



CASE STUDY
Sustainability in infection
prevention and control

Hunter New England: Gloves Off! Clean Hands. Safe for all.

Infection prevention and control/ Quality improvement program

Find out how the John Hunter Hospital developed a quality improvement program to improve hand hygiene and reduce unnecessary non-sterile glove use. John Hunter Hospital is an 800-bed tertiary referral and teaching hospital in Newcastle, NSW, within the Hunter New England (HNE) Local Health District (LHD).

For more information on hand hygiene/ glove use/ IPC sustainability programs, please refer to [Sustainability and infection prevention and control web page](#).

To view the summarised case study, you can skip to [At a glance](#).

Step 1: Select priority area

Non-sterile glove use, hand hygiene and patient safety

Why focus on non-sterile glove use?

Non-sterile gloves are commonly misused in clinical work by healthcare workers (HCWs), and HCWs are less likely to adhere to hand hygiene when wearing non-sterile gloves.¹

When used correctly and in the appropriate context, gloves play an important role in improving safety for patients and staff. However, behaviors such as prolonged wearing of gloves or neglecting to attend to hand hygiene pre- and post- gloves use, reduces hand hygiene compliance and can present a risk to patient safety. In addition, the large volume of non-sterile gloves used in healthcare has a significant impact on environmental health and healthcare costs.

The Gloves off! campaign aims to provide HCWs with the knowledge and skills needed to reduce unnecessary non-sterile glove use and prioritises effective hand hygiene.



Step 2: Plan the project: Following a quality improvement model

The project aims to:

- Improve hand hygiene compliance
- Improve HCWs confidence and understanding in performing risk assessments as part of implementing standard precautions
- Reduce unnecessary use of non-sterile gloves
- Design a quality improvement Gloves off! package which can be used by other health services.

Elements of the Gloves off! campaign include:

- Selecting pilot wards
- Baseline data collection
- Ward based education sessions (intervention phase)
- Collection of post-education data
- Evaluation of the project outcomes
- Roadmap development and roll out to the wider local health district.

The Gloves off! campaign ran across two 32-bed surgical wards at John Hunter Hospital, from July to September 2023 and included pre- and post-intervention measures. The project wards provide care to a variety of specialty surgical services including general, maxillofacial, ears nose and throat, plastics, trauma and orthopedics.

The Gloves off! campaign was endorsed by the John Hunter Hospital Executive General Manager, and the Executive Director of Clinical Nursing and Midwifery. The project team included the HNE Infection Prevention Service (IPS) Clinical Director, epidemiologist, Clinical Nurse Consultants, a Sustainability Project Officer, and Nurse Unit Managers (NUMs) for the two pilot wards. Project support was provided by the [NSW Health Climate Risk and Net Zero Unit](#), with the Allied Health and Surgical Net Zero Leads assuming key positions within the primary project team.

Step 3: Measure and review: Drilling down into the data

Hand hygiene compliance and glove use compliance for the two pilot wards

- Hand hygiene compliance was 59% for the two pilot wards pre-education.
- Overall, 60% of observed glove use was not required.
- 70% of missed hand hygiene moments were associated with unnecessary glove use.

Scale of non-sterile glove use across HNELHD

- Non-sterile gloves used annually = ~28.3 million.
- Gloves sent to landfill = 97 tonnes plus disposal costs.
- Carbon footprint = equivalent to driving a fuel-efficient car around Australia 175 times.



Monthly glove procurement data between July 2022 – February 2024 was used to calculate associated cost, carbon footprint, and waste.

Step 4: Explore reasons: Looking for underlying causes

We hypothesised that the following factors might influence the appropriate use of gloves by HCWs:

- A lack of confidence in risk assessing the need for gloves during routine patient care
- Uncertainty regarding the efficacy of alcohol-based hand rub (ABHR).

To explore this, a 17-item electronic survey was designed by the project team and distributed to all identified HCWs from both wards via email (n=223) prior to commencing the education intervention. The survey explored HCW demographics, knowledge of the [5 moments for hand hygiene](#), confidence in performing risk assessments for glove use and confidence in ABHR use to prevent the transmission of infections to staff and patients. Following the intervention, a 24-item survey was distributed via email to 276 HCWs who were identified as having had an opportunity to engage in education activities throughout the intervention period across the two wards. Two reminders for survey completion were sent, with 53% of HCWs completing the pre-education survey, and 20% completing the post-education survey. In the pre-education survey, 53% of respondents were nursing staff, 27% medical officers, and 19% allied health, which was similar when compared to post-education survey completion.

The pre-education survey highlighted the following:

- Most HCWs reported a high level of confidence in their ability to perform a risk assessment to guide non-sterile glove use
- When asked directly, 99% of HCWs correctly identified a need for glove use where contact with blood or body fluid was anticipated. However, in a scenario-based question which specified minimal risk of blood or body fluid exposure, 18% indicated that gloves should be used when assisting a patient to walk, 23% for patient repositioning, 56% for bed linen change, and 13% for routine observations
- HCWs ability to correctly identify the 5 moments for hand hygiene was poor, at 35%
- 14% of HCWs indicated that gloves were indicated for contact with non-intact skin
- 8% of HCWs indicated a need for glove use in the context of contact with patient belongings or bedrails
- HCWs appeared to lack confidence in ABHR as a tool to reduce pathogen transmission. 36% of survey participants indicating that they felt strongly that hand hygiene was effective at reducing transmission of 'germs to patients', and only 25% indicated that they felt strongly that hand hygiene using ABHR would be effective in reducing their risk of acquiring infections at work
- 47% of HCWs felt that gloves offered them "better protection" when compared to using ABHR, while 22% were unsure
- 5% of HCWs felt that using of non-sterile gloves meant hand hygiene was needed less often while 4% were unsure.



The campaign highlighted a need for ABHR to be consistently available at the point of care. It is recommended that auditing of ABHR availability and strategies to ensure compliance of greater than 90% be included as a Gloves off! campaign goal moving forward

Step 5: Act to improve: Putting the changes in place

The intervention includes a multi-modal approach with face-to-face education sessions, point of care posters and environmental cues.

Face-to-face education sessions were delivered by an IPS Clinical Nurse Consultant to clinical staff on the two participating wards over a 2-week period. Education material incorporated evidence-based guidelines regarding hand hygiene and risk assessing glove use in clinical practice. Baseline hand hygiene ward audits and education on the environmental impact of non-sterile gloves were included for discussion.

Visual education materials were developed specifically for the project remained as permanent fixtures on the wards. These included:

- Educational posters displayed beside every glove dispenser
- Large banners at ward entry
- Gloves Off! logo badges worn by the project team and ward champions.

Self-nominated ward champions were identified and, in partnership with ward nurse unit managers provided project reminders at daily staff safety huddles. Staff engagement strategies were supported by the project team and included a Gloves Off! newsletter, sharing of glove-shaped baked goods, and the creation of a custom Gloves Off! music video recorded by staff. All clinical staff (nurses, allied health, and medical staff) working in either of the two surgical wards were encouraged to participate.

Pre- and post-intervention outcomes were measured and included:

- Hand hygiene compliance
- Glove use appropriateness assessed using observational audits
- Glove procurement
- Staff knowledge and attitudes as determined by staff survey.

Step 6: Monitor and report: Looking at the impact- building on success

Seventy-six healthcare workers attended at least one face-to-face education session across the two wards during the education intervention phase.

Glove use and Hand Hygiene

- Inappropriate glove use behaviours were reduced by 29% post the intervention phase (60% reduced to 31%). A further reduction of 8% was demonstrated when measured again at 7

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months after the intervention phase, representing a 37% absolute reduction in inappropriate glove use when compared with baseline measures.

- Post-intervention episodes of missed glove use (i.e. not worn when should have been worn) were rare (1%) and did not increase compared with pre-intervention measures.
- Hand hygiene compliance improved from 59% at baseline, to 69% ($p=0.017$). At 7-months follow-up, hand hygiene compliance was 65%.

Glove purchases, cost, carbon footprint and waste

Glove procurement data over a 3-month post-intervention period was compared to the same period 1 year prior:

- There was a 21% reduction in number of non-sterile gloves purchased, equivalent to 6,290 gloves per ward per month.
- Carbon emissions relating to glove use per ward per month at baseline was calculated to be 214kg Co_{2e},² which is equivalent to driving a fuel-efficient petrol car 584km.³ It is estimated that this was reduced by almost 45kg Co_{2e} per ward each month post intervention.
- Waste related to glove use was estimated to be reduced by 22kg per month and cost savings of AUD\$315 per month for each ward.

Staff knowledge and attitudes

- Staff knowledge of the 5 Moments for Hand Hygiene improved significantly after education (35.0% vs 56.6% of staff scored 5/5; $p=0.05$).
- Staff indicating there was a requirement for gloves to be worn during contact with intact skin reduced from 13.5% to 0% ($p<0.05$).
- Staff confidence in performing risk assessments for non-surgical gloves use did not change significantly before and after the intervention.
- Staff confidence in the effectiveness of ABHR to reduce transmission of infectious pathogens to HCWs increased from 24.6% to 53.2% ($p\leq 0.05$).
- Staff confidence in the effectiveness of ABHR to reduce transmission of infectious pathogens to patients increased from 36.4% to 60.9% ($p\leq 0.05$).
- Staff understanding about the need to perform hand hygiene even when gloves have been worn increased from 60.9% to 80.9% ($p\leq 0.05$).
- 84% of survey participants claimed to have reduced their glove use during clinical care as appropriate.

Development of a resource package to promote appropriate non-sterile glove use

Gloves off! education material, campaign resources, and [a step-by-step guide](#) is available to be used by HCWs interested in performing a Gloves off! project within their healthcare setting. This package includes a custom [hand hygiene audit tool](#), which supports measurement of appropriateness of baseline and post-intervention glove use by participating units. Future



integration of this tool with routine hand hygiene auditing may provide a mechanism by which outcomes of this project can be monitored and sustained in the longer term.

In HNE, interested staff are encouraged to access the project resources, develop a project team, and get started! Interested staff can go to [Gloves Off! | HNE Health \(nsw.gov.au\)](https://www.nsw.gov.au/gloves-off) to access resources and find out more.

The broader goal of this project is to see Gloves off! education material incorporated into university education for all Australian healthcare professionals and hospital orientation, and to be promoted as a valuable safety and quality initiative in health districts across the country.

Acknowledgement: Gloves off! resources and media were developed with funding support provided by the NSW Health Climate Risk and Net Zero Unit. At this stage there is no ongoing government funding or partnerships for this project.

Lessons learnt

- The project results were consistent with published literature. Healthcare staff used gloves more than necessary and neglected hand hygiene when doing so.
- Leadership from the Infection Prevention Service was crucial. Staff and management trusted the message, while active engagement of Nurse Unit Managers appeared to strongly influence staff behaviour.
- Fun, inclusive and creative education elements improved staff engagement.
- With appropriate training, there is the potential for glove use auditing to be incorporated into routine hand hygiene audit schedules. Moving forward, this would reduce the resources required to run a successful Gloves off! campaign and might assist in sustaining behavioural change.
- The inconsistent availability of ABHR at point of care may have presented a barrier to staff performing hand hygiene. Strategies are needed to ensure hand rub is readily available in future campaigns.



At a glance

ISSUE

- Non-sterile gloves are commonly used inappropriately by healthcare workers.
- Healthcare workers are less likely to adhere to hand hygiene when wearing non-sterile gloves.
- Waste generated from inappropriate non-sterile glove use has a significant impact on environmental sustainability.

BARRIERS

- Healthcare workers lack confidence in risk assessing the need for non-sterile gloves during routine patient care.
- Healthcare workers voice uncertainty regarding the efficacy of ABHR to reduce the risk of infection.
- Poor access to ABHR at the point of care.

ENABLERS

- Access to and promotion of the effectiveness of ABHR to reduce the risk of infection.
- Leadership from the Infection Prevention Service promoted trust in staff participating in the project.
- Multimodal approach.
- Including staff in the implementation phase by involving them in fun and creative educational elements.

SOLUTIONS

- The development of a step-by-step guide for use by health service organisations wanting to reduce inappropriate glove use.
- Improved access to ABHR.

OUTCOMES

- Improved staff confidence in the effectiveness of ABHR to reduce the risk of transmission of infection.
- Reduced use of non-sterile gloves by healthcare workers during routine patient care.
- Improved hand hygiene compliance.

Resources

[Hunter New England Gloves Off! campaign](#)

Do you have a case study to contribute?

We will work with you to write the case study. Please contact us on HAI@safetyandquality.gov.au



References

1. Eveillard M, Joly-Guillou M-L, Brunel P. Correlation between glove use practices and compliance with hand hygiene in a multicenter study with elderly patients. *American journal of infection control*. 2012;40(4):387-8.
2. Jamal H, Lyne A, Ashley P, Duane B. Non-sterile examination gloves and sterile surgical gloves: which are more sustainable? *Journal of Hospital Infection*. 2021;118:87-95.
3. Wernet G, Bauer C, Steubing B, Reinhard J, Moreno-Ruiz E, Weidema B. The ecoinvent database version 3 (part I): overview and methodology. *The International Journal of Life Cycle Assessment*. 2016;21:1218-30.

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