



SUSQI PROJECT REPORT

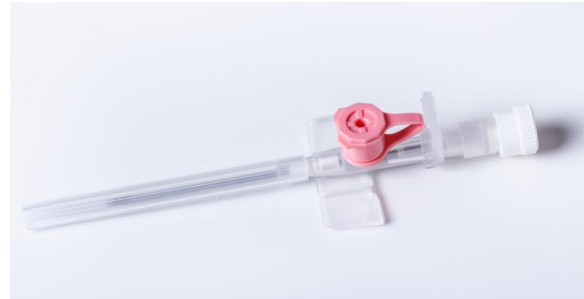
Reducing the number of Unused cannulas in A&E

Start date of Project: September 2024

Date of Report: 28/01/2025

Team Members:

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Background:

In the emergency department (ED), patients are often fitted with an intravenous (IV) cannula to take bloods at admission and to support quick administration of fluids or medications if needed. However, the insertion of many cannulas could be avoided, as the cannula is not used after having blood taken, leading to waste, inefficiencies and an increased risk of harm. Instead, patients could have admission blood taken with a butterfly, reducing the equipment used.

Reducing unnecessary cannulation is supportive of environmental, financial and social resource stewardship. Each cannulation requires over 10 single-use items which are all individually packaged and placed in clinical, infectious and sharps waste after use. Alternatively, collecting blood via a butterfly requires 6 items. In this report, we will be referring to cannulas used to take blood only which are not used to give medications or fluids as unnecessary cannulas, meaning a butterfly could have been used instead.

From an environmental point of view, using butterflies to collect blood rather than cannulas can help by reducing the number of single-use plastics. Previous quality improvement (QI) projects in UK hospitals have highlighted that a substantial percentage of cannulas remain unused. The ED team in [Royal Devon and Exeter](#) (2018) reduced unnecessary cannulation by 66% (105 cannulations per week) saving 8,399kgCO₂e and £27,830 per year. More recently [Charing Cross Hospital](#), reduced unnecessary cannulation by an average of 40 per day, with potential annual savings of 19,000 kgCO₂e and £95,000.

Cannulation can be uncomfortable and may lead to adverse effects, such as localised pain and bruising. Cannula also increases the risk of complications such as hospital-acquired infections, including bloodstream infections. In October 2020, in Imperial College Hospital ED, cannulated patients were interviewed. 68% had a negative view of their cannula (found it painful, would rather not have had one), irrespective of whether they were receiving IV medication or not.

Staff time is required to collect equipment, prepare, insert and remove. Reducing cannulation facilitates faster admission processes in high-pressure ED settings.

In Northampton General Hospital, we have a big and dynamic ED team coming from different social and professional backgrounds with a high inflow of patients presenting with a variety of health problems. We engaged all staff who are involved in the blood taking and cannulation process to learn more about staff perceptions of cannulation through a short survey. We had 79 responses (43 nurses, 8 HCAs, 21 Doctors and 7 others). 65/79 stated 'yes' to the question, "*Do you think patients are cannulated unnecessarily in ED?*" 11 responded 'maybe', with only 3 stating 'no'.

2. Do you think patients are cannulated unnecessarily in the ED?



When asked "*Why do you cannulate a patient?*", 44 stated they used their 'clinical judgment', 2 stated they 'had been told to', and 31 stated 'just in case they need it'.

3. Why do you cannulate a patient?



23 staff reported they do not document cannulation under the treatment section when referring or discharging, which highlights that our data on the number of cannulations and unnecessary cannulations may be underestimated.

This process showed us that there is staff agreement that unnecessary cannulation is a problem and that it would be beneficial to continue with our aim. In 2023, we formed the Green ED team, aiming to raise awareness of the impact the health system has on the climate crisis. Our main aim is to start projects aiming to decrease the overall CO₂e footprint of our ED.

Specific Aims:

To reduce the number of unnecessary cannulas used in collecting blood from walk-in patients presenting to A&E by 10% in 2 weeks aiming to reduce single-use plastics and ED CO₂e Footprint.

Methods:

This QIP was designed using the [PDSA cycle](#). We first completed an audit of practice to confirm if unnecessary cannulation is a problem in our ED. We found that in December 2023, 194 cannulas were inserted a day with 48% not used. Similarly in March 2024, 258 cannulas were inserted a day with 43.7% not used. We reviewed our current guidance and found that while it identified which bloods to take for a range of clinical presentations, there was no guide on whether the bloods should be taken via a cannula or by alternative means such as a butterfly.

First changes trailed:

In May 2024, we developed new guidance specifying 13 presentations that do not require a cannula. This was promoted via posters in the department. However, after a month of implementation, we found that there had been no change to practice (224 total cannulas - 46.43% still unused).

Reflecting on the change, we identified possible reasons for the guidance being unsuccessful:

- “Poster blindness”: ED is a fast-paced and constantly changing environment, there are new changes and posters every day so this may not be the most effective means of relaying information.
- Staff were unaware of the project and hence were not using the list.
- There was staff concern over specific patient presentations (E.g. headaches, chest pain) included in the guidance, which may lead to non-compliance with full guidance.

Second changes trailed:

Adjustments were applied to the list, removing the presentations that were of concern to staff. Changes were presented to and approved by the consultant team before the list was recirculated in clinical. A copy of the new guideline can be found in Appendix 1.

To improve colleagues’ awareness of the list and the project, and prompt more engagement, a few interventions were made including:

- Reminders were given via handovers and email however these may not have been sufficient.
- Promoting the project in the department monthly meeting.
- Face-to-face conversations with triage nurses and HCAs when on shift
- Teaching sessions organised at Departmental meetings and HCA training sessions

Third changes and next steps:

Following discussions with different team members, minor changes were made to the list in January 2025, after carefully considering their queries. The new list is now live, and a new cycle of data collection is to be done in February 2025.

Stakeholders:

- Consultant group: a lead consultant was part of the initial list formulation process. The whole team was kept in the loop with the modified list in November 2024.
- ED physicians/ACPs : emails were sent to inform the team about the project including the list and an invitation to join the Green ED team.
- Nurses/HCAs: emails were sent to the senior nurses asking them to circulate an email with the list to all nursing and HCA team members.

Measurement:

Patient outcomes: Will try to collect patient statements exploring their opinion about cannulas.

Environmental sustainability:

By reducing the number of cannulas used to collect blood only and using butterflies instead we will reduce the amount of equipment used. This will be measured by calculating the percentage of unused cannulas before and after the intervention.

A hybrid methodology was used to estimate the GHG emissions associated with taking blood using cannulation versus taking blood using a butterfly. A process-based life cycle assessment was used to estimate the GHG emissions associated with the Luer adaptor, vacutainer, butterfly and vacutainer. The analysis included GHG emissions associated with raw material extraction, transport and disposal. Material weights and transport distance were converted into GHG emissions using emission factors taken from the 2024 UK Government Greenhouse Gas Conversion Factors database.

For the GHG emissions associated with the saline flush, an Environmentally Extended Input-Output Analysis was undertaken. Costs were provided by the project team and multiplied by the relevant sector conversion factors taken from the 2021 UK Government database by SIC code.

GHG emissions associated with cannula dressing, cannula, needle, syringe tourniquet and alcohol wipes were taken from previous CSH projects where they had already been estimated using a bottom-up process-based approach. The analysis included GHG emissions associated with raw material extraction, transport and disposal.

Cannulation		Butterfly	
Item	GHG emissions per item (kgCO ₂ e)	Item	GHG emissions per item (kgCO ₂ e)
Cannula	0.051	Butterfly	0.017
Tourniquet	0.0373	Tourniquet	0.0373
Alcohol swap	0.0208	Alcohol swap	0.0208
Luer	0.0097	-----	-----
vacutainer	0.0075	vacutainer	0.0075
Extension	0.0118	-----	-----
Flush	0.116	-----	-----
Tegaderm	0.044	-----	-----

2 Gauze	0.088	Gauze	0.044
2 pairs Gloves	0.148	Pair Gloves	0.0074
Total	0.5341	Total	0.1341

Economic sustainability:

The costs of equipment were provided by our procurement team. In total, it costs £2.46 to cannulate and 69p to take blood using a butterfly.

Social sustainability:

We have obtained staff feedback through our initial survey and through informal conversations at the point of taking blood.

Results:

Patient outcomes:

It's established from previous projects (e.g. [Cut The Cannula](#)) that cannulas carry discomfort to patients. Patients reported: *"found it painful, would rather not have had one"*.

We collected direct feedback from patients stating that having a cannula is not comfortable. They were not sure why they needed a cannula since it was not used during their visit. When asked 'if they were offered the option not to have a cannula at the start of their presentation to ED?' all answers were 'they would have chosen not to have one' even if that meant reinserting one later to give any medications if needed.

Even though we didn't collect formal data, the patient statement confirms what has been confirmed in previous projects.

Environmental sustainability:

We calculated the average number of cannulas inserted in A&E over 1 year prior to the project start. This is done by averaging the number of cannulas inserted in 10 days across different months. Data was collected using 'symphony' filters. Then we investigated the number of cannulas used vs. the numbers unused for the same days.

	Total	Unused
10 days	676	307
1 day	68	31
Year	24,820	11,315

Data for post-intervention was collected for 2 weeks from 16 December 2024 to 29 December 2024. Data showed a decrease in the percentage of unused cannulas of 11% when compared to the pre-intervention data.

	pre-intervention	post-intervention
Total cannulation	61	81

Bloods and medication	32	52%	51	63%
Bloods only	29	48%	30	37%

If the same reduction is applied throughout the year and butterflies are used to collect blood instead of cannulas, this will sum up to a saving of 497.86 KgCO₂e. That is equal to driving a car for 1,467 miles (18 driving round trips to Leicester).

Economic sustainability:

Knowing that the cost of a cannula is about £2.5 compared to the cost of a butterfly being £0.7. When applying the 11% saving over 1 year, this will sum up to savings of about £2,203/year.

Social sustainability:

The initial staff survey showed that staff agree unnecessary cannulation is a problem, which is beneficial for engagement for change. Colleagues are showing great enthusiasm for the project and are happy to use butterflies instead of cannulas when they think they are clinically appropriate.

Discussion:

Although we are happy to have achieved the planned project goal, we realise we still have a long way to go. Involving other acute medicine teams working with ED carries the potential of more GHG saving and more team awareness. Given that primary data collection showed that about 50% of cannulas are not used, there's still plenty of improvement to apply to this project.

Reaching the full potential of using butterfly instead of cannula for the 50% would save about 3,060 KgCO₂e (equal to 95 driving round trips to Leicester) and about £20,000 a year.

We are aware that using symphony filters can give us underestimated data as not everyone is coding cannulas upon referral or discharge. But we are also aware that the opposite can occur where patients are coded as cannulated when they were not. Yet we trusted our daily shop floor observation that most patients with cannulas will not need it for any medication during their stay. So, we were happy to proceed with the data we collected.

As A&E is a very dynamic environment with lots of specialty involved, we are aware that not everyone will agree with our opinion about unnecessary cannulation. Colleagues have reported being challenged by other specialties to insert cannulas for medications that can be swapped with oral options with no plan to keep the patient in hospital or for ongoing need for IV medications. We will try to address this by attending other teams' departmental meetings if this proves to be an ongoing problem.

Conclusions:

It has been proven by this project along with similar ones in different hospitals that there are lots of aspects where environmental sustainability can be achieved. A huge learning point was the importance of team engagement. We started to see changes once we started talking to the team and considering their views, fears and concerns. The changes made by different stakeholders have

been a crucial part of this project, not only did it ensure the commitment of the team members but also it increased the bonds and respect we view each other.

We are looking into other environmental projects and sustainable changes so we can try and gain the Green ED accreditation within the following years. We are also hoping to widen the team by improving our publicity and asking new members from different stakeholder groups to join us. **We** hope this project raises awareness of the environmental crisis and helps people make more informed decisions when it comes to saving Earth.





Cannulation guidelines 2024

Use 'Butterfly' to take blood not a cannula

If NEWS ≤ 3 in total or ≤ 2 in one parameter for the following

- Palpitations (HR < 110)
- Minor injuries
- Resolved TIA
- Mental health (not overdose)
- Headache (age < 50 years)
- Coryzal viral symptoms
- Ophthalmology
- Joint pains
- No active bleeding
- SOB/Cough (NEWS ≤ 3 in total or ≤ 2 in one parameter)
- Pain- able to swallow and refusal of oral analgesia

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Version-2.

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Critical success factors

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