

Reporting radiographers within the European Federation of Radiographer Society (EFRS) member countries - motivation for becoming a reporting radiographer

J. Jensen ^{a, b, *, 1}, P.A. Blackburn ^{c, d}, N. Gale ^e, C. Senior ^f, N. Woznitza ^{g, h}, C.J. Heales ^e, M.R.V. Pedersen ^{c, d, i}

^a Research and Innovation Unit of Radiology, University of Southern Denmark, Odense, Denmark

^b Department of Radiology, Odense University Hospital, Odense, Denmark

^c Department of Radiology, Kolding Hospital— Part of Lillebaelt Hospital, Kolding, Denmark

^d Department of Radiology, Vejle Hospital — Part of Lillebaelt Hospital, Vejle, Denmark

^e Medical Imaging, Faculty of Health and Life Sciences, University of Exeter, UK

^f Dorset County Hospital NHS Foundation Trust, UK

^g University College London Hospitals, UK

^h Canterbury Christ Church University, UK

ⁱ Department of Regional Health Research, University of Southern Denmark, Odense, Denmark

ARTICLE INFO

Article history:

Received 30 November 2023

Received in revised form

6 February 2024

Accepted 20 February 2024

Keywords:

Reporting radiographers

Survey

EFRS

Motivation

ABSTRACT

Introduction: Radiographer-led reporting originated in the United Kingdom as a strategy to reduce reporting backlog and time taken to report images. The effectiveness of reporting radiographers has been demonstrated, but their motivational factors have not been thoroughly explored. This survey aims to understand the incentives for radiographers to pursue postgraduate education in reporting radiography across Europe.

Methods: An online survey was conducted, collecting data across a range of topics such as demographic information, professional role, and job satisfaction. Questions assessing the influence of motivational factors on the decision to become a reporting radiographer are presented in this study. Descriptive statistics characterized the respondents' demographics. The motivational aspects were analysed quantitatively by regression analyses. Thematic analyses were performed for the free text responses on motivational aspects. **Results:** 239 respondents from the UK, Denmark, Norway, Sweden, The Netherlands, Ireland, and Malta completed the survey's motivation section. Increased knowledge and new challenges were the most motivating factors for becoming a reporting radiographer, while less exposure to radiation and less patient contact were the least motivating factors. Job satisfaction was a significant motivator. Gender significantly correlated with the importance of social connections for female reporting radiographers. A cross-country comparison showed that title and position and job security were more important for reporting radiographers from the UK.

Conclusion: Taking in consideration that a sample of 239 is not generalisable for the role, this survey does provides insights into the motivation behind being a reporting radiographer in Europe. Factors such as increased knowledge, new challenges, and job satisfaction play significant roles. Hindrances experienced by reporting radiographers included lack of time, support, and standards, while aspirations for further professional development were expressed.

Implications for practice: A thorough understanding of the motivation behind pursuing postgraduate studies in reporting radiography is a valuable tool for managers, aiding in fostering a positive work environment and attracting/keeping qualified personnel. The findings of this study can be employed in the development of strategies to support and enhance the practice of reporting radiographers.

© 2024 The Authors. Published by Elsevier Ltd on behalf of The College of Radiographers. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

* Corresponding author. Research and Innovation Unit of Radiology, University of Southern Denmark, Odense, Denmark.

E-mail address: Janni.jensen@rsyd.dk (J. Jensen).

¹ www.linkedin.com/in/janni-jensen-x-ray.

Introduction

The concept of red dotting, i.e. indicating the presence of an abnormality in accident and emergency radiographs, was originally introduced in the United Kingdom (UK) more than 40 years ago.^{1,2} Since then, the concept has evolved from radiographers providing suggestions to clinical teams about the possible presence of traumatic abnormalities to radiographers undertaking the task of writing a structured diagnostic report. The first postgraduate programme for skeletal radiograph reporting by radiographers was accredited in 1994 in the UK.¹ In the mid 2000's radiographer led reporting was introduced in Denmark with employment of the first Danish reporting radiographer in 2004, soon followed by the recruitment of many more reporting radiographers.³

Low numbers of radiologists in the UK, combined with increasing demand for imaging services, and therefore image reporting, has been the primary driver for the education of reporting radiographers.⁴ Since then radiographer-led reporting has evolved from plain film appendicular and axial skeletal images into dual energy X-ray absorptiometry (DXA) scans, and multi planer modalities such as computed tomography (CT) and magnetic resonance imaging (MRI).⁵

Although the UK and Denmark were amongst the first countries to introduce the concept of image reporting by radiographers, the way in which it began was almost opposite in the two countries. In the UK, radiographer reporting evolved from informal schemes such as red dotting,² moving onto the introduction of postgraduate qualifications and reporting now forms part of a national strategy to reduce waiting times in imaging departments with a particular emphasis on improving outcomes for patients with cancer.^{6–8} Conversely, in Denmark, radiographer reporting was introduced by one single hospital.³ However, the concept soon spread to the rest of Denmark. Regardless of any strategic reasons for introducing radiographer reporting, support from radiologists has been key to its implementation and success.⁴ Today, reporting radiographers are employed in many European countries. The cost benefit of implementing radiographer reporting in departments of radiology has been substantiated, demonstrating savings in financial resources, the efficient utilization of radiology resources, and the successful achievement of targets related to waiting times.⁹ Reporting radiographers working within clearly defined scopes of practice have demonstrated their competency, with accuracy similar to that of radiologists for a comparable range of examinations.^{10–12} In more general terms there are wider benefits arising from postgraduate education, for example in nursing postgraduate education correlated with improved patient outcome and the implementation of evidence based care.^{13–15} In a study by Kinsella et al. 2018¹⁴ professional improvement and service was found to be amongst the most motivating factors for postgraduate education within nursing and personal benefit was one of the least motivational factors.

To the best of the knowledge of the researchers involved in the current study, the exploration of motivational factors behind radiographer reporting has not been previously investigated. An understanding of radiographers' incentive for undertaking postgraduate education within reporting can be explored using Maslow's hierarchy of needs. Jacobsen & Thorsvik 2014¹⁶ linked Maslow's hierarchy of needs to organisational factors to emphasise elements that can motivate employees. Jacobsen & Thorsvik explain how organisational factors such as wages and working regulations can satisfy the physiological need for material goods, where life balance, professional title and position relate to the need for esteem, and challenging tasks can satisfy the need for self-actualisation through personal development and the joy of performing.¹⁶

Accordingly, in a cross-sectional online survey, we explored the motivation behind becoming and being a reporting radiographer with the purpose of obtaining a deeper understanding of what motivates European radiographers to pursue a career within reporting radiography. This is the third part of a three-part survey exploring the field of reporting radiography across Europe. Part one and two explored demographic background, roles, tasks, advanced roles and responsibilities.^{17,18}

Methods

Ethical approval

The Local National Data Protection Agency and the Research Ethics Committee at the University of Southern Denmark approved the study (ID number 22/29639). Prior to commencement of the actual survey, respondents were informed of the purpose of the study and gave consent to participate.

Survey questions

The methodology applied when developing and piloting the survey is presented in study one.¹⁸ The survey contained questions on demographic background of participants such as age, gender, years of work experience and place of employment. Furthermore, respondents were asked whether 11 predetermined motivational factors, developed by the author group, played a role in influencing their decision to pursue a career as a reporting radiographer. The items were more responsibility, less patient contact, more independent work, increased knowledge, demand from workplace, less unsocial working hours, higher salary, improved clinical practice, less exposure to radiation, new challenges, and educational opportunity. Additionally, using a 10-point Likert scale, where "1" was least important and "10" was the most important, they were asked to rate the importance of the following reasons for being a reporting radiographer: salary, job security, social connections, title and position, professional development, personal development, and job satisfaction. Finally, the survey contained an open-ended question where respondents were given the opportunity to add any additional comment or feedback they had on reporting radiographers' practice.

Survey distribution

The survey was developed and distributed online using a secure Health Insurance Portability and Accountability Act (HIPAA) compliant research data capture and data management tool (REDCap - Research Electronic Data Capture) hosted by Open Patient data Explorative Network, University of Southern Denmark.^{19,20} The survey was promoted online by the European Federation of Radiographer Societies' (EFRS). The survey was distributed and promoted online via Facebook, Twitter, and LinkedIn and via direct links. Additionally, the author group reached out to professional network and collaborators for further distribution of the survey. The survey was open for twelve weeks from September to November 2022.

Quantitative statistical analyses

Descriptive statistics were used to characterise the respondents' demographic background. The motivational factors for becoming a reporting radiographer were presented descriptively and visualised in a bar chart. Regression models tested associations between age, gender and experience as a reporting radiographer and the motivational factors. The continuous variable of age and the categorical values of gender and clinical experience (years) as a radiographer

were used as independent variables. A cross-country comparison was made to explore potential differences in motivation stemming from the country of practice. Only twelve participants from countries other than Denmark and the UK contributed to the survey, with these respondents distributed among five different nations. We therefore deliberately focused solely on respondents from the UK and Denmark for this between-country comparison. The decision to exclude participants from other countries was motivated by the recognition that variations in hospital settings, work environments, and other factors across different nations could introduce complexities that may compromise the robustness of our analysis if data from more countries were grouped. As a result, data aggregation for this specific analysis was deemed inappropriate thus including only data from Denmark and the UK. The motivational factors of salary, job security, social connections, title and position, professional development, personal development, and job satisfaction were used as dependent variables, and country was used as an independent variable. The best fit for all regression analyses was reported as R-squared values. *P* values < 0.05 were considered significant. The STATA version 17.0 (StataCorp. 2021, College Station, TX, USA) was used for statistical analyses.

Qualitative analysis

All data in the open-ended section were analysed in three steps to capture the main themes expressed by the respondents. In the first step, all text was read to obtain an overview of the content. In the second step, initial codes were created by highlighting key words and phrases. In the third step, recurring themes and opinions

Table 1
Experience as radiographer and reporting radiographer (n = 239).

	Years of experience			
	0–3	4–9	10–19	20 +
Radiographer	6 (2.51 %)	47 (19.67 %)	107 (44.77 %)	79 (33.05 %)
Reporting radiographer	86 (35.98 %)	86 (35.98 %)	57 (23.95 %)	10 (4.2 %)

were identified and finally the codes were combined into overall themes ensuring all data refers directly and unanalysed back to the words expressed by the respondents.²¹ The coding process was done manually by two authors.

Results

Sample demographics

In total, 345 respondents participated in the survey, of those, 239 completed the motivation section. Of the 239 respondents, the majority were female (n = 148; 62%), 85 were men (36%), five (2%) preferred not to specify gender, and one respondent preferred not to answer. Mean age was 43 years [range 27–71]. The majority of the participants had more than nine years of experience as radiographers (n = 186). More than 70% had less than ten years of experience as a reporting radiographer (Table 1). Respondents were predominately from the UK (n = 186) and Denmark (n = 41) and the remainder from Norway (n = 5), Sweden (n = 2), The Netherlands (n = 2), Ireland (n = 2), and Malta (n = 1).

Motivational factors

More than 95% of the respondent stated that increased knowledge was a reason for becoming a reporting radiographer (n = 228) closely followed by new challenges as reported by 90% (n = 214). Less exposure to radiation and less patient contact were the least motivating factors for becoming a reporting radiographer with respectively n = 6 (3%) and n = 14 (6%) (Fig. 1).

Job satisfaction was the prevalent motivator for being a reporting radiographer. Conversely “title and position” was ranked as the least important factor (Table 2). When correlating age, gender and experience as a reporting radiographer to motivational factors, the regression model showed that gender significantly correlated to importance of social connections to other reporting radiographers for females (p < 0.01). No other significant correlations were found (Table 3).

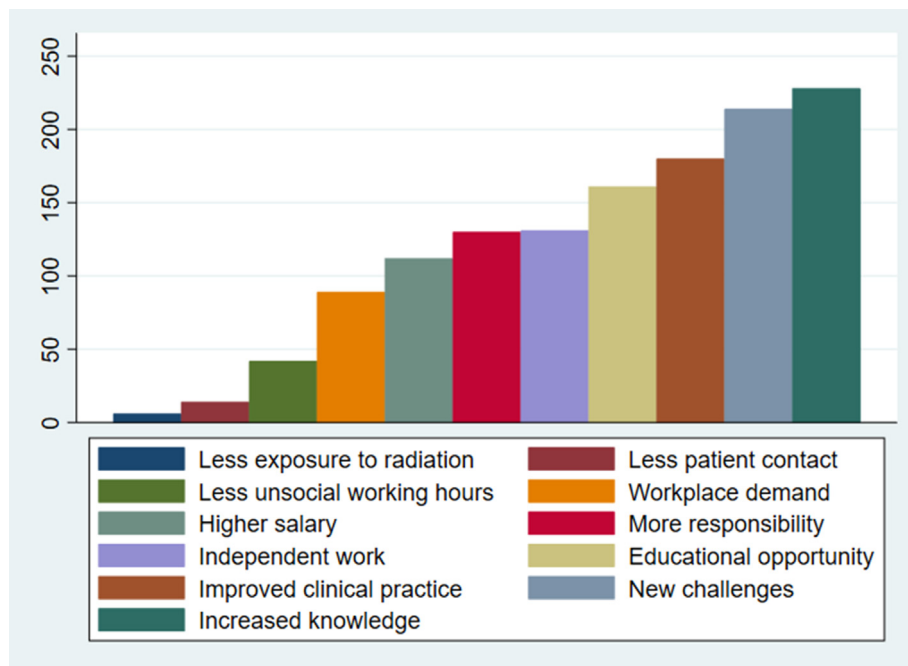


Figure 1. Motivation for becoming a reporting radiographer (n = 239).

Table 2
Importance of factors for being a reporting radiographer with mean and SD as indicated on a Likert Scale from 1 to 10, where a rating of 1 represents the least importance and a rating of 10 signifies the highest importance.

	Mean (SD)
Importance of:	
Salary	7.4 (2.0)
Job security	8.4 (1.8)
Social connections	7.2 (2.1)
Title and position	6.9 (2.5)
Professional development	8.8 (1.3)
Personal development	8.8 (1.3)
Job satisfaction	9.2 (1.1)

SD, Standard deviation.

Table 3
Regression analyses for correlation between age, gender, and experience as reporting radiographer and motivational variables. n = 239.

Motivational variables		p Value	R ²
Salary	Age	0.092	0.030
	Gender	≥0.406	
	Experience as reporting radiographer	≥0.182	
Job security	Age	0.124	0.042
	Gender	≥0.484	
	Experience as reporting radiographer	≥0.146	
Social connections	Age	0.277	0.051
	Gender	≥0.013	
	Experience as reporting radiographer	≥0.331	
Title and position	Age	0.284	0.039
	Gender	≥0.481	
	Experience as reporting radiographer	≥0.475	
Professional development	Age	0.904	0.013
	Gender	≥0.397	
	Experience as reporting radiographer	≥0.420	
Personal development	Age	0.608	0.033
	Gender	≥0.218	
	Experience as reporting radiographer	≥0.259	
Job satisfaction	Age	0.923	0.021
	Gender	≥0.316	
	Experience as reporting radiographer	≥0.305	

R²; Best fit.

Isolating respondents from Denmark and the UK resulted in exclusion of radiographers from Ireland (n = 2), Malta (n = 1), The Netherlands (n = 2), Norway (n = 5) and Sweden (n = 2). The regression model showed that “title and position” and “job security” were significantly more important to reporting radiographers from the UK with slopes of respectively 1.40 (95% CI, 0.59 to 2.22; p = 0.001) and 0.72 (95% CI, 0.12 to 1.32; p = 0.019). No other significant correlations were found between radiographers from Denmark and the UK. (Table 4)

Open-ended questions

Of the 239 respondents, 41 (17 %) provided a statement to the open-ended question “Please provide any feedback you have on being a reporting radiographer”. Of these 41 responses, the majority were from the UK (n = 40) and a single statement was made by a Danish reporting radiographer. The statements fell into two main themes

Table 4
Regression analyses correlating motivational variables between radiographers from the United Kingdom (n = 186) and Denmark (n = 41).

Motivational variables	Slope (95% CI)	p Value	R ²
Salary	0.20 (−0.49, 0.88)	0.567	0.002
Job security	0.72 (0.12, 1.32)	0.019	0.024
Social connections	0.19 (−0.52, 0.89)	0.603	0.001
Title and position	1.40 (0.59, 2.22)	<0.001	0.049
Professional development	0.10 (−0.34, 0.53)	0.655	0.001
Personal development	−0.02 (−0.47, 0.44)	0.950	0.000
Job satisfaction	0.03 (−0.34, 0.40)	0.868	0.000

CI; Confidence interval, R²; Best fit.

created in the analysis, namely i) Reporting radiographer experienced hindrances, and ii) Aspiration for further professional development.

Reporting radiographer experienced hindrances

The statements concerning hindrances as experienced by reporting radiographers focused on topics such as lack of time and support, clinical pressure typically related to staff shortage, wages, variation in tasks, resistance from radiologists, and a lack of standards, with statements focusing on lack of time being predominant. For example:

“Our trust was leading the way with radiographer reporting in multiple modalities, but this seems to have taken a significant back step since the clinical pressures have increased in recent years”

Clinical pressure is also expressed as shortage of clinical staff that cause lack of time to report.

“Staff shortages also greatly reduce the time available for reporting”

Lack of support was also a reoccurring issue with statements such as:

“I know of many Radiographers trained in reporting who do not fulfil the reporting role due to lack of support when qualified”

“I have not received much support or feedback from my department. I currently do not have an official mentor. I do suffer from a lack of confidence as a result of this and I am considering giving up reporting”

Finally, the issue of wages was expressed as demotivating connected to lack of development as exemplified in the statement below.

“There is no financial incentive to encourage reporters to increase their areas of reporting or modalities”

Aspiration for further professional development

The second theme revolved around further developments that the respondents wished to undertake. These ranged from network groups and continuous professional development (CPD) to expanding reporting responsibilities to new modalities:

“We need better network groups setting up for reporters like myself and regular CPD sessions ...”

"I would like to expand my reporting practice to other modalities"
"Need a DXA reporting course reestablished in the UK asap"

Discussion

This European survey explored the motivational factors for becoming, and for being, a reporting radiographer. Whilst previous studies explored incentives for undertaking research within radiography²² and motivational factors for postgraduate courses within nursing^{14,23} have been covered, motivational factors in relation to postgraduate education within reporting radiography have to the best of the author groups knowledge not been investigated. An in depth understanding of the motivation for pursuing postgraduate studies within reporting radiography can be an effective tool for managers, not only to create a positive work environment but also to recruit and retain qualified personnel.

Results showed that reasons for becoming a reporting radiographer covered all steps in Maslow's hierarchy of needs, i.e. physiological needs, safety and security, love and belonging, self-esteem, and self-actualisation.¹⁶ Predominant answers such as new challenges and knowledge will, according to Jacobsen & Thorsvik 2014,¹⁶ satisfy the need for self-actualisation which managers could facilitate or support with initiatives such as the creation of network groups, organizing continuous professional development sessions, and addressing specific educational needs.

The identified challenges of clinical pressure and short staffing, as voiced by a number of respondents, are perceived as substantial hindrances. This perception may extend to a perceived lack of managerial support. Recognizing and addressing these issues is not only crucial for the well-being of reporting radiographers but also serves as valuable knowledge for managers. These insights become particularly poignant for managerial professionals who navigate daily challenges, attempting to balance short-staffing issues and manage the persistent backlog of reporting times. It may not be immediately apparent to them that their commendable efforts to sustain the clinical workflow have tangible repercussions on the work environment of reporting radiographers. This situation encapsulates a complex, catch-22 scenario, challenging to resolve immediately but harboring potential for improvement. A strategy to address this challenge may be the cultivation of open communication channels. This not only allows managers to gain a profound understanding of individual concerns but also serves as motivation for radiographers, promoting a sense of belonging and collaboration toward finding viable solutions. By fostering a culture of open communication and mutual understanding, there exists the potential to not only alleviate but also improve the current work environment, ultimately enhancing overall job satisfaction for reporting radiographers.

This survey uncovered that radiographers undertaking postgraduate courses in reporting were predominantly motivated by new challenges, new knowledge, and by improved clinical practice. The latter correspond with Kinsella et al. 2018¹⁴ who reported that nurses undertaking postgraduate qualifications were predominantly motivated by intrinsic factors related to improved patient care. However, in opposition to nurses who reported job security the least important factor,¹⁴ reporting radiographers ranked job security as important with a mean score of 8.4 on a Likert scale from 1 to 10 (10 being of highest importance). The difference between nurses and radiographers can potentially be explained by the difference in work experience of participants in the two studies. In the study by Kinsella et al. 2018,¹⁴ the mean years of experience of their nurse respondents was 4 years as opposed to this study where 78 % of the respondents had more than ten years of experience within the field

of radiography. Another potential difference between nurses undertaking advanced nursing practice and reporting radiographers can be, that for a reporting radiographer, the altered work assignments will inevitably entail less direct patient interaction and more desktop work. Moreover, the study by Kinsella et al. 2018¹⁴ originates from Australia, therefore differences in current unemployment rates, social economic and social services between the countries may influence the reported importance of job security.

Many of the statements offered in the survey focused on lack of support or importance of support from managers and peers when undertaking the role as a reporting radiographer. Nurses undertaking new educational opportunities identified managers as important contributors to their motivation thus supporting this finding.¹⁴ Similarly, Pedersen 2022²² found that managerial support was key to radiographers undertaking research. Carasco-Saul et al. 2015²⁴ studied the relationship between leadership and employee engagement. They found that employees became more engaged when transformational and authentic leadership was demonstrated. They concluded that the way leaders are viewed by employees along with the quality of work environment can affect engagement. In summary, this positions managers and their leadership as crucial when radiographers undertake new roles.

A common theme that emerged from the free-text responses was that passion for the profession was expressed whether commenting on hindrances or desired developments. The fact that many radiographers expressed the wish for further role expansion in the statements coincide with the answers given in the survey where increased knowledge, new challenges and improved clinical practice were ranked high on the list of reasons to become a reporting radiographer. Given opportunity, the in-depth knowledge of anatomy and pathology obtained through the education and experience of reporting could be made use of in combination with the wish for improved clinical practice. For example, a musculoskeletal reporting radiographer not only knows how to obtain skeletal radiographs, but may also know the importance of adequate technical image quality and correct patient positioning to answer the clinical question posed by the referrer or the pathology demonstrated on the imaging. It has previously been suggested that musculoskeletal radiography is a specialty within the field of radiography and should be recognised as such.^{25,26} This could be supported by reporting radiographers undertaking research and/or quality improvement combining the fields of radiology and radiography.

Strengths and limitations

The survey had some limitations such as the open distribution method, which did not allow for a response rate to be calculated. The questions on motivation were at the end of an approximately 15 min long survey, which may explain why 31 % of the respondents did not complete the motivational section of the survey, which is a limitation to the results. Another limitation when interpreting the result is that the majority of the participants were from the UK followed by Denmark, which naturally affect generalisability to other European countries. However, this was to be expected since reporting radiography initially started in these countries and hence had more years to adapt and grow in number of reporting radiographers. Therefore, the findings from the cross-country analyses are constrained to include only Denmark and the UK. The overall number of respondents for the motivational section (n = 239) is however a strength when adding value to the results.

Conclusion

While acknowledging the limited generalizability of the sample size (239) to a broader context, this survey does provide valuable

insights into the motivations shaping the role of reporting radiographers in Europe, although predominately the UK and Denmark. Overall, this survey demonstrated that radiographers who pursue a career within reporting radiography are motivated by the desire to obtain increased knowledge, new challenges, and have a high job satisfaction. Only minor differences were uncovered between reporting radiographers from the UK and Denmark, where “job security”, and “title and position” were reported as more important by radiographers from the UK. The statements offered by respondents uncovered that managerial support and possibilities for further role expansion were important motivational factors. It was also evident that hindrances such as clinical pressure and short staffing are experienced by reporting radiographers.

Conflict of interest statement

None.

Acknowledgements

The authors thank the EFRS and all other colleagues for sharing the survey or participated in it. Much appreciation is extended to our colleagues who provided valuable feedback for the pilot survey.

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

1. Snaith B, Hardy M, Lewis EF. Radiographer reporting in the UK: a longitudinal analysis. *Radiography* 2015;**21**(2):119–23.
2. Berman L, de Lacey G, Twomey E, Twomey B, Welch T, Eban R. Reducing errors in the accident department: a simple method using radiographers. *Br Med J (Clin Res Ed)*. 1985;**290**(6466):421–2.
3. *Beskrivende radiograf (reporting radiographer)*. <https://sygehuslillebaelt.dk/afdelinger/vejle-sygehus/rontgenafdelingen/uddannelse/beskrivende-radiograf>.
4. Wood K. How is the reporting radiographer role portrayed in published studies? A scoping review. *Radiography (Lond)*. 2022;**28**(1):215–21.
5. Culpan G, Culpan AM, Docherty P, Denton E. Radiographer reporting: a literature review to support cancer workforce planning in England. *Radiography (Lond)*. 2019;**25**(2):155–63.
6. *The health of the nation: a strategy for health in England*. HM Stationery Office; 1992.
7. England NHE. *Reporting radiographers*. <http://tinyurl.com/2f52kxm6>. [Accessed 19 January 2024].
8. Woznitza N, Ghimire B, Devaraj A, Janes SM, Piper K, Rowe S, et al. Impact of radiographer immediate reporting of X-rays of the chest from general practice on the lung cancer pathway (radioX): a randomised controlled trial. *Thorax* 2023;**78**(9):890–4.
9. Bajre MK, Pennington M, Woznitza N, Beardmore C, Radhakrishnan M, Harris R, et al. Expanding the role of radiographers in reporting suspected lung cancer: a cost-effectiveness analysis using a decision tree model. *Radiography (Lond)*. 2017;**23**(4):273–8.
10. Woznitza N, Piper K, Burke S, Ellis S, Bothamley G. Agreement between expert thoracic radiologists and the chest radiograph reports provided by consultant radiologists and reporting radiographers in clinical practice: review of a single clinical site. *Radiography (Lond)*. 2018;**24**(3):234–9.
11. Woznitza N, Piper K, Burke S, Bothamley G. Chest X-ray interpretation by radiographers is not inferior to radiologists: a multireader, multicase comparison using JAFROC (Jack-knife alternative free-response receiver operating characteristics) analysis. *Acad Radiol* 2018;**25**(12):1556–63.
12. Brealey S, Scally A, Hahn S, Thomas N, Godfrey C, Coomarasamy A. Accuracy of radiographer plain radiograph reporting in clinical practice: a meta-analysis. *Clin Radiol* 2005;**60**(2):232–41.
13. Gerrish K, Guillaume L, Kirshbaum M, McDonnell A, Tod A, Nolan M. Factors influencing the contribution of advanced practice nurses to promoting evidence-based practice among front-line nurses: findings from a cross-sectional survey. *J Adv Nurs* 2011;**67**(5):1079–90.
14. Kinsella D, Fry M, Zecchin A. Motivational factors influencing nurses to undertake postgraduate hospital-based education. *Nurse Educ Pract* 2018;**31**:54–60.
15. Ge S, Xi X, Guo G-f. A systematic review of the impact of master's-educated nurses on inpatient care. *Int J Nurs Sci* 2015;**2**(4):414–21.
16. Jacobsen Jt DI. *Hvordan organisationer fungerer, en indføring i organisation og ledelse*. 4 ed. Copenhagen: Hans Reitzels forlag; 2022.
17. Pedersen MRV, Jensen J, Gale N, Senior C, Woznitza N, Heales CJ. Reporting radiographers in Europe survey: support, role satisfaction, and advanced clinical practice within the European federation of radiographer society (EFRS) member countries. *Radiography (Lond)*. 2023;**30**(1):87–94.
18. Pedersen MRV, Jensen J, Senior C, Gale N, Heales CJ, Woznitza N. Reporting radiographers in Europe survey: an overview of the role within the European Federation of Radiographer Society (EFRS) member countries. *Radiography (Lond)*. 2023;**29**(6):1100–7.
19. Harris PA, Taylor R, Minor BL, Elliott V, Fernandez M, O'Neal L, et al. The REDCap consortium: building an international community of software platform partners. *J Biomed Inf* 2019;**95**:103208.
20. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inf* 2009;**42**(2):377–81.
21. Dahler-Larsen P. *At fremstille kvalitative data*. Vol 246. 2nd ed. University of Southern Denmark Studies in History and Social Sciences; 2010.
22. Vils Pedersen MR. What motivates radiographers to start working with research? *Radiography (Lond)* 2023;**29**(1):215–20.
23. Ng L, Eley R, Tuckett A. Exploring factors affecting registered nurses' pursuit of postgraduate education in Australia. *Nurs Health Sci* 2016;**18**(4):435–41.
24. Carasco-Saul M, Kim W, Kim T. Leadership and employee engagement: proposing research agendas through a review of literature. *Hum Resour Dev Rev* 2015;**14**(1):38–63.
25. Mussmann BR, Hardy M, Jensen J. There's nothing plain about projection radiography! A discussion paper. *Radiography* 2021 Nov;**27**(4):1227–30.
26. Snaith B. General radiography - speciality status at last? *Imaging & Oncology* 2005;**1**(1):27–32.