—Photogravure—

Wear It Exactly as You See It: Promoting Proper PPE Donning through Visual Layout Optimization

Jun Hirai

Division of Infection Control and Prevention, Nippon Medical School Chiba Hokusoh Hospital, Chiba, Japan

(J Nippon Med Sch 2025; 92: 310–312)
Key words: personal protective equipment, gown, mask, goggle, glove

It is unclear why many healthcare workers (HCWs) fail to follow the correct donning sequence concerning personal protective equipment (PPE). The importance of PPE use has been emphasized, particularly in the aftermath of the Coronavirus disease 2019 (COVID-19) pandemic[1]. However, many HCWs struggle to adhere to the correct donning sequence, posing an ongoing challenge.

One contributing factor, as shown in **Figures 1A~C**, is the disorganized placement of PPE within hospital wards. In Panel 1A, masks, gloves, and sleeveless gowns are included, but both goggles and sleeved gowns are lacking, whereas in Panel 1B, all the major PPE components—masks, gloves, goggles, sleeveless gowns, and sleeved gowns—are stacked in a vertical configuration. However, the gloves are positioned at the top, which may prompt users to don them first. Moreover, the boxes of gowns in **Figures 1A and 1B** are stored upside down, which can cause contamination from falling bacteria. In contrast, Panel 1C displays gloves, sleeveless gowns, and sleeved gowns in a horizontal row but masks and goggles are lacking. These inconsistencies—in both the presence of PPE items (e.g., absence of goggles or sleeved gowns) and layout style (vertical vs. horizontal)—may lead not only to confusion about the correct donning order but also to a failure to wear all the necessary PPE components correctly, potentially compromising infection prevention. This highlights the need for standardized and intuitive PPE station design.

To address this issue, we optimized the placement of PPE to ensure that all healthcare workers—including students and professionals from various disciplines—could intuitively don PPE in the correct sequence.

To provide effective protection and minimize self-contamination, the optimal sequence for donning PPE is as follows: (i) gown: serves as the outermost barrier, protecting the torso and arms from splashes and contact-based contamination; (ii) mask: protects the respiratory tract from airborne droplets and limits the spread of the wearer's respiratory emissions; (iii) goggles or face shield: protects the eyes from droplets, sprays, and splashes; and (iv) gloves: donned last to protect the hands, which are frequently involved in patient care and most likely to come into contact with contaminated surfaces. It is critical that gloves be worn last, as putting them on too early can lead to contamination when handling other PPE items.

This sequence is visually reinforced in **Figure 2**, where the layout is intentionally designed to promote correct donning behavior through aligning PPE items both vertically and functionally. Additionally, the gowns should be stored in a manner that prevents contamination from falling bacteria. Items are arranged in the recommended donning order from top to bottom: sleeved and sleeveless gowns, masks, goggles, and gloves. Such intuitive configurations are particularly helpful for students, trainees, and staff who may not yet be fully familiar with infection control protocols. Through incorporating visual cues, even those without prior hands-on training can follow a simple mnemonic: "Wear it exactly as you see it."

Following the implementation of this method in our hospital, adherence to the correct PPE donning sequence improved significantly. Prior to optimizing PPE placement, 58 of 91 (63.7%) HCWs followed the correct order. Following implementation of this method, a univariate analysis revealed that 87 of 91 (95.6%) HCWs followed the correct order ($p < 0.01$). The increase in correct adherence to the PPE donning sequence—from 63.7% to 95.6%—was observed within two weeks of implementing the

Correspondence to Jun Hirai, Division of Infection Control and Prevention, Nippon Medical School Chiba Hokusoh Hospital, 1715 Kamagari, Inzai, Chiba 270–1694, Japan
E-mail: hiraichimed@gmail.com
https://doi.org/10.1272/jnms.JNMS.92-409
Journal Website (https://www.nms.ac.jp/sh/jnms/)

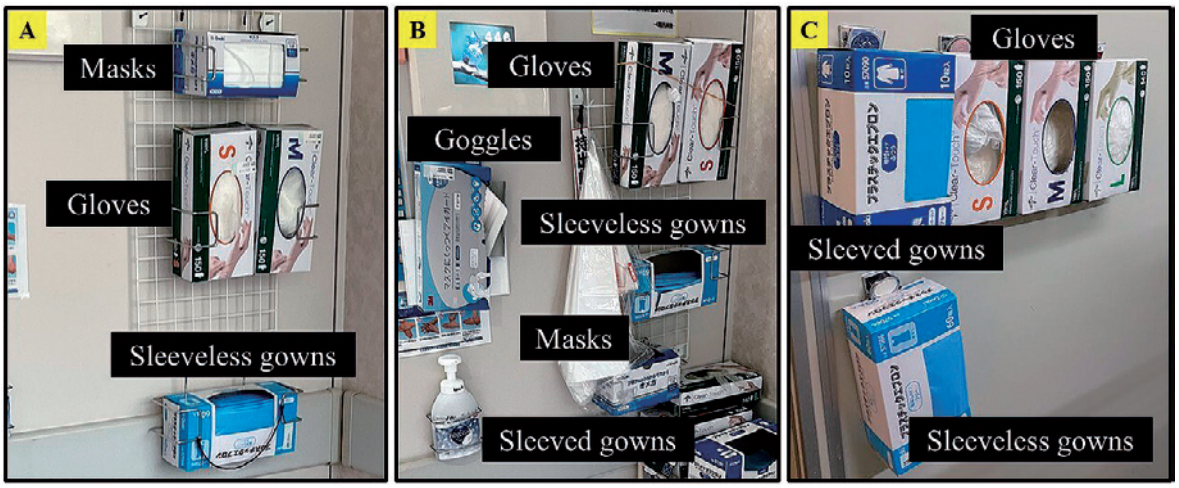

Fig. 1A~C

Fig. 2

redesigned PPE layout. Periodic evaluations will continue to be undertaken to ensure sustained adherence to correct PPE-donning procedures.

In addition to HCWs, we consider that this approach may be particularly beneficial for medical students, trainees, and non-clinical staff who may not have received formal PPE training but who are expected to adhere to infection control protocols. Correct use of PPE in medical settings is essential for preventing nosocomial infections, including surgical site infections, contact-transmitted infections caused by drug-resistant bacteria such as carbapenem-resistant *Enterobacteriaceae* and methicillin-resistant *Staphylococcus aureus*, and droplet-transmitted infections caused by viruses such as SARS-CoV-2 and influenza[2].

Our findings may prompt health professionals to adopt this demonstrably effective method of PPE donning.

Acknowledgments: I would like to thank the HCWs at Nippon Medical School Chiba Hokusoh Hospital for their daily cooperation in infection control.

Funding: None.

Conflict of Interest: None.

Fig. 1A~C PPE setup varies across hospital wards.

Fig. 2 The PPE items are arranged from top to bottom in the order in which they should be donned.

References

1. Cramer C, Hansen KK, Kinnerup MB, et al. Use of personal protective equipment among healthcare workers during the first and the second wave of the COVID-19 pandemic. Ann Work Expo Health. 2023;67:59−75.
2. Matsuda A, Yamada T, Ohta R, et al. Surgical site infections in gastroenterological surgery. J Nippon Med Sch. 2023;90:2−10.

(Received, April 7, 2025)
(Accepted, May 27, 2025)