Room decontamination (UV, HPV, others): An update

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Objective

- To pose questions that illustrate current concepts and controversies regarding room decontamination devices
1. Should we purchase room decontamination devices? Yes

- Standard cleaning is often suboptimal
- Room decontamination devices are effective
- Use of devices may reduce HAIs
  - Multiple “before-after” studies report reduced HAIs\(^1-6\)
  - Cluster randomized, multicenter, crossover study\(^7-8\)
  - Addition of UV to standard cleaning reduced colonization or infection with healthcare-associated pathogens and reduced hospital-wide incidence of CDI and VRE
  - Systematic review: UV-C may reduce CDI and VRE\(^9\)

1. Should we purchase room decontamination devices? Yes

- **Patient satisfaction**
  - Perceived positively by patients and personnel\(^1\)
  - “Your room has been treated with light disinfection - this is one of the extra steps we take to keep you safe and prevent infections”

- **Support by administration**
  - “We don’t want to be the only hospital in town that does not use room decontamination devices”

1. Should we purchase room decontamination devices? No

- Testimonials
  - “I feel great since I started taking bee pollen. I don’t know if it will work for you, but it works for me. Try it. If you don’t feel better, you can get a full refund.”
Unpublished observations

- Spoke with EVS Director using UV for 2 years. He stated “he wishes he never pushed for it, has not seen results, takes too long and no longer believes in UV”.
- He said "you should talk to X Health System, they have like 10 of them and they also are not seeing results".

1. Should we purchase room decontamination devices? No

- Systematic review – mostly before-after studies\(^1\)
- Cluster randomized trial
  - No decrease in CDI for bleach + UV versus bleach\(^2\)
  - Hospital-wide reduction in CDI and VRE with UV + quat, but not with UV + bleach??\(^3\)
- CDI guidelines: limited data to recommend automated, terminal disinfection for CDI prevention (no recommendation)\(^3\)

2. Which technology will result in the greatest reduction in environmental contamination?

- 1. Hydrogen peroxide vapor (HPV) device
- 2. Ultrasonic room fogger that generates submicron droplets of peracetic acid and hydrogen peroxide
- 3. Ultraviolet light room disinfection device
Effectiveness of devices for killing *C. difficile* spores on carriers

<table>
<thead>
<tr>
<th></th>
<th>Direct exposure</th>
<th>Indirect exposure</th>
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<tbody>
<tr>
<td>UV device</td>
<td>2 - 4 log</td>
<td>1 - 2.4 log</td>
</tr>
<tr>
<td>Hydrogen peroxide vapor</td>
<td>6 log</td>
<td>6 log</td>
</tr>
<tr>
<td>Ultrasonic peracetic acid and hydrogen peroxide</td>
<td>6 log</td>
<td>6 log</td>
</tr>
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</table>

Reduction in *C. difficile* contamination

CDI rooms

Non-CDI rooms
Reduction in *C. difficile* contamination

Hydrogen peroxide vapor: CDI rooms
Reduction in *C. difficile* contamination

UV-C: CDI and non-CDI rooms
3. What monitoring and feedback is required to optimize use of room decontamination devices?
Effective implementation of UV-C devices requires monitoring and feedback.

Methods for monitoring effectiveness of UV-C devices

- Radiometer
- Sensors
- Colorimetric test cards
- Biological indicators
- Cultures

4. Can decontamination devices be used as an adjunct to daily cleaning?

4. Can decontamination devices be used as an adjunct to daily cleaning?

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
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</thead>
<tbody>
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<td>19%</td>
<td>46%</td>
<td>33%</td>
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<td>1%</td>
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<tr>
<td>enhanced by the UV-C light</td>
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<td></td>
<td></td>
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<tr>
<td>UV-C light helps protect me</td>
<td>28%</td>
<td>53%</td>
<td>17%</td>
<td>1%</td>
<td>0%</td>
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<tr>
<td>from infection</td>
<td></td>
<td></td>
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<tr>
<td>I would prefer if my room was</td>
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<td>1%</td>
<td>11%</td>
<td>46%</td>
<td>40%</td>
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<tr>
<td>not cleaned with UV-C</td>
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</tbody>
</table>

5. Should decontamination devices be used in settings other than patient rooms?

- Operating rooms
- Radiology
- Equipment rooms
- Emergency department

6. A UV company claims a 6 log reduction in *C. difficile* spores. Which agency regulates UV testing to ensure that claims are valid?

- 1. FDA
- 2. EPA
- 3. APIC
- 4. None of the above
Summary

- Room decontamination devices are effective in reducing environmental contamination and may reduce healthcare-associated infections.
- Monitoring and feedback is needed to optimize use of room decontamination devices.
- Evolving areas: daily disinfection of patient rooms, operating rooms, Radiology.
- Standards are need for UV device testing.