Are gloves required when caring for patients with VRE?

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The Purpose of Nonsterile Gloves (NSG)

HIV

- Emergence highlighted need to prevent BBV transmission

- Principle strategy introduced involved NSG regardless of infection status

- Additional protection against BBV-sharps injury
How did NSGs become the norm for contact precautions?

• 1996 CDC Standard Precautions (SP) and Transmission based Precautions (Contact, Droplet and Airborne)
  - emergence of multidrug resistant organisms (MDROs)
• Adopted by Australian NHMRC and Infection Preventions and Control policy
Pros - NSG for VRE
Vancomycin Resistant Enterococci (VRE)

• Enterococci
  normal flora - lower gastro-intestinal tract
  other body sites - skin surfaces, vagina, urethra,
    hepatobiliary tree
• Most patients VRE colonised not infected
• Colonised patient VRE in faeces
• Prolonged survival in patient zone
Risk Factors for VRE Transmission

- Diarrhoea or faecal incontinence
- Enterostomies
- VRE discharging wounds
- Incontinence - VRE colonisation urinary tract
- Inability to maintain own personal hygiene
Routes of VRE transmission

- Direct contact - transient VRE carriage via HCWs’ hands
  or
- Indirectly - contaminated environmental surfaces/shared equipment
# Multistate Point Prevalence Survey of Health Care Associated Infections 2014

**Table 3. Reported Causative Pathogens, According to Type of Infection**

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>All Health Care–Associated Infections (N = 504)</th>
<th>Pneumonia (N = 110)</th>
<th>Surgical-Site Infections (N = 110)</th>
<th>GI Infections (N = 86)</th>
<th>UTIs (N = 65)</th>
<th>Bloodstream Infections (N = 50)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no. (%)</td>
<td>rank</td>
<td>number (percent)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Clostridium difficile</em></td>
<td>61 (12.1)</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>61 (70.9)</td>
<td>0</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>54 (10.7)</td>
<td>2</td>
<td>18 (16.4)</td>
<td>17 (15.5)</td>
<td>1 (1.2)</td>
<td>2 (3.1)</td>
</tr>
<tr>
<td><em>Klebsiella pneumoniae or K. oxytoca</em></td>
<td>50 (9.9)</td>
<td>3</td>
<td>13 (11.8)</td>
<td>15 (13.6)</td>
<td>1 (1.2)</td>
<td>15 (23.1)</td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>47 (9.3)</td>
<td>4</td>
<td>3 (2.7)</td>
<td>14 (12.7)</td>
<td>1 (1.2)</td>
<td>18 (27.7)</td>
</tr>
<tr>
<td><em>Enterococcus species</em></td>
<td>44 (8.7)</td>
<td>5</td>
<td>2 (1.8)</td>
<td>16 (14.5)</td>
<td>5 (5.8)</td>
<td>11 (16.9)</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>36 (7.1)</td>
<td>6</td>
<td>14 (12.7)</td>
<td>7 (6.4)</td>
<td>1 (1.2)</td>
<td>7 (10.8)</td>
</tr>
<tr>
<td><em>Candida species</em></td>
<td>32 (6.3)</td>
<td>7</td>
<td>4 (3.6)</td>
<td>3 (2.7)</td>
<td>3 (3.5)</td>
<td>3 (4.6)</td>
</tr>
<tr>
<td><em>Streptococcus species</em></td>
<td>25 (5.0)</td>
<td>8</td>
<td>7 (6.4)</td>
<td>8 (7.3)</td>
<td>2 (2.3)</td>
<td>2 (3.1)</td>
</tr>
<tr>
<td><em>Coagulase-negative staphylococcus species</em></td>
<td>24 (4.8)</td>
<td>9</td>
<td>0</td>
<td>7 (6.4)</td>
<td>0</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td><em>Enterobacter species</em></td>
<td>16 (3.2)</td>
<td>10</td>
<td>3 (2.7)</td>
<td>5 (4.5)</td>
<td>0</td>
<td>2 (3.1)</td>
</tr>
<tr>
<td><em>Acinetobacter baumannii</em></td>
<td>8 (1.6)</td>
<td>11, tie</td>
<td>4 (3.6)</td>
<td>2 (1.8)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>Proteus mirabilis</em></td>
<td>8 (1.6)</td>
<td>11, tie</td>
<td>1 (0.9)</td>
<td>5 (4.5)</td>
<td>0</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td><em>Yeast, unspecified</em></td>
<td>8 (1.6)</td>
<td>11, tie</td>
<td>3 (2.7)</td>
<td>0</td>
<td>1 (1.2)</td>
<td>4 (6.2)</td>
</tr>
<tr>
<td><em>Stenotrophomonas maltophilia</em></td>
<td>8 (1.6)</td>
<td>11, tie</td>
<td>6 (5.5)</td>
<td>0</td>
<td>0</td>
<td>2 (3.1)</td>
</tr>
<tr>
<td><em>Citrobacter species</em></td>
<td>6 (1.2)</td>
<td>15, tie</td>
<td>2 (1.8)</td>
<td>1 (0.9)</td>
<td>0</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td><em>Serratia species</em></td>
<td>6 (1.2)</td>
<td>15, tie</td>
<td>2 (1.8)</td>
<td>0</td>
<td>0</td>
<td>2 (3.1)</td>
</tr>
<tr>
<td><em>Bacteroides species</em></td>
<td>6 (1.2)</td>
<td>15, tie</td>
<td>0</td>
<td>5 (4.5)</td>
<td>1 (1.2)</td>
<td>0</td>
</tr>
<tr>
<td><em>Haemophilus species</em></td>
<td>6 (1.2)</td>
<td>15, tie</td>
<td>2 (1.8)</td>
<td>2 (1.8)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><em>Viruses</em></td>
<td>3 (0.6)</td>
<td>19, tie</td>
<td>1 (0.9)</td>
<td>0</td>
<td>0</td>
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</tr>
</tbody>
</table>

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How should we manage VRE patients?
CP-Current Guidelines for VRE

• Perform hand hygiene
• Don gloves and gown (PPE) on entry to patient-care zone
• Ensure HCWs’ clothing and skin have no contact with environmental surfaces
• Before leaving zone: doff PPE, perform hand hygiene
Nursing Truth: The minute you walk into a contact precaution patient's room = The minute your nose starts to itch.
Pros of NSG Use when Patients under VRE Precautions

- HCWs sense of self protection
- Protection from significant amount of BBF
- Potential for decreased transmission of microorganisms to environment
Respondents had positive attitudes towards:
- use of gloves to protect against acquiring an infection at work
- the availability of gloves
- acting as a role model to other staff
Overall good knowledge of glove use (83%)
Controlling VRE-What works?

- Larson (2000) increased handwashing associated 85% risk reduction VRE infection rates

- Pittet (2000) increased hand disinfection compliance 48% to 66% ($P < 0.001$) over a 3-year period associated with decrease in the HAI prevalence 16.9% to 9.9% ($P = 0.04$)

- Bonten (1996) effective environmental decontamination important in control VRE transmission
Cons - NSG for VRE
Transfer of multidrug-resistant bacteria to healthcare workers’
gloves and gowns after patient contact increases with
environmental contamination

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clothing is not precisely understood. Presumably, HCW contamination with MDR bacteria is
a key step in transmission to other patients. A study by Duckro et al (15) demonstrated that
contaminated HCW hands were capable of transmitting VRE to inanimate surfaces. The
frequency that HCW contamination results in transmission to patients is unknown. In our
study, even after appropriate use of gloves and gown while caring for a patient on contact
precautions, 1.7% to 4.2% of HCWs had a MDR bacterium on their hands without hand
hygiene. This emphasizes the importance of hand hygiene after removal of gloves and gown
(9).
NSG - Role in VRE Prevalence

- Tenorio (2001)
  39% gloves positive VRE after having contact with VRE colonized/infected patient
  hand hygiene not performed before & after glove use

- Hayden (2008)
  52% contaminated gloved & ungloved hands after touching zone VRE-colonized patient

  70% contamination after touching both patient and zone

  hand hygiene not performed before & after sampling
More Evidence

• Snyder (2008) 13% gowns and/or gloves acquired MRSA and/or VRE and MRSA on hands after removing gowns/gloves

• reinforces importance of handwashing after all HCW-patient interactions
Rates of compliance with hand hygiene demonstrate decreasing VRE prevalence.
The non-evidential emotionally driven practices of NSG use
NOTHING SPREADS LIKE FEAR

CONTAGION
NSG - Impact on Hand Hygiene
Clinical glove use: healthcare workers’ actions and perceptions

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\textbf{Findings:} A total of 163 glove-use episodes were observed over a period of 13 h. Glove use was inappropriate in 69 out of 163 (42\%) episodes, with gloves commonly used inappropriately for low-risk procedures (34/37; 92\%). In 60 out of 163 (37\%) episodes of glove use there was a risk of cross-contamination, most (48\%) being associated with failure to remove gloves or with performing hand hygiene after use. HCW interviews indicated that the decision to wear gloves was influenced by both socialization and emotion. Key emotions were disgust and fear. Assumptions that patients preferred gloves to be used, confusion about when to wear them, and social norms and peer pressure were also important influences.

\textbf{Conclusion:} Glove use is associated with \textbf{risk of cross-contamination} and should be more explicitly integrated into hand hygiene policy. An understanding of the drivers of glove-use behaviour is required to design interventions to reduce misuse and overuse.

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Misuse of gloves: the foundation for poor compliance with hand hygiene and potential for microbial transmission?


Hand hygiene was not undertaken due to improper gloving in 64.4% (95%CI, 64.1% to 65.1%) of instances.

Possible microbial transmission might have occurred in 18.3% (95%CI, 17.8% to 18.8%) of all contacts because used gloves were not removed before performing care activities that necessitated strict aseptic precautions.

Consequences of gloves misuse in terms of percentage of hand hygiene opportunities missed (■) and potential for microbial transmission *P=0.0008 versus medical wards, **P=0.01 versus nursing assistants, and P=0.0002 versus nursing assistants.
Mandatory NSG Eliminated from CP

- Cusini (2015) HH compliance for contact precautions 52% 2009 vs 85% 2012 ($P < 0.001$)
- Increased HH compliance before invasive procedures and before patient contacts
Innovative approach by Seto Wing Hong

- “Up till the present we know of no infectious material that can penetrate the intact skin”
- Infectious material on hands harmful if subsequently touch mucous membrane e.g. eyes
- Gloves should be worn for tasks with significant hand contamination (e.g. blood or body fluid contact) because subsequent hand hygiene may not remove all the infectious material
- Regular hand hygiene to remove these infectious materials best protection
Integrating ‘My 5MHH’ and NSG Use??
Role of hand hygiene and environmental cleaning

• Are we saying that My 5MHH isn’t enough when a patient is colonised with VRE or that we can’t rely on hand hygiene?

• Aren’t we sure about the decrease in bioburden by environmental cleaning?

• What about cleaning of shared equipment? What role does it plays in the cross transmission?
What will happen if we removed NSG from wards for **continent** patients?
Make Sensible Decisions
Reference

- J Wilson, S Lynam, J Singleton, H Loveday, 2013 The misuse of clinical gloves: risk of cross-infection and factors influencing the decision of healthcare workers to wear gloves.
- Fuller, C., Savage, J, Besser, S, Hayward, A, Cookson, B, Cooper, And Stone, S 2011. The Dirty Hand in the Latex Glove: A Study of Hand Hygiene Compliance When Gloves Are Worn. *Infection Control and Hospital Epidemiology*, 32.