

# The impact of working patterns on therapeutic radiographers' experience of work-life balance: A qualitative study at a cancer treatment centre in Wales

S. Allan, N. Courtier\*, L. Mundy

School of Healthcare Sciences, Cardiff University, Ty Dewi Sant, Heath Park, Cardiff CF14 4XN, UK



## ARTICLE INFO

### Article history:

Received 30 September 2024

Received in revised form

26 February 2025

Accepted 31 March 2025

Available online xxx

### Keywords:

Extended hours  
Work-life balance  
Wellbeing  
Working patterns  
Retention

## ABSTRACT

**Introduction:** Current and projected demand for NHS radiotherapy services outstrips projected capacity. One solution to increase treatment capacity seen in UK radiotherapy centres has been to adapt the treatment hours and working patterns of therapeutic radiographers. This study explores radiographers' experiences of the impact of working extended treatment hours on their work-life balance and wellbeing.

**Method:** Eligible Radiographers were employed in a substantive NHS AfC Band 6 Therapeutic Radiographer role. A descriptive qualitative design utilising semi-structured interviews allowed participants freedom to reflect upon individual experiences. The interview schedule and process were piloted before data collection in October 2023. Anonymised data were analysed using content analysis.

**Results:** Six participants were recruited. Our findings reveal different outlooks between radiographers of different ages, life-stage, personal circumstances and caring responsibilities. The importance for work-life balance of non-working weekends and flexibility, reliability and predictability of shift scheduling were common categories. There was concern that further changes to working patterns would lead to diminished work-life balance and wellbeing. As Radiographers' priorities regarding work-life balance were dynamic, agency to easily adapt working hours was seen as the ideal.

**Conclusion:** Opportunities to flexibly adapt working hours to suit personal circumstances are viewed as key to maintaining a healthy and rewarding work-life balance. Our findings reveal a desire for more openness to adaptation requests and highlight the need for future research into the transparency of parity between request grounds and the competing needs of services and the individual.

**Implications for practice:** Poor work-life balance risks burnout in TRs, with consequent retention issues and lower quality patient care.

© 2025 The Author(s). 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/>).

## Introduction

NHS capacity to deliver high-quality radiotherapy treatment exceeds demand.<sup>1</sup> Appropriate utilisation of radiotherapy continues to increase, with UK cancer incidence projected to surpass 500,000 per annum by 2038.<sup>2</sup> Workload savings from trends for hypofractionation are balanced by a high fraction burden from increasing treatment complexity.<sup>3</sup> A radiotherapy

service with insufficient capacity forms a barrier to equitable and timely access to world-class radiotherapy.<sup>4</sup> The stark impact on patient survival from delayed radiotherapy<sup>5</sup> has driven the introduction of national strategic cancer pathways, such as the Welsh Government Suspected Cancer Pathway, which aims to start treatment for 75 % of cancer referrals within sixty-two days from the point of suspicion.<sup>6</sup> StatsWales data suggests that no Welsh Health Board has yet met this target as demand outstrips capacity.<sup>7</sup>

Extended daily treatment hours have been implemented as one method of increasing radiotherapy service capacity,<sup>8</sup> however, any consequences for workforce wellbeing remain unclear. This paper explores the impacts of changed working patterns and extended treatment hours on therapeutic radiographers' (TRs') lives.

\* Corresponding author.

E-mail addresses: [steve@mistersteve.myzen.co.uk](mailto:steve@mistersteve.myzen.co.uk) (S. Allan), [courtiern@cardiff.ac.uk](mailto:courtiern@cardiff.ac.uk) (N. Courtier), [mundyla@cardiff.ac.uk](mailto:mundyla@cardiff.ac.uk) (L. Mundy).

## Literature review

The clinical<sup>9</sup> and cost-effectiveness<sup>10</sup> of modern radiotherapy have increased clinical demand relative to limited capacity. Back in 2006, Routsis et al.<sup>11</sup> cited the Royal College of Radiologists (RCR) 1997 report "Extending the Working Day for Delivery of Radiotherapy"<sup>12</sup> as recommending longer daily treatment hours as a strategy to increase capacity. A decade later, the National Radiotherapy Advisory Group (NRAG) echoed the sentiment, proposing short-term capacity should be boosted through making maximum use of existing equipment, either through adaptation of existing working patterns within standard treatment hours (37.5 h, Monday to Friday), or through the extension of both standard working and treatment hours.<sup>13</sup>

By 2020, over 80 % of UK radiotherapy departments regularly operated extended weekday treatment hours, with 65 % running at least a 10-h treatment day.<sup>14</sup> This approach has required adaptation of TRs' working patterns, raising the question as to whether limited machine capacity has been relieved at the cost of increased workload pressure on the radiotherapy workforce. Support for this proposition may be found in a 2023 All-Party Parliamentary Group for Radiotherapy (APPGRT) inquiry into a 'crisis of access to UK radiotherapy', which heard that the number of qualified graduates entering the profession was at least 30 % lower than the number of experienced staff leaving.<sup>15</sup>

A 2021 qualitative study identified the impact of working patterns on work-life balance, and lack of flexibility in working conditions, as two of the main reasons given by TRs leaving the profession.<sup>16</sup> Flexibility in working conditions is associated with the maintenance of a healthy work-life balance by other health professional cohorts. Timeliness and predictability in scheduling of shift patterns are valued by NHS nurses as they enable the flexibility necessary to sustain a positive work-life balance.<sup>17</sup> Furthermore, analysis of two population-level surveys from across EU workforces concluded that evening and weekend working are associated with poor work-life balance.<sup>18</sup>

Despite this retention problem, previous literature has concentrated on the practicalities of raising productivity with existing facilities, whilst considering the workforce solely as a functional body.<sup>19,20</sup> Little attention has been directed towards impacts of changes to traditional working hours/shift patterns on TRs' lives and work-life balance. Furthermore, we do not know whether altruism which influences decisions to enter an Allied Health Profession<sup>21</sup> will sustain a fulfilling radiotherapy career where work-life balance is unsatisfying.

With radiotherapy treatment hours routinely extending into the early evening,<sup>14</sup> TRs are working at more unsocial times, but any effects on their personal/home lives or professional motivations remain unidentified and unexplored. This study therefore explores the effects of working patterns and extended treatment hours on TRs' lives at a human level and the potential impact of life-stage and caring commitments on wellbeing and work-life balance.

## Methods

### Design

A qualitative descriptive design<sup>22</sup> was appropriate to explore TRs' experiences and perceptions of extended hours working in the context of individual radiographers' lives.

### Setting and participants

Participants were recruited and interviewed at a single Cancer Treatment Centre, operating a range of shift patterns Monday to

Friday, with emergency/ad hoc voluntary cover on weekends and Bank Holidays. The most recent changes to shift patterns were implemented following staff request and consultation. 25 % of staff currently have an individual flexible working agreement in place. The Workforce and Capacity plans are aligned, and the workforce profile of the department indicates headcount split of 89 % HCPC registered (across bands 5–8) and 11 % non-HCPC, with turnover and vacancy rates of 6 % and 3 % respectively. Current major change programmes have a dedicated resource.

Local and departmental permissions were obtained, and ethical approval was granted. Participants were purposively sampled where they were likely to possess experience to address the research aim.<sup>23</sup> The target sample size of 6–10 reflected a small but in-depth student project with associated time and workload restrictions. Maximum variation sampling was sought in terms of participant length of service, life-stage and personal circumstances.

Eligible radiographers needed to be employed as an AfC Band 6 Therapeutic Radiographer. The focus on Band 6 was because this group are more likely to work extended hours as they assume greater responsibility and consolidate professional skills. There are more TRs working at Band 6 than any other<sup>24</sup> and they may be employed at Band 6 for longer periods of their radiography career, enabling variation in life-stage even in this small sample.

### Recruitment

An introductory email was circulated by a gatekeeper. The researcher had previously undertaken student placements at the Centre, facilitating trust and engagement but also presenting potential for selection bias.<sup>25</sup> To strengthen rigour, the researcher was isolated from the selection process. Interested radiographers were invited to contact a research supervisor, who checked potential participants against study inclusion criteria. A stratification process aimed to achieve maximum variation in life stage and personal circumstances and permission was sought from potential participants for their details to be forwarded to the researcher.

Potential participants received all written and verbal information to enable them to make an informed decision before giving written consent to participate in the research. Appropriate wellbeing and support mechanisms were in place before data collection, in case of participant distress.

### Materials

The interview schedule was formulated to engage reflection regarding: current working hours and personal strategies for maintaining work-life balance; perceptions of the personal impact of a change in working hours on existing work-life balance; whether attitudes towards work-life balance altered with life-stage; whether work-life balance was important to job satisfaction (Appendix A). A semi-structured approach allows participants freedom to frame in-depth responses using their own terms of reference and allows flexibility and responsiveness from the researcher to follow the conversation into rich areas.<sup>26</sup>

To evaluate the acceptability, appropriateness and clarity of questions and check the content validity of the draft tool, an online pilot interview was conducted prior to data collection with a Band 6 TR from an alternative Cancer Treatment Centre. One question was subsequently rewritten with a more open structure: the pilot was not repeated as this minor revision lay within the semi-structured approach.

Data collection

Interviews were conducted in a quiet room, outside the radiotherapy department, to encourage participants to speak freely. Five interviews were conducted and audio-recorded face-to-face. A sixth was recorded online due to participant illness. Participants were given information about how the recording would be used and when data would be deleted before giving consent.

Data analysis

Data were anonymised as interviews were transcribed verbatim. Transcriptions were read several times for familiarisation. To improve rigour and reflexivity in the analytical process, data were managed after the Framework Method outlined by Gale et al. (2013).<sup>27</sup> Each interview transcript was coded by content and responses counted and grouped into descriptive categories. Response categories could relate to the research objectives (deductive) or be data-driven (inductive) codes. This consistent and structured approach enabled comparisons within and between interviews without losing the sense of the individual participants.

Findings

Six radiographers were accepted into the study (labelled P1 to P6). The variation between respondents in age, life stage and caring responsibilities within this small sample was deemed sufficiently wide to be representative of the population of 42 Band 6 radiographers. Interview replies were varied, detailed and insightful. Content analysis revealed a range of common issues amongst participants' responses (Fig. 1).

Current working hours and work-life balance

Five participants saw Radiotherapy as an important, rewarding job. The opportunity to make a difference was highly valued. Work, however, was simultaneously valued as an enabler of a rewarding home-life. There was an even split between participants who felt in control of their work-life balance and those who felt they were not. Participants who felt in control had all taken steps to adapt their

work hours in favour of home life. The requested changes were within the standard working hours framework ie: 37.5 h condensed into four longer days, allowing a weekly day off. Requests were made through face-to-face negotiations with managers by the individuals concerned. Two were successful and implemented quickly and permanently; one unsuccessful due to conditions attached to the change; and one was a protracted process involving several subsequent review points.

One participant for whom this process was ultimately unsuccessful still felt that understanding gained about the systems involved and their individual options had allowed them some control. Another participant had successfully adapted hours around childcare arrangements, and a third had taken control by arranging part-time hours:

P5: *"It's meant that I've been able to start exercising ... in the evening, so I go swimming ... and that has raised my mental health ... so it feels like living rather than existing"*

In contrast, two younger, more recently qualified participants felt they had no control over their work-life balance. They felt that work was in charge of them, and that home life had to adapt to fit:

P3: *"I'm living to work, not the other way round, really ... so to me then, it's like 'Right. Feed and walk the dog, have your dinner – Oh, my evening's gone.' I have a shower and go to bed."*

The two-day weekend was highly valued by all participants, irrespective of age, life-stage or caring responsibilities. Weekends were seen as time for household chores and life-administration, which participants found difficult to do after work during the week:

P1: *By the time you finish work through the week, you haven't got time to do a thing ... it's the weekends that are so important just to do the tasks, because you do exert all your energy in your working day"*

The two consecutive days off were valued as more restorative than a single rolling day off in the week, and significantly, weekends were perceived as essential to the maintenance of a healthy work-life balance because they enable meaningful, quality time with friends and family when they are also off work or school:

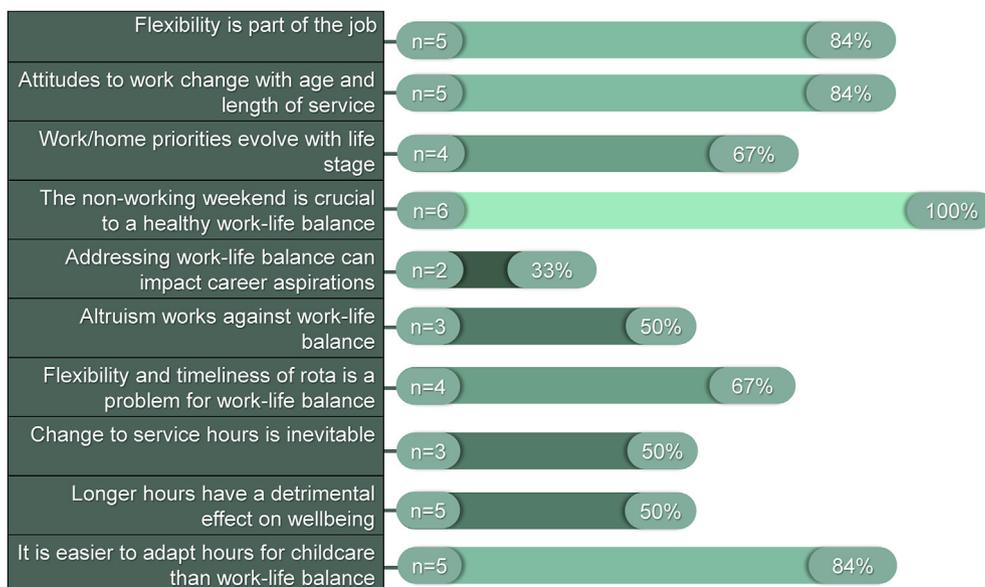


Figure 1. Categories of issues raised in participant responses.

P2: "If you're off at the weekend, your friends are off, my boyfriend's off ... there's people around. Whereas in the week ... everyone's at work ... so you sort of end up having a different day if you're off in the week than if you're off at the weekend"

Five participants had previously identified dissatisfaction with their work-life balance and taken steps to remedy the situation; their experiences of the process were variable:

P4: "I didn't have, erm, children ... when I took the band 6 ... but yeah, it was pretty easy to arrange"

P6: "... it's been an extremely difficult process"

Perceived differences in the ease of obtaining a modification of standard hours appeared to be centered on the grounds on which requests were made. Those made on childcare or physical health grounds were thought to be simpler to make, actioned more quickly and more likely to be granted than those made on well-being or work-life balance grounds. Indeed, there was a perception amongst participants that having children is a 'trump card' when it comes to being granted flexibility of hours. For example, staff with children can request a fixed day off, whereas staff without children requesting compressed hours on wellbeing grounds may not:

P6: "I know if you need that flexibility for childcare ... it's very difficult for them to refuse it. If you don't have children, it's between you and the wolfpack. I've been asking for, initially, much less flexibility than people in the department who have children have been granted"

For two participants, a request to adapt working hours in favour of home-life would only be granted through a change of role:

P1: "I had the choice of, if you don't continue your [current] role, then we're happy to give you those long days ... I know that if I was to give up the [role], I would have a better work-life balance"

Both requests were refused unless participants gave up their current roles and either returned to a previous role full-time or retrained.

The process of requesting adapted working hours on wellbeing grounds for one participant added to the stress of their original situation. They were granted a temporary adaptation with regular review points, but uncertainty and anxiety at each point became destabilising:

P6: "Not knowing what's going to happen, not being given any indication of whether it's likely at all that that will be made permanent just ... keeps everything unstable? So I haven't benefitted fully from the flexibility I've been offered"

That 100 % of our participants identified this issue suggests that work-life balance and mental wellbeing are not thought to merit the same timely and decisive action as childcare or physical health. Prowse and Prowse (2016)<sup>28</sup> identified similar impacts of others' childcare arrangements on colleagues without children in a study amongst midwives.

Lack of parity risks resentment between colleagues, and the loss of TRs' confidence in wellbeing protocols. They may subsequently be less likely to seek help when they need it, with potential consequences for patient care. Further research is needed to determine whether TRs' wellbeing and care giving requests are given parity.

## The impact of potential changes to working patterns on work-life balance

All six participants acknowledged the need for services to adapt and evolve to meet service users' needs and fully recognised that willingness to work flexibly is a requirement of the job:

P4: "That's just the nature of the work, and it's something that you've gotta go through ... in order to successfully treat everybody, isn't it?"

P2: "I just think that's part of the job ... you have to adapt to the patient that's in front of you, you have to adapt to the work hours, you have to adapt to a different machine"

However, in common with the nursing cohort in Emmanuel et al.<sup>17</sup> our participants suggested that sustaining a rewarding work-life balance is materially harder when working hours are unpredictable. There was acknowledgement that the nature of radiotherapy treatment means appointment schedules can unavoidably fall behind requiring the schedule of shifts to flex to treat the day's full patient list. However, four participants commented that planned rosters which are revised frequently or published without adequate lead-time make planning home life very difficult. They felt unable to rely on published hours being the hours they would ultimately work, resulting in potentially having to let people down, putting strain on social and personal relationships:

P3: "Then I'm like 'Oh, I'm really sorry, I can't come now' and then you feel a bit like a cop-out, kind of 'Oh, I did want to come, I promise' ... and a lot of people don't believe it 'What, you don't know your rota?'"

P2: "I would say I don't routinely make plans Monday to Friday ... I don't like letting friends down ... you don't know that you're guaranteed to walk out the door at six o'clock."

Although weekday rolling days off were valued, short notice of changes diminished the day's value in terms of work-life balance in the form of respite or a day for chores. The day off became difficult to use in a meaningful way, with less time to plan.

Our findings that the success of radiographers' work-life balance rests on forward-planning correlate with those of Nightingale et al. (2021).<sup>16</sup> Working non-standard hours inevitably means home-life must also be conducted in a non-standard timeframe, with the work roster as the stable point around which other life arrangements are made. Without a stable and timely roster, work-life becomes unbalanced, and the senses of wellbeing and job satisfaction diminish.

Two participants commented that whilst weekend working is inevitable in radiotherapy, there was concern that changes to working patterns resulting in loss or reduction of family time at the weekend would detrimentally impact close and social relationships and affect wellbeing, with potential for consequent impact on standards of care and performance at work:

P4: "Yeah, 'cos my [child]'s not in school, and obviously, that's family time together then ... yeah, so I would, I would resist {chuckles} any weekend working"

P2: "If I was working all the weekends, or whatever ... we wouldn't really get any quality time, and then that would really impact, like, your mood ... your emotional wellbeing"

These concerns align TRs with the findings of Kirby, Moreland and Pollard's 2016 study amongst paramedics.<sup>29</sup> If weekends

became regular workdays, our TRs expect to lose the full perceived value of the weekend as an opportunity to detach fully from work, relax, and spend time with friends and family.<sup>18</sup>

Whilst four participants voiced the idea that altruism is a key motivation when joining the profession,<sup>21</sup> they also believed that changes to working hours challenge that motivation. Individual participants held simultaneously opposing views on the subject. For example, acknowledgment that although longer treatment hours benefit patients, working those longer hours creates potential for a diminished work-life balance:

P3: *"I think all of us are very similar in radiotherapy ... we like to please others, we're very caring, and I do think those things lead to you unfortunately not putting yourself first"*

The implication is that putting oneself first creates personal tension with an altruistic work ethic, creating a powerful feeling that can negatively influence wellbeing:

P4: *"People are willing to sacrifice stuff to make it work, you know, just to try and help people ... it goes against the grain, they think 'Oh, I'm a bad person if ... ' and they'll hide it from themselves ... they're in constant conflict then: 'that is what I want, that is what I need, but I don't want to let anybody down'"*

Further research is needed to identify that point and develop solutions to prevent it from being reached.

**The role of life-stage and caring commitments on work-life balance**

Participants' life stage was a determinative factor in terms of work-home priorities and focus (Fig. 2).

Four participants related changes in attitude towards work-life balance at different life stages. For one of the younger participants, working hours were just part of the job, and work-life balance was only relevant if home life became compromised. For participants at later stages of life, with partners, children or caring commitments to consider, work-life balance became more significant. Work ceased to be a top priority and the need to re-balance in favour of home-life became stronger:

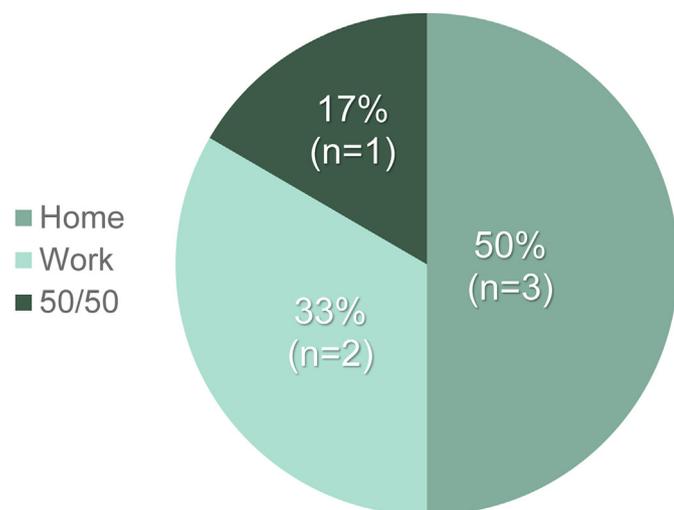


Figure 2. Participants' statement of their work-life priority.

P4: *"So that was five years before we had a child, and you know, during that time, it was like 'Ah ... I wanna be the manager of the thing one day.' Nah. Since having the child ... this isn't my priority".*

The younger TRs were more inclined to sacrifice home life for extra money, but over time, monetary remuneration ceased to compensate for the loss of free time:

P1: *"I think the incentive isn't enough ... you know, you gotta be on standby from 8am to 1pm ... which is ... your weekend plans sort of ruined for the sake of 15 pound, it's just not worth it".*

At earlier career stages, TRs were inherently more likely to value work above home life because they gained satisfaction and reward from developing their career. At relatively later life stages, home life goals and ambitions were seen as more fulfilling and consequently prioritised:

P2: *"I think when you first start working, it's exciting, you're earning money, you're learning lots ... whereas, like now I'm three and a bit years in, it's just the same, same, you sort of look forward to your leave, you're ready to go home at the end of the day"*

In summary, our participants found it easier to adapt home life to the demands of work hours when they were younger, because in general, they had fewer external responsibilities or other people, to consider:

P5: *"I get a lot of joy ... out of making a difference in work, that's really important to me, but it is more important to me to have a life outside of work, see my friends, see my family, those are the people that're really important, and you can't get time back with that"*

**TRs' perceived ideal working hours for a healthy work-life balance**

Even within our small sample, variation of opinion on the ideal working hours for a healthy work-life balance was evident. Participants' preferences varied with life stage, age and caring commitments. For one, the ideal hours would coincide with those of a partner to retain the quality of family time:

P2: *"... sometimes he's home before me, sometimes I'm home before him, but it's ... more similar?..if I'm leaving him and he's fast asleep and then I get home and he comes home late, it sort of turns into a bit of a cycle, and you're almost like not really seeing each other that well".*

The top priority for two participants was sufficient time to spend on the self-care which enabled them to return to work refreshed and ready to care for their patients:

P5: *"I'm only working two days at a time, so there's always a rest day after every two days, and that has ... really, really improved things for me"*

For two others, it was not the hours themselves that were most important, but the consistency and timely publishing of rosters required to plan home-life:

P3: *"I think the main thing I would do, regardless of hours, is give people warning. I would do three months in advance rota. Why do we only know one month in advance? Whatever you need to know, you just need to know it in advance"*

Our data indicate that a roster which optimises the work-life balance of all participants does not exist. Our findings extend the principle<sup>16,17</sup> that TRs want flexibility in working patterns to facilitate a rewarding work-life balance. Secondly, work-life balance means having time to spend doing things they enjoy, with people they love. Running a household, exercising, relaxing, doing all the things they need to do to maintain a healthy relationship between home life and work, so that when they are at work, they have the resource to give the quality of care to which they aspire.

#### Limitations and recommendations for future study

The present study was conducted in a single Cancer Treatment Centre, with a small number of participants recruited from a single NHS AfC pay band. The requirement to preserve anonymity prevented discussion of participants' individual circumstances or the Centre's full workforce profile. Transferability of our findings would require evaluation across radiographers in all pay bands and sites.

Mindful of work-time pressures, interviews were restricted to a maximum of 1 h. A future phased Delphi study, in which subsequent interviews are conducted with questions based on previous rounds, may elicit deeper and wider insights.

#### Conclusion

Our novel findings show TRs believe that more advance notice of working hours and greater flexibility in rostering would aid the maintenance of a healthy work-life balance. The findings particularly reveal aspiration for simpler, more flexible processes in requesting adaptations to hours and highlight the need for research into parity between the grounds of those requests.

The need to support personal wellbeing and care for the carers is indicated by the complex nature of altruistic work motivations in therapeutic radiography and may be a focus of tension with the voracious needs of the service.

By exploring what is important to therapeutic radiographers regarding work-life balance and the impact that working time has on that balance, this research may help those who plan and manage our Cancer Treatment Centres in reconciling the need for longer service hours with the work-life needs of those who will work them.

#### Ethics and declaration

Local and departmental permissions were obtained and ethical approval was granted (HCARE/SA29/18.8.23).

#### Conflict of interest statement

None.

#### Acknowledgements

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

#### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.radi.2025.102951>.

#### References

1. Radiotherapy UK. *Flash workforce survey 25th August - 5th September 2022*. 2022. Available at: <https://radiotherapy.org.uk/wp-content/uploads/2022/11/2022-Flash-Workforce-Survey-Report-D8-FINAL.pdf>. [Accessed 24 November 2023].
2. Cancer Research UK. *Cancer in the UK overview 2023*. 2023. Available at: [https://www.cancerresearchuk.org/sites/default/files/cancer\\_in\\_the\\_uk\\_report-overview-03.pdf](https://www.cancerresearchuk.org/sites/default/files/cancer_in_the_uk_report-overview-03.pdf). [Accessed 15 July 2023].
3. Heritage S, Sundaram S, Kirby NF, Kirby KJ, Mee T, Jenna R. An update on the Malthus model for radiotherapy utilisation in England. *Clin Oncol* 2023;**35**: e1–9. <https://doi.org/10.1016/j.clon.2022.06.006>.
4. Radiotherapy UK. *Radiotherapy 2034: a vision for world-class radiotherapy in the UK*. 2023. Available at: [https://radiotherapy.org.uk/radiotherapy-2034-a-vision-for-world-class-radiotherapy-in-the-uk/#\\_ftn2](https://radiotherapy.org.uk/radiotherapy-2034-a-vision-for-world-class-radiotherapy-in-the-uk/#_ftn2). [Accessed 3 July 2024].
5. Hanna TP, King WD, Thibodeau S, Jalink M, Paulin GA, Harvey-Jones E, et al. Mortality due to cancer treatment delay: systematic review and meta-analysis. *BMJ* 2020;**371**:m4087.
6. NHS Wales Executive. *Suspected cancer pathway*. 2019. Available at: <https://executive.nhs.wales/our-functions/networks-and-planning/cancer/workstreams/suspected-cancer-pathway/#:~:text=The%20Wales%20Cancer%20Network%20welcomed,in%20Wales%20from%20June%202019>. [Accessed 19 November 2023].
7. StatsWales. *Suspected cancer pathway (closed pathways): the number of pathways where the patient started their first definitive treatment and those informed they do not have cancer by local health board, tumour site, age group, sex, measure and month*. 2023. Available at: <https://stats.wales.gov.wales/Catalogue/Health-and-Social-Care/NHS-Hospital-Waiting-Times/Cancer-Waiting-Times/Monthly/suspectedcancerpathwayclosedpathways-by-localhealthboard-tumoursite-agegroup-gender-measure-month>. [Accessed 22 October 2023].
8. NHS Improvement. *Equality for all – delivering safe care seven days a week pp10-11*. 2012. Available at: <https://www.england.nhs.uk/improvement-hub/wp-content/uploads/sites/44/2017/11/Equality-for-all-Delivering-safe-care-seven-days-a-week.pdf>. [Accessed 4 July 2024].
9. Institute of Cancer Research [ICR]. *Higher doses of radiotherapy cut treatment time by up to 75 per cent in localised prostate cancer patients, while maintaining high cure rates*. 2023. Available at: <https://www.icr.ac.uk/news-archive/higher-doses-of-radiotherapy-cut-treatment-time-by-up-to-75-per-cent-in-localised-prostate-cancer-patients-while-maintaining-high-cure-rates>. [Accessed 26 November 2023].
10. Spencer K, Defourny N, Tunstall D, Cosgrove V, Kirkby K, Henry A, et al. Variable and fixed costs in NHS radiotherapy; consequences for increasing hypo fractionation. *Radiol Oncol* 2022;**166**:180–8.
11. Routsis D, Thomas S, Head J. Are extended working days sustainable in radiotherapy? *J Radiother Pract* 2006;**5**(2):77–85. <https://doi.org/10.1017/S1460396906000112>.
12. *Extending the working day for the Delivery of radiotherapy*. London: Royal College of Radiologists; 1997.
13. National Radiotherapy Advisory Group [NRAG]. *Radiotherapy: developing a world-class service for England*. 2007. Available at: [https://webarchive.nationalarchives.gov.uk/ukgwa/20130124035706mp\\_/http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/documents/digitalasset/dh\\_074576.pdf](https://webarchive.nationalarchives.gov.uk/ukgwa/20130124035706mp_/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_074576.pdf). [Accessed 22 August 2023].
14. Institute of Physics in Engineering and Medicine [IPEM]. *Position statement: the impact of extended clinical hours on a radiotherapy physics service 2020 update*. 2020. Available at: <https://www.ipem.ac.uk/media/altppq0nh/extended-hours-rt.pdf>. [Accessed 21 October 2023].
15. All Party Parliamentary Group on Radiotherapy [APPGRT]. *Inquiry into radiotherapy and the cancer crisis*. 2023. Available at: [https://radiotherapy.org.uk/wp-content/uploads/2023/03/APPGRT-Inquiry-Report\\_Radiotherapy-and-the-Cancer-Crisis-1.pdf](https://radiotherapy.org.uk/wp-content/uploads/2023/03/APPGRT-Inquiry-Report_Radiotherapy-and-the-Cancer-Crisis-1.pdf). [Accessed 28 October 2023].
16. Nightingale J, Sevens T, Appleyard R, Campbell S, Burton M. Retention of radiographers in the NHS: influencing factors across the career trajectory. *Radiography* 2022;**29**:76–83. <https://doi.org/10.1016/j.radi.2022.10.003>.
17. Emmanuel T, Griffiths P, Lamas-Fernandez C, Ejebu OZ, Dall'Ora C. The important factors nurses consider when choosing shift patterns: a cross-sectional study. *J Clin Nurs* 2023;**33**:998–1011. <https://doi.org/10.1111/jocn.16974>.
18. Greubel J, Arlinghaus A, Nachreiner F, Lombardi DA. Higher risks when working unusual times? A cross-validation of the effects on safety, health and work-life balance. *Int Arch Occ Environ Health* 2016;**89**(8):1205–14. <https://doi.org/10.1007/s00420-016-1157-z>.
19. White L, Beckingham E, Calman F, Deehan C. Extended hours working in radiotherapy in the UK. *Clin Oncol* 2007;**19**(4):213–22. <https://doi.org/10.1016/j.clon.2007.01.442>.
20. Radiotherapy Board. *Guidance on improving access to radiotherapy: increasing working hours*. 2015. Available at: <https://www.rcr.ac.uk/clinical-oncology/partnership-working/radiotherapy-board/radiotherapy-board-publications>. [Accessed 3 August 2023].
21. Wallis L, Locke R, Ryall S, Harden B. Motivations for choosing an allied health profession career: findings from a scoping review. *Int J Pract Learn Health Soc Care* 2023;**11**(1):1–17. <https://doi.org/10.18552/ijpbhlsc.v11i1.751>.
22. Doyle L, McCabe C, Keogh B, Brady A, McCann M. An overview of the qualitative descriptive design within nursing research. *J Res Nurs* 2020;**25**(5):443–55. <https://doi.org/10.1177/1744987119880234>.

23. Polgar S, Thomas S. *Introduction to research in the health sciences*. 7th ed. London: Elsevier; 2020.
24. College of Radiographers [CoR]. *Radiotherapy radiographic workforce 2021 UK census*. 2022. Available at: [https://www.sor.org/getmedia/8503732e-e584-4c8a-a4e051b61f37690b/2021\\_CoR\\_radiotherapy\\_radiographic\\_workforce\\_uk\\_census\\_report\\_v3](https://www.sor.org/getmedia/8503732e-e584-4c8a-a4e051b61f37690b/2021_CoR_radiotherapy_radiographic_workforce_uk_census_report_v3). [Accessed 28 October 2023].
25. Hicks CM. *Research Methods for Clinical Therapists: applied project design and analysis*. 5th ed. London: Elsevier; 2019.
26. Nathan S, Newman C, Lancaster K. Qualitative interviewing. In: Liamputtong P, editor. *Handbook of research methods in health social sciences*. Singapore: Springer; 2019. p. 392–409.
27. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative research data in multi-disciplinary health research. *BMC Med Res Methodol* 2013;**13**(1):117. <https://doi.org/10.1186/1471-2288-13-117>.
28. Prowse J, Prowse P. Flexible working and work-life balance: midwives' experiences and views. *Work Employ Soc* 2015;**29**(5):757–74. <https://doi.org/10.1177/0950017015570724>.
29. Kirby K, Moreland S, Pollard J. The impact of working shifts: exploring the views of UK paramedics. *J Paramedic Pract* 2016;**8**(5):252–7. <https://doi.org/10.12968/jpar.2016.8.5.252>.