Describing Bacterial Content on Inpatient Nursing Uniforms

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Outline

• Background & Significance
• Problem Statement
• Specific Aim
• Research Design & Methods
  • Design
  • Sample
  • Procedure
• Results
• Questions
Nosocomial infections impact 6/100 hospital stays and result in approximately 90,000 deaths.

>40% of healthcare acquired infections (HAIs) are attributed to cross-contamination during patient care.

Studies to date primarily focused on “white coats” and consistently demonstrate bacteria; typical wear averages 1 week prior to washing.

Studies suggest bacteria on clothing are acquired from both the patient and environmental contact (both direct and surface ➔ hand ➔ clothing).
Problem Statement

Do staff uniforms that are laundered at home contain more bacteria than hospital provided scrubs?
Specific Aim

Compare the degree of bacterial contamination of home-laundered uniforms to hospital-laundered scrubs in nurses working in an inpatient setting (bacterial contamination was sampled on arrival and after four and eight hours of wear).
Research Design

- Randomized Experimental Crossover Design
- Sample: The study population included nurses (RN, LPN, Medics) that provide direct patient care in an inpatient unit that wears home-launched uniforms
- 7 different units sampled

<table>
<thead>
<tr>
<th>Condition 1</th>
<th>Test</th>
<th>Condition 2</th>
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<tbody>
<tr>
<td>R Order 1</td>
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<td>O₁</td>
<td>~X</td>
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<tr>
<td>R Order 2</td>
<td>~X</td>
<td>O₁</td>
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Sample Criteria

Inclusion:
• Wear home-laundered uniforms
• Provide direct patient care

Exclusion:
• Individuals who do not provide patient care
• Nurses who work in clinical areas that wear hospital-laundered scrubs
Data Collection

Sampling completed twice
- Home-laundered uniform
- Hospital-laundered scrubs
Research Procedure

1. Sample uniforms on arrival (6 locations)
2. Return and sample 4 hours into shift (same 6 locations)
3. Final sampling 8 hours into shift (same 6 locations)
4. After 24 hours of incubation, perform automated count of colony forming units (CFUs)
5. Identify MRSA/VRE according to microbiology standards
## Demographics

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<td>median (IQR)</td>
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Typical Growth Images

Home-laundered

Arrival

4 hr

8 hr

Hospital scrubs

Arrival

4 hr

8 hr
Results - Abdominal

Home-laundered uniform vs. hospital scrubs median by time -- abdominal

* p < 0.001 between home-laundered uniform and hospital provided scrubs
# p < 0.05 between home-laundered uniform and hospital provided scrubs.
Results - Cuff

Home-laundered vs. scrubs median by time -- cuff

* p < 0.001 between home-laundered uniform and hospital provided scrubs
Results- Waist Pocket

Home-laundered vs. scrubs median by time -- waist pocket

*p <0.001 between home-laundered uniform and hospital provided scrubs
Results - Back

Home-laundered vs. scrubs median by time -- back

*p <0.001 between home-laundered uniform and hospital provided scrubs
Results - Wrists

No statistical significance was observed between uniform type at any sampling point.
Bacteria Identified

<table>
<thead>
<tr>
<th>Uniform Type</th>
<th>MRSA</th>
<th>VRE</th>
<th>Staphylococcus aureus</th>
<th>Enterococcus</th>
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<tr>
<td>Home-launched Uniform</td>
<td>1</td>
<td>0</td>
<td>10</td>
<td>0</td>
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<tr>
<td>Hospital-Provided Scrubs</td>
<td>0</td>
<td>2</td>
<td>6</td>
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</table>

- Bacteria identified from cuff sample of both uniforms at 8 hour time point.
- Focus was identification of MRSA/VRE.
- Chromagar plates used to preliminarily identify MRSA/VRE.
- Bacteria suspected as MRSA/VRE were isolated and confirmed by VITEK identification.
Overall Results

- Home-laundered uniforms at the abdominal site demonstrated a two-fold increase in the number of bacterial colonies compared to hospital-provided scrubs.
- The sleeve cuff and waist pocket of home laundered uniforms demonstrated a three-fold increase in the number of bacteria compared to hospital-provided scrubs.
- These findings were consistent across a sample of 126 inpatient nurses working both day and night shifts across seven different inpatient units.
- Even in absence of multi-drug resistant bacteria, high levels of normally benign species can become pathogenic for patients with compromised immune systems or open/exposed wounds.
Acknowledgements

• Thank you!
  • TSNRP for funding this study
  • Research team and prior research assistant
  • Participants
Questions

References available on request- gordon.f.west.mil@mail.mil