Radiotherapy UK

Equity of access to cancer treatment

An analysis of travel times to radiotherapy services across the UK

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EXECUTIVE SUMMARY

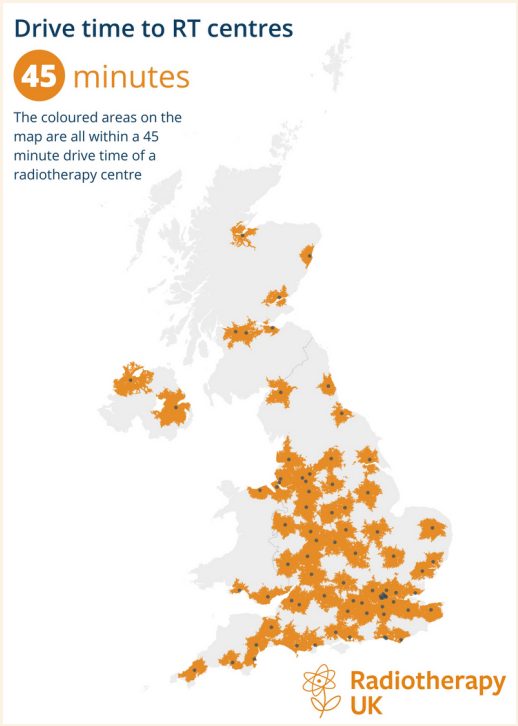
1 in 2 of us will get cancer at some point in our lives. When that happens, cancer specialists decide the best way to treat each specific cancer for each individual. Radiotherapy is one of these crucial life-saving treatments and 50% of cancer patients will need it.

Working with leading data analytics expert Dr Alasdair Rae, Radiotherapy UK have captured the reality of accessing radiotherapy treatment in the United Kingdom, and what this means for cancer patients.

We have discovered, based on travel times to a 9.30am appointment when travelling by private car, that 22% of the total population of the UK are further than the recommended 45 minutes from their closest radiotherapy service. When analysing time by public transport for a 9.30am radiotherapy appointment this increases to a staggering 75%.

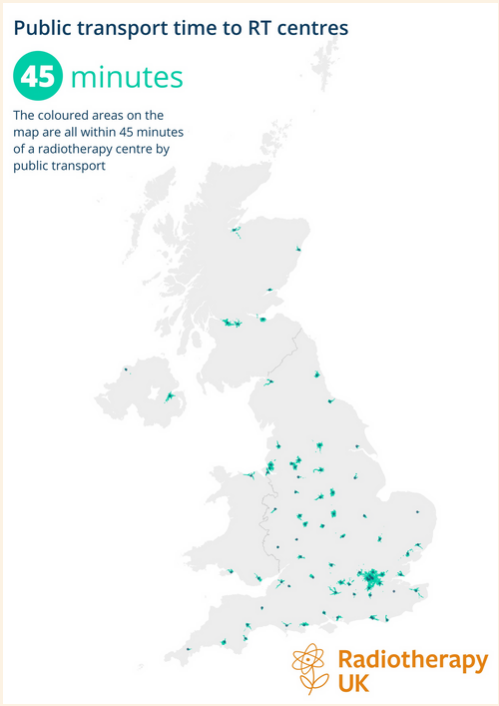
The analysis highlights geographical regions in the UK where access to radiotherapy is significantly limited, particularly for individuals who depend on public transport. The longer and more problematic a patient journey is for cancer treatment, the less likely they are to start and finish treatment. At a time when nearly 4 in 10 patients are waiting too long for treatment, this report highlights the urgent need to review and improve overall equity of access to radiotherapy services.

The UK remains near the bottom of international league tables when compared to similar high-income countries which underscores the pressing need for timely access to treatment. Radiotherapy in the UK is a life-saving service spread thin. Cancer patients in the UK urgently need national cancer planning that delivers equity of access to high quality treatments like radiotherapy.



grey: **22% or 14.8M** of total UK population are **further than 45 minutes** drive time from closest radiotherapy centre if arriving for a 9.30am appointment.

orange: **78% or 52.2M** of total UK population are **within 45 minutes drive** time of closest Radiotherapy centre if arriving for a 9.30am appointment.



grey: **75% or 50.3M** of total UK population are **further than 45 minutes** by public transport from closest radiotherapy centre if arriving for a 9.30am appointment.

green: **25% or 16.7M** of total UK population are **within 45 minutes** by public transport to closest radiotherapy centre if arriving for a 9.30am appointment.

CONTENTS

INTRODUCTION

Radiotherapy is the second most effective cancer cure after surgery, is needed in over 50% of cancer patients and contributes to 40% of cancer cures [1]. It is the most cost-effective cancer treatment, costing only £3-7K per patient [2].

Radiotherapy is a technologically advanced and innovative treatment that is primed to harness the evolving digital revolution leading to more cures, shorter waiting times, and better survival in the countries that embrace it.

High-quality personalised, precision radiotherapy is a major pillar of the future of cancer care. However, under-investment and under-resourcing in the UK have resulted in a depleted workforce [3,4.5], outdated equipment [6], and unequal access to new advances [7].

Nearly 4 in 10 cancer patients in the UK are currently facing unacceptable delays to starting their cancer treatment [8]. International research indicates that every 4 weeks delay in starting cancer treatment can increase the risk of death by 10% [9].

The incidence of cancer in the UK is projected to rise by a third to over 500,000 a year by 2040, representing an extra 2,000 cancer patients each week [10]. This increase, coupled with the fact cancer survival outcomes in the UK remains near the bottom of international league tables when compared to similar high-income countries [11] underscores the pressing need for timely access to treatment.

The recent drive towards earlier cancer diagnosis in the UK, for example through increased screening programmes (NHS lung cancer screening) is extremely important, however advantages gained by early diagnoses are lost when the patient does not also receive treatment on time.

CURRENT ACCESS TO RADIOTHERAPY

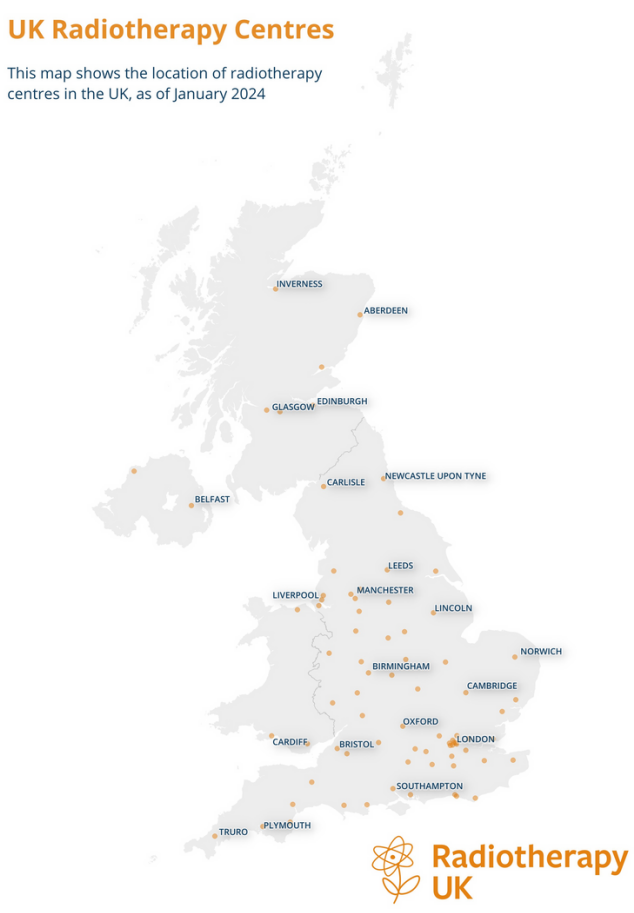
In the UK, 61 NHS providers deliver radiotherapy services across 79 delivery sites (figure 1) to over 160,000 patients each year [12].

Access rates to radiotherapy vary across the UK. Available data indicates that in 2019 24-27% of patients in England accessed radiotherapy as part of their primary treatment [13,14] and in 2017 access in Scotland was around 20% [15]. This falls below international consensus that 50% of cancer patients in the UK have an indication and need access to radiotherapy as part of their primary treatment [16,17].

Being able to access the most appropriate treatment is crucially important to give cancer patients the best chance of living longer and better. Analysis undertaken by the Marie Curie Foundation [18] based on Atun et al 2015 [19] estimated that if, by 2035, every cancer patient who needs radiotherapy had access to it, almost one million lives would be saved every year worldwide.

The time it takes to travel to a radiotherapy service can impact on a patients decision to access radiotherapy treatment [20].

Figure 1



Travel burden, often quantified by travel time or distance, has been demonstrated to have detrimental consequences on patients' mental health, participation in clinical trials, response to treatment, and health outcomes [21,22]. Research has highlighted that extended travel times for radiotherapy are associated with decreased survival and poor uptake of cancer treatments even in curable patients [23,24,25,26,].

WHY IS 45 MINUTES A BENCHMARK FOR TRAVEL TIME?

In 2018, in a public consultation by the National Health Service England (NHSE), travel times were seen as the most important radiotherapy patient concern [27] and a Cancer Research UK (CRUK) public survey noted that 43% of patients would not travel as far as possible to get the best Radiotherapy [28].

In 2007 the National Radiotherapy Advisory Group (NRAG) published a report which indicated that up to 45 minutes traveling time was acceptable, although less would be preferable. It recommended that no more than 45 minutes should therefore be seen as good practice, whilst recognising that this is not achievable in all areas [29].

In 2012, a Department of Health review noted this recommendation and also noted that access to radiotherapy within 45-minute travel and a reduced waiting lists support improved patient experience [30]. No further guidance on recommended travel times to radiotherapy services has been published since 2012.

It is accepted that for some highly specialised and paediatric radiotherapy services, patients may need to travel further to receive care at specialist centres.

Travel times were seen as the most important radiotherapy patient concern

This report uses 45 minutes as a guide to begin its analysis as this is a unit of time previously recommended by NRAG, however, it recognises this is a theoretical figure based on the principles of good practice. More than 45 minutes travel each way may not, at first glance, seem long but for many this is an extremely difficult journey. It is important to remember many cancer patients are suffering from the effects of treatment and ill health.

WHAT DID WE ANALYSE?

We focused on the proportion of the population that would need to travel over 45 minutes (60 and 75 minutes are also represented in the report) to reach their nearest radiotherapy service for a typical 9.30am (peak) and 13.00pm (off peak) appointment.

We collaborated with experts in data analysis and mapping - Dr Alasdair Rae and his team at Automatic Knowledge Ltd to calculate travel times to each UK radiotherapy service, enabling us to identify the population density within a 45-minute radius.

This analysis was extended in 15-minute increments up to 90 minutes to gain a detailed understanding of patient travel times. Both public transport and driving times were considered during peak and off-peak hours.

KEY FINDINGS

Arriving on time for a 9.30am appointment

When driving, 14.8 Million people in the UK are more than 45 minutes from their closest radiotherapy centre.

This equals 22% of the total population.

When taking public transport, 50.2 Million people in the UK are more than 45 minutes from their closest radiotherapy centre .

This equals 75% of the population.

Arriving on time for a 13.00pm appointment

When driving, 7.4 Million people in the UK are more than 45 minutes from their closest radiotherapy centre.

This equals 11% of the total population.

When taking public transport 49.6 Million people in the UK are more than 45 minutes away from closest radiotherapy centre.

This equals 74% of the population.

The coloured areas on the maps (Fig 2 and 3) show geographical areas where people can access their closest radiotherapy service within 45 minutes, 60 minutes and 75 minutes.

Figure 2 shows travel time by car and figure 3 shows travel time by public transport.

Figure 2

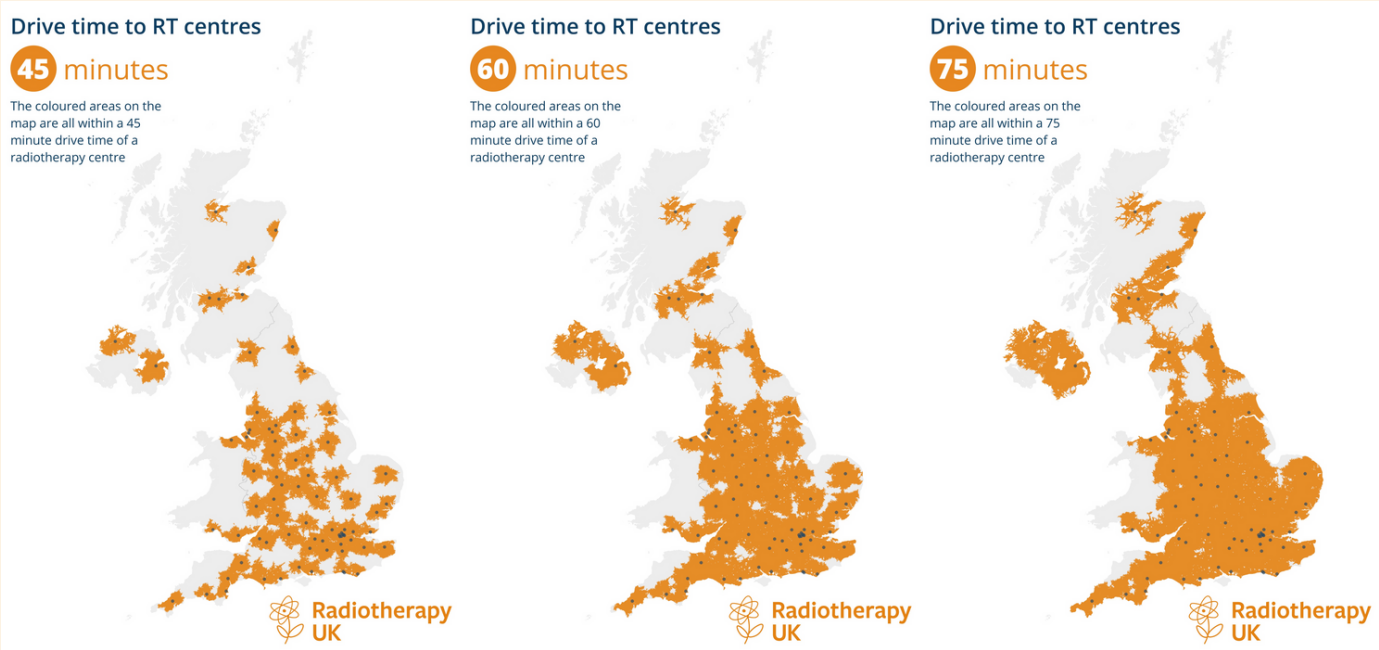
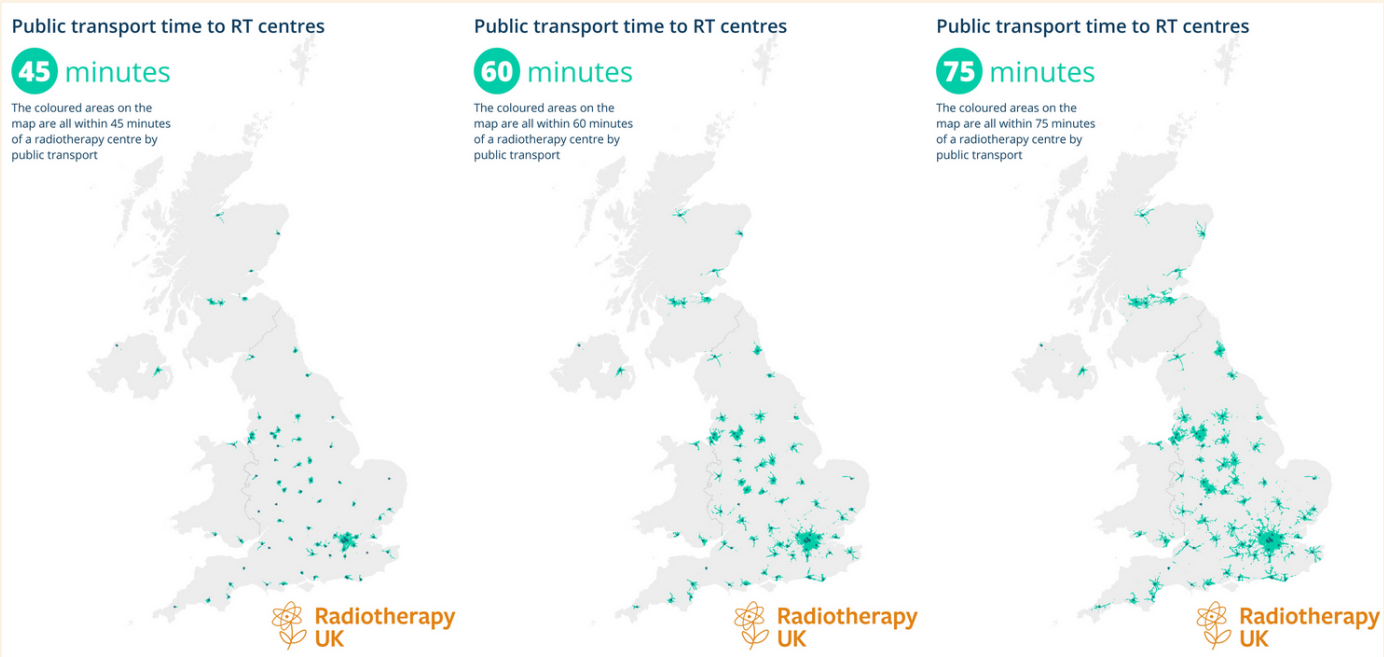


Figure 3



WHAT DOES THIS MEAN FOR CANCER PATIENTS?

Radiotherapy treatment is delivered daily and can range from a single treatment to up to 33 separate daily doses. This can mean up to seven weeks of daily treatment. This means to access this life-saving treatment many cancer patients have to travel to their radiotherapy appointments multiple times, over many weeks.

> ***If I'd had to do anymore then I'm not sure I would have. About halfway through I just didn't think I could do it, so I'm glad it's all over.***

Nick, 58, was diagnosed with prostate cancer in April 2022. After hormone therapy he was given 20 sessions of radiotherapy, starting in September 2022.

From Malton, in North Yorkshire, Nick was sent on a 90-mile round trip to Leeds for treatment, since no local hospitals have the radiotherapy machines needed to treat him. Nick's daily travel times added up to a 2.5 hour car journey each day. Looking back, Nick says he is not sure how he got through it.

"The team that treated me were so lovely, and I really appreciate what they did for me. I was quite lucky because my brother and sister could take me and that took the sting out of it, but I still felt quite guilty for putting on them.

Other patients had to rely on patient transport and they had a lot of waiting around to do. Anyone relying on public transport would have found it nearly impossible.

Cancer comes with a lot of stress anyway, but the extra travel was very challenging and I was glad to have it done and dusted."

Today Nick's PSA tests have reduced to 0,4 and his hormone treatment will continue. For now though, he is simply glad to be back home, no longer having to spend hours in the car travelling for treatment.

Regrettably, the circumstances faced by Nick are not uncommon and foreshadow the unequal reality for patients who can face multiple barriers to treatment.

The necessity of daily long-distance travel can have a substantial affect on patients, leading to physical, emotional, and financial stress. This is particularly significant for patients who are living with cancer and the side effects of its treatment, and those already living through poverty.

Longer travel times for treatment carries a financial burden and the costs of travel can accumulate rapidly, with expenses such as fuel, train and bus fares, taxis, parking, and meals adding to the financial pressures experienced by many cancer patients. It also means more time away from work, absence from families or caregiving responsibilities, and the potential financial implications this may entail.

The data shows that inequalities in access to radiotherapy are magnified when relying on public transport. For many people, public transport is their only option. A national transport survey conducted in 2019 reported that 24% of households in England did not own a car [31]. This figure increases to nearly 50% when considering groups in the lowest real income levels [32]. This indicates an intersectionality between reliance on public transport, poverty, and inequality of access to cancer treatment.

This is reflected in research which has found that patients from rural, less educated, and lower socioeconomic status populations with specific cancer types were shown to be disproportionately affected by travel burden [33].

Travel times can have an impact on patient survival

Travel times can also have an impact on patient survival. For some patients, the physical discomfort, inconvenience, and fatigue associated with long travel times can lead to a decision against receiving treatment [34].

Cancer treatments such as radiotherapy, which can involve daily appointments for up to seven weeks, can result in patients either choosing not to receive treatment [35,36] or selecting alternative treatment modalities instead. A study by Aggarwal et al (2023) [37] also found that patients were more likely to opt for a treatment that was available closer to their home.

Reducing travel times to radiotherapy services, or where not viable, providing provision for financial support to reduce the burden of travel will make radiotherapy more accessible and ensure patients have the opportunity to receive the most effective treatments for their conditions.

RECOMMENDATIONS

We are calling on the Secretary of State for Health and Social Care to commission a national review of access to radiotherapy services to deliver on **4 key areas**;

1. Analyse current rates of radiotherapy uptake and examine why rates are so much lower in the UK than in other comparable countries. From these findings implement a plan to ensure all patients in the UK have equal access to radiotherapy and that where they live does not determine what treatment they receive.

2. Assess where additional radiotherapy treatment capacity would be best placed to provide equality of access throughout the UK.

3. Ringfence investment for radiotherapy services through strategic and sustainable funding of workforce, equipment and advances to enable equality of access to high-quality radiotherapy and improve outcomes for patients.

4. Work with patients to understand the reality of travel time and how this affects their experience of radiotherapy treatment. Put in place practical and financial help to improve equity of access for all patients.

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APPENDIX 1

Data validation and interpretation

When dealing with travel times it is impossible to say with absolute certainty how long exactly any individual journey will take on a given day. This is because there are so many different variables that affect travel time, such as:

- Weather
- Roadworks
- Congestion
- Journey frequency for public transport
- Having to change buses or trains
- Time taken to find a parking space
- Diversions
- Time of day

However, despite all these different variables it is possible to generate reliable and robust travel time metrics that represent what is feasible on the ground. This is particularly important when generating travel time data for journeys to radiotherapy centres that must be completed multiple times over several days. Therefore, while it is theoretically possible to complete journeys in less time than results sometimes indicate, any analysis needs to be realistic and achievable on a regular basis.

In order to test the results a comparison was made to journey times generated by Google Maps as well as Mapbox. In all cases journey times appear both realistic and achievable. Even so, when using this data there may be a degree of variability in what can be achieved on a given day, perhaps plus or minus 10% in terms of travel time.

For population, Census 2021 data was used for England, Wales and Northern Ireland and for Scotland the most recent mid-year estimates. Travel times were calculated using the TravelTime API via QGIS (https://traveltime.com/gis). This tool is widely used for location intelligence and travel time analysis by large and small organisations across the world, as well as many local and national governments and the NHS.

For Census data, the lowest geographic level of data available was used, which for England and Wales was Output Areas, the new Data Zones in Northern Ireland and Data Zones in Scotland.

ACKNOWLEDGEMENTS

Radiotherapy UK would like to acknowledge the efforts of Dr Alasdair Rae and the team at Automatic Knowledge Ltd for creating the methodology for this project, undertaking analysis and providing ongoing support.

This work was only made possible by a grant from ERGEA, for which we are very grateful.

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