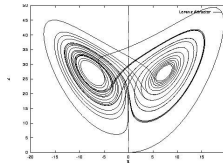


The Butterfly Effect



Reducing unnecessary cannulation in the Royal Free Emergency Department

BACKGROUND/RATIONALE

Previous studies in an ED setting have shown that many IV cannulas are either not used, or used inappropriately. This leads to increased carbon emissions (CO₂e) and financial costs due to medical equipment procurement and incineration of medical waste.

Reducing unnecessary cannulation has significant environmental and financial benefits. It also has benefits for patients in:

- reducing pain and discomfort for no therapeutic benefit.
- reducing physical restriction: having a cannula in situ can be physically awkward for a patient when washing, toileting and intravenous interventions impede mobility.
- encouraging use of the oral route for fluids and medications: without intravenous access patients may be encouraged to drink rather than maintain their fluid requirement with intravenous fluids, which is better for health.
- infection control: one of the ways of reducing cannula infections is by not inserting cannulae unnecessarily in the first place

Case studies:

North Bristol NHS Trust (2021): a baseline audit over 2 separate days in January 2021 found that 70% of cannulas inserted in Ambulatory Majors were never used. Through 3 different interventions this has been reduced to 23-28%. The project is ongoing.

Royal Devon Exeter NHS Trust (2018): by achieving a 70% reduction in unnecessary cannulation throughout the ED, they saved an estimated £27,830 per year and 8,400kg CO₂e per year.

Charing Cross Hospital (Imperial College Healthcare NHS Trust)

<https://www.england.nhs.uk/greenernhs/whats-already-happening/reducing-unnecessary-cannulation-at-charing-cross-hospital/>

<https://www.surveymonkey.com/r/5FNC2ND>

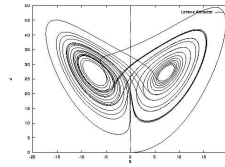
Existing policy and practice re: IV cannulation at the Royal Free ED: see [Trust policy on IV cannulation](#) - Departmental practice in the 'Green' (non-covid) Urgent Treatment Center (UTC) is to insert a cannula in most instances where blood sampling is required, except in certain circumstances where the triage nurse or doctor determines it to be highly unlikely the patient will require IV treatment or admission e.g. a patient with stable observations and a non-specific complaint such as 'generally unwell'.

EDA training / everyday practice

At each cannulation the following equipment is required: Clinell wipe, disposable tourniquet, cannula, dressing, gauze, blood bottle adapter, 10ml saline ampoule, 10ml syringe, Bionector (extension set) and packaging. The total weight of the equipment is XXg. The total cost is £YY.

Prior to 2019 the RF ED used 'bungs' but these have been replaced with extension sets on the grounds that these have a reduced risk of phlebitis. IPC instigated this change.

The Butterfly Effect



Reducing unnecessary cannulation in the Royal Free Emergency Department

Hypothesis: It is suspected that the practice of inserting a cannula 'routinely' in the Green UTC section of the Royal Free ED when taking bloods from patients is leading to significant waste in terms of clinician time and equipment, inappropriate use of intravenous fluids and medicines, and unnecessary discomfort for patients.

CANNULA AUDIT

On 2 x weekdays, over a 12h period each, EDAs and any other staff taking blood in Green Urgent Treatment Centre (UTC or 'minors') will measure:

- Number of patients triaged and seen (RETROSPECTIVELY?)
- Information on patients undergoing venepuncture with cannula OR Butterfly needle
- Number of attempts at venepuncture i.e. number of cannulae or Butterflies used
- Number of patients whose cannula is used in ED. What for? Was it necessary? E.g. IV fluids or drugs when the patient was able to drink and take oral medications
- Number of patients who undergo Butterfly venepuncture then require cannula insertion
- Bionector extension set attached Y/N
- TBD - Time taken for cannulation vs venepuncture - to gather equipment, wash hands etc.
- Patient perspectives on unnecessary cannulation, venepuncture vs cannulation, and cannulation after initial phlebotomy.

A [proforma for recording data](#) and [patient questionnaires](#) will be distributed at 730am EDA/nursing handover (and 8am/9am/1pm when doctors start their shifts) and will be made available on equipment trolleys. A collection tray for completed proformas will be placed in Green UTC.

RISKS

- Haemolysis rates of Butterfly venepuncture may be higher
- Patient experience - comfort / satisfaction may be adversely affected by multiple attempts at venepuncture, either due to haemolysis or cannulation after Butterfly venepuncture (i.e. unnecessary Butterfly venepuncture)

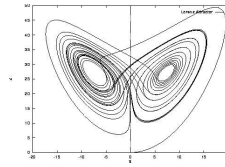
UPDATE_AUG 2021

- The rates of unnecessary cannulation were not found to be significant on 1x audit day
- A minority of sections of the proforma were filled in due to time pressures
- The original hypothesis has been revised to focus on the Yellow (non-covid/covid mix) ATA (Adult Treatment Area or 'Majors') section of the department as anecdotal feedback from several members of the ED's Green Team is that the 'Treatment Chairs' within this section is the site of more unnecessary cannulation than Green UTC. This is supported by the

NEXT STEPS

- Calculate emissions using [GreenED calculator](#)
- Analyse initial audit results (using QI tools e.g. fishbone diagram / process mapping) and come up with a driver diagram, measures and an aim statement.

The Butterfly Effect



Reducing unnecessary cannulation in the Royal Free Emergency Department

- Brainstorm change interventions. These could include: new departmental policy; awareness raising poster 'Drip or Drink?' 'To IV or not to IV?'; email update(s) to staff; informal (at handovers) and formal (via presentation) education sessions
- Conduct PDSA cycles
- Write up the project and share results with RCEM / the national *GreenED* network!

Notes on scope - not LAS patients that are already cannulated. Not repeat trop.

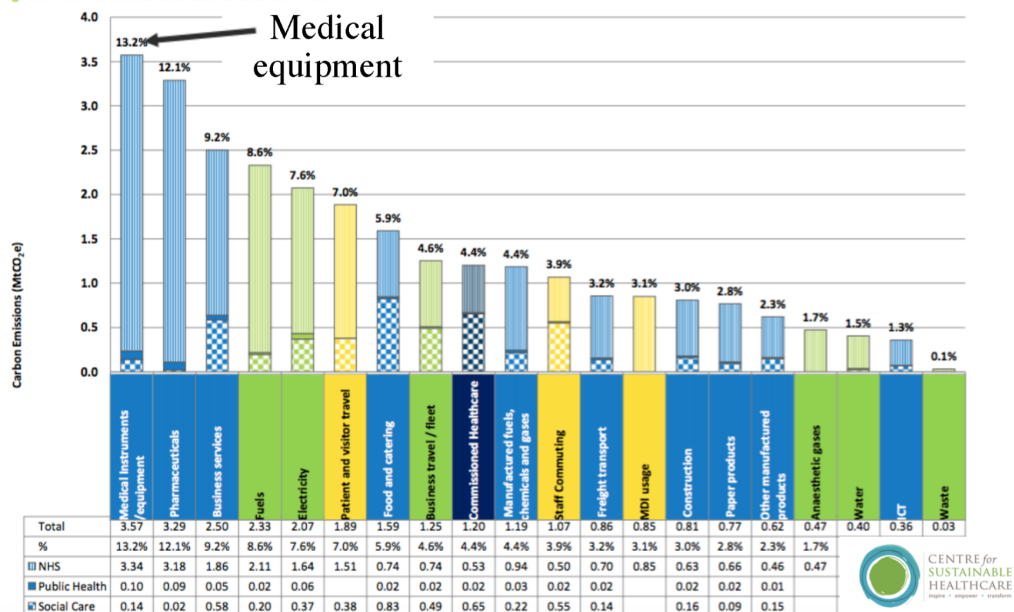
REFERENCES

<https://www.england.nhs.uk/greenernhs/whats-already-happening/reducing-unnecessary-cannulation-at-charing-cross-hospital/>

[https://sustainablehealthcare.org.uk/sites/default/files/26th february ob final devon green ward competition evaluation 2018.pdf](https://sustainablehealthcare.org.uk/sites/default/files/26th%20february%20ob%20final%20devon%20green%20ward%20competition%20evaluation%202018.pdf)

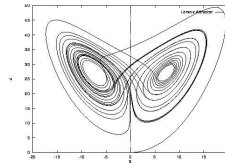
<https://map.sustainablehealthcare.org.uk/royal-devon-and-exeter-nhs-foundation-trust/reducing-unnecessary-cannulation-%E2%80%93-93-emergency-department>

Figure 2. Health and Social care detailed breakdown 2017



SDU 2018. Reducing the use of natural resources in health and social care 2018 report

The Butterfly Effect



Reducing unnecessary cannulation in the Royal Free Emergency Department

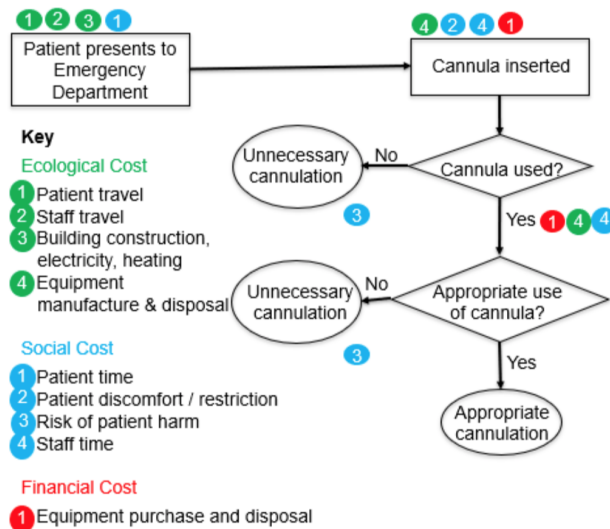
Reducing unnecessary cannulation in ED

Problem identified

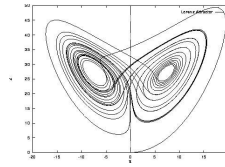
- ED staff team thought that a large number of patients were cannulated in but many cannulae were then not used/ or used appropriately.



Studying the system

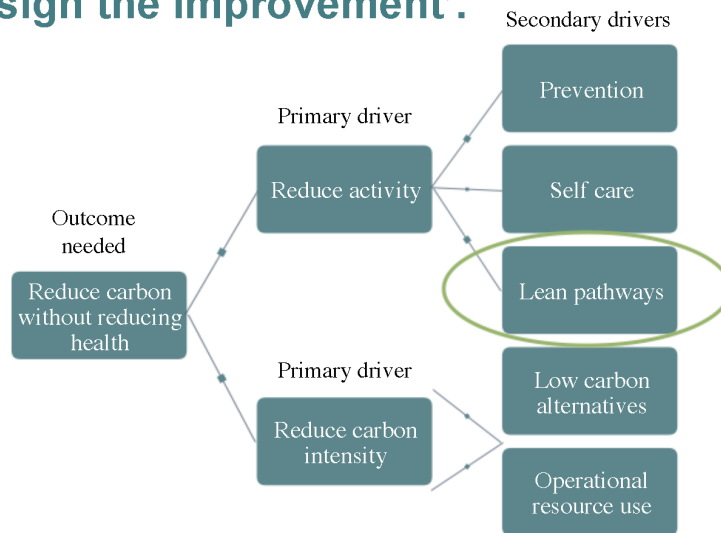


The Butterfly Effect



Reducing unnecessary cannulation in the Royal Free Emergency Department

Using the Principles of Sustainable Clinical Practice to 'Design the improvement'.



Mortimer-F, The Sustainable Physician



Reducing unnecessary cannulation in ED

Problem identified

- ED staff team thought that large number of patients cannulated but many cannulae not used

Measures

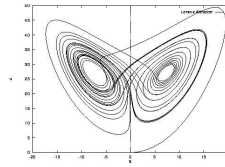
- Number of cannulae **inserted** per week
- Number of cannulae **used/not used** in ED

Intervention tested

- Campaign in ED to engage staff: **THINK before you cannulate.**

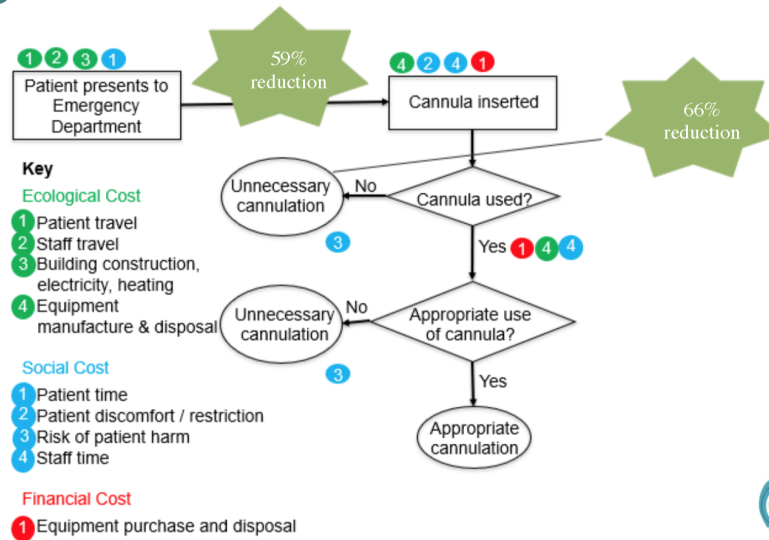


The Butterfly Effect

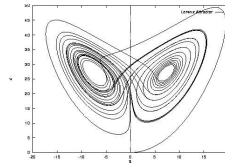


Reducing unnecessary cannulation in the Royal Free Emergency Department

Change achieved



The Butterfly Effect



Reducing unnecessary cannulation in the Royal Free Emergency Department

QI in Action: Reducing unnecessary cannulation in ED



Reduced infection risk

Less inappropriate iv fluid use



Annual savings **£27,831**



Annual savings 8,403 kg CO₂e



Patients ↑mobility/independence, ↓pain

Staff ↑time, improved workflow



QI in Action: Reducing unnecessary cannulation in ED

Environmental and financial calculations

- 105 fewer cannulae used per week (Cost: £1.80, weight: 0.061kg)
- 98 fewer bionectors used per week (Cost: £3.51, weight: 0.01kg)

GHG emissions factors used:

Medical/surgical equipment: 0.3 kgCO₂e/£

Waste incineration: 220 kgCO₂e/tonne

$$(105 * 1.80 * 0.3) + (105 * 0.061 / 1,000 * 220) = 58.11 \text{ kgCO}_2\text{e}$$

$$(98 * 3.51 * 0.3) + (98 * 0.01 / 1,000 * 220) = 103.41 \text{ kgCO}_2\text{e}$$

= 161.52 kgCO₂e and £533 saved per week

