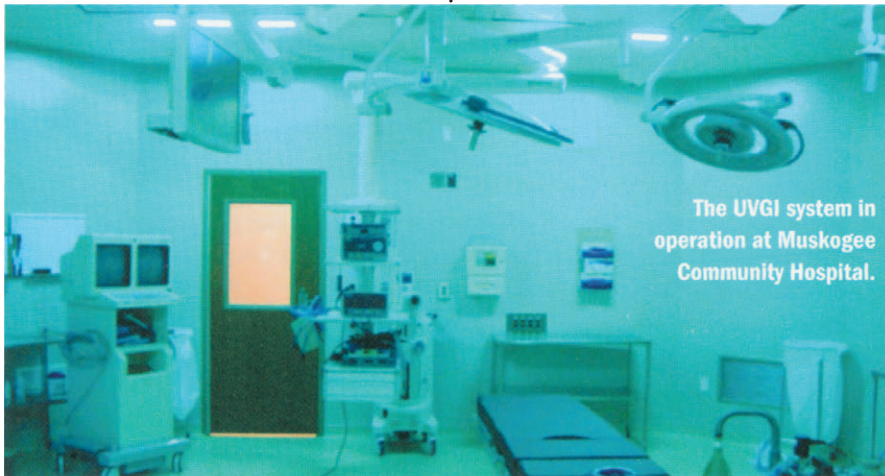


Oklahoma Hospital Takes Ultraviolet Germicidal Irradiation to the Next Level

Lights used for nightly operating-room sterilization

Muskogee Community Hospital, a rural, 45-bed hospital in Muskogee, Okla., may seem to be an unlikely place for ultraviolet germicidal irradiation (UVGI) to take an evolutionary leap. However, the unassuming, 2-year-old, 100,000-

on the coils of hospital HVAC equipment, Muskogee Community Hospital has taken the technology to the next level and installed UVC lights to sterilize its seven operating rooms (ORs) and procedure rooms every night.



sq ft hospital is using UVGI in a unique way that may someday be adopted by many other health-care facilities.

Ultraviolet (UV) lights have been used for years to kill microorganisms and prevent the buildup of dust, dirt, and contaminants on coils in HVAC systems. UV light fixtures have become a routinely ordered component of HVAC systems, particularly in hospitals and other health-care applications.

Although UVGI is commonly used

Mark Roberts, president of Muskogee Community Hospital, said the inspiration for the custom-designed UVGI system came from one of the facility's doctors, who told him of a portable UV sterilization unit that could be wheeled from room to room.

"I was intrigued by the idea, but I wasn't thrilled about a portable unit that might be easy to knock over and damage," Roberts said. "I asked our on-site mechanical engineer about the technology and asked him to design

something that could be permanently mounted in the ORs and procedure rooms. We're the first hospital in the country—and perhaps in the world—to be using UV in 100 percent of our HVAC systems and 100 percent of our operating and procedure rooms."

The system was designed with assistance from Steril-Aire, a manufacturer of UV lights for HVAC applications.

"Our engineer worked with the Steril-Aire people, and they went through several derivations of the idea," Roberts said. "They took into account what the light fixtures should look like, where they should be located in the ceiling, and how long they need to be on to get the benefit of sterilizing the surfaces in the room."

According to Roberts, "When you're breaking new ground, it can be difficult to know if the ground has been broken or not."

The facility was using the lights after hours for 8 hr per room per day, but it was not clear what, if any, effects they were causing.

"We had only been open for about a month, and we had all the engineering data on what the lights were supposed to be accomplishing, but you really don't know the bottom line because it's all speculative," Roberts said.

Evidence that the lights were having the desired germicidal effect came from a Oklahoma Hospital Association study that found zero hospital-acquired infections at Muskogee Community Hospital over a span of 21 months.

The Medicare hospital-acquired-

| | Foreign object retained after surgery | Air embolism | Blood incompatibility | Pressure ulcers, stages 3 and 4 | Falls and trauma | Vascular-catheter-associated infection | Catheter-associated urinary-tract infection | Manifestations of poor glycemic control |
|--|---------------------------------------|--------------|-----------------------|---------------------------------|------------------|--|---|---|
| Muskogee Community Hospital hospital-acquired-condition rate (per 1,000 discharges) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Oklahoma hospital-acquired-condition rate (per 1,000 discharges) | 0.049 | 0.004 | 0.000 | 0.061 | 0.665 | 0.380 | 0.380 | 0.036 |
| National hospital-acquired-condition rate (per 1,000 discharges) | 0.090 | 0.003 | 0.001 | 0.134 | 0.565 | 0.367 | 0.317 | 0.050 |

SOURCE: OKLAHOMA HOSPITAL ASSOCIATION

Zero hospital-acquired conditions is almost unheard of. Yet Muskogee Community Hospital has achieved that thanks in part to its innovative use of ultraviolet germicidal lights.



condition- (HAC-) rate analysis reports on hospital performance on eight of the ten Medicare HAC measures recognized by the Centers for Medicare and Medicaid Services as preventable HACs. The rate analysis recently was adopted by the federal Hospital Inpatient Quality Reporting Program, and the HAC rates will be published on the U.S. Department of Health and Human Services' Hospital Compare Website.

"Every hospital administrator strives for and dreams of a report with zero HACs," Roberts said. "We were thrilled with the findings, and it is all the more impressive because the study was done by a third party."

Such a report can have financial benefits to a health care facility as well. Beginning in October 2014, hospitals in the bottom quartile of risk-adjusted HAC rates will be subject to

a 10 percent Medicare inpatient payment penalty.

The life of UV bulbs operating 24 hr per day, 7 days per week in an HVAC system is roughly 9,000 hr, or one year. Because the hospital is using the operating- and procedure-room sterilization bulbs 5 days per week for a maximum of 8 hr per day, Roberts anticipates a 4-year lifespan. The lights are made to fit into standard 4-ft long ceiling light fixtures.

The UV-sterilized rooms are equipped with motion detectors and contact detectors in the doors to ensure the doors are closed and the rooms unoccupied when the lights are operating.

Muskogee Community Hospital also uses Steril-Aire UVC emitters to continuously clean the coils and drain pans in its HVAC system, providing an effective inactivation method for

surface and airborne microorganisms. In addition, the hospital boasts Leadership in Energy and Environmental Design (LEED) Gold status.

Yet it is the effectiveness of the lights in the operating rooms that has begun to garner national attention. According to Roberts, a group that represents a major hospital chain recently visited Muskogee Community Hospital.

"They're impressed by the results we've achieved and are looking to incorporate this type of system into their facilities," he said.

For more information visit www.steril-aire.com/hospital-airpurification. To watch an interview with Mark Roberts, visit bit.ly/muskogeeuv.

Information and photographs courtesy of Muskogee Community Hospital and Steril-Aire.

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