

# Hands deserve better: Global clinical consensus recommendations on surgical gloving practice

Enz A, Boermeester MA, Chatterjee A, Coombs N, Dye L, Johnson P, Lingaas E, Mittelmeier W, Munakata K, Sawyer RG, Spratt DL, Stearns KL, Wharton KR, Brindle CT, Journal of Hospital Infection, 2026

## Purpose

The Hands Deserve Better project conducted a comprehensive, four-arm systematic review and Delphi consensus to identify the best evidence for safe and effective surgical gloving practices. The aim is to guide operating room teams on glove fit, double gloving, indicator glove systems, and glove change frequency to optimize performance and protect both patients and healthcare providers (HCPs).

## Methods

- **Systematic Review:** 10,137 records identified; 7,979 abstracts screened; 260 studies included across four research questions (glove fit, double gloving, indicator systems, glove damage/change frequency).
- **Delphi Technique:** 29 experts shortlisted; 15 participated. Three rounds of anonymous voting established consensus ( $\geq 75\%$  agreement) on clinical recommendations.
- **Evidence Appraisal:** Strength of evidence and bias assessed using Johns Hopkins Evidence-Based Practice Model and ROB2/ROBIS/Newcastle-Ottawa scoring tools.

## Key findings

### 1. Glove fit

- Poorly fitting gloves impair dexterity, tactile sensitivity, comfort, and may increase perforation risk.
- Glove fitting should occur when entering OR practice and when manufacturers or product lines change.
- Availability of all glove sizes and styles accounting for anatomical and gender differences is essential.

### 2. Double gloving

- Strong evidence shows double gloving significantly reduces glove perforations and blood exposure to surgical staff. Over 70% of glove perforations go unnoticed during surgery.
- While double gloving may affect tactile sensitivity for some, most surgeons adapt quickly.
- Double gloving is recommended in most surgical procedures.

### 3. Indicator gloves systems

- Indicator systems (contrasting colour inner glove) detect perforations **2-6x more effectively** than two standard gloves. This topic had the strongest evidence across all research questions.
- All scrubbed team members should use double gloves with indicator systems.

### 4. Glove damage & glove change frequency

- Glove damage increases steadily with surgical duration, significant rises after 60-120 minutes.
- Specific high-risk specialties, especially orthopaedics and arthroplasty, show higher perforation rates.
- Changing gloves at key procedural steps improves aseptic integrity.
- Evidence supports glove change as part of perioperative "bundles," which reduce surgical site infection (SSI), especially in general surgery and caesarean sections.

## Final consensus recommendations (10 accepted)

### Glove fit

1. Mandatory glove fitting before first OR participation.
2. Re-fitting required after manufacturer changes or performance concerns.
3. Ensure broad availability of glove styles/sizes for diverse anatomic needs.

### Double gloving

4. Double gloving recommended to reduce aseptic barrier breaches and occupational exposure.

### Indicator gloves systems

5. All scrubbed staff should use an indicator glove system.

### Glove damage & glove change frequency

6. Change outer/single gloves every 60–120 minutes.
7. In orthopaedics (non-arthroplasty), change gloves every 60–120 minutes.
8. In arthroplasty change gloves at key steps (draping, cementing, implants, closure, and  $\geq 60$  min).
9. In general surgery, change gloves before abdominal closure as part of a sterile bundle.
10. In caesarean section, change gloves after placenta delivery and before closure.

(Two statements did not reach consensus.)

## Conclusion

This project provides the most comprehensive evidence-based consensus to date on surgical glove practices. Ten clinical recommendations offer practical, actionable guidance to enhance surgical safety, improve aseptic performance, and protect both patients and surgical teams. These findings can inform global standards and future guidelines for surgical gloving practice.

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