

## THE GLOVES ARE OFF ON THE PAEDIATRIC INTENSIVE CARE UNIT (PICU)

**TEAM MEMBERS:** Grace Crossland - PICU Staff Nurse, Dr Jonathan Ince - Simulation Fellow, LTHT, Dr Alex Olney - ST3, Paediatrics

**Project Aims:** To stop the use of non-indicated nonsterile gloves during the preparation and administration of oral and enteral medicines within PICU, via a staff re-education and behavior change initiative.

**Background:** Before the Covid-19 pandemic the use of personal protective equipment (PPE) had gradually escalated to an unprecedented level, bringing with it a significant financial and environmental burden. During the pandemic this burden has only worsened,<sup>1</sup> with gloves and plastic aprons now a regular part of almost every aspect of clinical care, without strong evidence of an improvement in patient or staff safety. Non-sterile gloves are used to protect healthcare professionals, for example from bodily fluid exposure or when preparing certain medications. However, there is reasonable evidence to suggest that frequent, untargeted glove use worsens hand hygiene<sup>2</sup> and increases transmission of preventable infection in our hospital environment<sup>3</sup>.



On the Leeds' PICU alone glove procurement, usage and disposal costs £11, 906.06 and generates of 16,7627kgCO2 per annum (from 2019-2020 data). Our team are nurses and doctors who work clinically and are part of the sustainable healthcare drive within LTHT. The wider PICU team have also recently declared their wish to actively work towards sustainability, so we therefore felt well placed to collaborate with the PICU work group to promote and implement sustainable changes. We believed glove usage could be brought down substantially without any detriment to patient care, or staff safety, inspired by similar changes achieved by Great Ormond Street Hospital (GOSH) through their gloves off campaign<sup>4</sup>. GOSH have publicly shared challenges they faced, resources they used, and data on the impact of their campaign, which helped to guide our project. By taking this opportunity to re-educate our workforce and reduce glove usage, we hope to make an impact across the triple bottom line of sustainable value.

### Approach and Method:

We completed a 2-week audit where each nurse kept a tally of the number of pairs of gloves they used per shift. With this data we averaged the number of pairs of gloves used per patient per 24-hour period.

A 7-day audit of the number of oral and enteral medications and number of administrations to each patient to obtain an average number of gloves used per patient for medications per 24-hour period. We noted that many medications require a second nurse to check the medication before it is administered. We therefore also audited the rates of 'double check' medicines and applied a glove use factor of 1.5 to these episodes (as multiple pairs of gloves are commonly worn during a 'double check' episode). From this data, we extrapolated what percentage of total glove use was attributable to enteral medicine administration and what we could reasonably expect to reduce.

### Change implemented

Our audit identified non-sterile gloves during preparing and administering of oral and enteral medications as an area to target reduction. We focused on nursing usage during medication administration as this accounts for the majority of glove use on PICU and we felt focusing on several areas of reduction at once may reduce engagement. This was then reviewed by one of the senior PICU nurses and infection prevention. We started by

conducting short non structured qualitative interviews with nursing staff to understand themes of either concern or support for glove use reduction so we could tailor our education materials to PICU staff.

We then implemented an awareness and education campaign aiming to change practice in line with current research. We placed posters next to glove dispensers and on an education board on the ward. We gave a presentation to nursing staff either 1 to 1 or in small groups, led by Grace and the rest of her professional development group.

### Measurement:

We are currently continuing our trial phase, however plan to measure our impact in the following ways;

*Environmental:* We will re-audit glove usage using the same proforma filled out by each nurse per shift and calculate a carbon footprint using the emissions factor for a single glove taken from Rizan et al (2021)<sup>5</sup>

*Social:* We will undertake further short non-structured interviews to further understand the impacts of our campaign and how this has been perceived by staff. This may highlight unforeseen barriers or difficulties people have found, as well as potential new supported avenues to further reduce glove usage. Research shows that inappropriate use of non-sterile gloves decreases hand hygiene compliance due to staff not removing or changing gloves at key moments and therefore missing hand washing opportunities. We therefore expect to see an improvement in hand hygiene and with this, a reduction in hospital acquired infections, reduced length of stay and reduced PICU bed days. This is data we can retrospectively collect once we have implemented the change onto PICU.

*Financial:* Due to changes in how PPE has been supplied in the pandemic we cannot obtain PICU specific data on gloves purchased from the last 2 years or current practice. We therefore obtained figures for 2019-2020 through hospital procurement. We will calculate savings based upon reduction in numbers of gloves on our audit form, and when available based on reduction in amounts of gloves compared to orders from the 2019-2020 data.

### Results:

Our audit found that over a two-week period an average of 93.6 gloves were used per patient in a 24-hour period. During these two weeks PICU had an average of 11 patients on the unit, equaling 1029.6 gloves in a 24-hour period. At full bed space capacity (18 patients) 1684.8 gloves would be used in a 24-hour period. Our drug chart audit found 9 episodes of drug administration per patient on average in a 24-hour period. 85.3% of the time, a 'double check' was required. We can assume a reduction of glove use in these instances as the nurse no longer needs to wear gloves for preparation, only for administration.

As we are still in our trial phase, we have made assumptions based on our audit data to estimate potential savings from reduction in glove use. We did not use procurement data as this would cover glove use for all medical professions for a range of reasons. We also considered the GOSH gloves off campaign result of a 38% reduction, however our project does not address all areas of glove use addressed in the GOSH campaign, for example, GOSH also removed the requirement for non-sterile gloves to be used when preparing and administering intravenous medications. While we cannot expect a reduction as great as 38%, with a successful behavior change campaign, we hope to achieve a reduction of glove use by 25%.

*Environmental benefit:* A 25% reduction would save between **2242.73 kgCO<sub>2</sub>e - 3997.19 kgCO<sub>2</sub>e** per year. These estimates include the production, transport, and incineration of the gloves. Reduction in glove use will also save a significant amount of plastic e.g. GOSH saved 21 tonnes of plastic in the first year of their campaign).

*Financial benefit:* Cost of gloves was obtained through hospital procurement data from 2019-2020 (pre-covid data). A reduction in use by 25% will save **£1965.81 - £3216.79** per year. These estimates include the purchase and disposal (via incineration) of the gloves. There is an expected increase in the price of PPE following the rise in oil price and so the implementation of this project is also crucial from a cost avoidance perspective.

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#### *Clinical and health outcomes:*

Use of non-sterile gloves is known to increase the rate of workplace related contact dermatitis<sup>6</sup>, and therefore reduced glove use may be of benefit to some staff. We plan to retrospectively audit rates of contact dermatitis (through occupational health), as well as if reduced glove use has improved hand hygiene and reduced hospital acquired infections, length of stay and PICU bed days.

#### *Social sustainability:*

When delivering the teaching to staff nurses on the unit we found there were many positive attitudes to welcome the change in terms of environmental impact and improved hand hygiene, as seen in the responses below;

*“Great idea, I think it would be really good to improve our hand hygiene, I feel I often see people not following the correct hand washing policy”*

*“It would be really good to improve our hand hygiene”*

*“Really good idea, really good that there is such an environmental saving”*

With positive attitudes towards the project, we can assume better engagement and hopefully improved staff morale when knowing that we are making a positive change for our patients, the environment and the trust.

#### **Barriers encountered:**

Data collection was challenging at times, due to the dependency on staff to complete audit forms on top of clinical demands. Grace went into PICU every day to hand out the audit sheets and prompted staff to fill them in. It was unachievable to collect data from service users as most of our patients are either intubated and sedated and/or too young to engage. We did consider collecting data from parents, but PICU is an incredibly stressful place for parents and carers and therefore it felt inappropriate to involve them at this time. The poster board display is in a location where both staff and parents/caregivers can view.

The team were required to implement education whilst also on clinical PICU shifts where 1:1 nursing care is required. To overcome this Grace gave presentations during her breaks, while she had cover for her patient, to get the information out to the rest of the team. A display board was also set up to display the information for all healthcare professionals to see and it was emailed to the wider team. As well as having much positive feedback from staff members, there was another key theme identified from the short interviews with staff which was perceived hygiene with some nurses feeling that they would be seen to be unclean if not wearing gloves. We are hoping that with time and chance for the cultural around this project to change with a wider awareness of it.

#### **Steps taken to ensure lasting change and conclusion:**

Our project demonstrates when empowering staff to use of PPE responsibly, we can reduce environmental harm, while enhancing hand hygiene and maintaining patient safety. Our main factor for success was staff engagement, which would not have been possible without the enthusiasm of nursing staff on PICU. Listening to their concerns throughout any next steps is vital to ensuring suggested changes are taken on by staff and that lasting change is achieved.

Our next steps are to continue to widen education and resource distribution and re-audit to obtain true outcomes. We recognise that cultural changes take time so plan to re-audit at 6 weeks and 6 months with changes or additions to our resource package and scope of change depending on uptake and success. We are also going to investigate the possibility of removing non-sterile gloves when preparing and administering IV

medications. This will need further input from the infection prevention team and the education team as it will affect the education program for newly qualified nurses. We would also like to consider embedding education of non-sterile glove indication in the initial education of new staff members to help maintain the change in practice we wish to achieve. We are also considering ways to include parental and patient views in a sensitive and ethical manner.

Positively, the project has gained the support of business management, pharmacy, and the infection control and prevention team, and we have already had other clinical areas get in touch to state their interest in participating in our gloves aware re-education. We can also expect to informally reach medical and allied healthcare professionals at this stage, potentially reducing their glove usage during some patient contacts. It will be important to involve each workforce in any new area covered as needs are likely to be somewhat different depending on clinical environments.

Overall, we are very pleased with the potential this project has to offer and look forward to sharing it more widely in the children's hospital and across LTHT, as it is applicable to the majority, if not all, clinical areas. With time and widening of our education program to include all front-line health care workers, we aim to achieve a similar reduction as GOSH.

## References

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