INTRODUCTION

Less Than Full-Time (LTFT) training allows UK postgraduate medical trainees to reduce their working hours below the standard full-time schedule (40 hours per week). This is typically expressed as a percentage of full-time work or whole-time equivalent (WTE), resulting in a longer overall training duration to accommodate the reduced weekly hours[1].

Data from the General Medical Council (GMC) shows a consistent rise in LTFT trainees across all medical specialties, from 9.1% in 2013 to 21.4% in 2024[2]. Within radiology, 19% of clinical radiology trainees were reporting to be LTFT in 2023, rising to 19.8% in 2024. In 2024, 39% of consultant clinical radiologists reported working LTFT, reflecting a continuing upward trend. LTFT working was most common among older consultants (41% in those aged 50–59), though it was also reported by 26% of those under 40. Importantly, prevalence has risen across all age groups over the past six years. [3]

Research participation is a key component of both the GMC's Good Medical Practice guidance and the RCR's recently updated curriculum[4,5]. Radiology trainees are expected to demonstrate engagement with and commitment to evidence-based practice through a range of research-related activities, from participating in local audit/quality improvement projects to publication of radiology research. However to our knowledge, dedicated research hours are not specifically recommended by the RCR.

A survey conducted by the Radiology Academic Network for Trainees (RADIANT) in 2021 reported that 72.3% of radiology trainees were motivated to participate in research[6]. However, respondents reported barriers to research including lack of time (60.7%), lack of awareness of opportunities (53.6%), and limited experience in research statistics (46%). In that survey, the vast majority of

respondents were full-time trainees (93.7%, n=210), with only a small minority of LTFT trainees represented. As such, the specific challenges and research barriers faced by LTFT trainees remained largely unexplored.

These findings raise the question of whether LTFT trainees who may have unique constraints and competing priorities experience additional or distinct challenges in accessing research opportunities. The increasing prevalence of LTFT working patterns, particularly among those with caring responsibilities or health concerns, makes this question increasingly relevant to workforce planning and academic inclusion.

The primary aim of this study was to increase our understanding and awareness of the experiences of past, present, and prospective LTFT radiology trainees in relation to research participation. Specific objectives were: (1) To determine the level of interest in and opportunities for research among LTFT radiology trainees; (2) To identify perceived or actual barriers to engaging in research within the LTFT training structure; (3) To gather suggestions and recommendations for how research access and engagement could be improved for LTFT trainees.

MATERIALS AND METHODS

A cross-sectional study was conducted using an online survey to assess research participation and barriers among UK radiology trainees. The survey targeted all UK clinical radiology trainees who identified as current, past, or prospective LTFT trainees. Prospective LTFT trainees were included on the basis that they were expected to have considered similar barriers and aspirations to LTFT as current trainees and thus could contribute comparable viewpoints. There were no exclusion criteria. All responses received during the data collection period were included in the final analysis.

The survey was hosted on Google Forms and comprised of 34 questions, structured into five thematic sections: trainee demographics, reasons for LTFT training, research interests, research contributions, and trainee recommendations. Questions included both close-ended (multiple choice, Likert scale) and open-ended formats (Supplementary Material File: Survey Questions). Only one submission per user account was permitted. We did not identify any evidence of duplicate submissions in the dataset.

Survey dissemination occurred between 12 October 2023 and 14 December 2023 through three main routes: (1) the RADIANT UK member mailing list; (2) Clinical Radiology Training Programme Directors of NHS deaneries; and (3) RADIANT UK's X account to reach the wider trainee community.

Participation was voluntary and anonymous. Responding to the survey implied informed consent. Ethical approval was deemed unnecessary as per the Medical Research Council (MRC) Health Research Authority decision tool as we surveyed doctors in training about their educational experiences without collecting patient data[7].

The survey collected both quantitative and qualitative data. Descriptive statistics were used to summarise categorical variables such as demographics and levels of research interest. For qualitative data, thematic analysis was conducted to identify key themes and recurring patterns.

RESULTS

Demographics

A total of 48 responses were received (Table 1). Our respondents comprised 68.8% current LTFT trainees, 16.7% past LTFT trainees (recently qualified), and 14.6% prospective LTFT trainees (considering LTFT but in full-time training at the time). The average age of respondents was 34 years (range: 27-45 years). Respondents came from a wide range of ethnic backgrounds, with 50% identifying as White British. All respondents identified as either male or female (64.6% female, n=31). A significant proportion of respondents (64.6%, n=31) reported carer responsibilities (Figure 1). Most respondents were married or in a civil partnership (64.6%, n=31).

The responses represented all training levels set out by the UK Local Education Training Boards /deaneries, with ST3 (20.8%, n=10) and ST4 (22.9%, n=11) being the most represented (Figure 2). Hospital-based and academy-based training models were evenly represented.

At the time of the survey, 68.8% (n=33) were current LTFT trainees, 16.7% (n=8) were past LTFT trainees, and 14.6% (n=7) were considering LTFT. Of the past/current LTFT cohort, 47.9% were or had worked at 71-80% full-time equivalency. Notably, 14.6% (n=7) had never worked full time during radiology training. (Figure 3) Of the 41 trainees who has reported working LTFT, 70.7% (n=29) were female-identifying.

Reasons for Choosing LTFT Training

Respondents were asked to rate the importance of various factors influencing their decision to undertake LTFT training, with the listed categories being childcare, work-life balance, healthcare-related goals, academic/research work, and personal health and wellbeing. Each factor was evaluated using a 5-point Likert scale, where 1 indicated "not important" and 5 indicated "very important".

Childcare and work-life balance were the most cited reasons (Figure 4). Specifically, 60.4% (n=29) considered childcare a "very important" factor, and 79.2% (n=36) rated work-life balance as either "important" or "very important".

Personal health and wellbeing were also frequently cited, with 41.7% (n=20) considering it "very important" and 31.3% (n=15) "important".

Healthcare-related goals were defined as aims aligned with fulfilling curriculum requirements, such as exam preparation, attendance at educational courses, and/or clinical skill development. These were rated as "important" by 16.7% (n=8) and "very important" by 12.5% (n=6).

Academic or research work was one of the least commonly cited motivators for choosing LTFT training. 47.9% respondents (n=23) stated that academic or research pursuits were "not important at all" in their decision-making. Only 8.3% (n=4) rated it as "very important," and 10.4% (n=5) as "important", highlighting a disconnect between academic interest and the realities of LTFT adoption.

Trainee Interest in Research

Respondents were asked to rank their interest in getting involved in research on a Likert 5-point scale (1 = not important, 5 = very important).

A total of 37.5% of respondents (n=18) rated their interest in research as a 5, the highest level of engagement, and an additional 20.8% (n=10) selected a 4, further emphasising that more than half of the respondents (58.3%, n=38) have a significant interest in research (Figure 5).

Conversely, 27.1% (n=13) reported moderate interest (3), while only 6.3% (n=3) and 8.3% (n=4) reported low or very low interest, respectively.

Research Contributions of LTFT Trainees

To define research contributions, respondents were asked to select all applicable types of research involvement listed in Figure 6.

Of the 48 respondents, 20 reported undertaking no research activity while training LTFT. 19 reported undertaking research activity; among this group, the most common forms of contribution were publication in a peer-reviewed journal (57.9%, n=11) and poster presentations (57.9%, n=11). Oral presentations (36.8%, n=7) and involvement in research without any output for dissemination (36.8%, n=7) were also noted, but fewer trainees reported pursuit of higher degrees (21.1%, n=4) or participating in multi-centre research (10.5%, n=2) (Figure 6).

Only one (5.3%) respondent reported undertaking research solely during NHS-contracted hours while working LTFT. The majority conducted research either entirely outside of working hours (52.6%, n=10) or partially during NHS hours (42.1%, n=8). (Figure 7).

Barriers to Engaging in Research

Respondents were asked to reflect on how LTFT training affected their ability to engage in research. Responses were mixed: out of 40 respondents, 14.6% (n=7) reported a positive impact, 22.9% (n=11) reported a mixed impact, while 18.8% (n=9) noted a negative impact. The largest group (27.1%, n=13) reported that LTFT had no impact on their research involvement.

In a multiple-choice question, respondents who reported not engaging in research activity whilst working LTFT (n=20) were asked to report any perceived barriers to engagement. The most frequently cited barrier was lack of protected time during working hours (22.1%, n=15). Other frequently reported barriers were limited access to supervisors (17.6%, n=12) or projects (17.6%, n=12), lack of confidence/skills (16.2%, n=11), and logistical/organisational constraints (14.7%, n=10). Fewer respondents cited lack of interest (2.9%, n=2) or childcare commitments (1.5%, n=1) as a key deterrent. (Figure 8). These findings suggest that structural constraints such as dedicated research time allocation and mentorship can represent barriers to research engagement.

No significant difference in research engagement were observed by gender or carer status. 70% (n=14) of 20 respondents who did not participate in research cited carer-responsibilities, compared to 68.4% of 19 respondents who did engage with research activities (n=13).

Qualitative responses exploring the impact of LTFT training on research revealed key themes:

- Lack of research opportunities: Trainees cited missed chances due to non-working days and feeling overlooked.
- Time constraints and competing priorities: Many noted insufficient time during LTFT schedules to meet training needs and conduct research.
- Work-life balance considerations: Some felt that research during non-working days would negate the benefits of LTFT training.

- Impact on clinical training: Concerns were raised about meeting portfolio targets and logbook requirements within reduced hours.
- Positive experiences: A minority highlighted improved focus, cognitive space, and flexible scheduling enabling engagement in research (Table 2).

These findings suggest that while LTFT offers potential for flexibility, it also introduces unique challenges that can hinder research participation depending on local support and rota structure.

Likelihood of Increased Research Engagement with Dedicated Time

When asked about the likelihood of engaging in research if provided with dedicated time, respondents expressed a strong positive inclination.

When asked how likely they would be to engage in research if provided with dedicated research time, 43.8% (n=21) of trainees said they would be "extremely likely" to do so. An additional 39.6% (n=19) responded that they would be "likely," indicating a strong overall enthusiasm for protected research opportunities. Only a small minority reported being "neutral" (14.6%, n=7) or "unlikely" (2,1%, n=1) to engage with research. (Figure 9)

The above suggests that dedicated research time could increase research participation among LTFT trainees, highlighting the consideration for structural reform in training programmes to support academic engagement.

Recommendations and Suggestions

Free-text responses yielded several constructive suggestions to improve research engagement among LTFT trainees. (Table 3) Thematic analysis of these responses identified three primary areas of reform:

- Advocacy for dedicated research time: Many trainees expressed a desire for protected research time to be formally integrated into LTFT schedules. The absence of such time often forces research into personal hours, undermining work-life balance, the very reason many chose LTFT training.
- Inclusive research opportunities and flexible posts: Respondents noted the limited availability of Academic Clinical Fellow (ACF) posts that accommodate LTFT training. There was strong advocacy for increased flexibility in formal academic roles and more transparency around adapting fellowships for part-time working.
- Positive impact of flexibility when supported: Some trainees reported that dedicated study sessions within LTFT frameworks significantly aided their ability to engage in research, illustrating that flexible and supportive planning can empower LTFT academic contributions.

These insights reinforce the need for structural and cultural changes to make academic pathways more accessible and sustainable for LTFT trainees. OBJ

DISCUSSION

To our knowledge, this is the first UK-wide study specifically exploring the barriers and enablers to research engagement among LTFT clinical radiology trainees. While several of the challenges identified are shared with the broader trainee population, this study highlights unique structural and cultural barriers, and opportunities, for improving research participation within this growing cohort.

Work-Life Balance and the Changing Landscape of LTFT Training

The decision to pursue LTFT training in our cohort was predominantly driven by personal wellbeing and caregiving responsibilities, echoing national data on LTFT uptake. The increasing popularity of Category 3 LTFT (which allows trainees to reduce hours for lifestyle reasons) suggests a paradigm shift in how doctors structure their careers, reflecting the need for sustainability and flexibility in training.

Our results suggest that for most respondents, LTFT training was not a means to carve out time for academic engagement, but rather a protective mechanism against burnout. This aligns with national studies across specialties, which show that LTFT is increasingly used to preserve mental wellbeing and prevent attrition from training[8,9].

Despite research not being a key factor in their decision to train LTFT, over half of our respondents expressed a strong desire to participate in academic activity, particularly if dedicated research time were made available. This reveals a disconnect between trainee interest and structural opportunity. The implication is not that LTFT trainees lack academic ambition, but rather that current training models may not be accommodating to achieve their aspirations. Accounting for these working patterns when developing future research initiatives could help prevent exclusion of LTFT trainee involvement.

Structural Barriers to Research Engagement

Despite a clear interest in academic work, many trainees in our survey were unable to pursue research due to well-recognised structural barriers: lack of in-hours time, mentorship gaps, and concerns about falling behind in clinical competency. These findings mirror those of Cathcart et al, who reported that 32% of LTFT trainees across the UK described a negative impact on their training, with reduced academic opportunities being a key theme[10].

A notable issue is the absence of protected research time for LTFT trainees. In our cohort, over half of trainees who undertook research did so outside NHS-contracted hours, widening inequity with full-time trainees who can more easily access daytime academic opportunities. Furthermore, reduced hours may also heighten time pressure to meet portfolio targets and clinical competencies within fewer weekly working hours.

This echoes concerns raised by Hendrickson et al. in plastic surgery, where LTFT trainees reported difficulty accessing training opportunities due to inflexible rotas, poor understanding of LTFT frameworks among rota coordinators, and a lack of clarity around study leave and academic entitlements[9]. Similarly, Dobson et al. found that 60% of LTFT cardiology trainees lacked access to regular research or administrative sessions[8].

Further evidence from a national survey by Parida et al. reinforces these systemic concerns. Female doctors were three times more likely than their male counterparts to report entering LTFT training or leave their specialty, citing rota inflexibility, relocation demands, and a lack of control over training schedules as key drivers[11]. These challenges, represent structural impediments that indirectly restrict participation in non-clinical opportunities such as research and quality improvement.

Cultural and Gendered Barriers

Although a large proportion of respondents in our cohort were female and many reported carer responsibilities, our results did not demonstrate a difference in research engagement between male and female respondents or between carers and non-carers. A similar proportion of trainees in both groups had been able to engage in research. However, this finding should not be interpreted as evidence that gender and caring roles are irrelevant to academic engagement. Rather, it underscores the complexity of barriers faced by LTFT trainees and suggests that these are likely systemic rather than limited to individual identity categories.

The broader literature supports the notion that LTFT training remains a gendered space. Morgan et al. describe how motherhood often necessitates a shift to LTFT in surgical training but also introduces further disadvantages such as rotational disruptions and lack of mentorship continuity[12]. Rich et al. similarly reported that female trainees with children frequently face both logistical challenges and structural biases, describing a training culture that can feel dehumanising and unsupportive[13].

The academic aspirations of LTFT trainees represent a valuable but underutilised resource. Our findings suggest that appropriate support such as dedicated time and mentorship could significantly increase participation. Enabling academic development within LTFT frameworks could help address underrepresentation of women and carers in leadership and research-intensive roles. As the radiology workforce evolves, creating space for inclusive academic participation is both a strategic and ethical priority.

Missed Potential and Workforce Implications

Given the growing interest in research and academia among UK radiology trainees (as highlighted by

the 2021 RADIANT survey), the currently unmet academic aspirations of LTFT trainees represent a missed opportunity[6]. In a workforce increasingly reliant on imaging-led decision-making and multidisciplinary innovation, enabling research engagement among all trainees, including those with alternative working patterns, must become a strategic priority.

This is especially relevant in the context of workforce sustainability. Studies have shown that LTFT pathways, when properly supported, reduce burnout, improve morale, and enable retention of experienced trainees[8,9]. In the long term, ensuring access to academic development for LTFT trainees may help address the underrepresentation of women and carers in leadership and research-intensive roles, and contribute to a more inclusive, resilient radiology workforce.

Limitations

Several limitations of this research should be acknowledged. The survey was distributed openly via trainee networks rather than directly to all LTFT trainees, meaning a formal response rate cannot be calculated. The self-selected nature of the sample may have introduced bias, with potential over-representation of trainees already engaged with RADIANT or with a particular interest in research. In addition, while our findings highlight important themes, they may not fully capture the perspectives of all LTFT trainees across the UK. Some prospective LTFT trainees may also have anticipated barriers they had not yet experienced, which could skew responses about perceived challenges. Nevertheless, capturing the perspectives of this group is valuable, as their expectations can influence future decisions regarding LTFT training and research engagement.

Recommendations and Future Directions

Our findings suggest that meaningful structural and cultural reforms are required to ensure equitable access to academic development for all radiology trainees, regardless of working pattern. To address

these barriers and unlock the academic potential of LTFT trainees, we recommend the following:

Formal allocation of pro-rata research sessions within LTFT job plans. Pro-rata allocation of research sessions within job plans would allow LTFT trainees to pursue academic development without additional burden or guilt. Similar calls have been made in the context of clinical academia more broadly, where lack of ring-fenced time has been cited as a deterrent to progression for women and caregivers[11,13]. The RCR Clinical Radiology Curriculum emphasises research engagement but does not mandate protected research time or minimum academic sessions. As a result, provision varies across deaneries and departments, leading to inconsistent access for both LTFT and WTE trainees. Future RCR guidance could support flexible, pro-rata academic time in job plans to improve parity of access.

Increased availability of flexible ACFs and PhD pathways. Current ACF structures are almost exclusively designed for full-time trainees, with limited clarity on how posts can be adapted for LTFT colleagues. Expanding the number of ACFs that are explicitly open to flexible working and ensuring that fellowship durations and funding are adjusted accordingly could widen access to academic careers.

National guidance on equitable rota design and research access for LTFT trainees. National-level guidance from NHS England or the GMC on how to structure LTFT rotas, particularly those incorporating research or educational roles, would support both trainees and rota coordinators and mitigate against local gatekeeping or inconsistencies.

Visibility and mentorship from clinical academics who have trained LTFT. Mentorship is a well-established facilitator of academic engagement, yet LTFT trainees often lack visible role models who have successfully pursued research. Initiatives to amplify the visibility of LTFT

academic clinicians, including speaker panels, social media campaigns, mentoring schemes, may normalise diverse career paths and dismantle the misconception that academic success requires uninterrupted full-time training[11,13].

CONCLUSION

This study provides the first UK-wide evaluation of research participation among LTFT clinical radiology trainees and identifies key challenges and opportunities for improvement. Despite the limitations of our research, the findings provide a useful insight into the perceptions and experiences of conducting research as a LTFT, with findings that echo those of the prior research of LTFT academic experiences as described in the discussion section.

Despite strong interest in research, LTFT radiology trainees face significant structural and cultural barriers, including lack of protected time, mentorship, and systemic biases in access to academic opportunities.

Our findings reveal that these barriers often compel radiology trainees to conduct research outside of working hours, with implications for wellbeing and equity. Importantly, most trainees indicated they would be more likely to engage in research if supported with dedicated time and inclusive academic frameworks.

There is clear scope to improve academic access for LTFT radiology trainees by implementing structural reforms such as pro-rata research time, more flexible academic posts, consistent national policy, and increased visibility of successful LTFT academic role models. Addressing these gaps is critical to fostering a more equitable and inclusive radiology workforce that supports diverse working patterns and promotes sustained academic engagement.

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FIGURE LEGENDS

Figure 1: Gender distribution and caring responsibilities among survey respondents. A total of 31 female and 17 male radiology trainees responded. Among female respondents, 71% (n=22) reported having caring responsibilities, compared to 53% (n=9) of male respondents.

Figure 2: Geographical chart depicting deaneries of respondents. Responses were received from clinical radiology trainees in all UK Local Education Training Boards/deaneries.

Figure 3: Working time equivalent (WTE) patterns among LTFT radiology trainees. Nearly half of past/current LTFT respondents (47.9%) reported working at 71-80% WTE, followed by 20.8% at 51-60% and 8.3% at 61-70%. Only 6.2% of trainees worked at 81-90% WTE.

Figure 4: Importance of factors influencing decision to pursue LTFT training. Radiology trainees rated a range of considerations, including childcare, work-life balance, and mental wellbeing. Most respondents rated childcare and work-life balance as either "very important" or "important," with lower levels of importance reported for research-related or financial factors.

Figure 5: Respondents' self-reported interest in research. Interest was rated on a Likert scale from 1 (not interested at all) to 5 (very interested). Many radiology trainees indicated a moderate-to-high level of interest, with almost 60% selecting Level 4 or 5.

Figure 6. Types of research contributions during LTFT radiology training. The most reported research activity was poster presentation at a conference or publication in a journal (almost 60% respectively).

Figure 7: Research conducted in hours by LTFT radiology trainees. Most respondents conducted research either entirely outside of work hours (52.6%) or partially during NHS hours (42.1%).

Figure 8: Barriers to conducting research among LTFT radiology trainees. The most cited reason for not engaging in research was lack of allocated time to conduct research during working hours (22.1%, n=15).

Figure 9: Likelihood of increased research participation if dedicated research time were provided. The majority of respondents indicated they would be more likely to engage in research activities with allocated time during LTFT training.

TABLE LEGENDS

Table 1: Demographic and training characteristics of survey respondents (n = 48), including age, gender, ethnicity, carer status, relationship status, geographic distribution across UK LETBs/Deaneries and radiology training stage.

Table 2: Selected free-text responses highlighting the impact of LTFT on research participation for radiology trainees.

Table 3: Respondents' free text comments