

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

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Dennison, PDI

# 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<sup>1-6</sup>
  - Cluster randomized, multicenter, crossover study<sup>7-8</sup>
    - 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<sup>9</sup>

# 1. Should we purchase room decontamination devices? Yes

## ■ Patient satisfaction

- Perceived positively by patients and personnel<sup>1</sup>
- “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# Unpublished observations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".

McMullen K, et al. Impact of a pulsed xenon UV light room disinfection system on *C. difficile* rates. [https://academic.oup.com/ofid/article/2/suppl\\_1/1714/2634329](https://academic.oup.com/ofid/article/2/suppl_1/1714/2634329) (Conclusion: no significant difference in CDI rates with use of the PX-UV light disinfection system)

# 1. Should we purchase room decontamination devices? No

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

1. Marra AR. ICHE 2017;39:20-31; 2. Anderson DJ. Lancet 2017;389:805-14; 3. McDonald LC. Clin Infect Dis 2018;66:987-94; 4. Fleming M. ICHE 2018;46:241-3; 5. Anderson DJ. ICHE 2018;39:157-63; 6. Anderson DJ. Lancet Infect Dis June 2018.

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

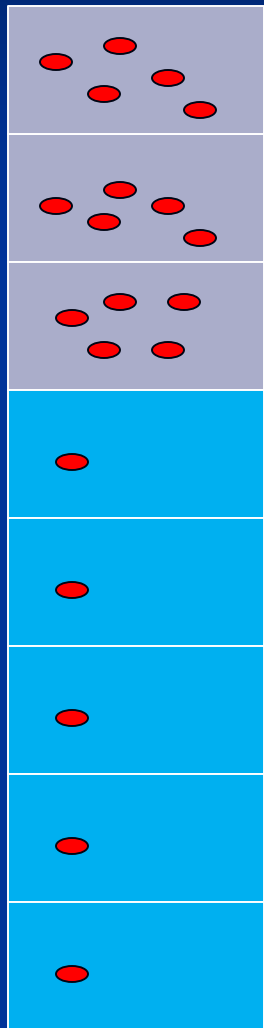
- 1. Hydrogen peroxide vapor (HPV) device
- 2. Ultrasonic room fogger that generates submicron droplets of peracetic acid and hydrogen peroxide
- 3. Ultraviolet light room disinfection device



# Effectiveness of devices for killing *C. difficile* spores on carriers

	Direct exposure	Indirect exposure
UV device	2 - 4 log	1 - 2.4 log
Hydrogen peroxide vapor	6 log	6 log
Ultrasonic peracetic acid and hydrogen peroxide	6 log	6 log

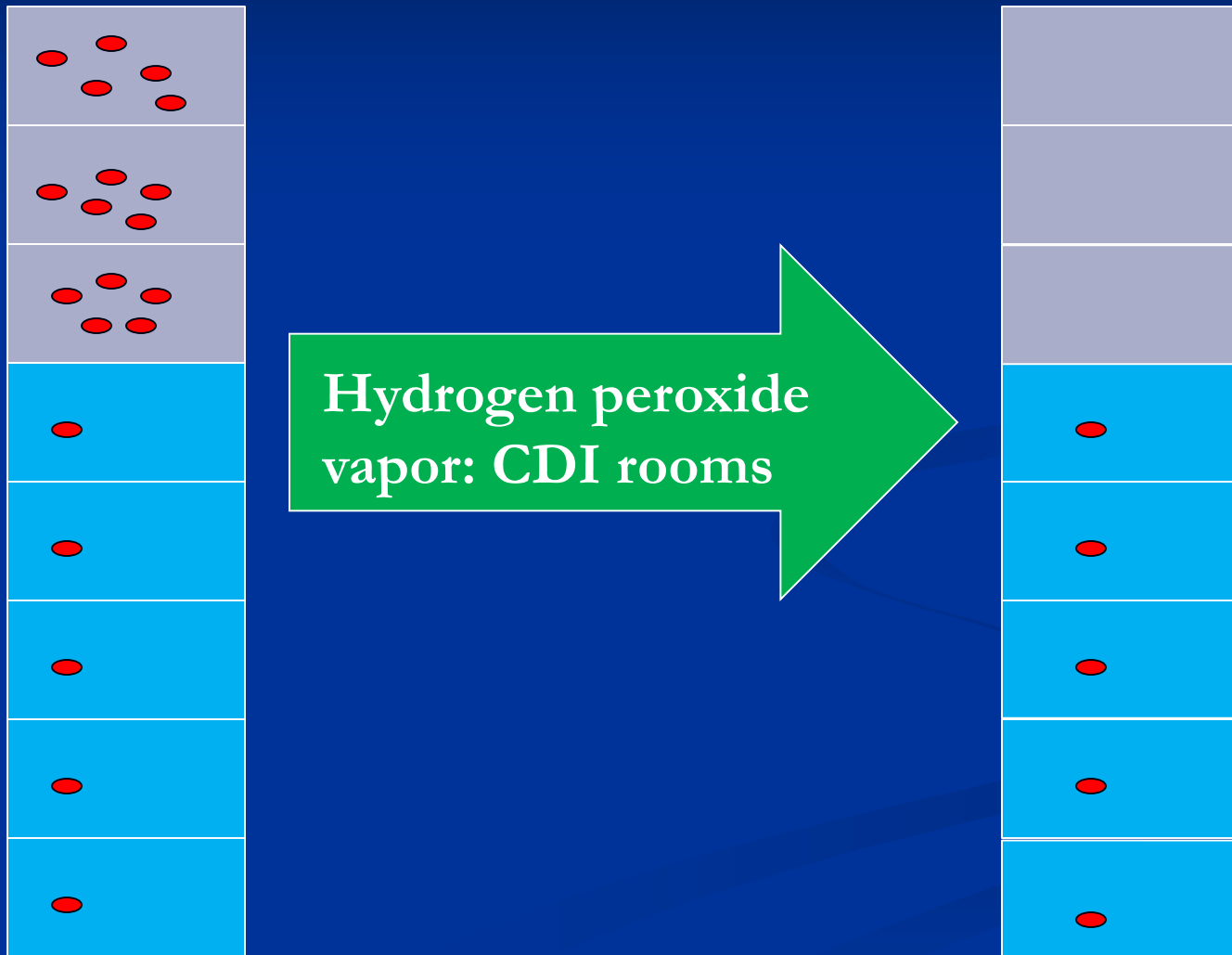
# Reduction in *C. difficile* contamination



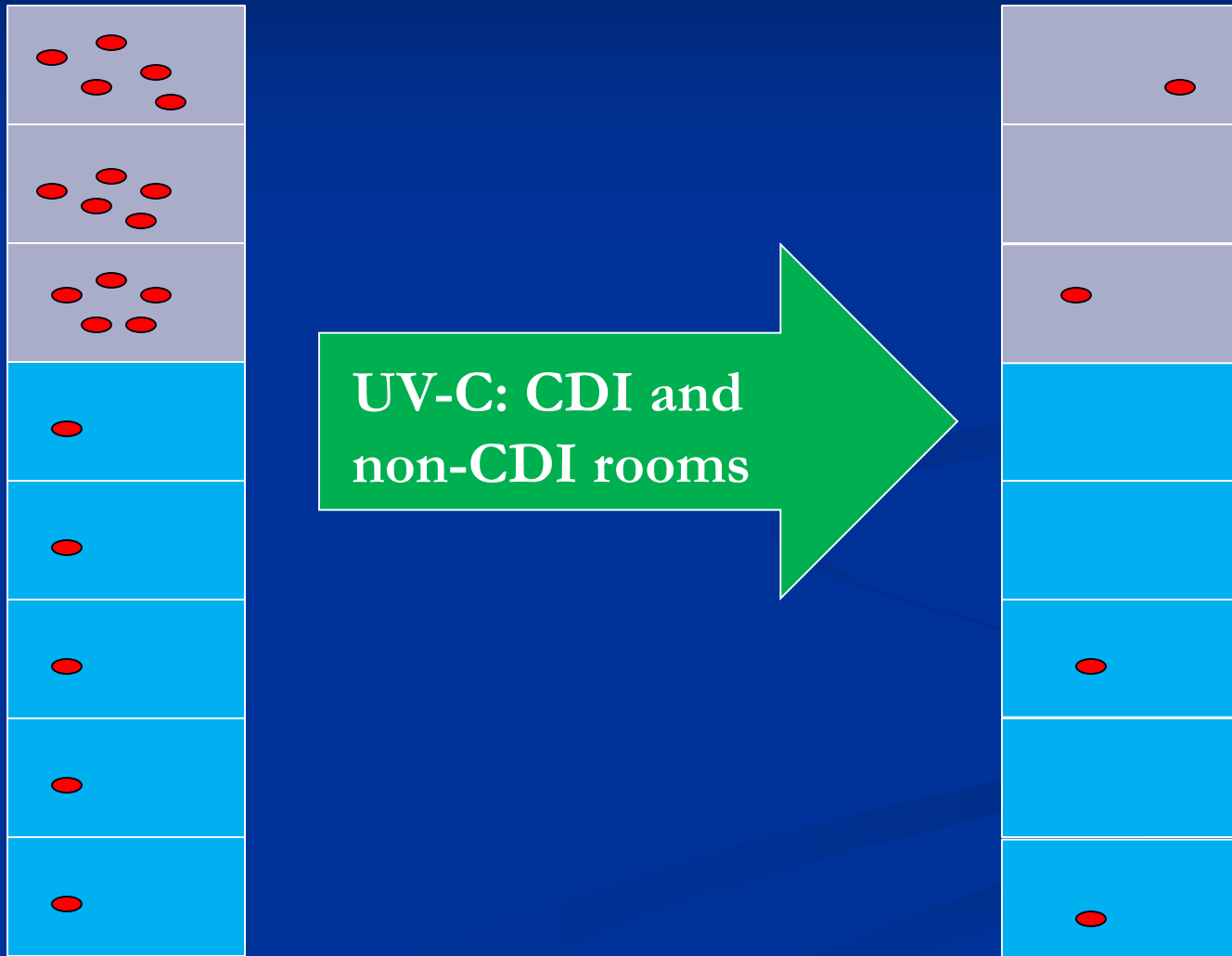
CDI  
rooms

Non-  
CDI  
rooms

# Reduction in *C. difficile* contamination

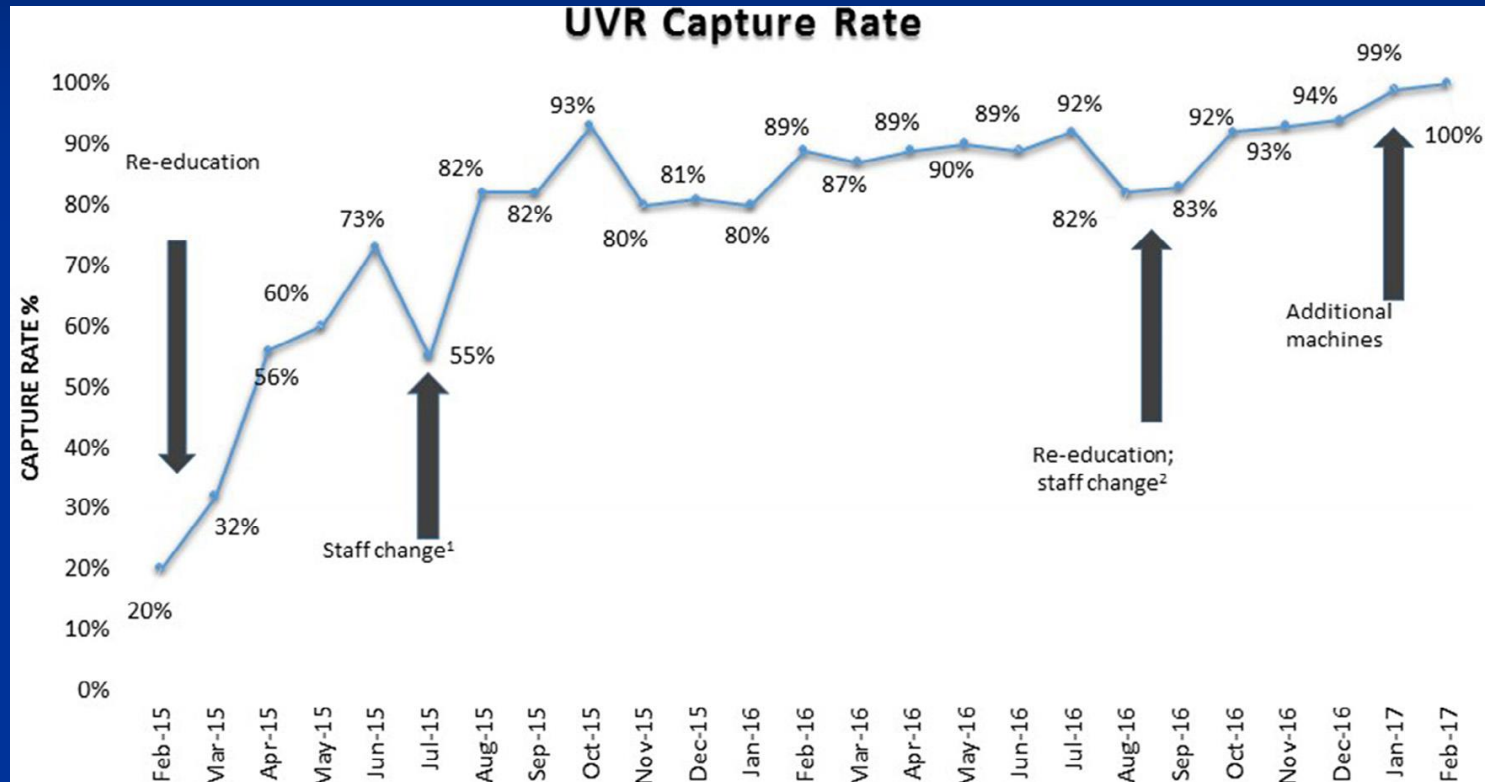


# Reduction in *C. difficile* contamination



3. What monitoring and feedback is required to optimize use of room decontamination devices?

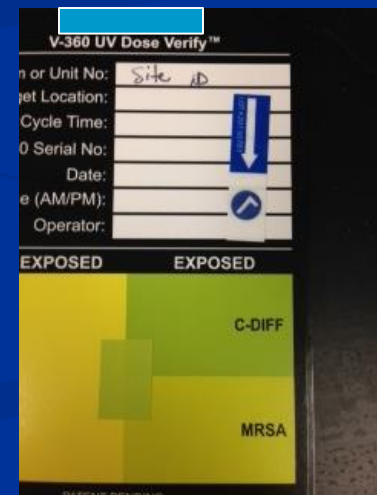
# Effective implementation of UV-C devices requires monitoring and feedback



Fleming M. Deployment of a touchless UV light robot for terminal room disinfection: The importance of audit and feedback. *AJIC* 2018;46(2):241-243; Anderson DJ. Implementation Lessons Learned From the Benefits of Enhanced Terminal Room (BETR) Disinfection Study: Process and Perceptions of Enhanced Disinfection with Ultraviolet Disinfection Devices. *ICHE* 2018;39:157-163

# 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?



Alhmidi H, et al. Evaluation of an ultraviolet light device for decontamination of personal use items in rooms of long-term care facility residents. SHEA 2016



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

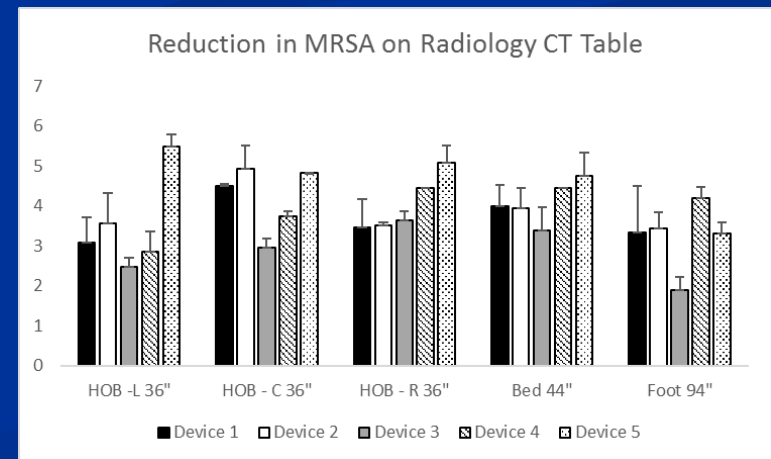
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
My patient experience is enhanced by the UV-C light	19%	46%	33%	1%	1%
UV-C light helps protect me from infection	28%	53%	17%	1%	0%
I would prefer if my room was not cleaned with UV-C	1%	1%	11%	46%	40%

Rock C, et al. Patient and health care worker perceptions of daily use of UV-C as an adjunct to daily cleaning in an academic hospital. *Am J Infect Control* 2018;46:348-9

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

- Operating rooms
- Radiology
- Equipment rooms
- Emergency department

## Radiology CT scanner



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