Abstract # 326

Where Does the Glove Fit? Examining the Effect of Hand Hygiene Timing on Healthcare Personnel Glove Contamination

Erin Gettler, MD
erin.gettler@duke.edu
DUMC Box 103259
Durham, NC 27710

Duke Center for Antimicrobial Stewardship and Infection Prevention

Erin Gettler, MD[1,2]; Bobby Warren, MPS[2,3]; Guerbine Fils-Aime[2,3]; Aaron Barrett[2,3]; Amanda Graves, MPH[2,3]; Deverick Anderson, MD, MPH[1,2]; Becky Smith, MD[1,2]

[1]Division of Infectious Diseases, Department of Medicine, Duke University School of Medicine, Durham, NC; [2]Duke Center for Antimicrobial Stewardship and Infection Prevention, Duke University Medical Center, Durham, NC; [3]Disinfection, Resistance, Transmission and Epidemiology Laboratory, Department of Medicine, Duke University Medical Center, Durham, NC

Duke University School of Medicine

Background

- The hands of healthcare personnel (HCP) contribute to pathogen transmission within the healthcare environment.
- Guidelines recommend performing hand hygiene (HH) prior to donning non-sterile gloves, yet strong evidence is lacking and overall adherence is low.
- This study compared the rate of glove contamination among HCP practicing different methods of hand hygiene.

Methods

- HCP were enrolled on inpatient units and randomized into 3 arms: 1) standard practice of alcohol-based hand rub (AHBR) before gloving, 2) ABHR after gloving, or 3) direct gloving without HH (**Figure 1**).
- Study personnel collected 1 control glove per HCP from the same glove box used after randomization. After donning, HCP gloves were aseptically removed and placed into sterile bags by study personnel.
- Inverted gloves were filled with neutralizing buffer, sealed, and agitated. Buffer was centrifuged and decanted leaving ~3 mL of sample. Each homogenate was plated onto routine media to assess for bioburden and epidemiologically important pathogens (EIP), including *Staphylococcus aureus*, *Enterococcus* species, and gram-negative bacteria.
- Gloves were visually inspected and tested for microperforations by the water inflation test.
- Rate of glove contamination and bioburden were compared.
- HCP completed a brief survey on their typical HH habits.

Figure 1. Study arm randomization

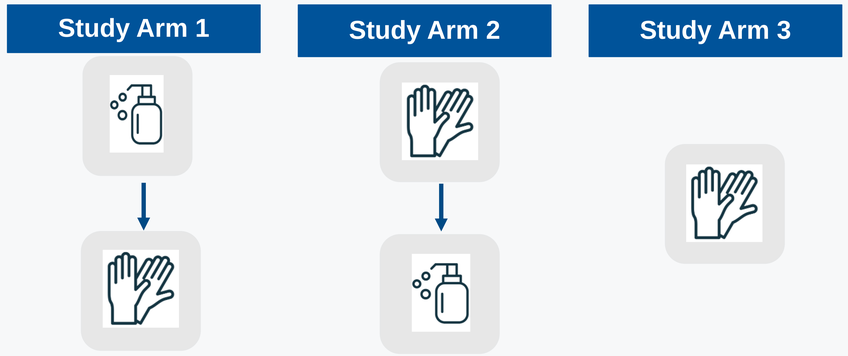
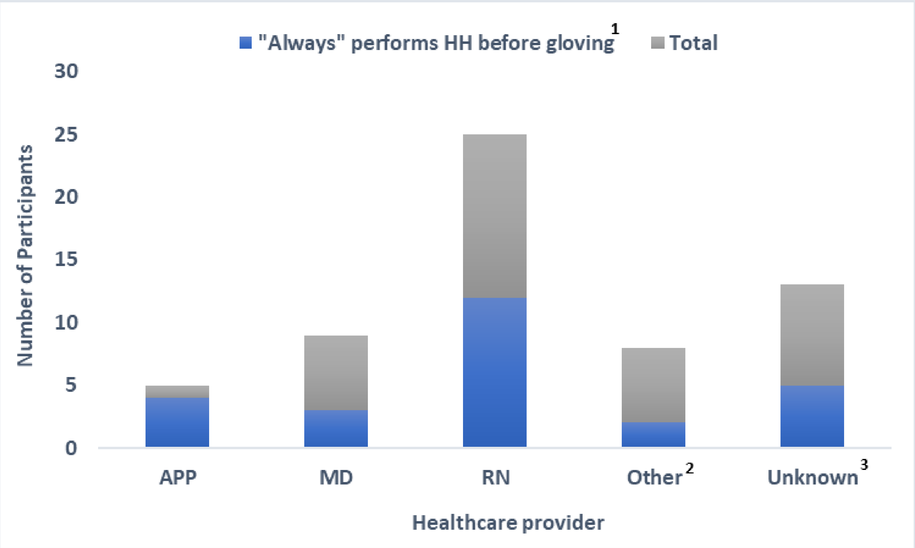


Figure 2. Self-reported hand hygiene before gloving by provider type



[1]HCP who self-reported "always" performing hand hygiene before gloving (options: always, often, sometimes, rarely, never).
[2]Pharmacists, pharmacy students, and medical students reported as "other."
[3]HCP type not reported.

Results

- 60 HCP across 8 inpatient units were enrolled.
- Self-reported HH before gloving varied by HCP type (**Figure 2**). Difficulty gloving until hands dry was the main barrier to adherence.
- Control gloves obtained were frequently contaminated (48%).
- Compared to standard practice, neither HH after gloving nor direct gloving led to significant differences in glove contamination or bioburden (**Table 1**).
- Importantly, the application of ABHR to gloves did not compromise the integrity of the glove or result in microperforations.
- Gloves were relatively void of EIP.

Table 1. Glove contamination by different hand hygiene and gloving strategies

	Control N=60	ABHR before gloving N=42	ABHR after gloving N=40	Direct gloving N=38	*p* value[1]
Glove contamination, n (%)	29 (48)	26 (62)	24 (60)	22 (58)	0.94
Bioburden (CFU), median (IQR)	0 (0-19)	28 (0-60)	16 (0-59)	16 (0-48)	0.24
Difference in bioburden relative to control (CFU), median (IQR)	-	14 (-10-46)	10 (0-56)	10 (0-37)	0.24

[1]Study arms compared using chi-squared and one-way ANOVA for glove contamination and bioburden, respectively.

Conclusions

- In this exploratory analysis, hand hygiene after donning non-sterile gloves or direct gloving did not result in higher glove contamination.
- These techniques may represent safe alternative HH practices for HCP and circumvent some of the common barriers limiting HH compliance. Additional studies are needed.