



## Sutter's 'germ-zapping' robot latest tool to banish deadly hospital infections

They're the unseen visitors in hospitals. But they can be fatal.

Germs that cause hospital-acquired infections – lurking in the bloodstream and surgical wounds – are a stubbornly difficult problem for hospitals, which are continually seeking better ways to banish bacteria and germs that can be killers.

Last week, Sutter Medical Center in Sacramento showed off its first-ever “germ-zapping” robot, a wheeled machine that emits pulsating ultraviolet light that’s been shown to kill off infection-causing bacteria. It’s even got a name, chosen by hospital staffers: Xhaiden, an American baby name said to mean “beam of cleansing light.”

“The robot gives us one more tool in the arsenal,” said Debbie Sandberg, director of environmental services for Sutter Health Medical Center in Sacramento, which started using Xhaiden in mid-February. “People want to know they’re in a clean environment. This gives everyone more confidence from a patient-safety perspective.”

Resembling a bug zapper or camping lantern, Xhaiden’s pop-up UV cylinder emits blinding-white, xenon-fueled light that bounces into walls, floors, ceilings and hard-to-clean crevices, places where manual cleaning might miss. On any eight-hour shift at Sutter, Xhaiden goes to work primarily in areas where patients are most at risk for infections: pediatric oncology, cardiac surgery and bone marrow transplant rooms. The high-intensity UV light passes through the cell walls of bacteria, viruses and bacterial spores to break down or destroy them.

Germ-hunting robots are just one of many ways that hospitals combat infections, which are among the most troubling and stubborn aspects of modern health care. On any given day, 1 in 25 patients has a “hospital-acquired” infection, according to the federal Centers for Disease Control and Prevention. More than 750,000 infections occur annually in acute care hospitals, according to the CDC. About 75,000 patients die during their hospitalizations.

But in the past decade, hospitals nationwide have seen a “significant decrease” in most categories of health care-acquired infections, according to the most recent CDC data, from 2014. One area, in particular, has proved tougher to eliminate: *Clostridium difficile* (known as “C. diff”).

“There’s no end to the efforts. It’s an all-consuming, never-ending (concern) for hospitals,” said Dr. Gregory A. Maynard, chief quality officer for the UC Davis Medical Center in Sacramento.

He said those efforts range from simple things like more staff training on hand washing or having patients take an antiseptic-solution bath before heading to the hospital for surgery. He said UC Davis is also running pilot programs, such as testing incoming patients for C. diff, even if they show no diarrhea symptoms. If patients test positive, they can be isolated to reduce the risk of spreading the bacteria to other patients.

Aside from patient safety, there's a lot at stake financially for hospitals coping with infection rates. According to a 2013 study, U.S. hospital-caused infections cost \$9.8 billion a year. Some insurance companies refuse to cover those costs; Medicare penalizes a hospital's reimbursement rates, dropping them 1 percent for discharges involving infections.

Nationally, California has fared better than many states in combating health care-acquired infections, according to the CDC.

By law, California hospitals are required to report these infection categories to the state Department of Public Health: *Clostridium difficile* (which causes acute, sometimes fatal diarrhea); surgical sites (such as hysterectomies); catheter-associated bloodstream infections; and bloodstream infections caused by staph and Enterococci bacteria.

In 2015, nearly 400 acute care hospitals statewide reported 19,847 instances of infections, according to the department. Its interactive map shows individual, county-by-county hospital infection statistics.

In January, Consumers Union urged California's health department to ramp up its investigation of hospitals with the worst infection records. Last month, the public health department said it had already begun sharing infection rates with investigators and focusing on its requirement to conduct licensing investigations every three years.

Sutter is the first hospital in the Sacramento area to deploy the anti-germ robot manufactured by San Antonio-based Xenex, one of several disinfecting UV robots on the market. The company says its robots operate in about 40 California hospitals, from California Pacific Medical Center in San Francisco to smaller facilities such as Valley Children's Hospital in Madera.

The \$100,000 robots can quickly pay for themselves in treatment costs, according to Sandberg, Sutter's environmental services director. In a previous position at an out-of-state hospital, Sandberg said the use of a fleet of four robots dropped *C. diff* rates by 40 percent in three months. That translates into cost savings, she said, noting that hospitals typically spend \$15,000 to \$50,000 treating patients who are readmitted with *C. diff* infections.

After a patient is discharged, hospitals must do an extensive room cleaning, first removing linens and paper debris, then sending staff in to thoroughly disinfect a room, especially all "high-touch" surfaces, such as bed rails, light switches, bed tables and toilet seats. Many also conduct random follow-up tests, such as dabbing a germ-detecting gel on surfaces, then scanning with a black light to see whether germs still lurk.

At Sutter, "Xhaiden comes in and finishes the job," said Sandberg, taking about 15 minutes total as the robot is positioned in three locations: in the patient's bathroom and on both sides of the bed. She described the robot as an additional tool, not a replacement for manual disinfecting and cleaning by human staffers.

In a 2015 study by Duke University School of Medicine, the combination of cleaning chemicals and UV light "cut transmission of four major superbugs" by 30 percent among patients in rooms where someone with a known infection had previously been treated.

But not everyone is convinced that germ-killing robots will make a huge difference. “We have looked at using the ultraviolet lights and are actively considering them, but the jury is out on whether they add a lot to standard disinfectant processes,” said Maynard of UC Davis.

Dr. Clifford McDonald, a CDC hospital infection disease expert, said: “The UV lights do seem to work and provide that incremental impact on improved cleaning. Whether it will change the incidence of actual infections is still unclear.”

Overall, through more training, better cleaning techniques and innovative approaches, hospitals are doing a better job – with the exception of C. diff – in tamping down infections, McDonald said. “Fifteen years ago, there was a perception that infections are an inevitable part of getting hospital care. It has long been a stubborn problem, but we’ve started seeing success,” he said, noting a 50 percent decrease in U.S. infections related to catheters.

UC Davis’ Maynard added: “It’s a supremely long list of things that have to be done right to make sure an infection doesn’t occur. It’s hard to do all of them well 100 percent of the time.”

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