Effectiveness of an Ultraviolet Light Decontamination Device in Reducing Hospital Room Contamination

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Introduction

- Environmental surfaces in hospital rooms play an important role in the transmission of healthcare associated pathogens
- Mobile ultraviolet (UV) light room decontamination devices are effective as an adjunct to standard cleaning
- Relatively long cycle times (~45 minutes) are often recommended for killing of Clostridium difficile spores
- However, long cycle times may not be feasible in busy healthcare settings

Methods

- In each patient room, two 5 minute cycles were run on each side of the bed and 1 cycle was run in the bathroom
- Samples were collected from 6 sites (tray table/bed rail; toilet seat/hand rail; call button/telephone) after standard cleaning during the pre-intervention period and after standard cleaning plus UV during the intervention
- Cultures were collected for C. difficile, methicillin resistant Staphylococcus aureus (MRSA), vancomycin resistant Enterococcus (VRE) and multi-drug resistant Gram-negatives

Results

- Of 61 rooms cultured after cleaning during the pre-intervention period:
  - 16 (26%) rooms had a MDRO contamination
  - 13 (21%) had MRSA contamination
  - 6 (10%) had C. difficile contamination
- During the intervention, there was a significant reduction in recovery of MRSA and/or C. difficile after cleaning plus UV in comparison to the pre-intervention period:
  - 2 of 32 rooms, 6% versus 16 of 61, 26%; P=0.03
- During the intervention, MRSA and C. difficile were each recovered from 1 room after cleaning plus UV

Objective

- To determine the efficacy of a mobile UV device to eliminate nosocomial pathogens in hospital rooms using relatively short cycle times

Conclusions

- Use of the UV device was associated with a reduction in contamination of hospital rooms with C. difficile and MRSA after completion of cleaning processes
- Our results suggest that relatively short cycles can be effective in reducing C. difficile in hospital rooms

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Contamination of hospital rooms at baseline, pre-intervention and during intervention

<table>
<thead>
<tr>
<th>Rooms Sampled</th>
<th>Any MDRO</th>
<th>C. difficile</th>
<th>MRSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>61</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>Pre-intervention</td>
<td>51</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Intervention</td>
<td>32</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Contamination of hospital rooms at baseline by site

<table>
<thead>
<tr>
<th>Percentage (%)</th>
<th>Call button</th>
<th>Telephone</th>
<th>Tray table</th>
<th>Bed rail</th>
<th>Toilet seat</th>
<th>Hand rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRSA</td>
<td>Red</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. difficile</td>
<td>Yellow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VRE</td>
<td>Blue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gram-negatives</td>
<td>Green</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Baseline contamination (n=61)