



Impact of pulsed xenon ultraviolet (PX-UV) light disinfection for reduction of pathogens on high touch surfaces following hospitalization

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BACKGROUND

- Ultraviolet (UV) light disinfection following a manual terminal cleaning process for hospital rooms has been proposed as an additional method to reduce the bacterial burden on surfaces.
- The impact of UV light disinfection and the level of interdependence between the modalities remains unclear.

METHODS

- Samples were collected from 5 high touch surfaces from 10 patients room following discharge prior to manual disinfection, following manual disinfection, and following pulsed xenon UV disinfection using the Replicate Organism Detection and Counting (RODAC) contact plates (total 150 samples).
- Colonies were identified using Matrix-Assisted Laser Desorption/Ionization - Time of Flight Mass Spectrometry (MALDI-TOF) mass spectrometry.
- The bacterial colony counts were recorded and analyzed as pathogenic or commensal organisms (based on CDC criteria).

RESULTS

- Average colony counts for the rooms prior to disinfection was 185.8 CFU +/- SD 280, post disinfection 43 CFU +/- 121, and post UV light, 20 CFU +/- 36.7 respectively.
- The average drop in colony-forming units of the five high touch areas in patient's rooms can be seen in table 1.
- Reductions in the predominant bacterial species following disinfection modality are noted in table 2.

Table 1	Pre-Dis	Post-Dis (% change)	Post PX-UV (% change)
Bathroom rail	138.6	28.5 (-79.4%)	10.0 (-92.7%)
Bathroom sink	67.9	19.2 (-67.6%)	27.2 (-59.9%)
Call button	220.8	16.8 (-92.3%)	6.5 (-97.0%)
Toilet Grab Bar	242.7	60.6 (-75.5%)	21.2 (-91.2%)
Tray Table	262.3	13.3 (-94.9%)	7.5 (-97.1%)

Table 2	Pre-Dis (CFU %)	Post-Dis (CFU %) (Pre/Post-Dis r %)	Post PX-UV (CFU%) (Pre/Post UV change%)
<i>Proteus Mirabilis.</i>	10 (4.23)	0 (0.00) (-100%)	0 (0.00) (-100%)
<i>Acinetobacter Sp.</i>	8 (3.37)	4 (1.87) (-50%)	2 (1.24) (-75%)
<i>Staphylococcus Aureus.</i>	4 (1.69)	1 (0.62) (-75%)	1 (0.62) (-75%)
<i>Enterococcus Sp.</i>	5 (2.11)	2 (1.25) (-60%)	0 (0.00) (-100%)
<i>Bacillus Sp.</i>	43 (18.18)	61 (37.95) (+29.5%)	59 (37.06) (+27.1%)
<i>Coagulase (-ve) staphylococcus sp.</i>	87 (36.81)	36 (22.4) (-86.5%)	35 (21.96) (-86.5%)

CONCLUSION

- A combination of manual disinfection and UV has shown additional reduction in overall bacterial contamination compared with manual disinfection alone.
- UV light may be considered as an additional room disinfection method to reduce overall pathogenic bacterial contamination.
- Further studies needed to correlate disinfection and the theoretical decreased risk of hospital acquired infections.