SUSQI PROJECT REPORT

Reducing Unnecessary Glove Use in Basingstoke Emergency Department

Start date of Project: 21.05.2025
Date of Report: 30.07.2025

Team Members:

- Karoline Chalk (karolina.chalk@hhft.nhs.uk) - ED QIP Trust Grade
- Melanie Koh Lin (melanie.kohlin@hhft.nhs.uk) – ED Physician Associate
- Emma Christmas & Sarah Noble – EM Consultants

Background:

As part of the Basingstoke Emergency Department Green Team, we noted the increasingly inappropriate use of PPE by healthcare professionals, potentially being due to the COVID-19 pandemic[1]. This leads to significant financial and environmental burden. Increased carbon footprint from waste disposable and transport of these consumables within the health infrastructure remains one of the largest threats to mankind[2]. Additionally, an inspection from the CQC revealed less than ideal hand hygiene levels amongst ED staff. Poor hand hygiene would ultimately lead to increased risks of infection and unnecessary, unsatisfactory patient outcomes.

Led by our initial data collection on ED PPE usage, we soon realised that single use plastic gloves were the most widely inappropriately used PPE, likely due to unclear guidelines and protocols. We felt that reducing this unnecessary use could have the largest clinical, social and environmental impact, with potential changes being easily implemented to generate significant financial and environmental savings.

Specific Aims:

To better and promote our Basingstoke GreenED culture by:

- Reducing unnecessary use of single use plastic gloves in ED
    - Specifically looking to reduce the number of gloves ordered weekly
- Improving staff knowledge on appropriate glove use

[1] Unicef. 2021. https://www.unicef.org/supply/stories/three-reasons-why-personal-protectiveequipment-ppe-supply-remains-critical.
[2] World Health Organisation (2022) Climate change and health. Available at: https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health.

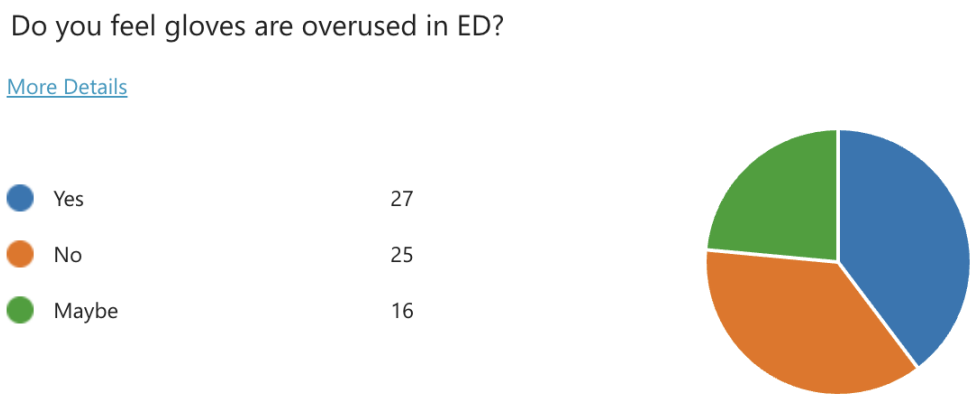
Methods:

Studying the system

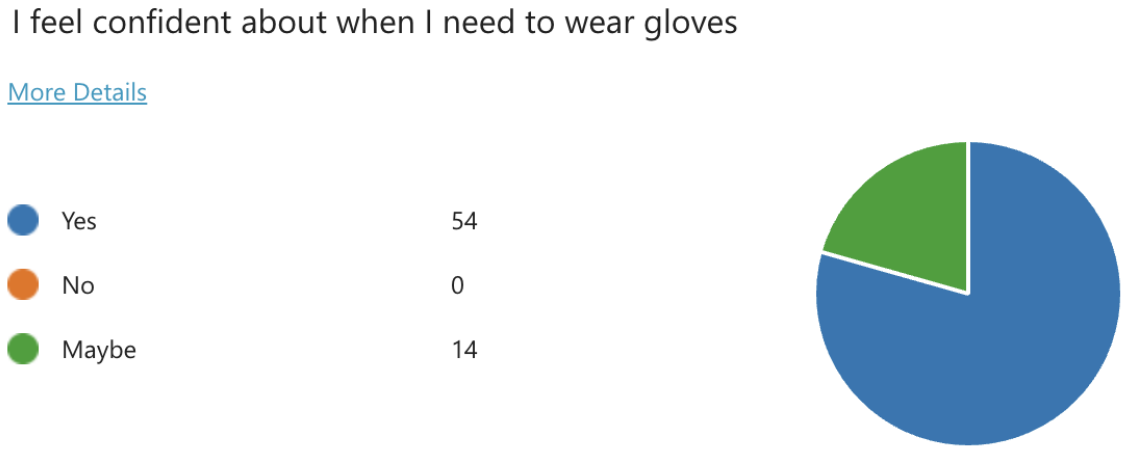
We reviewed current practices of glove use through:

- A survey widely distributed through email and the staff Facebook page to determine:
  - Staff's opinion of whether gloves were overused
  - Identifying what combination of hand hygiene was adopted (i.e. wearing gloves, washing hands, not wearing gloves, not washing hands)
  - Identifying staff's knowledge on appropriate glove use with specific clinical scenarios
  - Staff's confidence levels with appropriate glove use
  - Other comments with a free text section to gather insights into the unforeseen barriers and difficulties around the inappropriate use of gloves.

We identified that 63% of staff either agreed or were unsure regarding the overuse of gloves.



We identified that 20% of staff were unsure regarding glove use.



Contrastingly, we identified during an hour of observations in the department that 55% of gloves were being inappropriately used, with the following trends identified:

- Taking patient observations
- Performing an ECG
- Examining patients that had no / low potential for highly infectious diseases
- Transporting patients to the ward / for imaging

- Giving an intramuscular or subcutaneous injection
- Giving oral medications

We also received comments such as:

- *"I am not aware of a clear protocol or information regarding when or when not to use gloves and find most people do what they feel comfortable with."*
- *"There needs to be clear communication that it is inappropriate to wear gloves for certain procedures, e.g. patient examination or ECG."*
- *"We could wear gloves a lot less if our policy was reviewed and aligned with research. Also, I think we wash hand less due to glove use!"*
- *"Agree overuse. Porters are obsessed with wearing gloves."*

Implementing change

With these results, we were able to identify specific knowledge gaps and deliver targeted staff education. Following this, we noted initiation of some staff challenging inappropriate decision making around gloves. The NICs and ED Consultants supported and engaged with the education.

- Implementing Trust IPC glove use guidelines in the form of posters attached to glove dispensers
- Presenting Trust IPC glove use guidelines during nursing and doctor clinical handovers
- Educating importance of hand hygiene alongside overuse of gloves in the reduction of hand dermatitis incidence
- Challenging staff on shift to see if their glove use was necessary

Following better staff knowledge on appropriate glove use, we were also able to implement less gloves being ordered and supplied by the ED.

Measurement:

Patient outcomes:

It was not possible to directly measure any improved infection control rates that were related to poor hand hygiene and unnecessary glove use. However, literature into similar projects revealed an improved mortality rate with better hand hygiene compliance and unnecessary glove use. The NIH reported that this could avoid 184 – 921 healthcare associated infections per average general hospital per year and prevent 6 – 31 deaths annually[3].

Environmental sustainability:

We calculated the amount of CO2e waste with raw procurement data by comparing number of inappropriate gloves used before and after implementation of our changes. The emission factor for a single glove of 0.026 kgCO2e / item was taken from the Rizan et al 2021.

[3] National Library of Medicine. 2019. Modelling the costs and consequences of reducing healthcare-associated infections by improving hand hygiene in an average hospital in England. Available at: Modelling the costs and consequences of reducing healthcare-associated infections by improving hand hygiene in an average hospital in England - PubMed.

Economic sustainability:
We calculated the ED's financial savings by applying the reduction in percentage of inappropriate glove use after implementation of our changes to the known cost per year of current procurement. Current spend on gloves and cost per glove was provided by the procurement team.

Social sustainability:
We identified specific staff knowledge gaps through our survey and offered an open comment section to gather insights into the unforeseen barriers and difficulties around the inappropriate use of gloves. We did not directly measure the impact on staff following the change but observed that staff felt more confident with choosing when to use gloves, as they had better knowledge of Trust policies. There were some concerns that reduced glove use did present an increase infection risk to themselves.

Results:

Patient outcomes:
This table shows the ED's staff habits around hand hygiene and gloves:

We identified that:

- 12% wear gloves and did not wash their hands
- 27% did not wear gloves and washed their hands
- 66% wore gloves and washed their hands

While it was not possible to resurvey following change implementations, the reduction in PPE supply by the department indicated that appropriate use had improved. We also did not observe any changes to the infection rates in ED, which would also indicate appropriate hand hygiene.

Following our survey and prior to our change implementations, an inspection from the CQC was commenced and their report showed less than ideal hand hygiene levels in the ED staff. This observation by the CQC may represent an inaccurate representation of perceived ED staff habits that was identified in our survey.

Reducing improper glove use could result in more staff washing their hands, which would minimise the risk of cross contaminating healthcare-associated infections between staff and patients[4] and result in multiple, significant benefits downstream.

Environmental sustainability:
This table shows the number of inappropriate gloves used in ED before and after implementing our changes:

Number of inappropriate gloves used before intervention in 1 hour	17
Number of inappropriate gloves used after intervention in 1 hour	2
Inappropriate glove use difference	15
Percentage difference	88%

The observational audit data showed an 88% reduction in inappropriate glove use following our interventions. We identified that performing ECGs with gloves remained an inappropriate theme observed during our post-change observation.

This table shows the procurement data of gloves supplied and the reduction we would see based on our observational audit percentage difference.

Weekly use of gloves before intervention	**Weekly use of gloves after intervention**	**Difference before and after intervention**	**Carbon saving per glove (kgCO2e)**	**Total carbon saving per week (kgCO23e)**
24,000	2,880	21,120	0.026	549.12

Prior to our intervention, the ED procured 120 boxes of 200 gloves per week in Basingstoke which is a total of 1,248,000 gloves per year. We believe that this data represents a combination of unnecessary glove use in ED as well as an oversupply of stock. We acknowledge that this data may be partially overestimated due to performing one completed PDSA cycle lasting an observation period of one hour.

The reduction of 1,508 pairs of gloves a day would represent a reduction of approximately 233 fewer pairs of gloves per staff member in ED (based on average staffing of all clinicians and healthcare professionals in ED on a weekday during in-hours[5]).

If extrapolated across a year, the potential annual saving of 6,589.44 kgCO2e would be achieved. This is equivalent to driving 19,386 miles in an average car.

This is also an estimated reduction of 52.8kg of plastic per week (based on each glove weighing 2.5g).

[4] HCRG. 2024. Gloves Off: a case study in reducing PPE waste. Available at: https://www.hcrgcaregroup.com/case-studies/gloves-off-a-case-study-in-reducing-ppe-waste/#:~:text=An%20overwhelming%2041.1%25%20reduction%20in%20the%20use%20of,contamination%20from%20staff%20not%20completing%20hand%20decontamination%20appropriately.
[5] 15 nurses, 11 HCAs, 19 clinicians

Economic sustainability:
Based on the reduction identified in the procurement data, a financial saving of £365.6 could be achieved in a week.

Cost (£ per box of gloves)	**Cost per week pre-intervention (£)**	**Cost per week post-intervention (£)**	**Total cost reduction per week (£)**
3.48	417.60	52	365.60

Based on the costs per tonne for HHFT waste disposal (£442 for tiger waste), a financial saving of £23.3 could be achieved in a week.

Cost (£) of tiger waste disposal per tonne	**Amount (kg) of plastic gloves used per week pre-intervention**	**Amount (kg) of plastic gloves used per week post-intervention**	**Total amount (kg) of plastic gloves reduced per week**	**Total cost reduction in reduced waste disposal per week (£)**
442	60 *Equivalent to £26.52 for waste disposal*	7.2 *Equivalent to £3.18 for waste disposal*	52.8	23.34

If extrapolated across a year, an estimated total of £20,224 would be saved (£19,011 in procurement costs and £1,213 in waste disposal).

Social sustainability:
We felt that better knowledge increased staff confidences to deliver better patient care. It also promoted discussions into reducing other aspects of PPE such as aprons and masks. We did find that staff felt more confident on how to use gloves appropriately, as they were now aware of the Trust guidance and how to follow it.

Discussion:
We felt overall that the project had very positive engagement. Our survey identified majority of staff agreeing glove overuse was an issue and this may have led to more open-mindedness.

Whilst we undertook this project within the 10-week time frame of the competition, we encountered multiple challenges during data collection. The inappropriate use of gloves while performing ECG was identified post-intervention, which may be a target for future projects. This could reflect how difficult it was to convey glove education the large number of ED staff. Other barriers to successful implementation could also include lack of staff engagement due to “poster fatigue”. We tried to overcome this by using a mixture of communication tools with social media, in person presentations and posters.

We also identified that we had a high dependency on staff engagement to complete surveys on top of clinical demands. We also noted that the time frame was not lengthy enough to obtain more accurate procurement data and explore education around hand hygiene. Additionally, the new rotation cycle of resident doctors coupled alongside large percentages of bank / locum staff with high rates of ED staff turnover meant that we lost many healthcare professionals that had been educated on inappropriate glove use. This also made it difficult for us to keep track of who had been educated. We would be keen to further explore the addition of our glove education during staff inductions.

We also found that our procurement data needed to go through a third party, which made it difficult to obtain data in a timely manner and represents a data limitation.

In hindsight, we may have had better outcomes and levels of engagement with better discussion with other staff and setting realistic smart goals to ensure the goals were met despite clinical and operational pressures.

Conclusions:

Our post-intervention education was successful in showing that inappropriate glove use can be reduced in the ED, with significant reduction already being seen within 10 weeks. From a single PDSA cycle, we have seen an 88% reduction of inappropriate glove use. This could translate into savings of 17,022.72 kgCO2e and £1,462 in a month. The additional benefits to patient safety and staff are also significant. We feel that our staff have gained valuable and can already be seen adopting these changes into their practice. Ongoing behaviour change could be sustained by introducing Trust guidance for glove use and appropriate hand hygiene into staff inductions and annual training.

Due to the scale of the NHS, we have opportunity to reduce our environmental, economic and social impacts significantly. By introducing simple changes in a very common process, the impacts are obvious. These methods and measures are easily transferred to other waste streams within the ED, with potential for upscale across the hospital in various wards.

References and Resources

Thank you to:
SusQI Programme Lead – Rachel McLean
Sustainability Manager HHFT – Miranda Chubb
Sustainability Analyst CSH – Rosie Hillson
Janice Chow – ED SHO

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6. Northampton General Hospital. Greener PPE: How we reduced PPE successfully! Available at: https://networks.sustainablehealthcare.org.uk/sites/default/files/2025-05/SusQI%20Project%20Report%20%20-%20PPE.pdf
7. The Leeds Teaching Hospitals. The gloves are off on the paediatric intensive care unit (PICU). Available at: https://networks.sustainablehealthcare.org.uk/sites/default/files/resources/PICU%20case%20study.pdf
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Appendix 1 – glove guideline posters

Appendix 2 – glove posters in the ED

Appendix 3 – pre-intervention observational glove use

Date	Location	Staff Type	PPE Type	Appropriate?	If yes, why	If no, why
130-May	RAT	doctor	gloves	yes	blood stained	
230-May	RAT	RN	gloves	yes	bodily fluids - COVID/flu swab	
330-May	RAT	doctor	gloves	no		for clinical examination
430-May	RAT	RN	gloves	yes	taking bloods	
530-May	RAT	HCA	gloves	yes	taking bloods	
630-May	RAT	RN	gloves	no		transferring patient to ward
730-May	RAT	paramedics	gloves	no		transferring patient to bed and wiping equipment
830-May	RAT	HCA	gloves	no		moving bed
930-May	RAT	HCA	gloves	no		wiping equipment
130-May 0	RESUS	RN	gloves	yes	bodily fluid - urine	
130-May 1	ambulatory rat	HCA	gloves	yes	taking bloods	
130-May 2	ambulatory rat	PA	gloves	no		for ear examination, no indication
130-May 3	ambulatory rat	RN	gloves	yes	giving IV meds	
130-May 4	ambulatory rat	HCA	gloves	no		ECG
130-May 5	ambulatory rat	doctor	gloves	yes	PR exam	
130-May 6	ambulatory rat	doctor	gloves	no		clinical examination
130-May 7	ambulatory rat	RN	gloves	yes	removing cannula	
130-May 8	ambulatory rat	RN	gloves	yes	bodily fluid - urine	
130-May 9	ambulatory rat	doctor	gloves	yes	remove cannula	
230-May 0	ambulatory rat	doctor	gloves	no		clinical examination
22-Jun 1	ambulatory rat	doctor	gloves	yes	remove cannula	
22-Jun 2	ambulatory rat	doctor	gloves	no		clinical examination

22-Jun	ambulatory rat	RN	gloves	yes	remove cannula	
22-Jun	RAT	PA	gloves	yes	bodily fluid - urine	
22-Jun	ambulatory rat	HCA	gloves	yes	taking bloods	
22-Jun	RAT	doctor	gloves and mask	no		foul odour and clinical examination
22-Jun	RAT	doctor	gloves	no		clinical examination
22-Jun	RAT	HCA	gloves	yes	taking bloods	
22-Jun	RAT	HCA	gloves	yes	bodily fluids - COVID/flu swab	
32-Jun	RAT	HCA	gloves	no	ECG	
32-Jun	ambulatory rat	doctor	gloves	no		clinical examination
32-Jun	RAT	nurse	gloves and mask	yes	giving IV meds	(nurse was wearing mask all day; had a cold)
32-Jun	RAT	nurse	gloves and mask	yes	taking bloods	(nurse said "I always get unwell at work, so now I'm wearing a mask")
32-Jun	RAT	nurse	gloves	Yes	taking bloods	
32-Jun	Ambulatory rat	nurse	gloves	no	taking observations	
32-Jun	Ambulatory rat	nurse	gloves	no		ECG
32-Jun	RESUS	domestic	gloves	no		sweeping dry goods off floor
32-Jun	RAT	HCA	gloves and apron	yes	patient personal care	
32-Jun	chairs	RN	gloves	yes	giving IV fluids	

Appendix 4 – post-intervention observational glove use

Date	Location	Staff Type	PPE Type	Appropriate?	If yes, why?	If no, why?
29/07/125	RAT	RN	gloves	yes	taking bloods and cannula	

2	29/07/25	RAT	HCA	none	yes	doing ECG	
3	29/07/25	AMB RAT	HCA	gloves and apron	yes and no	taking bloods and cannula	?apron needed
4	29/07/25	RAT	HCA	gloves	yes	bloods and cannula	
5	29/07/25	RAT	student nurse	none	yes		doing ECG
6	29/07/25	RAT	nurse	gloves	yes	bloods and cannula	
7	29/07/25	RAT	RN	gloves and apron	yes	personal care	
8	29/07/25	RAT	HCA	gloves	yes	running VBG	
9	29/07/25	RAT	HCA	gloves	yes	bloods and cannula	
10	29/07/25	RAT	doctor	none	yes	examining patient	
11	29/07/25	trolleys	nurse	gloves	yes	bloods and cannula	
12	29/07/25	trolleys	nurse	gloves	yes	running UD	
13	29/07/25	trolleys	RMN	gloves and apron	yes	personal care	
14	29/07/25	trolleys	PT/OT	gloves	no		mobilising patient
15	29/07/25	AMB RAT	RN	gloves	yes	taking bloods and cannula	
16	29/07/25	AMB RAT	RN	none	yes	doing obs	
17	29/07/25	RAT	RN	gloves	yes	taking bloods and cannula	
18	29/07/25	RAT	RN	gloves	yes	taking bloods and cannula	
19	29/07/25	RAT	RN	none	yes	transporting patient to ward	
20	29/07/25	RAT	RN	gloves	no	doing ECG	
21	29/07/25	RAT	RN	gloves	yes	removing used urine bottle	
22	29/07/25	RAT	RN	gloves	yes	taking bloods and cannula	

23	29/07/25	RAT	RN	none	yes	preparing medication
24	29/07/25	RAT	doctor	gloves	yes	performing USS
25	1-Aug	resus	doctor	none	yes	examining patient
26	1-Aug	resus	RN	none	yes	dispensing medication
27	1-Aug	resus	RN	gloves	yes	running VBG
28	1-Aug	resus	HCA	gloves	yes	running VBG
29	1-Aug	resus	RN	none	yes	dispensing medication
30	1-Aug	amb rat	HCA	gloves	yes	taking bloods and cannula
31	1-Aug	amb rat	HCA	gloves	yes	taking bloods and cannula
32	1-Aug	amb rat	HCA	gloves	yes	taking bloods and cannula
33	1-Aug	amb rat	PA	gloves	yes	taking bloods and cannula
34	1-Aug	trolleys	HCA	gloves	yes	running UD
35	1-Aug	trolleys	HCA	gloves	yes	running VBG
36	1-Aug	trolleys	RN	none	yes	giving oral medication
37	1-Aug	chairs	doctor	gloves	yes	examining laceration (blood)
38	1-Aug	trolleys	RN	gloves	yes	personal care
39	1-Aug	trolleys	RN	gloves	yes	giving IV medication
40	1-Aug	trolleys	RN	gloves	yes	taking bloods
41	1-Aug	trolleys	HCA	gloves	yes	cannulation
42	1-Aug	trolleys	HCA	none	yes	taking observation

Critical success factors

Please select one or two of the below factors that you believe were most essential to ensure the success of your project changes.

People	Process	Resources	Context
☐ Patient involvement and/or appropriate information for patients - to raise awareness and understanding of intervention ☐ Staff engagement ☐ MDT / Cross-department communication ☐ Skills and capability of staff ☐ Team/service agreement that there is a problem and changes are suitable to trial (Knowledge and understanding of the issue) ☐ Support from senior organisational or system leaders	☐ clear guidance / evidence / policy to support the intervention. ☐ Incentivisation of the strategy – e.g., QOF in general practice ☐ systematic and coordinated approach ☐ clear, measurable targets ☐ long-term strategy for sustaining and embedding change developed in planning phase ☐ integrating the intervention into the natural workflow, team functions, technology systems, and incentive structures of the team/service/organisation	☐ Dedicated time ☐ QI training / information resources and organisation process / support ☐ Infrastructure capable of providing teams with information, data and equipment needed ☐ Research / evidence of change successfully implemented elsewhere ☐ Financial investment	☐ aims aligned with wider service, organisational or system goals. ☐ Links to patient benefits / clinical outcomes ☐ Links to staff benefits ☐ 'Permission' given through the organisational context, capacity and positive change culture.