SUSQI PROJECT REPORT TEMPLATE

This project report template should be used to report projects which have followed the Sustainable Quality Improvement 'SusQI' process. If your sustainable healthcare project does not apply SusQI methodology, please use our Case Study template instead (LINK)

This template is adapted from SQUIRE 2.0 reporting guidelines.

Project Title:

Online Priming Haemodialysis Lines in Acute Dialysis Unit

Start/End date of Project:

03/23- 09/23

Date of Report: 28/09/23

Team Members at St George's University Hospitals NHS Foundation Trust: Dr RM Montero (Kidney Consultant), R Calayag (Renal IT), Carolyn Baanag (Renal Dialysis Education Nurse Lead), R Cubita (Dialysis Matron).

Background:

In the majority of cases haemodialysis is performed three times a week for 4 hours. Every session a 500mls bag of 0.9% normal saline (N/saline) is used to prime the dialysis lines so that there is no air in the tubing that attaches to the patient. This uses approximately 12mls of N/saline the rest of the bag is rarely used and discarded in to the waste bin at the end of the session. In the instance of low blood pressure some of this fluid is used to administer this to the patient.

We looked at the safety of online priming and whether in the case of an emergency whether bolus fluid could be given quickly via the dialysis machine. We saw this was possible and there were no patient safety concerns. The dialysis education nurse went to visit a couple of units that were using online priming and learnt this technique ensuring there were no breaches in infection control when using this.

Specific Aims:

1) Reduce waste by unnecessary use of 0.9% normal saline 500mls bag on haemodialysis
2) Staff education for online priming

Measurement:

Patient outcomes: **Patient experience and satisfaction with change providing verbal feedback and impact on length of dialysis preparation. Staff experience with training and time saved for the procedure. Datix for any complications eg infection or adverse events.**

Population outcomes: **Increase time spent with the patient and time for staff documentation.**

Environmental sustainability: **CO2e calculation for N/saline use on haemodialysis with waste of PVC and N/saline.**

Economic sustainability: **Cost of N/saline bags and tubing. Space in stock room. Time redirected to delivering goods/equipment/medicines to other areas in the hospital.**

Social sustainability: **Reduction in staff sick leave due to manual handling of stock boxes. Reduced infection with using less plastic resulting in less need for antibiotics.**

Results:

Patient outcomes: **Patient require less tubing to be connected to the dialysis machine therefore reducing time and risk of infection. A decrease in connection time for dialysis sessions improves patient experience. No safety concerns.**

Environmental sustainability:

N saline in PVC packaging 460g
N saline PVC bag 0.875kg
N saline packaging bag
PVC plastic tubing 0.100kg
Incineration factor 220

PVC = (3.39918kgCO2e/kg + 0.220 kgCO2e/kg) x (0.875 kg + 0.100 kg +0.460 kg) = 5.19kg

3x sessions = 15.57kgCO2e
CO2e for 1 person on haemodialysis per year = 809.64 kgCO2e

Minimum of 36 patients per week per year = 29,147.04kgCO2e = 29 tonnes of CO2e per year on the Acute dialysis unit as a conservative CO2e saving.

When scaled up to satellite dialysis units there is a greater reduction in PVC, less N/saline would need to be made and would avoid the need for packaging or delivery. A lifecycle assessment has not been performed that would increase the CO2e savings.

Economic sustainability:
Cost of boxes of N/saline per day = £50
£2.77 per bag
£350/wk - £350x52 = £18200.00 saving per year

20 bags per box that a life cycle will provide further information regarding cost and impact on storage.

Social sustainability:
Staff found the change made connection shorter and more efficient. They reported having more time to speak with patients as they were not going to get the N/saline. They also found setting up the dialysis machines took less time and they had more time to document. Patients noticed

they were put on their dialysis faster and were happy knowing there was less waste in their dialysis.

Discussion:

Many units use 500mls N/saline bags to prime dialysis lines despite using a small volume. N/saline bags are enclosed in PVC plastic to hold the fluid and are packaged in a thinner PVC to ensure there is no breach in the bag and ensuring sterility. The bags are delivered by vehicles from the manufacturing distributer and are taken to the dialysis unit by staff in boxes. Our project did not look into the life cycle of this as the overall quantity delivered to the Acute dialysis unit is a small fraction of that delivered to the hospital.

This project however illustrates how small changes result in a reduction in CO2e that can easily be adopted and scaled nationally to decrease the use of this unnecessary resource in priming lines for dialysis. Dialysis machines are equipped with the facility to allow online priming together with providing boluses of fluid as is necessary. Training dialysis nurses is central to introducing the change not only from an infection control point of view in connecting patients to the dialysis machines but also in learning how the dialysis machines can be used for priming.

There are cost savings associated with this including a reduction in waste and also the extra tubing required to connect the n/saline bag to the patient's line. The extra tubing is additional PVC to that of the n/saline bag and thus the online priming avoids using this further resource. There are social benefits that maintain the health and wellbeing of patients and staff.

Limitations of this project is the small scale however, this can be scaled to satellite units and nationally with small changes accumulatively reducing our carbon footprint.

Conclusions:

Using dialysis machine dialysate for online priming avoids the need to use N/saline thereby reducing carbon emissions and waste. Online priming has been shown to be safe and has the additional benefit in allowing staff to have more time to be with patients and to do their documentation. There are health and safety benefits with the removing the need to deliver and stack boxes of N/saline.

References and Resources

GHG conversion factors datasheet
Conversion factors sheet

Appendices

Template References

- SQUIRE | SQUIRE 2.0 Guidelines (squire-statement.org)
- Home | Sustainable Quality Improvement (susqi.org)