



SUSQI PROJECT REPORT

Project Title: Reducing routine blood testing in Frailty and Care of the Elderly Wards.

Start date of Project: May 2023

Date of Report: July 2023

Team Members:

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Background:

Many elderly inpatients are subject to regular (up to daily) blood tests during their inpatient stay to help monitor their condition and guide their treatment. However, it has been recognised that an overuse of testing is commonplace in this population of patients which can negatively impact multiple aspects of the process and decrease patient satisfaction.

Routine blood testing has adverse environmental impacts due to consumable use (many of which are single use plastics), test processing and waste disposal involved in the blood testing process. In addition to improving environmental sustainability, reducing the number of tests taken would bring benefits for patients and staff. This patient group can find excessive blood tests distressing, patient discharges and hospital flow can be delayed if waiting for blood test results as part of the decision-making process. There is also a financial impact from excessive testing and more staff time is needed to carry out the testing.

Both overuse and underuse of healthcare are now seen as markers of an ineffective and iniquitous healthcare system. Besides the benefits of laboratory testing in terms of setting a diagnosis and deciding upon the best treatment strategy, these tests may offer wider benefits to patients, for example in terms of reducing diagnostic uncertainty or offering reassurance (Wallace and Fahey, 2018). However, laboratory testing is (inevitably) also associated with patient discomfort, and a plethora of test results may divert the physician's attention away from the clinically relevant information. In addition, it may lead to overdiagnosis, which may result in unnecessary, potentially harmful or costly downstream activities. Indeed, previous studies suggest that, depending on the definition used, 30–70% of all laboratory tests may be considered potentially inappropriate (Kip *et al.* 2020).

Unnecessary and overuse of blood sampling substantially contributes to healthcare expenses, potentially exposes patients to unnecessary harm and leads to excessive healthcare 'waste'. Healthcare waste contributes massively to the NHS and the UK's carbon footprint and the waste produced from excessive blood sampling is no exception.



Specific Aims:

The aim of the project is to reduce low value and unnecessary blood testing on Care of the Elderly inpatients.

Methods:

We completed a process map (Appendix 1) to identify resources used within the blood testing pathway. We identified two potential areas of waste;

- 1) How many inpatient routine phlebotomist requests were conducted on care of the elderly inpatients and were some requests unnecessary?
- 2) For each routine request, several blood tests may be requested. How many blood tests did each patient have carried out per request, and were these all necessary?

A decision-making tool was developed (Appendix 2) to aid clinicians in deciding if blood testing was necessary at all, and if so, which tests were necessary for each patient to guide their treatment.

To achieve a reduction we raised awareness of negative impacts of inpatient routine blood testing amongst the care of the elderly clinicians and individuals who would be making the blood test requests. A specific focus on this patient population and the environmental impact of unnecessary blood testing has influenced the need for this project to be conducted.

Education for clinicians was needed to aim to create a change in culture and challenge their thought-process when requesting these tests, and this was developed and provided to the relevant staff by the Project Lead. Additionally, we developed a comms campaign (Appendices 3, 4 and 5) and disseminated this across our 6 care of the elderly wards as well as presenting to wider staff and primary care colleagues at a Trust event.

Measurement:

Patient outcomes:

We collected data on the number of phlebotomist request forms submitted before and after the project change. We also collected data on the volume of tests that were requested per patient before and after the change.

We do not anticipate any negative outcomes related to patient outcomes, and patient safety was not compromised. We have highlighted anticipated impacts in our results section.

Population outcomes:

It was not possible to measure broader population outcomes in the competition timeframe, however, we have hypothesised potential impacts in the results section.

Environmental sustainability:

To estimate the carbon footprint of the three types of blood tests, data from an Australian study estimating the life cycle assessment (LCA) of pathology tests (McAlister et al 2021) was used as it was assumed that the tests were undertaken in a similar way. However, the carbon intensity of the Australian electricity grid is a lot higher than the UK, and to account for this, UK electricity emission factors were taken from The UK Government BEIS 2023 database and substituted into the calculations. Some consumables were also removed where appropriate.

To estimate the carbon footprint of the consumables, a hybrid carbon footprinting methodology was used. The carbon footprint of the tourniquet, blood bottle, clinell wipe, butterfly needle and plastic specimen bag



were estimated using a process based analysis. The carbon footprint of the gauze was estimated based on a top-down method and the carbon footprint of the gloves were taken from Rizan et al 2021.

Emission factors used:

- Taking blood (consumables + blood bottle): 0.356 kgCO₂e
- A full blood count blood test: 0.03 kgCO₂e
- Urea and electrolytes test: 0.07 kgCO₂e
- CRP test: 0.04 kgCO₂e
- 1x extra blood bottle: 0.041 kgCO₂e

As it was not always possible to know which tests had been reduced, we also used an emission factor of 0.087 kgCO₂e for an 'average' test, which was an average of the three tests plus one blood bottle.

To identify savings from a reduction in phlebotomist requests, we included the consumables, relevant tests and blood bottles per patient. To identify savings from a reduction in tests per phlebotomy request (when bloods are still requested), we excluded consumables as the patient still required some blood to be taken.

Economic sustainability:

The costs of the following consumables were calculated:

- Gold bottle (this tests CRP, urea and electrolytes): £0.28
- Purple bottle - (this tests full blood count): £0.18
- Consumables including butterfly needle, tourniquet, cleaning wipes (x2), gauze (x3), gloves, specimen bag and labels: £0.85
- The cost of running each blood test;
 - full blood count - £3.92
 - urea and electrolytes - £1.55
 - CRP - £1.55

As we don't always know which tests have been reduced, we have taken a cost of £2.34 per 'average' test (the average cost of the three known tests).

Social sustainability:

Qualitative data was collected via conversations and surveys with staff. The staff surveyed were doctors, consultants and advanced clinical practitioners who requested blood tests for the care of the elderly patient group.

Results:

Patient outcomes

Before our interventions, **234 phlebotomist request forms** were submitted in a 7 day period across the 6 care of the elderly wards. After our intervention, this was reduced to **211 phlebotomist request forms** in the same timeframe across 6 wards. This is a **9.8%** reduction in phlebotomy requests and testing on the care of the elderly wards.

In the same 7 day period, an average of **4.2 tests** were requested per request form before our intervention. Following our intervention, the average number of tests was reduced to **4.0 tests** per request form.

Our elderly population group who are subject to multiple inpatient blood tests often have poor skin integrity with vulnerable skin tissue, meaning excessive blood testing leaves them with a high level of bruising and skin



damage. In addition, many of our patients are suffering from permanent or temporary cognitive impairment meaning that they may not fully understand the need for repeated blood tests and can find the process distressing and painful.

Population outcomes:

While not possible to measure in the competition timeframe, a reduction in testing may reduce delays in discharge for this patient group, as clinicians are not waiting for routine blood results to guide their decision making on a patient's suitability for discharge. Patients agreed that being discharged sooner in the day was preferable over a late discharge whilst awaiting test results. This also meant improved patient flow within the hospital and freeing up a bed for another patient.

Environmental sustainability:

Our data showed a reduction in 23 phlebotomist requests ordered per week (with an average of 4.2 blood tests requested per order). This is a reduction in 0.624 kgCO₂e per order. With an average of 23 less requests per week, our anticipated savings are 14.35 kgCO₂e per week, or 746.2 kgCO₂e per year.

The average number of tests requested per phlebotomy order also reduced from 4.2 to 4 (0.2 test reduction). As it is not possible to know which tests have no longer been requested, we have taken an average emission factor of 0.087 kgCO₂e from the three tests (FBC, urea and CRP) and 1 blood bottle to estimate savings. With an average of 211 orders still requested, this is a saving of 3.67 kgCO₂e per week, or 190.9 kgCO₂e per year.

In total, our anticipated annual saving is **937.1 kgCO₂e per year**, equivalent to driving 2,767.57 miles in an average car.

Economic sustainability:

There is a saving of £1.31 per order for the consumables used by the phlebotomist to take bloods, and of £9.82 for processing of 4.2 tests per order (a full blood count, urea and electrolytes, CRP and 1.2 'average' tests). With an average reduction of 23 orders per week, we will therefore save £256 per week, or £13,312 per year.

For continued orders, a reduction in 0.2 tests per order saves £2.34 per order. With 211 orders per week, this is a saving of £98.70 per week. Projected across a year, this is a potential saving of £5,132.4 per year.

Our total anticipated financial savings are **£18,444 per year**.

Our financial savings do not include staff time saved for ward staff, phlebotomy staff and lab processing time, which is highlighted in the social sustainability results below.

Social sustainability:

Less testing will likely improve patient and staff satisfaction. Patients were in agreement that less blood tests were preferable during an inpatient stay and staff agreed that this patient population find testing distressing leading to excessive bruising, pain and anguish particularly for those with cognitive impairment (which is common in our patient group).

As mentioned above, patients who are awaiting results of routine blood tests may be delayed from discharge. If discharge decisions are made based on clinical assessment rather than waiting for test results, this can expedite the discharge process meaning patients return to their own homes sooner and a hospital bed is freed up for another patient, improving flow throughout the hospital.



Less testing meant that nursing or medical staff were carrying out less tests that phlebotomy were unable to obtain, meaning they had more time to focus on clinical tasks and patient assessments.

The average time taken to run the blood tests was 4 hours. By reducing the number of tests being conducted within Frailty and Care of the Elderly Wards, 92 hours of laboratory time was saved in a 1 week period, which enabled the laboratory to prioritise patients that required tests. Based on this data, we can assume that over a 1 year period, this would equate to 4,784 hours saved by one department actively reducing unnecessary blood testing.

The staff surveyed all agreed that we carried out too many blood tests on our care of the elderly population. Many of them had not previously considered the environmental impact excessive blood testing could have, but they all commented that they felt a lot of waste was created during routine blood testing.

Staff feedback:

100% of staff surveyed prior to the project launch felt that too many blood tests were taken on our patient group

"I think we need to consider the impact of multiple blood tests that our frailty patients are exposed to. So many times our patients are left with bruising and discomfort from numerous attempts of blood taking".

- (ACP survey response)

"A lot of waste is created in the sampling process, especially when patients are hard to bleed and multiple needles etc taken to patients bedside and even if not used often still go to waste".

- (ACP survey response)

"Thank you for your work in reducing unnecessary blood tests across the frailty wards. The benefits of this project for our patient group are considerable –unnecessary blood tests cause pain and distress and they can result in delays to discharge which can be very detrimental to this patient group. In addition reductions in blood testing will provide both environmental benefits reducing waste and a number of cost savings".

- (Consultant feedback)

Discussion:

The results of the project have been fed back to the department and the project team have received a positive response from those in the department who have been involved. The biggest challenge was around changing culture with this group of clinicians and encouraging them to change or evaluate their practice. Many clinicians agreed that there was an overuse of testing in this patient group, but some felt that their practice was justified and challenging this was difficult. Overall, staff feel that the impacts of this project are only positive and the wider trust are now interested in the project being extrapolated across the whole Trust.

To ensure the project is embedded into the Trust, education will be provided and PDSAs conducted to identify benefits for all areas with a view to change the culture.

The challenges around high staff turnover and junior doctors rotation will mean the project needs to be re-launched at regular intervals to ensure the message is reiterated for new staff (as well as existing staff).



However, the junior doctor rotation offers a new opportunity each time a rotation takes place to provide teaching on this matter as part of induction to ensure it is embedded within the culture of our department.

Due to the nature of patients and environment, there will always be fluctuations in testing resulting from factors such as clinical outbreaks and winter pressures.

Interest from other specialties including A+E and the primary care setting allows for opportunities to expand the project wider and make an impact to other patient populations. The project team is in talks with other specialties to provide the same campaign and training that was carried out within the care of the elderly department.

There is a huge carbon and financial cost saving for the hospital trust when the amount of blood tests carried out is reduced. The trust estimated that last year they had 272,000 haematology requests carried out across the hospital. Any reduction in this number of tests carried out would have a significant saving for the trust, in keeping with their green plan and financial targets.

Conclusions:

Unnecessary or excessive routine blood testing in care of the elderly inpatients creates waste, has a negative detrimental impact on the environment and contributes to the overall carbon footprint of the Trust

From the project, we can conclude that the following areas were achieved

- Cost saving
- Time saving
- Improved staff satisfaction
- Increased patient satisfaction and clinical care (e.g. by protecting skin integrity, excessive bruising and undue distress to frail patients)
- Reduction in un-sustainable practices, and improved carbon footprint
- Possibility of reduction in length of stay, as well as timely discharges
- Actively working towards achieving lean pathways
- Reduction in phlebotomy workload return, a reduction in laboratory testing time

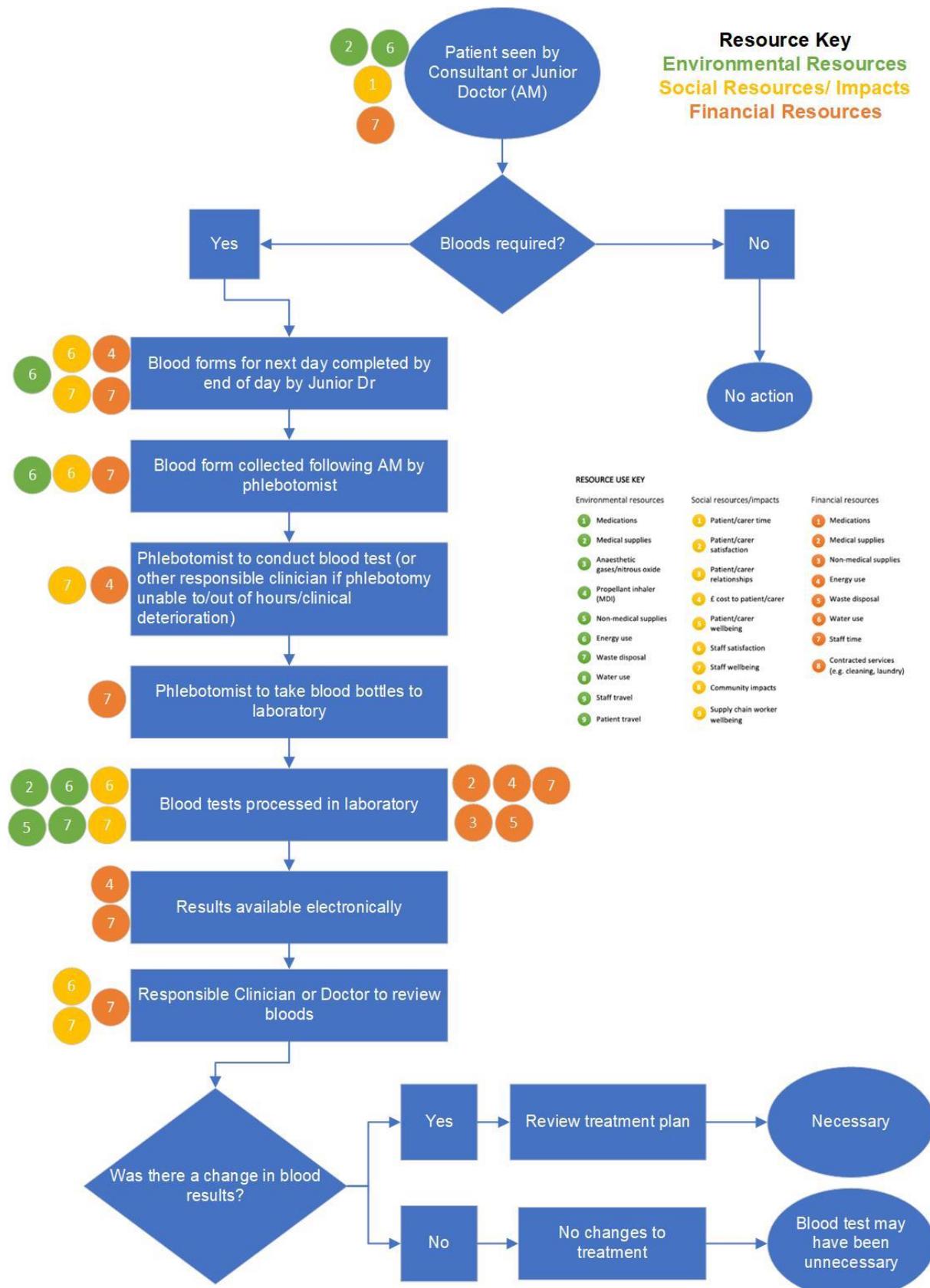
References and Resources

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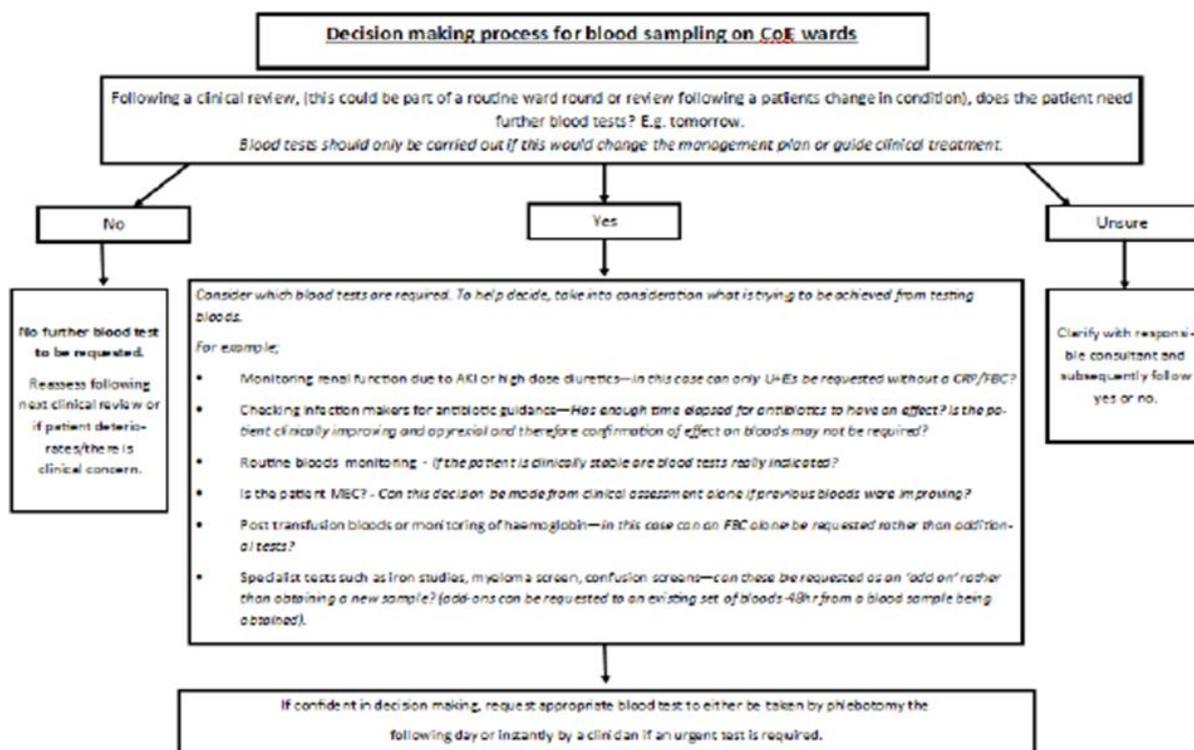


Appendices

Appendix 1



DECISION MAKING PROCESS FOR BLOOD SAMPLING



Please contact Ellie Berry (ACP) or Lorna Bannan (OPMU) for more information



OPMU AND CARE OF THE ELDERLY

Sustainability PDSA

Reducing blood testing across Care of the Elderly Wards

Please contact OPMU or Ellie Berry for additional information

→ Aims

- Reduce unnecessary activity via lean pathways which in turn will benefit a reduction in carbon intensity
- Achieve SWFT's sustainability pledge to embed prevention into every service
- Work to achieve SWFT's goal in leading the NHS carbon reduction
- Work to change the culture and lead the way in conducting necessary blood tests only
- Reduce plastic usage for unnecessary tests
- Reduce use of surgical gloves for unnecessary tests

→ Why?

<p>HEALTH CARE'S CLIMATE FOOTPRINT</p> <p>Carbon footprint of global healthcare sector is 2 Gt CO₂e</p>	<p>Supply chain workers paid less than US\$1 per day, no health and safety, many are children</p>	<p>2% global plastic production is medical plastic; increases by 6.3% per year</p>
<p>Deforestation: rubber plantations for surgical gloves</p>	<p>Scarcity of resources: conflict minerals in medical equipment</p>	<p>Antibiotics found at 65% of 711 river sites worldwide</p>

→ Patient Benefits

- Improved patient satisfaction

→ Other Benefits

- Reduction in phlebotomy waiting times
- Reduction in plastics, paper and other resources
- Improved staff satisfaction
- Cost savings
- Workload reduction

→ Resources used within the blood testing process

RESOURCE USE KEY

Environmental resources

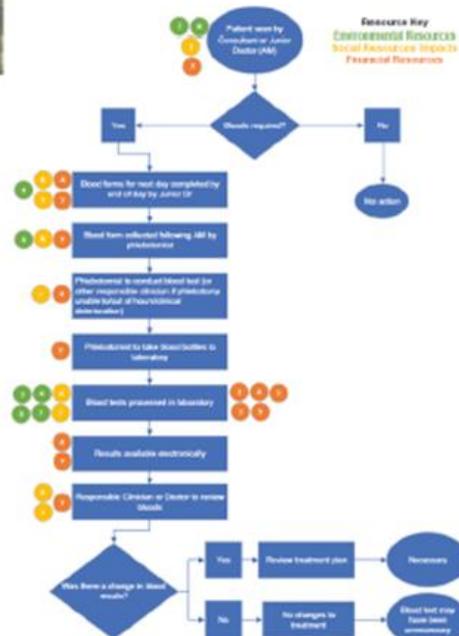
- 1 Medications
- 2 Medical supplies
- 3 Anaesthetic gases/introus oxide
- 4 Propellant inhaler (MDI)
- 5 Non-medical supplies
- 6 Energy use
- 7 Waste disposal
- 8 Water use
- 9 Staff travel
- 0 Patient travel

Social resources/impacts

- 1 Patient/carer time
- 2 Patient/carer satisfaction
- 3 Patient/carer relationships
- 4 £ cost to patient/carer
- 5 Patient/carer wellbeing
- 6 Staff satisfaction
- 7 Staff wellbeing
- 8 Community impacts
- 9 Supply chain worker wellbeing

Financial resources

- 1 Medications
- 2 Medical supplies
- 3 Non-medical supplies
- 4 Energy use
- 5 Waste disposal
- 6 Water use
- 7 Staff time
- 8 Contracted services (e.g. cleaning, laundry)



Frailty and OPMU REDUCING UNNECESSARY BLOOD TESTING



Working to create sustainable practices within the NHS

Frailty are working with OPMU to run a PDSA focusing on sustainability within the Trust from **Wednesday 14th June 2023**. The aim is to actively reduce unnecessary blood testing by following the revised Decision Making for Blood Sampling process.

The PDSA will run for 2 weeks, with the view of embedding the sustainable practices into the department once all benefits have been realised.

What will be studied?

- Environmental impacts and carbon foot-printing
- Departmental costs
- Patient satisfaction
- Staff satisfaction
- Volumes of blood testing across Frailty and CofE Wards
- Education and culture



Why?

- Climate change is both a health and environmental crisis, with wide-ranging impacts on patient's health and care
- 2% of global plastic production is medical plastic
- The NHS is responsible for 4% of the UK's carbon footprint - equivalent to total emissions of Croatia
- The NHS is set to reach Net Zero by 2024



DID YOU KNOW



- 2% of global plastic production is medical plastic, increasing 6.3% per year
- The NHS is responsible for 4% of the UK's carbon footprint - equivalent to total emissions of Croatia!

Routine blood testing on inpatients has a huge environmental impact, produces excess waste and contributes to NHS carbon emissions.

By reducing the amount of tests carried out, Frailty can improve patient satisfaction, reduce departmental costs and improve sustainability within our department.

For more information, please speak to Ellie Berry (ACP) or Lorna Bannan (OPMU)