



SUSQI PROJECT REPORT

Reusable tourniquets for sustainable phlebotomy

Start/End date of Project: 11 September 23

Date of Report: 23 January 24

Team Members:

- Rebecca Palmer Nurse Lead for Governance Quality Improvement
- Lea Lindley Senior Sister, Cardiology/Vascular Outpatients
- Tony Ward Senior Charge Nurse, Renal Outpatients
- Nina Coggins Sister, Cardiology/Vascular Outpatients
- Joanne Vaines Clinical Support Worker, Key phlebotomy Trainer
- Steve Newsome Logistics Manager, SYRS
- Paul Cattell Senior Charge Nurse Cardiac Catheter Suite



Background:

Sheffield Teaching Hospital's (STH) strategic aim is to be a sustainable organisation capable of minimising any adverse impact on society and on the natural environment which could jeopardise the ability of future generations to meet their health and social care needs. As set out in our manifesto, '[Making a Difference- the Next Chapter 2022-27](#)' the trust recognises the importance of transforming our service delivery models to ensure that they are sustainable and responsive to the changing needs of the people we service.

In discussions, the team acknowledged the growing evidence of the global climate emergency and the role that the NHS plays as a significant contributor to carbon emissions. The Project team wanted to take direct action and play a role in supporting STH to achieve its strategic aims and move towards the NHSE goal to be Net Zero by 2040 and the world's first net zero national health service.

STH is one of the UK's biggest providers of integrated and community-based healthcare providers providing a comprehensive range of local and tertiary services to the residents of Sheffield, South Yorkshire, Mid Yorkshire and North Derbyshire and also some highly specialised services to all parts of England. We deliver over 2 million patient contacts every year across 5 hospital sites and Community Services through our 18,500 staff.

South Yorkshire Regional Service (SYRS) is a Care Group within STH that includes Cardiology, Cardiac Surgery, Thoracic Surgery, Vascular and Renal services. These services treat patients from across South Yorkshire, with some providing services to an extended region.



It was identified that SYRS Outpatient Departments create a significant amount of clinical waste which contributes to the NHS overall carbon footprint. This includes high volumes of single use tourniquets in the Phlebotomy service. In view of this, the decision was made for this project to take place in the Outpatient Departments for these services.

It was agreed that the single-use tourniquets currently used were poor quality and provided a poor experience for both patients and staff. An alternative reusable tourniquet ([Daisygrip](#)) was explored in response to the consensus opinion that we needed to preserve the vascular access for our patients because it is so important for their long-term clinical care and health outcomes. Our focus was to find a product capable of reducing environmental and financial waste, whilst at the same time, improving patient and staff experience.



Image: The Daisygrip reusable tourniquet

Previous work had been undertaken by [Mid Yorkshire NHS Hospitals Trust in 2022](#), when they reviewed their tourniquet use across the Trust. Working with the NHS Supply Chain they accessed a reusable alternative. There was an overwhelming positive response to their trials which identified multiple benefits including carbon reduction and financial savings and improved social value for both patients and staff. The work undertaken at Mid Yorks proved highly beneficial to our project. We were able to build on their work and enable us to select a suitable product as it had been already completed within NHSE and supported by the NHS Supply chain.

Our SusQI Project Team was formed and consisted of the Senior Sister and Charge Nurses for the Outpatient Departments, Logistics Manager, Charge Nurse Cardiac Catheter Suite, Key Phlebotomy Trainer and the Nurse Lead for Governance Quality Improvement.

Our SusQI Project team came together from across a number of SYRS Departments to work on this project. Each represented their wider team and brought the passion to make a difference for all patients and staff. They recognised the financial constraints of their services and still wanted to try to achieve a SusQI project to positively impact on patients, staff and the environment within these constraints.

Our vision was to start by implementing reusable tourniquets within Chesterman and Renal outpatient departments. This was a success, so we piloted them in the Cardiac Catheter Suite prior to the wider roll out across all clinical areas in SYRS. This work is still in progress. Our ultimate aim is to scale the implementation of reusable tourniquets across the Trust.

Specific Aims:

To replace single use tourniquets with reusable tourniquets in our Cardiothoracic Services, Vascular and Renal Outpatient Departments using SusQI methodology, to benefit patients' clinical and social outcomes while reducing our environmental harm and financial costs.

Our long-term aim is to support uptake of this project Trust Wide and to share within the Yorkshire and Humber and National Kidney Network and NHS Sustainability networks.

Methods:

Studying the system:

We conducted a staff survey to explore staff perceptions of the single use tourniquet that were being used in clinics. Of 20 responses, 80% of staff said they did not like the single use and wanted a better option. 20% said the current single use options were ok, 0% staff said they liked them.

80% said single use tourniquets are uncomfortable for patients, nipping/pinching at skin and hair. 55% said the single use is challenging to remove one handed. One staff member commented this is especially challenging for staff who may have health conditions themselves, such as arthritis of the hands/wrists or repetitive strain injuries.

While 40% believed single use is always better, and 50% usually better, from an infection prevention perspective, showing the need for education on this, 75% of staff still reported they would like to switch to a reusable tourniquet. 20% wanted to trial before making a decision, and only 5% staff felt an alternative single use product would be better.

The reasons for staff wanting to change to reusable covered social, environmental and financial impacts and overall indicated to us that staff would be supportive of implementing our project aims to improve patient and staff satisfaction.

We reviewed procurement data and completed observation of staff in the clinical areas which led us to identify variation/ multiple suppliers of product use for single use tourniquets. Tourniquets were not always being used in line with infection and prevention control (IPC) guidance.

Stakeholder engagement and implementation

We used our survey results, procurement and observation data to approach various stakeholders and gain approval for the change to reusable tourniquet, including:

- Endorsement from the Triumvirate - Cardiothoracic and Renal Clinical Directors, Operations Director and Nurse Director.
- Endorsement from the Trust Infection Prevention and Control team.
- Approval from the SYRS Governance teams for each Care Group Directorate.
- Approval from Clinical leaders and relevant trainers.



We continue to work with Stores and Procurement regarding product change, support and ongoing monitoring and oversight of Daisy-Grip usage and stock control of unwarranted stock ordering of other equipment.

It was important to trial the change in one clinical area in order for us to have oversight over the change to be able to estimate how many reusable tourniquets would be required in each area based on clinical need, and identify any potential issues, such as equipment being taken or moved to another clinical area.

We initially piloted the change in our Cardiac Catheter Suite before starting to roll out into the other SYRS Clinical Services. This was commenced after obtaining Clinical Governance and Matron approval.

Our communication and education strategy for implementation included:

- Demonstration with department heads, clinical areas/depts senior nursing/clinical teams.
- Presenting at ward safety huddles.
- Evaluation of the Daisy-Grip tourniquet product information which includes an instruction leaflet.
- Generic email to all SYRS staff regarding the product change, ensuring visibility of the project leads and provision of their contact details.
- Presented at Governance and Matrons meetings.
- Training prior to issuing stock to wards/departments.
- Dissemination of YouTube videos to relevant staff.
- Project update to the trust Sustainability Forum.

Measurement:

Patient outcomes:

A second staff questionnaire was conducted after staff had trialed the reusable tourniquet to gather feedback about how the new tourniquet was for use on patients.

We obtained feedback from patients who have had experience of both the single use and reusable tourniquet, by providing questions for nurses to ask patients during their phlebotomy appointment. Every opportunity was taken to demonstrate and compare both types of Tourniquets so that patients could describe and enrich their feedback from having the experience of engaging with the project.

We monitored the trust's safety reporting system, Datix, for any incidents related to the use of the reusable tourniquets.

Environmental sustainability:

Carbon dioxide emissions (CO₂e) were calculated for each type of tourniquet item using a bottom up (process based) methodology. Individual materials were weighed, and appropriate carbon emissions factors allocated to each material from the [UK Government Greenhouse Gas \(GHG\) 2023](#)



[conversion factor database](#), and the greenhouse gas emissions associated with transport from production to our service site estimated. Emissions associated with waste disposal were obtained from [Rizan et al 2021](#). The carbon footprint of a reusable (daisy grip) tourniquet was provided by the Centre for Sustainable Healthcare, who had footprinted this item for a previous project.

Data was provided from Procurement to establish the usage of disposable tourniquets in both Cardiology, Renal Outpatients and SYRS. CO₂e for each item was then applied to our single use usage figures. To calculate the CO₂e of a reusable tourniquet, we have assumed 8,000 uses per daisy grip prior to disposal. The manufacturer has suggested 10,000 uses per item however we have reduced this in our calculations to account for any losses.

We also calculated the number of reusable tourniquets required and provided one for each phlebotomy station. An additional 4 were given to each area to cover losses at these stations. There is ongoing oversight by our Logistics Manager as we distribute into the wider SYRS clinical areas.

Our CO₂e reduction was translated into miles driven using emission factor 0.3386 kgCO₂e per mile driven in an average car with unknown fuel, from the UK Government Greenhouse Gas (GHG) 2023 conversion factor database.

Economic sustainability:

Financial data was provided from Procurement along with our usage data for disposable tourniquets in both Cardiology, Renal Outpatients and the SYRS Care Group as a whole.

Social sustainability:

We sought patient and staff feedback on the single use and reusable products regarding their experience of the equipment and the importance of reducing waste and the environment throughout the NHS.

Results:

Patient outcomes:

While evaluating baseline practice, it was identified that there was unexpected variation in how stock was being used. Some of which were not supported by IPC policy. By transitioning to a reusable option with clear guidance, we are aiming to minimise variation in practice. This will ensure all tourniquet use is in line with IPC, which may reduce risk of infection.

Our staff and patient survey results are detailed further in the social impact section. However, staff also commented that the single use tourniquet could cause unnecessary harm to patients:

“Removing it [single use tourniquet] is difficult and causes further discomfort as we wrestle with it. And trying to remove it while the needle is still in the arm and the last bottle being drawn can cause trauma in the vein while you're wrestling with it.

“Too tight for fragile skin. Bruise patients' skin and on occasions cause skin tears.”



“After taking blood We are supposed to open the single-use tourniquets with one hand but I find this unsafe when I still have the needle in someone's arm”.

Environmental and economic sustainability:

Annual financial and CO2e savings are projected in the table below.

Area	Single use			Re-usable			Saving	
	#	£	kgCO2e	Predict ed #	£	kgCO2e	£	kgCO2e
Chester man clinic & renal OP	10,190	8,224.4	407.6	12	318	0.42798	7,906	407.2
SYRS	37,732	7,692.1	1,509.28	40	1,060	1.58474	6,632	1,057.7
STH	622,780	75,618.2	24,911	1,500	39,750	26.15676	35,868	24,885

Within our trial of SYRS, we have projected annual saving of **£6,632** and **1,057.7 kgCO2e**, equivalent to driving 3,123.7 miles in an average car. We will need to monitor our procurement data and after one year will be able to confirm if our estimated savings are correct or under/overestimated.

We plan to promote the scale of this change Trust wide. Based on procurement data of single use items, this change could bring savings of £35,868 and 24,885 kgCO2e, equivalent to driving 73,493.7 miles in an average car. However, this will require monitoring of actual procurement data as our results are based on a projection of the number of reusable tourniquet required.

Social sustainability:

Staff feedback

Before the trial, staff commented;

“We need a better-quality tourniquet to help us do our job well. Preserving our patients' veins is really important for their future as renal patients. Poor quality of single use can make patient experience stressful and poor. I feel this when I’m trying to take their blood”.

“I worry about potential infection risks, but feel disposable is a waste of money and bad for the environment”.

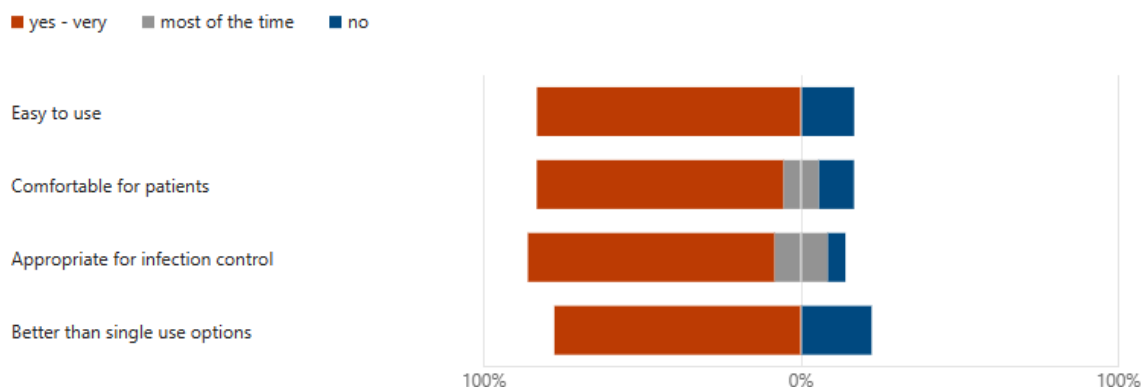
“Patient comfort, better quality to help me take blood well. Easy to clean in between patients. Less waste has got to be a good thing to do”.

“Patients don't like the feel of the throw away ones and have commented on the environmental impact many times”.



80% of staff said they were very concerned about the impact of healthcare and waste on the environment, while 15% had not considered it before.

Post trial, we received 18 responses to our second survey. There was over 77% agreement that the reusable option trial was easier to use, more comfortable for patients, appropriate for infection control and better than the single use option.



In conversation with some staff after they completed the survey, we learned some staff had completed the survey about reusable tourniquets believing they were being asked about single use. Therefore, we expect that the results are slightly skewed, and that there is more than a 77% agreement that the reusable option was better.

94% staff said it was important to them that the reusable tourniquet would help to reduce waste and carbon emissions in the department.

Staff quotes:

“It’s much more gentle for the patient. Easier to handle and to clean. The release catch was so simple to unclip. It feels more robust and doesn’t wrinkle up like to single use, they are spiteful”.

“I like the colour it’s bright enough so I don’t think it’ll get accidentally thrown away”

“It will cut down on unnecessary waste”.

Some potential issues were highlighted:

“Too heavy for frail patients.”

“Cleaning it if soiled will be an issue.”

Over the course of the ten weeks these problems were addressed by developing a robust education package which included the Outpatient Phlebotomy Trainer going into clinical areas and demonstrating as well as using YouTube video support for the wider teams.

As staff gained experience and confidence using the tourniquet it was recognised the single-use were more uncomfortable and the tourniquet was more gentle against frail patients' skin when used correctly.



In practice the tourniquet is easy to clean and this was accepted once staff had had time to get used to using it and cleaning it between each patient.

Patient feedback

22 patients completed the patient survey. Of these, 59% reported they did not like the single use tourniquet, commenting it digs into their arm which causes marks and hurts. Others reported it hurts when being removed, with one patient reporting the tourniquet hurts more than the blood test.

100% agreed they liked the reusable option, reporting it does not pinch or mark their skin or cause any pain. Others said they could barely feel the tourniquet and that it is far better in comparison to the disposable. 95% thought the service should switch to reusable, 5% (1 patient) reported they were unsure. Further discussion amongst the team clarified that this was based around concerns with infection control.

Patient comments included

“Comfy and better for the planet”.

“What’s not to like!”.

“We shouldn’t be using throw away products if a reusable one is available”

“I definitely think a better option is needed and I really like this new tourniquet. I think they will save so much waste if they can re-use these ones”.

Discussion:

The SYRS SUSQI Project team’s 10-week journey

Confidence with Infection Prevention and Control standards.

A small number of staff raised concerns regarding infection control because they had become used to the single use disposable equipment. This was discussed as a team and the education support from the key phlebotomy trainer helped alleviate concerns about effective cleaning processes in between patients. The tourniquet was not implemented until the project team had requested validation from the trust Infection Prevention and Control Team (IPC) to use the tourniquet. The validation from the IPC team gave the Project team confidence to proceed and provided reassurance to the staff who had raised concerns.

Staff engagement with the feedback questionnaires using a QR code format.

We had two nursing teams highly skilled at taking blood from very complex patients. Each member of the team was prepared to use the equipment and give their opinions because they were passionate about improving the quality of the equipment on offer.

The project leads were excited about using a QR code to collect our data. We wanted maximum access to staff opinion and thought this was a creative solution. In practice, it required a more hands on approach to educating and giving some of the staff the confidence to use the technology. On



reflection, agreeing with staff how to undertake the questionnaire would have been more productive. We learned that posters in coffee rooms and clinical areas did not increase staff responses. The most detailed information was gathered through the project team going into the clinical areas and talking directly to staff and patients. This informal approach was practical and efficient for the Project team and felt more relaxed in forming interdepartmental relationships. Clinical staff felt valued and happy to give honest feedback.

Two questionnaires for staff were used. On reviewing the responses, it was identified we had not been clear enough in which questionnaire was for the re-usable tourniquet. As a result, there was a small degree of blending of responses which diluted the data. In view of this we had more verbal team discussions. The small number of staff made this feasible and we could be confident with our staff feedback.

A small degree of resistance to changing in practice.

Staff are proud of their clinical skills and strive to do their best when taking blood. It's important to preserve the vascular access to renal, vascular and cardiac patients, many who are managing long-term health conditions. Our staff care greatly about making the experience a positive one for patients. The team spent time finding out what matters for our staff and listened to their concerns. It was clear that we all need to be confident that we had the right equipment that enables our staff to be the very best phlebotomist they strive to be and that they felt valued.

Procurement and stock control management

The tourniquet was so popular that staff taking blood wanted one each that they could keep. Steve, our Logistics Manager was a huge support in helping manage, advise and educate the managers in the ordering process. Without doubt, Logistics involvement prevented some areas from over ordering. We have one or two areas that ordered large volumes and we responded to this by maintaining oversight on ongoing stock levels and losses in the clinical areas. This was considered a financial risk and escalated to our Triumvirate for operational oversight.



Staff training and stock management.

At the start of the project the training and supporting staff was undertaken by the Key Phlebotomy Trainer in the two Outpatient Departments which went very well. Stock management was easy to

control with one tourniquet was allocated per phlebotomy station. Prior to further roll out, the decision was made to pilot the Tourniquet in one clinical area, the Cardiac Catheter Suite (CCS). Once again, one tourniquet per phlebotomy station. However, there were different order requests for one tourniquet per staff member, which reflected in high order numbers to Procurement. Steve, Logistics Manager responded to this by going out into the Clinical areas to educate and advise staff. This was supported by Lea Lindley who is currently supporting the training of all trainers before distributing stock once the clinical teams have been trained.

The reusable Tourniquet can be used for 10,000 uses or for 2 years. To date, we have lost a very small number of tourniquets in the pilot phase on CCS. Some areas have labelled them to identify their area. Steve monitors our orders and the SYRS Governance team is there to support this change in practice.

Standardisation of tourniquet brands.

There will always be a need for disposable tourniquets for infectious patients. However, as we manage the transition over to reuse, we will also move towards standardisation and reducing the number of brands across SYRS.

Team reflection

In summary, we achieved our specific aim which was to replace single use tourniquets with reusable tourniquets in our Cardiothoracic Services, Vascular and Renal Outpatient Departments. Within the 10 week project timeline, we also started to roll the tourniquets out into other clinical areas. Our staff embraced this change and the feedback we continue to collect from patients is overwhelmingly positive. Driving this change has been the motivation of our staff who feel that their main limitation was having the sufficient time to dedicate to the project as we would have liked.

The key elements that contributed to the success and learning in this project were the importance of keeping the weekly meetings going over the 10 weeks. We were extremely focused when it came to driving actions and tracking key milestones and risks. We learnt when things didn't go so well. Particularly around education, communication and stock ordering. This helped focus our priorities which were patient and staff engagement, and listening to what mattered to them. We learned that staff education, product distribution and stock control are important and need to continue beyond the project timeline. Involving the right people from the start and inviting colleagues in response to any issues as they arise. With the support from our Nurse Director, Operations Directors and the Infection Prevention and Control team we were able to make our changes happen.

Moving forward, the Project team plans to share the learning through the trust Communication network, Patient Experience Committee and meetings held by the Nurse Directors and Operations Directors. The Organisation Development Team celebration events and the Sharing Best Practice events held by the trust.

There are plans in place to share this work with the Yorkshire and Humber and national Kidney Networks and further forums are being considered in which we can spread this initiative outside the organisation.



Conclusions:

The SusQI Project team aspired to make a sustainable change at local level that could then be shared across STH. Our broader vision from the start was to be successful and that STH could inspire a sustainable change within the wider NHS.

Our teams achieved their aim to improve patient and staff experience whilst at the same time making an impact environmentally, financially and socially.

As a Project team we learnt about SUSQI alongside our staff. Each team involved is proud that they implemented the reuse tourniquet into their areas within the 10 weeks and made a tangible difference to their patients and colleagues. Everyone involved is confident that we will see the tourniquet across the wider Trust in the future.



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