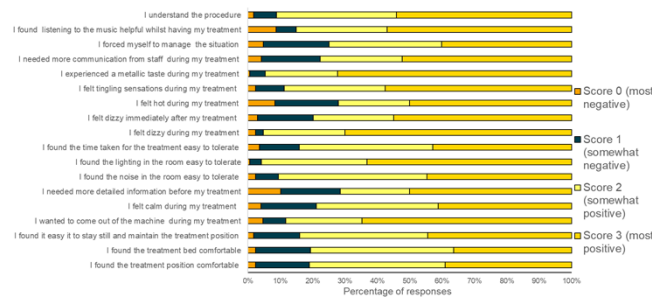


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Development and results of a patient-reported treatment experience questionnaire on a 1.5 T MR-Linac

Aim- Report multi-institutional patient experience of MRI-guided adaptive radiotherapy (MRgART) on the 1.5 T MR-Linac (MRL).

Method: Developed validated and distributed patient questionnaire



84% positive responses across all questions and responders (scores 2 and 3)



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'Scanxiety': Content analysis of pre-MRI patient experience on Instagram

Aim: investigate pre-MRI patient experience on Instagram posts.

"As I sit here waiting for my MRI, I have never felt so ALONE"

Adding #MRI to my list of least favourite things. The anxiety while you wait is on a whole other level. It's cold, sterile and the anxiety about what the procedure entailed was unreal

diverse, multifactorial, and often concomitant nature of preprocedural MRI anxiety and distress



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