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Radiographers' readiness for artificial intelligence (AI) leadership: confidence, challenges and role expectations in the UK

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Received 16 December 2025
Accepted 15 June 2026

To cite: Walsh G, St John-Matthews J, Kyratsis Y, *et al*. *BMJ Leader* Published Online First: [*please include* Day Month Year]. doi:10.1136/leader-2025-001513

ABSTRACT

Background With the rapid implementation of artificial intelligence (AI) in radiographer workflows, leadership roles are necessary for its safe and effective integration into practice. Due to their dual professional identity (encompassing patient-centred care skills and technical skills) radiographers emerge as natural AI leaders within the medical imaging and radiotherapy ecosystems.

Aim To examine how UK radiographers perceive their readiness, confidence and potential roles in AI leadership, and to identify the barriers and enablers for their engagement within the AI-ecosystem.

Methods A UK-wide, cross-sectional, online survey of radiographers and students (n=273) combined demographic questions, AI knowledge and experience questions, Likert-type assessments of preparedness and free text responses. Quantitative data were analysed using descriptive statistics and Mann-Whitney U tests; qualitative data underwent thematic content analysis.

Results Most respondents reported limited AI literacy and minimal hands-on experience, citing insufficient education, protected time and managerial support as key barriers to leadership readiness. Confidence varied: women and those with little AI exposure, expressed statistically significant lower confidence to lead in AI-enabled environments. Respondents felt more comfortable taking on leadership responsibilities once AI systems were already in place than leading their implementation. Qualitative findings indicated that in this predominantly frontline sample, radiographers described AI leadership mainly as operational, practice-based work. Motivations for leadership focused on improving workflows, supporting colleagues and ensuring safe practice.

Discussion/conclusions Radiographers recognise the relevance of AI leadership but understand it as practice-proximal, operational-focused responsibilities, due to limited AI exposure, uneven confidence and the absence of defined leadership pathways in national policy. Role ambiguity and limited experiential learning constrain radiographers' ability to envision strategic or organisation-wide AI leadership. Profession-specific education, structured experiential opportunities and organisational support are essential for enabling radiographers to participate equitably and effectively in AI-enabled service transformation.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Artificial intelligence (AI) in healthcare remains mostly aspirational, demanding strong expert leadership to drive meaningful adoption. Radiographers, with their combined clinical, technical and analytical skills, are uniquely positioned to lead AI implementation throughout healthcare.

WHAT THIS STUDY ADDS

⇒ Radiographers currently interpret AI leadership mainly as operational, practice-focused work. They face substantial barriers to stepping into broader leadership roles, including limited education, little hands-on AI experience and weak organisational support.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Addressing these barriers is essential to fully embed this vital workforce within the evolving AI ecosystem.

INTRODUCTION

Artificial intelligence (AI) is rapidly reshaping clinical workflows in medical imaging and radiotherapy. However, AI's successful implementation depends not only on the technology itself but also on the digital leadership capacities of the workforce who use, interpret and operationalise these systems in practice.[1 2] Radiographers, due to their dual professional identity (encompassing patient-centred care and technical skills), are central to medical imaging and radiotherapy workflows. They are inevitably affected by AI-enabled change, but their readiness, confidence and understanding of what AI leadership might entail remain poorly understood. Understanding how radiographers' themselves conceptualise AI leadership is critical to ensuring that digital transformation in healthcare is credible, inclusive and grounded in professional expertise.

Radiographer roles and scope of practice

Radiography is an autonomous recognised profession, regulated by the Health and Care Professions Council, and encompasses the protected titles of *radiographer*, *diagnostic radiographer* and *therapeutic radiographer*.[3] Diagnostic and therapeutic radiographers hold distinct yet complementary roles within radiology (medical imaging) and radiotherapy (cancer services), respectively. They have established roles and responsibilities across clinical practice, education, research, management and professional standards,[4 5] and are one of the 14 Allied Health Professions (AHPs) in England,

Scotland and Northern Ireland and one of the 6 Healthcare Science (HCS) professional families in Wales.[6–9]

Digital transformation and policy context

Radiology and oncology are among the fastest-moving AI implementation domains, owing to their reliance on image data and pattern recognition.[10 11] Although many AI solutions are CE-marked or Food and Drug Agency (FDA) cleared, their integration into routine UK practice is still in an early stage and variable.[12 13] There are clear policy ambitions for AI implementation. As of June 2025, all four UK nations have released long-term strategies outlining the future direction of their healthcare systems. A shared priority across these strategies is the acceleration of digitally enabled care.[14–17] National reviews, such as the Topol Review, call for a workforce capable of leading safe, effective and ethically aligned AI-enabled care.[18] However, these high-level reviews and policy frameworks do not define dedicated AI leadership roles for radiographers or other AHPs/Healthcare Science Professionals. They do not recommend pathways into generic digital leadership roles or acknowledge barriers that limit individuals' ability to step into these roles.

NHS England's 'AHPs Deliver' strategy and the 'Digital Framework for AHPs' explicitly position digital leadership as a core AHP responsibility.[19 20] Comparable expectations are embedded within the broader digital health and workforce strategies of Scotland, Wales and Northern Ireland[17 21 22] despite the absence of nation-specific AHP digital frameworks. The Society of Radiographers (SoR) has engaged with the aforementioned policies by establishing the SoR AI Advisory Group, which authored the AI guidance for radiographers[23] and led to the creation of a dedicated Professional Officer for AI, assistive and digital technologies.[24] AI guidance published by the SoR frames AI leadership as a profession-wide responsibility.[23] It positions radiographers as leaders in practice, education, research and stakeholder partnerships. In contrast, the Royal College of Radiologists guidance places radiologists at the forefront of strategic AI adoption.[25] Contrary to radiologists who are clearly expected to lead AI implementation at strategic levels, radiographers have no equivalent policy mandate. The absence of profession-specific expectations creates role ambiguity, leaving radiographers to interpret locally what 'AI leadership might mean' and whether it extends beyond frontline operational responsibilities.

Professional expertise and leadership identity

Evidence from organisational and health leadership research highlights the value of expert leaders; those with deep domain knowledge.[26 27] Leaders and line managers with core business expertise and experience are more effective at driving innovation and maintaining credibility within clinical teams, creating a strong case for profession-led AI transformation. Radiographers' expertise in imaging technology, workflow coordination, patient safety and quality assurance, positions them well to contribute to AI-related decision making. However, to develop this potential, radiographers need clarity about possible leadership trajectories, access to profession-specific training and opportunities for experiential learning and working with AI.[28] Domain experts, including those in healthcare, often display low confidence under novel leadership conditions with insufficient structural support.[26] This low confidence is not to be confused with a low capacity to lead.

Aim

This study aims to investigate UK radiographers' readiness for AI leadership. Specifically, it examines how radiographers understand and conceptualise AI leadership roles, their confidence and perceived preparedness to undertake such roles and the challenges and motivators shaping these perceptions.

MATERIALS AND METHODS

Study design

This study was part of a wider, cross-sectional online survey designed to explore the perceived impact of AI on the future of radiographer professional identity.[29] Questions designed to examine radiographers' perceptions of AI leadership are the focus of this research. The data generated by these questions has not previously contributed to or been discussed in prior publications. The study adopted a semistructured questionnaire, combining quantitative assessments of AI knowledge, experience and perceived readiness with qualitative exploration of how radiographers conceptualise AI leadership. This design allowed us to capture workforce patterns alongside radiographers' own interpretations of emerging AI-related leadership responsibilities.

Survey governance

Data collection was anonymous. Essential demographic data were collected allowing for meaningful, inclusive data analysis. To ensure anonymity and confidentiality, authors were unable to see the IP addresses of respondents.

Design, development and piloting of survey

The survey was developed on Qualtrics.[30] The questions were based on previous surveys on AI in radiography,[1 31] and further developed by a group of experts on AI, radiography, leadership and professional identity. Two review rounds of the survey by the project team followed, ensuring content validity.[32]

Further refinements were achieved through piloting. This survey adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) and Consolidated Health Economic Evaluation Reporting Standards (CHERRIES) reporting guidelines.[33 34]

Furthermore, the survey was piloted on a small sample size (n=12) of radiographers to assess the internal consistency of the questionnaire. These data were analysed using Cronbach's alpha reliability tool.[35]

Recruitment and eligibility of participants

Recruitment was voluntary, and no incentives were offered. Data collection occurred between 1 June and 31 August 2023.

Co-authors electronically distributed the survey to their professional networks in academia, research, policy and practice in the UK via personal email and social media (LinkedIn, X and Facebook). Snowball sampling was used.[36] Face-to-face recruitment also took place within the Research Hub at the UK Imaging and Oncology Congress in June 2023.[37] This approach enabled broad national reach but also resulted in a sample predominantly composed of front-line practitioners. Given the study's aim of understanding how radiographers interpret AI leadership, rather than evaluating senior leaders' formal responsibilities, this composition is analytically relevant, reflecting how leadership is understood within everyday practice contexts.

Eligible participants included those aged 18 and above, studying or practising radiography in the UK in any capacity, practice or modality. Anyone trained as a radiographer was

eligible to join the study, including students, those working in academia, industry or retired.

Data analysis

Descriptive and inferential statistics were employed for quantitative data analysis. Mann-Whitney U tests were performed for non-parametric statistics between groups.[38] Comparisons, where eligible, were run between the groups for: (a) age range (above and below 35 years of age), (b) gender (male and female), (c) years of professional experience (above and below 10 years), (d) academic qualification (up to BSc level or PgC and higher), (e) specialty (diagnostic and therapy), (f) level of AI education (none/self-reading and structured education) and (g) experience of AI use (basic and advanced). Thresholds were decided on team consensus. For AI use, basic experience was defined as 'never' or 'occasional use', while advanced experience included 'daily use' or 'involved in AI research'.

Qualitative data from the four open-ended questions were analysed using thematic content analysis, following an inductive–deductive approach.[39] This method was selected to allow themes to be informed both by existing concepts relevant to digital leadership (eg, preparedness, operational vs strategic roles, structural barriers) and by novel insights emerging from participants' accounts. Content analysis was performed by the first author manually, identifying key codes and categories and then reducing the categories into themes. This process was recorded using Microsoft Excel. The study's senior investigators subsequently reviewed the analysis for accuracy and consistency. The content analysis was further disaggregated to identify patterns across gender for confidence and preparedness in undertaking AI leadership roles, and professional backgrounds of radiographers for identifying proposed key responsibilities for AI leaders.

RESULTS

Survey response and sample characteristics

Pilot survey responses yielded $\alpha=0.780$, indicating acceptable internal consistency.[35]

A total of 322 valid responses to the survey were received, of which 273 participants completed the related questions exploring AI leadership (n=273). The majority were diagnostic radiographers (80.2%), female (64.5%), working in public hospitals (72.9%) and aged 26–45 (60.5%). Most respondents reported between 6 and 20 years of practice experience (including time as a student; typically 3 years). Demographic characteristics are summarised in table 1.

This sample reflects a predominantly frontline, clinically embedded workforce, which is a relevant context for interpreting how radiographers conceptualise AI leadership.

AI knowledge, experience and education

Most respondents described their AI knowledge as basic (53.4%), and reported never having used AI in clinical practice (56.4%). Only 28.5% had received any form of structured AI education or continuous professional development activities (CPD) mainly through higher education institutions (HEI), industry or professional societies such as the SoR and the British Institute of Radiology. Details are shown in table 2.

Collectively, these findings indicate limited AI literacy and minimal hands-on experience across the workforce, forming a limited experiential basis for imagining AI leadership roles.

Workforce preparedness and individual confidence for AI leadership

Participants were asked two linked questions: (1) Are radiographers well prepared to lead the implementation of AI in healthcare? and (2) Would you feel confident to lead in an AI-enabled work environment? (figure 1). When considering workforce readiness, 61.9% felt radiographers were not well prepared. On individual confidence, responses were more balanced, with 55.4% reporting low personal confidence and 44.6% reporting confidence.

Table 1 Summary of respondent characteristics

Demographic	Variables	%	Frequency (n)
Gender	Female	64.5	176
	Male	33.3	91
	Non-binary	1.5	4
	Prefer not to say/other	0.7	2
	Total	100	273
Age	18–25	11	30
	26–35	35.5	97
	36–45	25	68
	46–55	19	52
	56–65	7.3	20
	>65	2.2	6
	Total	100	273
Radiography experience (years)	0–2	11.7	32
	3–5	14.3	39
	6–10	14.7	40
	11–20	31.1	85
	>20	27.5	75
	Retired	0.7	2
	Total	100	273
Radiographer specialty	Diagnostic radiographer	80.2	219
	Therapeutic radiographer	13.9	38
	Sonographer	4.8	13
	Both diagnostic+therapeutic radiographer	1.1	3
	Total	100	273
Highest academic qualification	Still studying as an undergraduate student	11	30
	BSc (or equivalent)	29.6	81
	Post graduate certificate	17.2	47
	Post graduate diploma	14	38
	Master's (or MBA/equivalent)	24.2	66
	PhD/professional doctorate	4	11
	Total	100	273
Professional role	Undergraduate student	15	41
	Apprentice radiographer	0	0
	Assistant practitioner radiographer	0	0
	Clinical radiographer	39.9	109
	Research radiographer	4.4	12
	Advanced practitioner radiographer	12.8	35
	Consultant radiographer	1.1	3
	Radiology manager	7	19
	Clinical academic (practitioner+teaching)	5.5	15
	Academic in radiography (teaching only)	5.5	15
	Academic in radiography (teaching+research)	6.2	17
	PhD student in radiography	0.4	1
	Retired radiographer	1.5	4
	Other	0.7	2
	Total	100	273
Main work setting	Public hospital	72.9	199
	Private hospital/centre	6.9	19
	Research centre/Institute/facility	1.5	4
	Mobile unit	6.2	17
	Not working in a clinical setting	12.5	34
	Total	100	273

Percentages have been reported to one decimal place.

Table 2 Self-reported level of AI knowledge, frequency of AI use and sources of AI education and training

Question	Answer	%	Frequency (n)
AI knowledge	Never heard of AI	4.8	13
	Basic	53.4	146
	Intermediate	35.2	96
	Advanced	5.9	16
	Expert	0.7	2
	Total	100	273
AI experience/use	Never used	56.4	154
	Occasional	18.7	51
	Daily	14.6	40
	Involved in research	10.3	28
	Total	100	273
AI education/training	None/self taught/personal reading	70	191
	CPD (HEI, Industry, Prof Soc)	28.5	78
	Others	1.5	4
	Total	100	273

Answers for 'others' included 'online CPD' and 'conference CPD'.
AI, artificial intelligence; CPD, continuous professional development; HEI, higher education Institution; Soc, professional society.

Taken together, these findings reveal a gap between perceived workforce-level readiness to lead AI implementation—where the majority felt the profession is not yet prepared—and individual confidence to lead within an AI-enabled working environment, where responses were more evenly divided. This pattern may reflect a distinction between leading the strategic introduction of AI and leading within an environment where AI is already in use.

Qualitative explanations: workforce-level preparedness

Respondents provided 267 narrative explanations for their responses to the question 'Are radiographers well prepared to lead the implementation of AI in healthcare?'. Many included multiple reasons, generating 177 coded excerpts explaining 'No, the workforce is not prepared' and 120 coded excerpts explaining 'Yes, the workforce is prepared'. These explanations fell into two broad clusters: (1) Barriers: rooted in education, resources and structural conditions and (2) Conditional enablers: linked to existing skills and professional potential.

Content analysis generated 11 themes (table 3). The dominant 'No' themes were Limited Access to Leadership-Enabling Education (n=99) and Lack of Resources (n=38). Among 'Yes' responses, the most frequent themes were Radiographer Skills (n=61) and Training and Support (n=23).

Overall, respondents framed workforce-level readiness as structurally constrained, not professionally implausible. Even supportive responses described readiness as conditional on training, protected time and managerial support.

Qualitative explanations: individual confidence in AI leadership roles

For the second dichotomous question, 'Would you feel confident to lead in an AI-enabled work environment?', 44.6% answered 'Yes' and 55.4% 'No' (figure 1). A total of 252 narrative explanations produced 138 coded 'No' responses and 114 coded 'Yes' responses (table 4). Themes mirrored those from workforce preparedness, with additional emphasis on Uncertainty About What Frontline AI Leadership Entails, reflecting ambiguity around what the role would involve in practice.

Factors shaping leadership confidence

At a significance threshold of 0.05, Mann-Whitney U tests showed:

Gender: Female radiographers reported significantly lower confidence in leading within AI-enabled work environments than males (p=0.002), and were more likely to perceive the radiography workforce as unprepared to lead AI implementation (p=0.03).

AI experience: Unsurprisingly, respondents with limited AI experience (having never used AI or using it only occasionally)

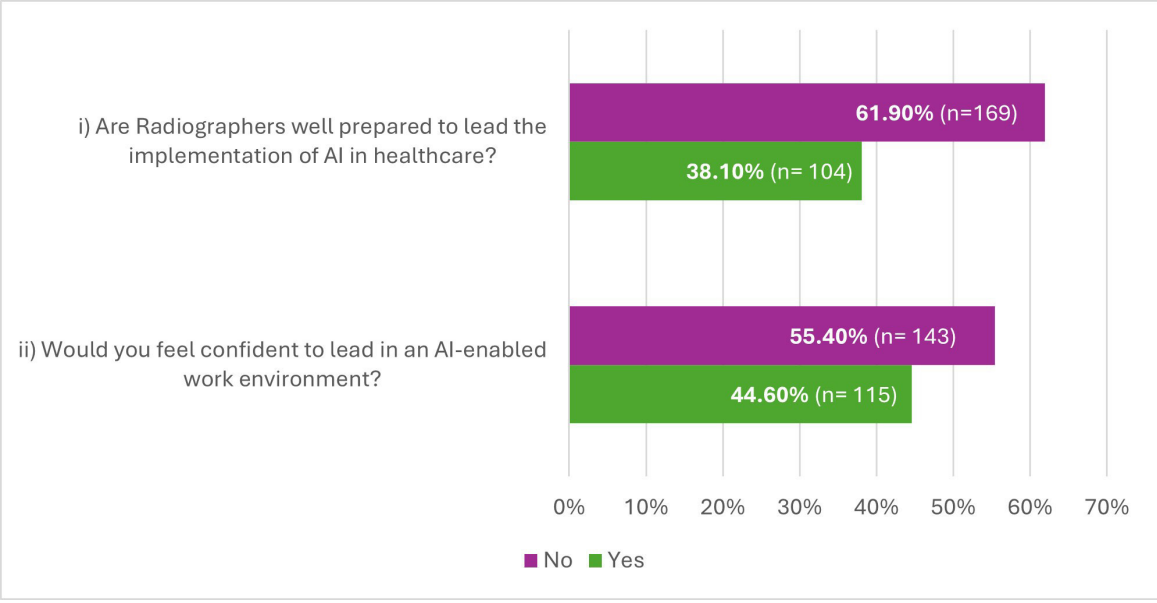

Figure 1 Results for questions exploring radiographer preparedness for undertaking AI leadership roles. Question (i) Are radiographers well prepared to lead the implementation *of* AI in healthcare?; n=273. (ii) Would you feel confident to lead in an AI-enabled work environment?; n=258 (number reduced due to survey attrition near the end). The majority of respondents answered no to both questions suggesting a lack of preparedness and confidence for AI leadership roles. AI, artificial intelligence.

Table 3 Summary of the main themes arising, and representative quotes, from content analysis of qualitative data asking participants to explain their answers to the following question: 'Are radiographers well prepared to lead the implementation of AI in healthcare?'

No responses (not prepared for AI leadership)		Yes responses (prepared for AI leadership)	
Limited Access to Leadership-Enabling Education (n=99)	*"They are not adequately educated or experienced across the UK in this subject to 'lead' on this."*	Radiographer Skills (n=61)	*"We already work with highly technical concepts and are in the best position to manage AI in imaging."*
Lack of Resources (n=38)	*"…without the protected time to learn and understand about the new ways of practice and the basics of what they are using, radiographers are being set up to fail."*	Training and Support (n=23)	*"I think they could be as we are all technically minded. If given the appropriate knowledge and training and have the support from higher up, locally and nationally, then we could really have a big role in this"*
Structural Changes Needed (n=15)	*"Needs a sea of change in managerial priorities to allow more involvement on implementation."*	Understanding of AI's role (n=19)	*"… we are well placed as radiographers to understand its (AI) role in medical diagnosis and champion its uses for improved workflows and diagnostic accuracy"*
Professional identity threat (n=13)	*"Our jobs are very independent, making our own decisions and being able to justify the reasoning behind doing these. Implementing AI will remove our ability to do this, therefore we will not want to lead something that has the possibility to remove the need for us to work"*	Need for evidence based practice (n=7)	*"Radiographers are best positioned to demonstrate how AI would help improve patient management… However, more research-based evidence is required."*
Alternative Leaders (n=12)	*"At this present moment, no. I feel as though clinical scientists/physicists mostly drive these changes and radiographers are taken along for the ride."*	Pool of radiography talent (n=6)	*"we have outstanding specialists who are also very ambitious."*
		Necessity (n=4)	*"We have to. If we don't, AI will not be utilised in a correct way. AI needs to be in tune with the system and people using it otherwise it disrupts"*
Total: n=177		Total: n=120	

AI, artificial intelligence.

reported significantly lower confidence in leading within AI-enabled settings than those using AI daily or involved in AI research (p=0.04).

Gendered differences in preparedness and confidence

Women who viewed the radiography workforce as unprepared for AI leadership were more likely to attribute this to 'professional identity threat' (10.3% vs 2.6% of men), while men more often cited systemic constraints such as 'lack of resources' (26.3% vs 15.4%) or the 'need for structural changes' (18.4% vs 6.8%). Women also more frequently reported needing role clarification (14.3% vs 8.6%), but despite lower overall confidence, they were more likely to frame AI leadership as a positive opportunity for change (19% vs 8.2%).

Aspirations: conceptualising AI leadership responsibilities

A total of 206 respondents suggested potential day-to-day responsibilities when asked 'What are some day-to-day responsibilities you think an AI radiographer leader could take on?'. Content analysis generated 344 coded excerpts across 19 categories and 5 themes (figure 2). Theme descriptions emphasised operational, practice-proximal responsibilities, including

Table 4 Summary of the main themes arising from content analysis of qualitative data asking participants why they answered yes or no to the following question: 'Would you feel confident to lead in an AI-enabled work environment?'

No responses (not confident)		Yes responses (confident)	
Lack of Education and Training (n=89)	*"I do not know enough about AI to have a role like this"*	Additional resources needed (n=45)	*"With the right team, support and funding. I wouldn't lead independently, I think you need multiple figures from different disciplines as everyone brings a different perspective"*
Uncertainty About What Frontline AI Leadership Entails (n=18)	*"I am not sure what this would look like to know if I could."*	Already have the necessary skills/ experience (n=42)	*"Having some background of research in AI I feel confident to introduce AI in my service."*
Not Professionally Interested (n=11)	*"I'm too old needs to be a young tech"*	AI as an opportunity for change (n=16)	*"Of course, it could be and interesting opportunity, a different way to work."*
Lack of Local Support (n=9)	*"No confidence that I would be supported if I were to try and implement some kind of AI improvement within the department"*	Need for radiographer leaders (n=8)	*"…manufacturers are the real implementers of AI in the clinical settings by selling their AI products. I feel this should be radiographers led not industry led"*
Lack of Trust in AI (n=8)	*"No it still feels too new to apply to healthcare setting"*	Dependent on clinical context (n=3)	*"Would depend on what the specific AI applications were."*
Governance Concerns (n=3)	*"there is also a lot to consider with information governance and patient data"*		
Total: n=138		Total: n=114	

AI, artificial intelligence.

Figure 2 Word cloud depicting categories (in word cloud) and themes (top left in key) from qualitative content analysis of the question 'What are some of the day-to-day responsibilities you think an AI Lead radiographer could take on?'. Themes are detailed in the legend, and colour-coded categories are displayed in the word cloud. The categories have the following frequencies: staff education/training (n=69), general quality assurance (n=43), general managerial responsibilities (n=38), monitoring systems (n=26), maintain clinical skills (n=25), safety (n=22), integrating new systems (n=20), audits (n=18), patient care (n=17), industry communication (n=10), image quality (n=12), patient/public communication (n=9), research (n=8), building and labelling data sets (n=7), AI troubleshooting (n=6), other healthcare professional (HCP) communication (n=4), AI procurement (n=4), data quality (n=3) and networking (n=3). Frequency of categories appearing in survey responses proportionally determines the size of the fonts in the word cloud. Identified themes suggest radiographers conceptualise potential AI-led responsibilities as mainly operational and practice-proximal. AI, artificial intelligence.

Quality Assurance and Governance, Staff Management, Collaboration and Communication, Operational Aspects of AI and Skills Honing.

When asked specifically about the day-to-day responsibilities of a dedicated AI Lead radiographer role, respondents focused predominantly on operational and practice-proximal tasks; quality assurance, staff support, system monitoring and governance, with very little reference to strategic, organisation-wide or profession-level functions. This pattern reflects how participants conceptualised the responsibilities of that specific post and should not be read as a direct measure of how radiographers perceive AI leadership more broadly; the latter is addressed by the preceding questions on workforce preparedness and individual confidence.

Differences across professional backgrounds

Table 5 illustrates variation in responses across frontline radiographers, radiology managers and radiographer academics, when suggesting day-to-day responsibilities an AI lead radiographer could take on.

Perceptions of AI leadership varied more by professional identity than hierarchical role. Radiographer academics showed greater confidence (9.1% answering 'don't know' vs 18.8% clinical and 21.4% managers) and broader views of the role. Education and training was the most cited responsibility (n=69), especially among leaders (45.5% vs 28.8% clinical, 28.6% managers). Some clinical staff (15%) stressed maintaining clinical competence, a view absent in management. Governance

Table 5 Notable differences in roles and responsibilities, as suggested by radiographers from different professional backgrounds, in response to the question 'What are some of the day-to-day responsibilities you think an AI Lead radiographer could take on?'

Suggested role/responsibility (figure 2)	Frontline/clinical radiographers (n=215)		Radiology managers (n=19)		Radiographer academics (n=33)	
	Freq. (n)	%	Freq. (n)	%	Freq. (n)	%
Staff education and training	46	28.8	4	28.6	10	45.5
General quality assurance	41	25.6	1	7.1	3	13.6
Safety	13	8.1	1	7.1	7	31.8
Maintain clinical skills	24	15	0	0	1	4.5
Integrating new systems	9	5.6	2	14.3	0	0
Audits	16	10	3	21.4	3	13.6
Don't know	30	18.8	3	21.4	2	9.1

Cohorts included front-line/clinical radiographers (undergraduate students, clinical radiographers, research radiographers, advanced practitioner radiographers, consultant radiographers and clinical academics; n=215), radiology managers (n=19) and radiographer academics (academics and PhD students in radiography; n=33) (see table 1: professional backgrounds). Percentages are calculated from the total respondents to this question for each cohort.
AI, artificial intelligence.

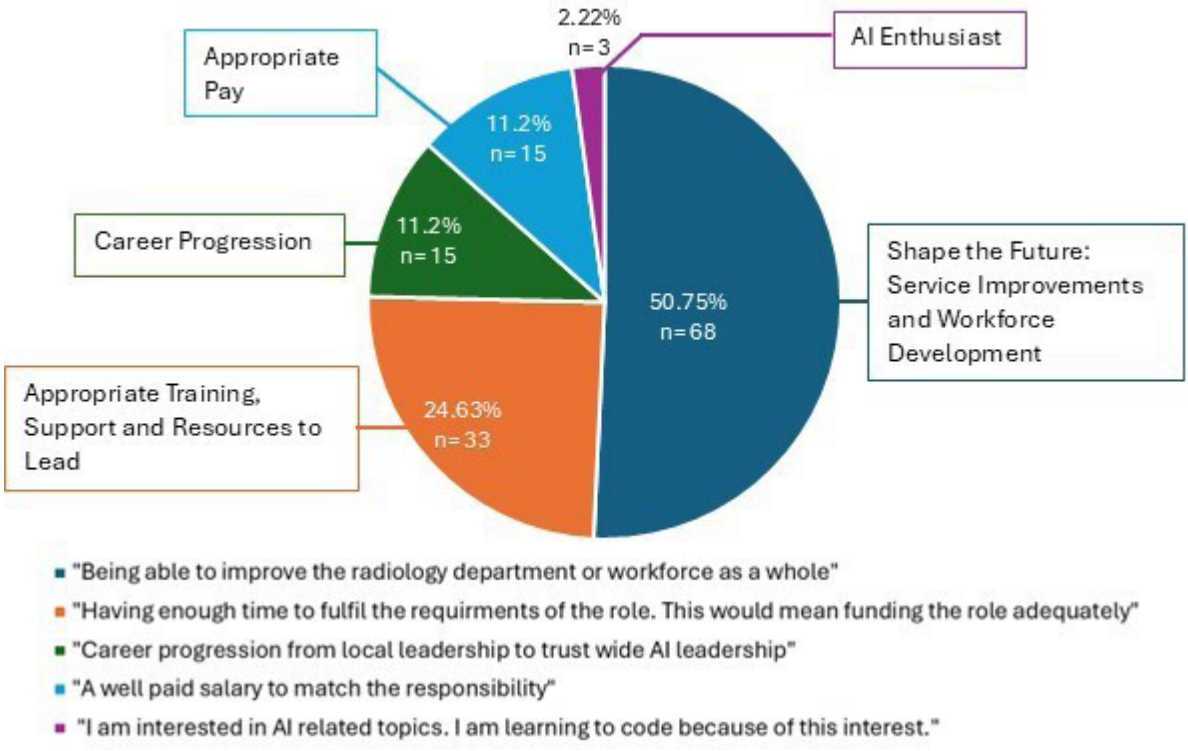

Figure 3 Themes for the qualitative responses to the question 'If you feel confident leading in an AI-enabled work environment, what would motivate you to consider an AI leadership role?' (n=134). Example quote for each theme is colour-coded with the theme. Motivations are predominantly collective and service-oriented, rather than for personal advancement. AI, artificial intelligence.

responses also diverged: clinical staff highlighted quality assurance (25.6%), academics emphasised safety (31.8%), while few managers (7.1%) mentioned either. Instead, managers framed the role as task-oriented, focusing on system integration (14.3% vs 5.6% clinical, 0% leaders).

Motivations for pursuing AI leadership

Among those who reported confidence to lead within an AI-enabled work environment—that is, to exercise AI-related leadership responsibilities as part of their existing radiographer role—101 narrative responses (134 coded excerpts) that formed 5 themes, addressed motivations for taking on such responsibilities (figure 3). Note that the survey question used the phrase 'AI leadership role' without specifying whether this referred to a dedicated post or to leadership within an existing role; responses should therefore be read as reflecting motivations for AI-related leadership engagement broadly, rather than pursuit of a formal AI leadership position specifically.

Motivations were predominantly collective and service-oriented: improving workflows, supporting colleagues, enhancing patient care and promoting safe implementation, rather than oriented toward personal advancement.

Synthesis of findings

This study provides the first systematic evidence of how UK radiographers perceive their readiness, confidence and roles in AI leadership. Radiographers recognise the importance of AI leadership but feel constrained by gaps in education, resources, limited experiential exposure, with gendered variations in confidence and limited structural and organisational support. Radiographers conceptualise AI leadership less as an abstract strategic influence and more as a set of day-to-day responsibilities rooted in governance, quality assurance, troubleshooting and staff support.

DISCUSSION

Radiography leadership remains an emerging field of inquiry, with only a small number of scholars, most notably Mills *et al*,[40 41] actively shaping its early evidence base. In the absence of up-to-date leadership frameworks for the profession,[42] and with current support largely channelled through initiatives such as special interest groups and mentorship schemes,[43–45] there is limited legacy literature from which to anchor emerging concepts such as AI leadership. It is therefore important to acknowledge that this study sits within a developing landscape, where radiographer leadership research is still evolving, and where AI-specific leadership is even less defined. The intention of this work is to contribute foundational insights into this growing conversation, recognising that establishing AI leadership within a profession still building its broader leadership identity presents inherent conceptual and practical challenges.

Readiness and education gaps in AI leadership

Most radiographers in this study did not feel adequately prepared or confident to assume AI leadership roles reflecting low levels of AI literacy and limited hands-on exposure to AI technologies. Qualitative responses illustrated concerns such as 'fear of replacement', 'lack of trust in AI' and 'governance concerns', reflecting broader anxieties documented in the literature, particularly among healthcare professionals with limited exposure to AI education.[1 31] Evidence from recent studies demonstrates that foundational AI training reduces fear and increases optimism about AI. This suggests that addressing basic AI education gaps

is a critical precursor to fostering readiness and enthusiasm for AI leadership roles.[1]

The study findings indicate that radiographers with advanced experience in AI demonstrate greater confidence for potentially leading within AI-enabled clinical environments. This suggests the importance of hands-on, interactive training alongside HEI education to cultivate leadership readiness. To support the development of radiographers as confident and capable AI leaders, educational initiatives must be embedded within routine clinical practice and delivered in parallel with foundational AI principles.

It is important to recognise that the radiography workforce has different levels of AI educational needs. Some require foundational literacy, focusing on basic concepts and contextual understanding. Others need intermediate, practice-embedded training to work effectively with AI-enabled workflows. A smaller group will require advanced leadership education to guide AI implementation and influence strategic decisions. Embedding experiential learning through supervised AI use, shadowing and project-based involvement will be essential for building confidence and capability. Crucially, the development of advanced-level educational pathways or development programmes must not occur in isolation and must be accessible across the profession.

How radiographers conceptualise AI leadership roles

Respondents predominantly framed AI leadership as operational and practice-proximal. Suggested responsibilities centred on quality assurance, safety, monitoring systems, troubleshooting and educating colleagues, aligning with workforce archetypes 'drivers' and 'embedders' as described by NHS England's 2023 report outlining the workforce archetypes needed for successful AI adoption.[46] Strategic responsibilities such as procurement, policy shaping or involvement in national governance frameworks, described as 'shapers' and 'creators' by National Health Service (NHS) England, were mentioned far less frequently. This reflects a conceptualisation of leadership grounded in everyday clinical problem-solving rather than in broader organisational or profession-level influence.

This pattern mirrors radiographers' current visibility and role boundaries within the NHS. In the absence of clearly defined AI leadership pathways and policies, radiographers default to interpretations that resonate with their professional identity, workflow responsibilities and regulatory obligations. Leadership is viewed as an extension of existing operational duties rather than a shift into new strategic territory.

Compared with other radiology professionals, radiographers exhibit a more reserved perspective regarding their potential involvement in AI leadership. For instance, a majority of European radiologists (62.1%) believe that radiologists should oversee all stages of AI system development within radiology.[47] Radiographers possess distinctive strengths that would enrich AI leadership; their ability to bridge patient-care and technological competence, communicate effectively across diverse services and specialties, oversee end-to-end radiology and radiotherapy workflows and rapidly troubleshoot technical issues, positions them as invaluable contributors to AI-enabled transformation. It is a missed opportunity that these capabilities are not more fully recognised by the workforce or reflected in strategic leadership pathways. Nonetheless, the motivations expressed by radiographers for engaging in AI leadership (figure 3) reflect similarly altruistic and profession-driven values as other professions. Wichtmann *et al* identify key motivators among radiologists for assuming AI leadership roles, including clinical stewardship, ethical oversight, operational efficiency, mitigation of burnout, preservation and elevation of professional identity and future-proofing through workforce development.[2] In alignment with these themes, 50.75% of radiographer respondents in this study cited motivations such as 'shaping the future through service improvement and workforce development' (figure 3).

It is important to avoid interpreting low reported confidence as evidence of low competence for AI leadership but as a predictable feature of early-stage professional engagement with novel responsibilities. Evidence from other healthcare professions demonstrates that confidence in digital and technology-related leadership is strongly mediated by exposure and structured development, rather than by fixed professional capability and competence.[1 28 48] For example, studies of nursing and pharmacy workforces show comparable patterns of initial underconfidence in digital leadership that diminish substantially following targeted education and experiential opportunity.[49–51] The expert leadership literature similarly documents that domain experts, including clinicians, who are given the structural conditions, training and mandate to lead, consistently outperform non-experts in technologically complex environments.[26] The findings of this study should therefore be read as a diagnostic of current preparedness gaps and systemic barriers, not as a ceiling on radiographers' leadership potential.

Structural and organisational barriers to AI leadership

Managerial support and protected time

A significant proportion of radiographers reported insufficient managerial support, lack of protected time and absence of clear development pathways as barriers to engaging in AI leadership. Participants frequently described being 'set up to fail' due to workload pressures and competing clinical priorities. These concerns underscore the need for organisational environments that provide psychological safety, resourcing and support for exploring AI-related responsibilities. Without such infrastructure, AI leadership will remain inaccessible to many radiographers regardless of their motivation.

Policy and leadership architecture

Mizzi and Marshall (2023) highlight the systemic and cultural barriers that render AHPs, including radiographers, invisible within England's leadership structures.[48] AHPs often encounter a 'glass ceiling', with few senior roles tailored to their profession and a loss of identity when stepping into leadership. This is exacerbated by medical-centric job descriptions (eg, 'medical director', 'medical education') that persist even in digital transformation contexts, where terms like 'clinical director' would be more inclusive. Mizzi argues that leadership pathways are shaped by both culture and nurture: while medical doctors benefit from embedded leadership routes, interprofessional learning and systemic visibility, AHPs are frequently excluded from strategic decision-making due to poor policy design and limited data granularity.

Radiographer leadership training typically focuses on team-based skills such as communication, resilience and collaborative problem-solving framed as universally accessible.[42 45] In contrast, leadership development for medics (including radiologists) is often reserved for consultant-level roles and geared toward strategic decision-making, innovation and complex change management.[52] To standardise leadership across NHS roles, the new 'NHS Management and Leadership Framework' introduces a national code of practice, inclusive of AHPs, but its full rollout is delayed until late 2026.[53] In the meantime, radiographer

leadership remains fragmented, with inconsistent governance and narrow operational scopes. More coherent governance, wrapped around inclusive leadership development, is required to ensure that radiographers can meaningfully participate in digital transformation.

Gender, confidence and equity

Our analysis revealed gendered differences in perceptions of AI leadership readiness. Female radiographers feeling less confident and less prepared for AI leadership positions is not surprising. Previous radiographer research has shown female radiographers tend to express lower levels of confidence in using AI technologies compared with their male counterparts.[31] This lack of confidence may be attributed to disparities in training exposure,[54] or more simply, that women are underrepresented in leadership roles related to technological innovation, which may influence their openness to considering such roles.[55] Given that approximately two-thirds of the radiography workforce in the UK is female,[56] it is imperative that targeted strategies are implemented to ensure that women feel confident, adequately prepared, and meaningfully supported to engage in AI adoption and leadership.

The wider AHP community

The structural, educational and confidence-related barriers identified in this study are not unique to radiographers. These barriers mirror challenges reported across the wider AHP workforces, both in relation to digital and AI-enabled technologies and within broader leadership development.[48 57–59] As such, the insights generated here may have broader applicability, offering a useful foundation for understanding and supporting AI leadership development across the wider AHP community.

Organisational recommendations

Managers could enable meaningful engagement with AI by providing equitable access to CPD and structured learning time, recognising that, while not currently a regulatory requirement, protected time is essential for developing the confidence and capability needed for radiographers to lead in AI-enabled practice. Management could also create structured opportunities for radiographers to engage in digital leadership mentorship and gain hands-on experiential exposure to AI in practice.

LIMITATIONS

This study has several limitations. Snowball sampling and voluntary participation may have introduced selection bias, with respondents potentially more interested in digital transformation than the wider workforce. The sample was mainly composed of frontline practitioners, which may have reinforced the operational emphasis in leadership conceptualisation. Unfortunately, the leadership experience of participants was not captured, which limits the ability to compare responses by leadership background, preventing a comparison of views across varying levels of leadership exposure. Low AI literacy at the time of data collection may have constrained participants' ability to envision advanced or strategic leadership roles. Additionally, the open-ended question on AI leadership responsibilities focused on day-to-day tasks, which may have steered responses away from higher-level functions. Variability in the language used to describe AI-focused roles versus AI-related responsibilities within existing roles may have introduced uncertainty regarding which construct survey questions were referring to, raising the possibility that survey participants may not have interpreted these distinctions uniformly. Finally, it is difficult to determine whether participants' reported beliefs and confidence relate specifically to AI leadership or whether they reflect broader leadership confidence within the sample. As such, any conclusions drawn from these perceptions should be interpreted cautiously, acknowledging the potential conflation of AI-specific views with more general leadership attitudes.

Future research should purposively sample senior leaders, employ longitudinal designs following AI education interventions and undertake qualitative studies that explicitly probe strategic and national-level leadership responsibilities. Further work is needed to determine how much of the reported preparedness, confidence and perceived barriers relate uniquely to AI leadership, as opposed to broader radiographer leadership considerations. The emotional barriers that may prevent radiographers from engaging in AI leadership also warrant further exploration.

CONCLUSIONS

Radiographers recognise the necessity of AI leadership within medical imaging and radiotherapy, but their understanding remains largely operational and tied to immediate practice concerns. While this reflects current work realities and limited hands-on exposure to AI systems, it also exposes significant gaps in policy guidance, role definition and professional development infrastructure. The findings also reinforce literature pointing to broader structural challenges affecting AHP leadership more generally, including the absence of profession-specific leadership pathways, medico-centric governance structures and inequitable access to development opportunities. This study adds new evidence by showing how these systemic barriers manifest in the AI context. For radiographers to move beyond implementation roles and contribute meaningfully to strategic decisions about AI adoption, governance and service redesign, national bodies, educators and healthcare organisations must act deliberately providing clearer career pathways, supported learning opportunities and targeted strategies to address workforce inequities. Without such investment, the profession risks being shaped by AI rather than actively shaping how AI is integrated into imaging and radiotherapy services. By addressing the educational, structural and cultural barriers identified here, radiographers can be positioned not only to operate AI safely and effectively, but to lead its responsible, evidence-informed and patient-centred implementation across the healthcare system.

Contributors All authors contributed to the conceptualisation and study design. GW, CM, JJM and BOB collected the data, with GW, CM and JJM conducting the data analysis and BOB undertaking the statistical analysis. GW drafted the manuscript, and all authors contributed to its revision. CM provided overall supervision and serves as the guarantor for the work.

Funding This work was supported by the College of Radiographers Industry Partnership Scheme (CoRIPS) from the College of Radiographers (grant number 218). This work was further supported by the ESRC (part of UKRI) through the South and East Network of Social Sciences (SENSS) Doctoral Training Partnership.

Competing interests JJM and AG, co-authors of this manuscript, both serve on the editorial board for BMJ Leader. These roles did not influence the design, conduct or reporting of this research and all editorial processes adhered to the journal's conflict of interest policy. All other authors have no potential conflicts of interest affecting the research, funding or publication of this study.

Patient consent for publication Not applicable.

Ethics approval Ethical approval (ETH2223-1346) was granted by City St George's, University of London School of Health and Psychological Sciences Ethics Committee. Informed consent was obtained from all participants using an online information sheet, and an explicit consent button on the survey's first page.[30]

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as supplementary information.

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