Study shows UV technology raises the standard in disinfecting ORs and medical equipment

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Ultraviolet (UV) technology developed by the New York-based firm PurpleSun Inc. eliminates more than 96 percent of pathogens in operating rooms (ORs) and on medical equipment, compared to 38 percent using manual cleaning methods that rely on chemicals to disinfect surfaces, according to a study published this month in the *American Journal of Infection Control* (*AJIC*).

Health care is in constant battle to maintain a clean and pathogen-free patient care environment. To improve quality and reduce risk, hospitals use established protocols for cleaning and disinfecting ORs and medical equipment with chemical wipes after each case. Medical equipment ranges from surgical robots, microscopes and scanners to patient beds and stretchers.

"The challenge from an infection control standpoint is that microbes and bacteria are invisible to the human eye, and there is potential for errors in the manual cleaning and disinfection process, whether it's attributable to inadequate staffing, poor training, lack of adherence to manufacturers' instructions or other human error," said Donna Armellino, RN, DNP, vice president of infection prevention at Northwell Health, who was the lead author on this study. Among other factors, for instance, the disinfectants may have the wrong dilution, be incompatible with the materials used to clean, may not be in contact with the equipment long enough, or the chemicals may be improperly stored, reducing their

pathogen-destroying effectiveness, she said.

To assess the current standard of cleaning and disinfection in ORs, Northwell clinicians teamed with PurpleSun, which developed a focused multivector, ultraviolet (FMUV) device that is used to supplement manual cleaning. FMUV takes 90 seconds to fully disinfect surfaces. They evaluated the current standard of cleaning in the OR with and without the use of FMUV.

As part of the study, researchers assessed pathogen presence by performing tests on equipment that was reported out in colony-forming units (CFUs). CFUs represent pathogens that could potentially increase the risk of a hospital-acquired infection. The testing was done before manual cleaning, after manual-chemical cleaning and disinfection, and after the automated FMUV light technology using a five-point assessment technique. The aggregate CFUs following manual-chemical disinfection compared to pre-cleaning showed a 38 percent effectiveness at killing pathogens, whereas the process using FMUV was 96.5 percent effective at reducing the level of reported CFUs.

"The study supports the fact that operating rooms are clean, but not as clean as we'd like following manual chemical cleaning and disinfection. FMUV has the potential for changing the cleanliness of operating rooms," said Dr. Armellino. Her co-authors on the study were Kristine Goldstein, RN, and Linti Thomas, RN, of Northern Westchester Hospital; and Thomas J. Walsh, MD, and Vidmantas Petraitis, MD, both of Weill Cornell Medicine of Cornell University.

More information: Donna Armellino et al, Comparative evaluation of operating room terminal cleaning by two methods: Focused multivector ultraviolet (FMUV) versus manual-chemical disinfection, *American Journal of Infection Control* (2019). DOI: 10.1016/j.ajic.2019.10.009

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