



SUSQI PROJECT REPORT

Reducing travel for blood tests used for Radiotherapy Planning

Start date of Project: 18/09/23

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Team Members:

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Background:

Climate change is a major global topic of concern (Anundio et al., 2023; Xu et al., 2018). As a result, the NHS has committed to being Net Zero by 2040 (NHS England, 2019). The biggest contributor to Radiotherapy's carbon footprint currently is patient travel (Chuter et al., 2023). The patient pathway was discussed in the context of sustainability issues, it was identified that patients who required a planning scan with contrast were attending for an additional appointment to have a blood test done. The Radiotherapy contrast procedure (Radiotherapy, 2023) states that patients should have an estimated glomerular filtration rate (eGFR) of $>45\text{ml}/\text{min}/1.73\text{m}^2$ before a contrast scan thus the need for an up-to-date blood test. The team recognised that this could be avoided by providing the patient with local options for having their blood test done or by them having the test done at their initial new patient consultation.

Intravenous Contrast is becoming more widely used as the need for better tissue delineation becomes necessary for planning more complex treatments (Minogue et al., 2019). During the Covid-19 pandemic Therapeutic radiographers gained additional competencies in blood taking to reduce additional exposures to their immunocompromised patients. Therefore, blood tests can be done in the department if required, thus reducing the need for the patient to attend multiple appointments. This project explored reducing the number of attendances required by patients by streamlining their appointments and improving service efficiency.



Specific Aims:

- To reduce the need for patients to attend the Radiotherapy department for a separate blood test appointment by:
 - having the test done on the same day as a consultant appointment, or,
 - having the test done locally (reducing travel distance and time)
- To see if we can reduce the number of tests being requested for the blood tests.

Methods:

Research (studying the system)

To understand how many patients were attending for a blood test we conducted a retrospective audit of the patients that attended the pre-treatment area of Radiotherapy for their blood tests during Sept 2023. This was a total of 19 patients.

The audit collected information on:

- Patient diagnosis
- Clinician
- Date of Blood Test
- Blood tests taken
- Date and location of clinic appointment where Radiotherapy was decided and consent signed
- Location where the blood test was taken
- Mileage travelled for the round trip for the blood test

The audit process highlighted that the issues surrounding when and where the patients had their blood tests were complex and there were many factors to consider.

Appointment times and travel:

We identified three cohorts of patients.

The first were patients having their pre-Radiotherapy consultation with the doctor at the hospital. If these patients could have their blood test done on the same day as the clinic appointment that would prevent an additional journey being needed to take the blood test. From the 19 patients reviewed from Sept 2023, 10 patients fit this criterion. If the additional journeys for blood tests had been avoided for these 10 patients, we could have saved 201 miles/month which projects to 2412 miles/year. These mileage savings convert to a carbon saving of 68.2kgCO₂e/month and a projected saving of 819.2 kgCO₂e/year (Department of Energy Security and Net Zero, 2023).

The second cohort of patients had their pre-Radiotherapy consultation with the doctor remotely (via telephone).

The third cohort of patients were seen for their pre-Radiotherapy consultation more than 30 days before their Radiotherapy planning CT scan. The blood test needs to be within 30 days of the



Radiotherapy CT scan and therefore these patients would not be able to have their blood test done until nearer their CT planning scan.

Both cohort two and three would still need to travel for a blood test, however this could potentially be done locally rather than travelling to Northampton General Hospital (NGH). We were not able to quantify potential savings for this group of patients from our retrospective review however could capture actual savings moving forward following our changes.

Low value blood testing:

The data showed that, in most cases, there were not additional unnecessary tests being done. If there were more tests done than the Radiotherapy CT scan required this was normally needed for additional treatment, for example chemotherapy. We therefore did not pursue further data collection or implement changes for testing.

Changes implemented:

Once we had analysed this initial data collection, we decided the biggest saving to travel could be made by enabling the patients to get their blood tests done at their clinic appointment where the decision for Radiotherapy is discussed and consent gained (cohort 1). It is at this appointment that the decision for a CT scan with contrast is made and thus the need for a blood test decided.

To enable this to happen we needed to ask those that conduct these consultations to change their procedures, this is mainly the Consultant Clinical Oncologists. There are also clinic-trained radiographers present in many of the clinic consultations as they provide some of the Radiotherapy information and undertake consent. Initially an email was sent to these groups. The email included:

- An introduction to our project
- The results of the background audit
- A request to send all patients that require contrast bloods directly from their clinic consultation to their blood test. At Northampton General Hospital this is possible as Oncology patients are allowed to walk into the blood taking department at any time for a blood test (i.e. don't need an appointment)
- The benefits that this change will make; the reduction in carbon emissions and a more streamlined pathway for the patient.

The request was re-iterated by one of the Green Team Project members attending the Radiotherapy Consultant Meeting. The post-change data collection process started 10 days after this meeting to monitor if there had been a change of practice.

For patients in cohorts two and three, who will still require travel, we reviewed local options. As some GPs will not conduct blood tests, we researched local centres and hospitals blood taking policies for different areas of the county, so we had this information available for patients moving forward.



Measurement:

Patient outcomes:

We do not anticipate any negative change to patient clinical outcomes. While it has not been possible to measure, we have included some potential positive impacts in the results section.

Environmental sustainability:

The post change data collection was collected prospectively. This enabled us to ask the patients some questions as part of the audit. The data collected was:

- Patient diagnosis
- Clinician
- Date of Blood Test
- Type of Blood Test taken
- Date and location of clinic appointment where Radiotherapy was decided and consent signed
- Location where the blood test was taken
- Mileage travelled for the round trip for the blood test
- Mileage saved by the patient not having to make an additional trip for their blood test

We also asked the patient:

- Where did you have your blood test taken?
- Was that convenient for them?
- Was there any problems getting their bloods taken?
- Any other comments?

This prospective audit was conducted for two weeks. The data was collected for every patient that attended for a contrast scan in this two-week period. Data was collected for 23 patients.

Using the data collected we were able to calculate if there had been any mileage saved for every patient that attended for a contrast scan in the audit period either from having the test conducted on the same day (cohort one) or at a centre closer to their home (cohort two and three).

We did not record specific means of transport so have assumed all patients travelled in an average car with average fuel, using the carbon emission factor of 0.3386 kgCO₂e per mile driven, from the Greenhouse Gas Reporting: conversion factors (Department of Energy Security and Net Zero, 2023).

The post-change audit period felt like a particularly busy period, therefore we compared the average number of contrast scans in September with those during the post-change audit period. The average number of contrast patients in September was **2.5 patients per day** and in the post-change audit period was **2.4 patients per day**. Therefore, these time-periods were comparable.

Economic sustainability:

Staff time will be saved (as outlined in our social sustainability section), however we have not included this as a financial saving as staff would remain in their roles but their time could be utilised doing other tasks.



There is potentially a cost saving in the number of blood test tubes used in the department. The blood tubes are costed at £0.12 per tube by our Pathology department.

Social sustainability:

We have collected feedback from staff and patients informally during the project.

There are potential travel and parking savings for the patients – data for this was not collected prospectively from the patients in the post-change audit. Predictions have been made for how much these savings could be.

Results:

Patient outcomes:

We do not anticipate any negative changes to clinical outcomes for patients. Having the blood tests available sooner may enable the Radiotherapy planning CT scan to be booked sooner (no data was collected on this factor). Patients may feel that their pathway is smoother but would not have experienced the previous pathway to know the difference.

Environmental sustainability:

In two weeks, from 23 patients, **374.2 miles** were saved, which projects to savings of **9,729.2 miles per year**. This is the equivalent of driving from Northampton to Aberdeen and back 20 times. Converting this to carbon savings equates to **126.7 kgCO₂e** for the 2 week period or **3,294.3 kgCO₂e per year**.

Some of these patients had their blood test taken after their consultation appointment, some had them taken locally and some had them taken as an in-patient. All these patients were included in the post change data collection assuming they would have had to come to the Radiotherapy department for their blood test previously. In reality, it is unlikely all these patients would have had to come into the Radiotherapy department previously.

If we separate out the results for patients who had their blood test done after their clinic appointment (i.e. cohort 1) then the results show a saving of 191.3 miles for the 2-week period that equates to **4,973.8 miles per year**. This is the equivalent of driving from Northampton to Aberdeen and back 10 times. The carbon saving for this mileage would be 64.8kgCO₂e for the 2-week period that equates to **1,684.1 kgCO₂e/year**. Long term we believe the change to this cohort will be the easiest to sustain as the department have more control over the appointment time and location.

Economic sustainability:

If we prevented all 19 patients from the baseline data collection coming for a blood test that is a saving of 19 gold top blood test tubes to our department although another department/hospital would then have this cost. This equates to a saving of £2.28/month, which is £27.36 for the year. Therefore, a small saving will be made in blood tubes, but minimal. The Oncology department is charged on a block basis so in reality there is no saving.



Social sustainability:

Patients:

Our project should have improved the patient experience, as patients will have less travel or only local journeys to take for their blood test. We did not ask patients prior to the change if they felt it was inconvenient, having to come to the Radiotherapy department for their blood test as it was assumed most patients were unlikely to realise there was an alternative.

We had some comments from patients in the post change data collection:

1. Felt that the location for the blood test (Radiotherapy department) was not convenient, as a relative had to take a day off work to bring them to. They would have preferred to go to their GP.
2. It was convenient for them as they had another appointment at the hospital.
3. They were not told the reason for the blood test.

Although there were only a couple of comments these support that the change makes it more convenient for the patient. Patient 1 was a patient that had a telephone appointment and therefore had to have an additional appointment at the hospital for their blood test. As stated, they would have preferred to have this at their GP but we do not have data as to why this was not possible. Patient 2 had their blood test done straight after a clinic appointment at the hospital therefore it was convenient. Patient 3 felt the process was not explained to them properly. In feeding back to staff about our project we will include a note that all staff need to ensure the patients understand the need for the blood test.

Patients will benefit from savings to their cost of travel. Using the average of 47p/mile (Yurday, 2024) the saving for the 23 patients reviewed would be £175 (374.2 miles x £0.47), an average saving of £7.60 per patient. Using this data the savings for all patients that attend for a CT contrast scan over the year could be £4,550.

The patients will also save on the parking costs for attending for their blood test. The patients are given a parking pass for their Radiotherapy treatment, but this does not include their blood test appointment. The minimum charge for the parking is £1.10 (Northampton General Hospital, 2024).

Staff:

There will be a time saving for the Radiographers if we are performing less blood tests in the department. An estimate of the time taken for a blood test (from obtaining the blood form to taking the blood sample to Pathology) is 15 minutes. Therefore, the change has potentially saved staff time for 2.25 hours a month, or 27 hours per year. The staff taking blood tests can be Band 4-7 depending on availability of staff. The time saving has not been converted to a financial saving, as staff would remain in their roles. However, this does free up time for staff to undertake higher value work and have time to reasonably fulfil their job plans.



Discussion:

The results from this project show that the change made has greatly reduced the carbon emissions caused by patients having to attend for extra blood test appointments for Radiotherapy contrast scans. Even using the more conservative results from cohort one only, the saving is **1,684.1 kgCO₂e/year**. This will help the hospital move closer towards a net zero carbon goal and will help reduce the number of cars on site.

There are some limitations with the data. In the post-change data, we looked at every patient that came for a CT scan and assumed they would have all come to the Radiotherapy department for their blood test before the change, to calculate the savings made. Before the change not every patient had to come to the Radiotherapy department to get their bloods taken, therefore this saving may be slightly overestimated. To correct for this the second calculation of data was performed where the carbon saving for patients in Cohort 1 were calculated. This was the cohort that we identified was the cohort where we could most easily change our practice. This data shows there was still a significant saving each year from just these patients.

A couple of the issues highlighted by the project were:

1. Some GPs do not take blood tests anymore and ask the patient to attend the hospital for their blood test. This therefore means we are limited in the mileage we can reduce.
2. We do not have access to the blood taking systems for Kettering General Hospital therefore if a patient comes under their catchment area we cannot request a blood test that they could then have taken nearer to their home. If we had access to this system, or if NGH and KGH were on the same system, we could remotely request blood tests and get results for patients and it would stop more patients having unnecessary journeys for blood tests. It would also save staff time getting the blood results (at present we have to ring KGH pathology department for results).

The Consultants and Review staff were supportive of the project and initially the numbers of patients coming to the hospital for blood tests did seem to reduce however, we are starting to see those numbers increase again, therefore the change in practice may have to be reiterated until it becomes more standard care. We also did not involve the admin staff that book the blood tests in the project so they are not aware that we are trying to reduce these numbers of tests. We have plans to share the results of the project with this team and engage them in helping reduce the numbers further. We can do this by asking the patients if they can get the test done more locally to themselves rather than them having to come to the Radiotherapy department for it.

This project highlights the need to relook at patient pathways. The patient pathway changed to our patients having their blood tests taken in the Radiotherapy department during COVID when the blood-taking unit was minimised to protect our patients from infection. Radiographers undertook additional training to be able to take these tests. While this solution improved the patient pathway during COVID, since then practices have changed, and the demand for contrast scans has increased, the patient pathway was therefore no longer the best it could be. It also shows that a small change, in this case the doctors being aware of the impact to change practice and improve the pathway, can make a big difference.



The only negative to this project is that the radiographers could be deskilled in blood taking. This is a minimal risk as most of the staff that take bloods also perform the cannulations for the scans. As the demand for contrast has increased so therefore has the number of people needing cannulating. In addition, we still take bloods for patients who are already on radiotherapy treatment so there is the possibility to practice those skills.

Conclusions:

The initial learning about SusQI and what area can have the biggest impact helped us focus our research in an area we had not thought of looking at. The focus was on unnecessary appointments and attendances and this led us to focus on the blood taking,

The research and baseline data collection phase of our project highlighted how complicated the patient pathway can be. This is increased by the fact that the Radiotherapy department treats patients from all over Northamptonshire, and some patients from other counties meaning there are different referring hospitals and different services that the patient can access in their local area.

The whole team found it hard dedicating the time to the project on top of the clinical demands of the job. Although the benefit to streamlining the pathway can be seen, the clinical part of our roles always comes first and that can leave little time for research, data collection and analysis.

Despite these difficulties, the project did help us reduce our environmental impact as a department saving at least **1,684.1kgCO₂e/year** and reducing patient mileage by **4,973.8 miles per year**. It also hopefully provides a more streamlined pathway for the patients. This project involved changing one small area of our processes and we hope to expand our learning to reduce our environmental impact in other areas.

Going forward the number of patients that are coming back to the radiotherapy department for their bloods will have to be monitored and clinicians and clinic staff reminded that the patient should be having their bloods taken straight after their clinic appointment. A meeting has been scheduled with the Radiotherapy Assistants that book the CT contrast planning scans and the blood tests to help them to also monitor and improve where the blood tests are being taken.

As mentioned above, the pathway could be improved further if we had access to the pathology systems of Kettering General Hospital as we could then request bloods tests we need for some patients we cannot at present. It would also save staff time as it would be easier to get the blood test results. We are also aware of other areas within our Directorate that would benefit from this, we therefore asked for this to be raised at Directorate levels meetings.

Our project will be shared with the other staff in Radiotherapy to inform them of the results. We hope this will help others to think about what other changes we could make to improve the patient pathway and potentially save money, resources and have a positive environmental impact.



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Critical success factors

Please select one or two of the below factors that you believe were most essential to ensure the success of your project changes.

People	Process	Resources	Context
<input type="checkbox"/> Patient involvement and/or appropriate information for patients - to raise awareness and understanding of intervention <input type="checkbox"/> Staff engagement <input type="checkbox"/> MDT / Cross-department communication <input type="checkbox"/> Skills and capability of staff <input type="checkbox"/> Team/service agreement that there is a problem and changes are suitable to trial (Knowledge and understanding of the issue) <input type="checkbox"/> Support from senior organisational or system leaders	<input type="checkbox"/> clear guidance / evidence / policy to support the intervention. <input type="checkbox"/> Incentivisation of the strategy – e.g., QOF in general practice <input type="checkbox"/> systematic and coordinated approach <input type="checkbox"/> clear, measurable targets <input type="checkbox"/> long-term strategy for sustaining and embedding change developed in planning phase <input type="checkbox"/> integrating the intervention into the natural workflow, team functions, technology systems, and incentive structures of the team/service/organisation	<input type="checkbox"/> Dedicated time <input type="checkbox"/> QI training / information resources and organisation process / support <input type="checkbox"/> Infrastructure capable of providing teams with information, data and equipment needed <input type="checkbox"/> Research / evidence of change successfully implemented elsewhere <input type="checkbox"/> Financial investment	<input type="checkbox"/> aims aligned with wider service, organisational or system goals. <input type="checkbox"/> Links to patient benefits / clinical outcomes <input type="checkbox"/> Links to staff benefits <input type="checkbox"/> 'Permission' given through the organisational context, capacity and positive change culture.