The robot will clean up now: More hospitals buying automated systems to reduce infections

A growing number of hospitals are buying robots that kill bacteria such as C-difficile as they seek new tools to stop costly and deadly hospital-acquired infections. But there are questions about how best to use the new disinfection robots.

The University of Vermont Medical Center, a health system based in Burlington, is one of hundreds of U.S. hospitals that have purchased a disinfection robot. Sally Hess, U-V's manager of infection prevention, said the two Xenex Disinfection Services robots purchased last year add an “extra level of protection” to the hospital's infection-control program. It removes the element of human error, she said.

The market for disinfection robots is expected to grow from $30 million in 2014 to $80 million by 2017. But as adoption grows, hospitals have to decide which of two technologies is better, how to deploy the robots most efficiently, and whether they actually reduce hospital-acquired infections.

There is limited independent research showing that the robots, which can cost upward of $100,000, reduce infections. Most experts agree the systems do kill pathogens found on hospital room surfaces. But there are no studies comparing the two dominant technologies—systems using hydrogen peroxide vapor and those using ultraviolet-C light. The latter are more commonly used.

“There's no question they kill bugs,” Hess said. “But do they really lead to reductions in hospital-acquired infections? Nobody really knows.”

Two factors have driven increased interest in disinfection robots over the past 18 months. First, hospitals face stiff Medicare payment cuts for having excessive rates of patients who acquire infections while receiving care. Second, last year's Ebola outbreak and the infection of two nurses at a Dallas hospital fueled demand for new disinfection tools.

“Reimbursement revenues are at risk,” said Morris Miller, CEO of San Antonio-based Xenex, one of about 15 manufacturers marketing disinfection robots. “That means (hospitals) have got to be focused on this.”

The rapid adoption of these systems prompted the ECRI Institute, a not-for-profit that studies the safety and effectiveness of medical products and services, for the first time to include disinfection robots on its 2015 C-Suite Watch List.

Robert Maliff, ECRI's director of applied solutions, said all hospitals are focused on getting their hospital-acquired infection rates as low as possible. “Is this a helpful tool in achieving that? Yes. Which technology is best for the hospital? That's the decision that the hospital has to make.”

Hospitals must consider workflow and where in the hospital the robots should be used, as well as how often. A cleaning may take 15 minutes or three hours, depending on the system. The robots are most likely to be deployed in ICUs, burn units and operating rooms.

The hydrogen peroxide models are considered more efficient in terms of cleaning, but the process can take up to three hours and requires staff to shut down vents.

The systems that use ultraviolet light are more costly—about $76,000 on average compared with the hydrogen peroxide systems that cost about $31,000. And the UV robots tend to clean only what they detect. A UV system, for instance, may not clean under the bed tray, for example. But a UV cleaning can be done in 15 minutes.

Both technologies have been used in other industries for at least a decade.

The robot manufacturers with the largest market share, according to estimates from ECRI, are Xenex; Tru-D SmartUVC Room Disinfection in Memphis, Tenn.; and a joint venture between Clorox Co. and UltraViolet Devices.

Xenex is backed by three venture funds—Battery Ventures, Targeted Technology Fund II and RK Ventures. It announced about $11 million in funding in November 2013 and reported more than $20 million in revenue in 2014.

Clorox, a longtime manufacturer of manually applied disinfectants, made its move into the disinfection robot market in 2014, announcing plans to distribute and market UltraViolet Devices' system. Keri Lestage, Clorox's technical services group manager, said hospitals and health systems should use both manual disinfectants, as well as the extra layer of protection provided by the disinfection robot.

Privately held Tru-D Smart-UVC split off last year from parent company Lumalier, also based in Memphis, after reporting a 52% increase in revenue in 2012.

For now, the market is in the early adopter phase, said Venkat Rajan, an analyst with Frost & Sullivan. Still, he said, the robots are expected to provide economic value to hospitals at a time when healthcare providers increasingly are limiting supply purchases to products that help them reduce costs.

But there is little empirical evidence of what technology works best and whether their use reduces rates of hospital-acquired infections. As more hospitals adopt the robots, it's expected that more data will become available about the advantages and flaws of each product, Rajan added.

A 2013 study in the journal Infection Control and Hospital Epidemiology concluded that disinfection systems using ultraviolet light “can effectively reduce environmental contamination and potentially mitigate infection risks.”

But the majority of other studies looking at disinfection systems are manufacturer-funded.

“The Ebola situation has given people an opportunity to say their technology is at least a good adjunct to normal processes,” said Janet Haas, director of infection prevention and control at Westchester (N.Y.) Medical Center. “But they do add time and costs, and labor that is underappreciated.”

One of ECRI's recommendations is for hospitals to try out a robot and gather data about pre- and post-robot infection rates, readmission rates, disinfection times and room downtimes before making an investment. ECRI also urged that hospitals not neglect proven infection-reduction methods such as staff education and enhanced hand-hygiene protocols.

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