



# Eye Healthcare Clinic's Ultraviolet Light Systems Prevent Hospital Acquired Infections; Promote IAQ

Source: *St. Luke's Cataract & Laser Institute*

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St. Luke's Cataract & Laser Institute continues to pioneer the use of ultraviolet (UV) germicidal irradiation light systems for disinfecting surgery rooms and promoting clean HVAC system coils for cutting-edge indoor air quality (IAQ), according to a news release. The Tarpon Springs, Florida-based eye care company recently installed UV surface disinfection equipment to supplement daily manual sterilization in two operating rooms in the Villages, Florida, the newest of its seven central Florida clinics. Next, contractor Trinity UVC Lighting LLC will install UV lamps in three rooftop HVAC systems to supply the 9,600-square-foot building with clean IAQ devoid of allergens, mold, and any other biological contaminants.

"As far as I know, we're one of the few, if not the only, eye care surgery company in Florida using UV disinfection to this degree," Donald Bislick, facilities management and IT, St. Luke's, said in the news release.

St. Luke's other two OR locations, its headquarters in Tarpon Springs and a 14,525-square-foot clinic in Clearwater, the latter which performs cosmetic surgery services, also have UV surface disinfection for ORs and HVAC coil disinfection. The efforts illustrate the 45-year-old company's penchant of providing sanitary environments for patients and employees during services that include comprehensive ophthalmology, cataract procedures, LASIK, and treatments for vitreoretinal diseases, glaucoma and cornea conditions.

In an age when the Center for Disease Control (CDC), Atlanta, lists hospital acquired infections (HAI) as a major challenge for the health care industry, St. Luke's stellar disinfection record is confirmed by external, independent reviews of the Accreditation Association of Ambulatory Health Care (AAAHC), Skokie, Illinois.

St. Luke's uses UV disinfection equipment providing UV-C wavelengths, which are most effective in eliminating microorganisms from OR surfaces and HVAC coils. UV-A (used for black lights), UV-B (used in tanning salons and causes sunburns) and UV-C wavelengths are all present in sunlight. However, higher frequency UV-C wavelengths are filtered by the Earth's atmosphere, therefore microorganisms have no experience or defense against it. UV-C light kills microbes by scrambling their DNA and preventing reproduction.

Trinity UVC Lighting, which has specified and installed commercial building and medical facility UV systems throughout Florida, specifies and installs 390-microwatt ( $\mu\text{W}$ ) lamp systems manufactured by Fresh-Aire UV, Jupiter, Florida. The lamps are three times more powerful and require only 3 hours of nightly disinfection versus the health care industry's standard 120- $\mu\text{W}$  lamps requiring eight to 10 hours of operation. Thus, the shorter, but equally effective disinfection time extends lamp life, saves energy and reduces maintenance costs. The patented Fresh-Aire UV power supply for each lamp carries a lifetime guaranty.

## Specifying a UV Surface Disinfection System for Health Care

UV surface disinfection system size and time exposure must be precisely calculated to assure total biological deactivation. Brian Stacy, Trinity UVC Lighting vice president-sales, references published data from organizations such as the CDC to calculate the micro-wattage required to irradiate any known biological contaminant, such as clostridium difficile (C.Diff) or

methicillin-resistant staphylococcus aureus (MRSA). A calculation typically includes a room's square feet, ceiling to floor distance, lamp output and a microorganism's recommended micro-wattage irradiation requirement to arrive at an effective exposure time. Additional variables include room ventilation air changes, humidity, lamp placement shadowing and the space's allowable down-time for disinfection.

Stacy's calculations allow for the worst case scenario and also specify a 200-percent protocol above recommendations, because all UV lamps slowly lose UV intensity over their expected 1-year lifecycle. He also slightly over-sizes a system to ensure even the most resilient microorganisms are irradiated, such as vegetative and spore-forming C.Diff, which can require UV dosages ranging from 11,000 to 46,000- $\mu\text{W s}/\text{cm}^2$ . "A static system such as this ensures the same disinfection time every day, whereas portable UV robots require qualified employees to program, position and monitor them properly during use for efficacy," Mr. Stacy said.

The Villages clinic's 900- and 1,200-square-foot eye surgery rooms each have four 32-inch-long, stainless steel ceiling-mounted, ozone-free UV lamp fixtures positioned in the middle of the rooms. Timers activate the lamps for off-hours disinfection. Since UV-C wavelengths can be harmful to eyes and skin, Trinity UVC Lighting has built in UV-monitoring entry-door interlock sensors and motion-detection safety measures that can prevent accidental activation during occupancy times. Systems also allow manual operation by authorized personnel with timed shut-offs after proper disinfection time.

After the warranty period, the service contract calls for Trinity UVC Lighting to periodically inspect all UV systems and perform lamp efficacy evaluation with radiometer instruments. "It's important to keep systems operating with full intensity to ensure disinfection," said Mr. Stacy.

### **Using UV for IAQ**

Trinity UVC Lighting will soon install eight 32-inch and 46-inch UV-C lamps in the Villages location's three York air handlers, manufactured by Johnson Controls, Norman, Oklahoma. The air handlers in the surgery center' total 7,100-cfm and are supplied chilled water from The Villages' community central plant. Trinity UVC Lighting designs, custom-builds and installs UV systems using Fresh-Aire UV power supplies, lamps and other components engineered specifically for disinfecting an HVAC system's airstream, evaporator coil, and interior surfaces. The air handlers discharge air between 42°F to 47°F and induct electric re-heaters manufactured by Tutco Heating Solutions Group, Cookeville, Tennessee., raise the temperature to surgery room temperatures as per ASHRAE Standard 170--Ventilation of Health Care Facilities.

St. Luke's Tarpon Springs facility was the first to incorporate UV disinfection when the IAQ industry was burgeoning 15 years ago. The three-story, 78,000-square-foot facility uses 40 UV lamps to disinfect both the supply and return side of eight air handler coils supplied by one 120-ton chiller manufactured by Trane, Tyler, Texas; and 80-ton and 40-ton chillers manufactured by Carrier, Syracuse, New York.

Before UV lamps were installed, the Tarpon Springs facility needed semi-annual HVAC service calls to remove mold and slime build-ups on coils and the drain pans. Now the UV lamps prevent biological contaminant growth inside the HVAC systems and ductwork, thus saving the facility approximately \$8,000/year it once paid for coil maintenance. Aside from better patient/employee health and IAQ, the clean coils also result in better heat transfer and energy efficiency. Furthermore, St. Luke's no longer uses toxic cleaning chemicals with gaseous contaminants that can damage the environment, prematurely corrode the coils and shorten expensive HVAC unit lifecycles.

The Tarpon Springs location's initial 60-day UV system trial in one HVAC unit produced such impressive results of eliminating biological growth on a coil that J. Bradley Houser, St. Luke's administrator, approved UV systems for the building's other seven HVAC systems. "Their attention to detail and understanding of disinfection makes UV technology and how it works an easy sell," said Stacy.

UV technology is gradually appearing in more healthcare facilities across the nation, however St. Luke's was a pioneer of UV disinfection as long as 16 years ago.

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## COMMENTS

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