SUSQI PROJECT REPORT

Project Title:

Sustainable ENT: Fractured Nose Manipulation- Local Anaesthetic Pathway

Date of Report:

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Team Members:

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Background:

During the COVID-19 pandemic we were all forced into different ways of working. Within surgery, our theatre capacity plummeted due to COVID demands leading to long waiting lists for many surgical procedures with nearly 6.5 million patients currently awaiting an operation. Ear, Nose and Throat (ENT) surgery was also negatively affected.

ENT have a group of patients who required urgent but not life or limb saving treatment for fractured noses. As a result of Covid, we developed a pathway to perform these in a timely and safe manner under Local Anaesthetic (LA). Prior to the pandemic, all fractured noses were previously treated under general anaesthetic (GA).

The new LA pathway introduced has apparent environmental, financial and social benefits.

Specific Aims:

Our aim was to support this pathway to be retained post-Covid and hopefully spread to other hospitals in Wales and the UK, by

- Analysing the social, financial and environmental impact of the new fractured nose manipulation LA pathway.
- To compare our new LA pathway to the fractured nose manipulation GA pathway
- To embed this change within the department by educating clinicians on the benefits of the new pathway
- To capture data on patient satisfaction for fractured nose manipulation under LA

Methods:

The entire ENT team was involved in implementing this change, including consultants, specialist registrars, senior house officers, foundation doctors, advanced ENT nurse practitioners (ANPs), ENT clinic nurses, health care assistants and our receptionist.

It was key that everyone was aware and supportive of the change in practice. This was likely made easier by the necessity for the change created by lack of theatre space and time for GA during Covid.

An LA procedure protocol was created, with procedures initially performed by specialist registrars. A training/competency document was subsequently created to formalise the teaching and assessment process for our ANPS and junior doctors, expanding the number of competent staff available to safely perform the LA procedure.

Staff were reassured that there was strong evidence for use of LA for fractured nose manipulation in most patients. While bleeding risk from an LA procedure is small, plans and stock were put in place in clinic in case of any significant epistaxis.

Measurement:

Patient outcomes:

There is strong evidence for use of LA for fractured nose manipulation in most patients, however patient outcomes were not specifically measured due to the urgency of the change implemented during the Covid19 Pandemic. Anticipated benefits are detailed in the results section.

Environmental sustainability:

Theatre data from 3 years post pandemic was obtained to estimate the average number of adult procedures performed per year, with an average of 122 adult cases per year. However, as not all cases are suitable for LA, we took 90% of cases as shown in column 2 for a more realistic estimate of potential environmental and financial savings.

A hybrid approach to carbon footprinting was taken (bottom up and top-down methods used). We applied emissions factors to the activities and consumables involved in both the GA and LA pathways to compare the CO2e of a procedure under each approach. We applied the saving from performing an LA procedure to 90% of total procedures for fractured nose manipulation completed annually to provide a CO2e saving.

Emissions factors for the following units of activity were taken from The Sustainable Development Units 2015 Care Pathways Guidance on Appraising Sustainability[1].

- attendance at outpatient clinic* and elective theatre (*1.14 kgCO2e/per visit)*
- patient travel to and from appointments (*2.9 kgCO2e/one way)*
- A&E visit (*13.8 kgCO2e)*
- Inpatient bed day - low intensity ward (*37.9 kgCO2e/ bed day)*
- A surgical procedure (*35.1 kgCO2e/66 minutes)*

**Emission factor for a GP consultation was used as it more closely mimics a 10-minute ENT casualty clinic appointment for assessment of fractured nose.*

The emission factors for medical equipment (*0.46 kgCO2e/£*) and pharmaceuticals (*0.128 kgCO2e/£*) were taken from the Greener NHS 20/21 database (this database is not publicly available). The emission factors for high temperature incineration waste disposal (*1074 kgCO2e/tonne*) was taken from Rizan et al 2021.

Economic sustainability:

Theatre and clinic costing data for the 2 pathways was obtained from the Health Board financial advisors. Savings in Consultant and Registrar time due to procedures being conducted by ANPs was factored into our financial analysis.

Social sustainability:

Patient questionnaires were collected, and further assumed social benefits for patients and staff were obtained from our own analysis (informal discussion with staff).

Results:

Patient outcomes:

Patients now have an efficient and safe streamlined pathway option for treatment of a fractured nose under LA. Delays in treatment can leave patients with a permanent nasal deformity and need for further much more complex surgery. The LA pathway also avoids risks of GA. While necessary during the Covid pandemic, the change has additional benefits beyond faster treatment for this patient group. As the procedure can be performed by ANPs outside of theatre, Consultant and Registrar time, as well as theatre space availability has increased, potentially reducing patient waiting times for a range of appointments, bed spaces and procedures that require theatre space and GA.

Environmental sustainability:

Based on 90% of 122 annual cases switching to LA instead of GA, we anticipate savings of 4,137.26 kgCO2e per year. This is equivalent to driving 11,916 miles (19,177 km), or 15 return trips from Cardiff to Glasgow in an average car.

If 100% of cases were performed under LA, our savings would increase to 4,596.96 kgCO2e, equivalent to 13,239 miles (21,306 km) travelled in an average car, or 16.7 return journeys from Cardiff to Glasgow by car. Please see summary of data and calculations in Appendix 1.

Economic sustainability:

We calculated the financial cost of both pathways. Based on the assumption that 90% of cases previously carried out under GA can now be delivered under LA, we anticipate savings of £27,337 per year.

Costs and savings are summarised in the table below:

Cost and Potential Savings	£
Cost for 1 procedure in theatre	£277.80
Cost for 1 procedure in clinic	£27.00
Saving per procedure	**250.80**
Projected saving if 100% procedures performed under LA (122 procedures per annum)	30,597.6
Projected saving if 90% procedures performed under LA (109 procedures per annum	**27,537.84**

Social sustainability

For patients:

- No need for a GA
- No need for a sick day or time off work post GA
- Less travel to hospital
- No delay to treatment due to lack of theatre time or cancellation

For staff:

- ANPs and junior staff members have been empowered to take on a new role, and have enjoyed this practical procedure and being able to treat patients with fractured nose independently
- No need for cancellation conversations and apologies to patients which helps with reducing staff burnout and moral injury
- More time for Consultants and Specialist Registrars to treat other patients in clinic or do other theatre cases
- An awareness that our practice is reducing it's carbon footprint, offsetting some climate anxiety

Discussion:

There are some limitations in our carbon footprinting calculations due to use of a hybrid approach and emission factors that may not be directly applicable to our practice. For example, we used an emission factor for a GP outpatient appointment as we did not have one for our clinic available. This may be an over or underestimation of CO2e. However, given hospital infrastructure it is likely an underestimation.

As recovery from the Covid19 Pandemic has started, some staff have wanted to return to the status quo of providing all procedures under GA. Education of staff on the financial, environmental and social benefits of switching to the LA pathway has been our main tool for challenging this barrier and has been very effective.

Conclusions:

Working on this project has helped me realise the impact that small changes can make and inspired me to continue seeking out opportunities to become more sustainable within ENT. It has also helped highlight to me that education around sustainable working is key. All we need to do is start the conversation to get people thinking and change will come. Key messages to others would be to Persevere. You have permission. Get stuck in. Try. Your colleagues will come on board when you highlight the social, environmental and financial savings.

We aim to spread and scale the project to other departments across Wales by education and presentations. Hopefully, we would eventually spread the project to UK wide ENT departments.

References

1. *Care pathways guidance on appraising sustainability (Sustainable Development Unit, 2015) Available from:* Sustainable Development Unit (SDU) carbon footprints of various units of healthcare activity | CSH Networks (sustainablehealthcare.org.uk)
2. *Rizan C, Bhutta M, Reed M, Lillywhite R. The carbon footprint of waste streams in a UK hospital. Journal of Cleaner Production 286 (2021) 125446. https://www.sciencedirect.com/science/article/abs/pii/S0959652620354925*

This template is adapted from SQUIRE 2.0 reporting guidelines.

Appendix 1: Carbon footprint (CO2e) calculations.

Activity / Item	Emission factor	General Anaesthetic Pathway		Local Anaesthetic Pathway	
		#	Total CO2e	#	Total CO2e
A&E (emergency department) visit	13.8 kgCO2e	1	13.8 kgCO2e	1	13.8 kgCO2e
Self-travel results to elective care (per single trip	2.9 kgCO2e	4	11.6 kgCO2e	2	5.8 kgCO2e
OP appointment*	1.14 kgCO2e/per visit	1	1.14 kgCO2e	1	1.14 kgCO2e
Inpatient bed day – low-intensity ward –	37.9 kgCO2e/ bed day	½ day	18.95 kgCO2e	NA	
Surgical procedure (66 minutes)	35.1 kgCO2e	MUA Nose estimate of 33 minutes	17.55 kgCO2e	NA	
1x pair of gloves	0.026 kgCO2e/glove	NA		2	0.052kgCO2e
Dental needle = (7 g, cost of £0.94) +incineration	0.46kgCO2e/£ 1074kgCO2e/tonne	NA		1	0.44 kgCO2e
Lignospan (7g, £0.48) +incineration	0.128kgCO2e/£ 1074kgCO2e/tonne	NA		1	0.069 kgCO2e
Cophenylcaine = (40g, £8.76) +incineration	0.128kgCO2e/£ 1074kgCO2e/tonne	NA		1	1.16 kgCO2e
Total per procedure		**63.04 kgCO2e**		**25.36 kgCO2e**	
Total per 122 procedures per year		**7,690.88 kgCO2e**		**3,094.92 kgCO_2e**	

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