AnsellCARES℠

InTouch™
CLINICAL UPDATE

THE RELATIONSHIP BETWEEN MEDICAL EXAMINATION GLOVES AND HAND HYGIENE

A continuing education self-study for healthcare workers with an interest in patient and healthcare worker safety and infection prevention.

ISSUE 9

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LEARNING OBJECTIVES

After completing this continuing education activity, you should be able to:

1. Be proficient at undertaking a proper infection control assessment including understanding how gloves are protective in circumstances where a patient is isolated;
2. Appreciate how unintended glove misuse can impede hand hygiene compliance;
3. Apply best practice principles of glove use as an adjunct to routine and fundamental infection prevention measures including hand hygiene and use of personal protective equipment.

Cathryn Murphy PhD, CIC

Executive Director – Infection Control Plus
Honorary Adjunct Associate Professor,
Faculty of Health Sciences and Medicine
Bond University, Gold Coast, Queensland, Australia.

Associate Professor Murphy provides consulting services to Ansell worldwide and is the editor of this edition of AnsellCares℠ InTouch™.

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UNDERTAKING A PROPER INFECTION CONTROL ASSESSMENT INCLUDING UNDERSTANDING HOW GLOVES ARE PROTECTIVE

Intact, appropriately-sized single-use gloves worn per manufacturers' instructions typically provide a reliable barrier function between HCWs' hands and other potential sources of contamination including co-workers, patients, solutions, spills and surfaces. Examination gloves have been positioned as a convenient, integral, safe and reliable piece of routine personal protective equipment (PPE) since the global adoption of the infection control strategies of Universal Precautions,[1] Body Substance Isolation[2] and subsequently Standard Precautions.[3] The Universal Precautions and Body Substance Isolation models recommended glove use for any occasion in which it was reasonably anticipated that a healthcare worker (HCW) may come in contact with blood, body fluids, mucous membranes or non-intact skin. [1,4] Standard Precautions consolidated this approach by suggesting that transmissible infectious agents could be contained within blood, body fluids, secretions, excretions other than sweat, non intact skin, and mucous membranes.

The emergence and proliferation of antimicrobial resistant organisms (AMROs) and refinement in our understanding of disease-specific transmission routes have led to current practice where in addition to routine care according to the Standard Precautions model, patients known to be either colonized or infected with epidemiologically significant AMROs are most often placed under isolation.

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Some experts suggest that with each of these infection control strategies HCWs have become more confused with the relevant recommendations. Instead of rational risk-assessment and well-informed HCW decision-making in regard to PPE use, many HCWs routinely wear non-sterile examination gloves even when neither the nature of the care delivered, nor the patient's infectious status require such protection.[3,5-7] To overcome this confusion a few contemporary researchers suggest that HCWs should no longer routinely don examination gloves prior to entering rooms which house patients colonized or infected with multi-resistant organisms (MROs). [6,8,9]

Until well-designed, comprehensive studies that refute our contemporary approach to infection control and prevention are undertaken in real-life clinical settings and produce valid and reliable findings that can be generalized across various healthcare settings, it is prudent that HCWs continue to undertake meaningful risk-assessment of the need for gloves prior to every episode of clinical care.

That assessment should include at a minimum consideration of each of the following questions and pending the answers, hand hygiene and wearing of gloves:

- **Am I likely to have direct contact with any potentially infectious blood, body fluid, secretion or excretion or any contaminated surface during the delivery of this episode of care?**
- **How many multiple tasks will I be performing in this one episode of care?**
- **If I am likely to be performing multiple tasks/ procedures during this episode of direct care, what is the best sequence of activity to reduce the potential for my hands contributing to disease transmission?**
- **At which stage(s) is it appropriate for me to perform hand hygiene and change gloves according to the World Health Organization's (WHO) "My Five Moments for Hand Hygiene (M5MFHH)" model?**

It is prudent that HCWs continue to undertake meaningful risk-assessment of the need for gloves prior to every episode of clinical care.

HOW UNINTENDED GLOVE MISUSE CAN IMPEDE HAND HYGIENE COMPLIANCE

Since 2006, the global promotion of hand hygiene according to the WHO's M5MFHH has revolutionized HCW hand hygiene practice. However, some experts argue that the M5MFHH model has inadvertently promoted glove misuse and in doing so leads to greater opportunities for HCWs to contaminate environmental surfaces and patients.[6,7,10-12] In addition to failing to wear gloves, the main reported ways in which glove misuse is affecting hand hygiene compliance are:

1. **HCWs over using gloves rather than performing hand hygiene as recommended,[7]**
2. **HCWs not removing gloves between patient care tasks on a single patient and not performing hand hygiene as frequently as stipulated in the WHO recommendations,[12] and/or**
3. **HCWs performing an episode of hand hygiene while wearing gloves.**

Regardless of the specifics of misuse, each episode of non-compliant glove use and removal has the potential to lead to unintended contamination and horizontal transmission of pathogenic organisms.[13]

OVER-USE OF GLOVES

Early research from 2004 demonstrated HCWs may ironically, either under or over-use gloves. Incorrect non-use of gloves accounted for 8.0% of observed instances (95%CI, 7.6–8.4%) whereas observed HCWs used gloves in 93.5% (95%CI, 93.2–93.9%) of occasions despite their use being indicated in only 58% of occasions.[7]

Subsequent studies confirmed that HCWs' glove misuse typically involved wearing gloves during procedures that did not involve potential exposure, not removing gloves at times during care where hand hygiene is required and not performing hand hygiene after glove removal.[5]

In 2014, Loveday and colleagues recognized a need to better understand what drives glove misuse and why staff 'break' the rules. They argue that this knowledge is needed so that corrective interventions and strategies can be implemented.

Their work considered issues such as human factors and HCW beliefs and found that a HCW's perceived level of "disgust" was a key driver of glove overuse and conversely, underestimation of transmission risk influenced non-use of gloves.[3]

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Over the last decade healthcare organizations have considered and sometimes promoted the involvement of patients and their families in the delivery of safer care.[14] Regarding infection control this has included permissioning and empowering patients to question and prompt clinicians and allied healthcare workers who are non-compliant with recommendations regarding hand hygiene,[15,16] management of peripheral vascular access devices[17] and environmental cleaning.[18]

However very recently, Walaszek and colleagues argue that the perceptions of risk and appropriate protective measures against infection vary between patients and clinicians. As a consequence patients with insufficient or incomplete knowledge may wrongly encourage HCWs to over use gloves.[19]

HCW NOT REMOVING GLOVES BETWEEN PATIENT CARE TASKS

One form of glove misuse occurs when HCWs fail to remove gloves, perform hand hygiene and redon a new pair of gloves between individual patient tasks.

Girou acknowledges that in this practice gloves become like an additional skin for HCWs.[7] Several studies have attempted to better understand the magnitude, complexity and implications of glove non-removal. Naderi's observational study in Iran reported a high degree of appropriate glove use (91.6%) however that rate of appropriate glove changing was only 39.4%.[12] Naderi's rates of inappropriate glove changing were similar to those reported by Girou 64.4% (95%CI, 64.1–65.1%).[7]

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HOW UNINTENDED GLOVE MISUSE CAN IMPEDE HAND HYGIENE COMPLIANCE

A comprehensive study of glove use in clinical settings by Loveday reported that almost half (48%) of the episodes in which HCWs misused gloves and subsequently increased the risk of crosscontamination involved a breach of Moment 4 of the M5MFHHs, 18% involved a breach of Moment 3 of the M5MFHHs, 13% breached Moment 2 and 15% breached Moment 1.[3]

Several researchers have recently described tensions between the WHO's M5MFHH and the practicalities and complexities of appropriate glove use.[3,5,12] They have also raised concerns regarding the until now undervalued risk of cross-contamination posed by HCW failure to remove gloves as indicated.[5,8] Jain and McLaws argue further that breaches of glove use recommendations may also be predictive of a HCW's non-compliance with hand hygiene recommendations.[8]

A comprehensive study of glove use in clinical settings by Loveday reported that almost half (48%) of the episodes in which HCWs misused gloves and subsequently increased the risk of crosscontamination involved a breach in one of the MFMFHH model.

Addressing the problem of glove misuse is complex. Suggested high level strategies include:

- **Reducing the need for gloves by modifying current recommendations for isolated patients known or suspected to be infected or colonized with an epidemiologically significant MDRO;[6,9]**
- **Rewording the WHO's 5MFMHH to emphasize the need to remove gloves and perform hand hygiene between each Moment;[8]**
- **Consolidating the concept that gloves are an adjunct to, not an alternative for hand hygiene;**
- **Increased routine use of double-gloving for complex situations such as anesthesia, thereby enabling removal of the outer pair of gloves after induction and avoiding inadvertent environmental contamination.[11]**

Another recently suggested but controversial strategy is modifying existing recommendations to permission HCWs to perform hand hygiene using an alcohol based hand rub while wearing gloves between Moments.[11]

PERFORMING AN EPISODE OF HAND HYGIENE WHILE WEARING GLOVES

The introduction of Body Substance Isolation confused the relationship between hand hygiene and glove use inadvertently positioning glove use as an alternative, not an adjunct, to hand hygiene.[8] Supporters argue that there is a small evidence base demonstrating that hand hygiene is as effective when hands are gloved as when hands are bare.[11] Notwithstanding, there is insufficient robust evidence addressing the complex issues of glove wear, glove puncture and the cumulative effects on glove composition, shape, elasticity, fit, level of protection afforded and durability associated with extended use.[11]

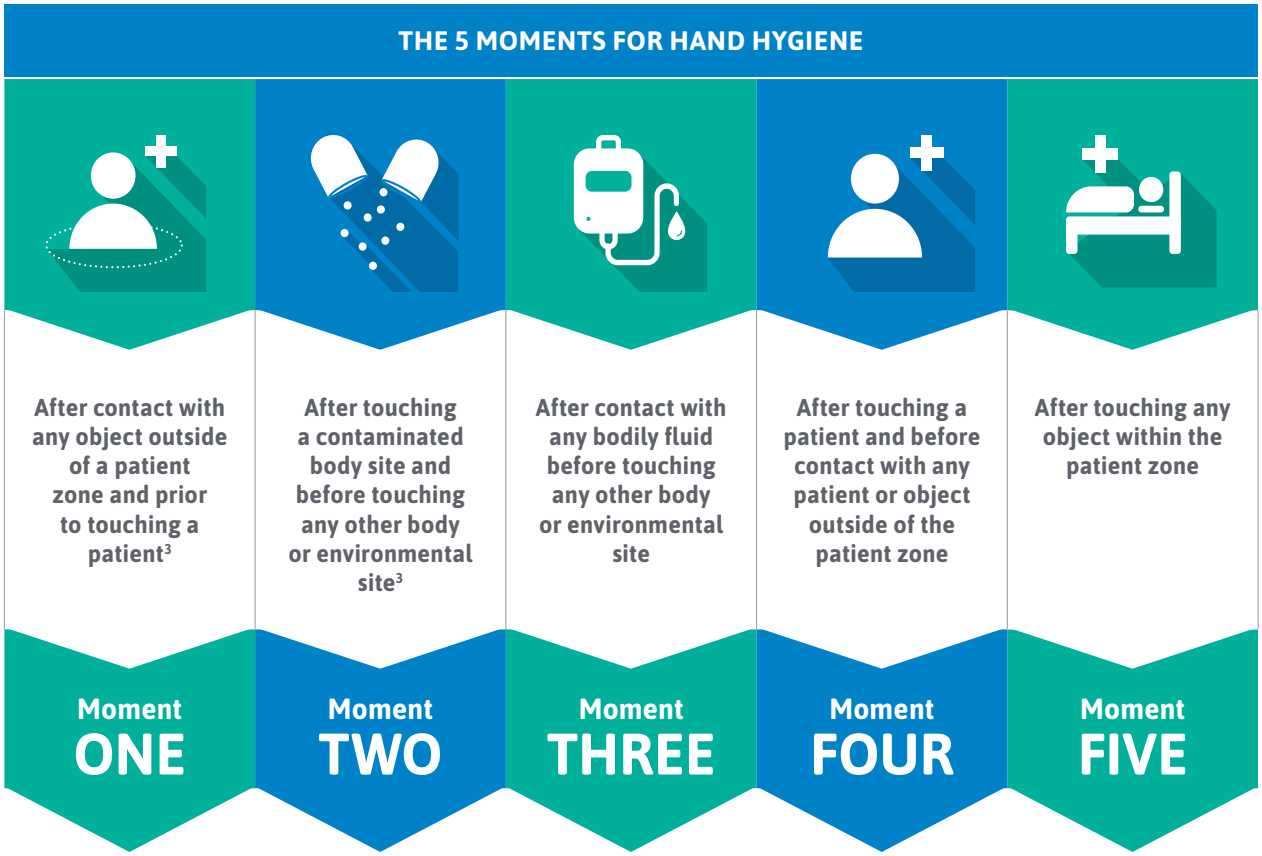
Further, HCWs' inherent practice of developing workarounds and unproven alternative ways to use medical devices including PPE are common yet not well explored or understood. It is highly likely that relaxing rather than modifying infection controls may increase the risk of healthcare acquired infection transmission. Manufacturers' ability and willingness to recommend extended use and reuse of gloves in the absence of sufficient standardized testing against various glove compositions is also unresolved and poses an important question of liability for healthcare organizations and healthcare workers.[11]

APPLY BEST PRACTICE PRINCIPLES OF GLOVE USE AS AN ADJUNCT TO ROUTINE AND FUNDAMENTAL INFECTION PREVENTION MEASURES

As HCW glove wearing practice and relevant research evolves, it is possible that infection prevention and control recommendations may change. In the interim HCWs, healthcare organizations and especially infection control teams would be well advised to closely monitor their organization's glove use recommendations and routine practices. Deficiencies and episodes that deviate and increase HAI risk should be interrogated, remediated and resolved.

In the interim each of the following general and WHO M5MFHH-specific scenarios should prompt a HCW to remove their gloves and perform hand hygiene:[3,11]

- **If a glove is damaged, torn or not intact;**
- **After direct contact with non-intact skin, mucous membranes, blood or body fluids;**
- **On exiting a room where a patient is in isolation;**
- **On completion of every episode of patient care;**
- **After direct contact with a hazardous substance.**



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RECOMMENDED FURTHER READING

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North America
Ansell Healthcare Products LLC
111 Wood Avenue South
Suite 210
Iselin, NJ 08830, USA

Europe, Middle East & Africa
Ansell Healthcare Europe NV
Riverside Business Park
Blvd International 55
1070 Brussels, Belgium

Asia Pacific
Ansell Services Asia Sdn. Bhd.
Prima 6, Prima Avenue
Block 3512, Jalan Teknokrat 6
63000 Cyberjaya, Malaysia

Australia & New Zealand
Ansell Limited
Level 3, 678 Victoria Street
Richmond, Vic, 3121
Australia

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