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Two Novel Cleaning Methods Remove Most Bacteria from Hospital Rooms

Barbara Boughton

September 23, 2009 (San Francisco, California) — Two novel methods for cleaning hospital rooms are not only easy to use, they are more effective than standard disinfection for removing hardy bacteria, researchers announced here at the 49th Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC).

Results of 2 studies on new cleaning methods show that they can reduce bacteria, including hard-to-remove *Clostridium difficile* spores, by almost 90%, according to researchers. One method uses an automated ultraviolet (UV) radiation device, and the other uses ultramicrofiber cloths and mops containing a copper-based biocide.

In the Mayday Hospital Cleaning study, British investigators from London compared standard cleaning with mops, chlorine, and water, and cleaning with ultramicrofiber mops and cloths with water or with a copper biocide. The study took place over 12 weeks.

The study confirms the ability of ultramicrofiber to more effectively remove dirt, but the copper biocide was needed for bacterial control, the authors said in their poster at ICAAC.

"Other studies have found that microfiber mops are better than cotton ones," said John Boyce, MD, chief of the Infectious Diseases Section at the Hospital of Saint Raphael and clinical professor of medicine at Yale University School of Medicine in New Haven, Connecticut. Dr. Boyce was not involved with the study.

"The authors are to be commended for documenting the effects of a new kind of disinfectant or biocide that can be used in healthcare settings that also has a residual antibacterial effect," he said. Dr. Boyce noted that other novel compounds with antibacterial effects are being investigated by different teams of researchers, including those that contain copper and silver.

In another study presented at ICAAC, researchers used an automated UV radiation device to decontaminate hospital rooms at the Cleveland Veterans Affairs (VA) Medical Center in Ohio, and

analyzed its ability to remove troublesome bacteria, including *C. difficile* spores. The Tru-D device, manufactured by Lumalier in Memphis, Tennessee, uses UVC radiation for decontamination.

Tru-D reduced methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococcus* bacteria by 89% and *C. difficile* spores by 83% in hospital rooms.

The Tru-D device was able to decontaminate all surfaces in 40 hospital rooms, including hard-to-clean surfaces such as the undersides of tables, said lead researcher Curtis Donskey, MD, chair of the Infection Control Committee at the Cleveland VA Medical Center. After testing, the researchers found that Tru-D cleaning removed all MRSA on the undersides of bedside tables, whereas 18% of sites tested after standard hospital cleaning remained contaminated with the bacteria.

C. difficile spores are especially challenging for hospital staff, since they can only be removed by soaking surfaces in bleach for 8 to 10 minutes, Dr. Donskey said in an interview with *Medscape Infectious Diseases*. The UV radiation device is computerized, and once placed in a room and turned on, can assess how much power is needed for decontamination by measuring the reflected UV radiation from surfaces in the room, Dr. Donskey said. It requires no special training to use. However, because the UV radiation produced can be dangerous to people, the device is placed in a closed, empty room, and operated with a remote control by housekeeping staff located outside the room. A sensor at the door turns the machine off if anyone enters the room.

Although the cost is steep, running from \$75,000 to \$100,000 per unit, it's inexpensive to operate; it requires no cleaning supplies and uses a small amount of electricity. Dr. Donskey has already put in a request for several units to the administration of the Cleveland VA Medical Center. The next step in his research is to incorporate the Tru-D into the standard cleaning routine of the housekeeping staff at the Center, and to assess how easy it is for "real world" housekeepers to use it as part of their daily routine.

UVC radiation is an exciting new technology for disinfecting patient rooms and contaminated surfaces in healthcare, said Luke Chen, MBBS, FRACP, assistant professor of medicine in the Division of Infectious Diseases at Duke University Medical Center in Durham, North Carolina. UVC technology has been used to disinfect water, to reduce food-borne microorganisms, and to purify air, he said, and is now being tested by the healthcare industry.

"UVC technology represents a major step forward for disinfection in hospitals and patient care areas," Dr. Chen explained. "The Tru-D device demonstrated consistency and rapidity in killing microorganisms." The safety profile in the study appeared to be good, but further research is needed to validate this finding, Dr. Chen said.

"There is potential to use this technology to rapidly clean and turn around patient rooms, clinic space, or waiting rooms," he added. "The technology could also be adapted for disinfection of surfaces of healthcare equipment, for example, monitoring devices, wheelchairs, and ventilators. Overall, I think technologies like this are versatile and are likely to be widely used."

Dr. Boyce noted that the advantages of the Tru-D device are that it is easy to employ and that it can reduce the number of positive bacterial cultures substantially. "It would be interesting to compare this device with other new methods for decontaminating hospital rooms," Dr. Boyce said.

In 2008, Dr. Boyce published a study on a disinfection system using vaporized hydrogen peroxide (*Infect Control Hosp Epidemiol.* 2008;29:723-729). "Our data so far indicate that it reduces contamination to virtually 0," he said. However, unlike the UV radiation device, the vaporized hydrogen peroxide system requires 4 to 6 hours to clean a room and operators with special training to manage it, Dr. Donskey said.

"The UV radiation device has the potential to be effective, faster, and less expensive to operate — a good supplement to bleach or more effective than bleach," he said.

Dr. Boyce reports being a consultant to Bioquell, 3M, Clorox, Advanced Sterilization Products, and Cardinal Health. Dr. Donskey and Dr. Chen have disclosed no relevant financial relationships.

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