WHITEPAPER: UV DISINFECTION FOR

Nursing Homes & Assisted Living

SINCE 1963 ATLANTIC ULTRAVIOLET CORPORATION®

The Big Picture

It is estimated that over five million Americans live in nursing homes, assisted living facilities, and senior centers at any given time. These institutions present a challenge in regards to infection control, as the overwhelming majority of their residents require a higher level of protection against life-threatening illnesses. According to the CDC, one to three million infections are contracted each year in these types of environments, many of them resulting in death.[1]

Ultraviolet germicidal irradiation (UVGI) technologies have emerged as a promising alternative to biocides as a means of surface disinfection in hospitals and other healthcare settings.

The Institution of Engineering and Technology[2]

Sources of Contamination

Skin flakes

Elderly patients are prone to skin squames, or the normal shedding of skin flakes. As they fall and cling to the bedrails, bedsheets, blankets, mattresses, and floor—they could infect guests or staff who routinely touch these areas.

High Touch Surfaces

Light switches, door handles, outlets, IV poles, tubing, bags, and other medical accessories like catheter bags, vital sign monitors, and workstations can host germs.

Bathrooms

Sinks, soap dispensers, and toilets are all danger zones as they are touched many times prior to any washing and can splash droplets. Personal showers can spread contaminated aerosols from the sprayers and harbor germs in corners and on tile grout.

Airborne Dangers

Tuberculosis, *SARS-CoV-2*, and *Influenza* cause thousands of deaths each year, mainly among nursing home patients 65 and older.[3] This is due to proximity to other patients, frequent interaction with staff and visitors, and inadequate disinfection of common areas.

Documented UV-C Success

Air & Surfaces: UV disinfection has shown to be effective at inactivating over 97% of pathogens, reducing airborne infections in healthcare patients and employees.[4] One hospital, after implementing an air and surface UV-C program for 12 months, reduced multidrug-resistant HAIs by 19% and saved over $1.2M.[5]

Water: As one study reveals, when UV disinfection is incorporated into existing water management programs, it can help prevent the spread of disease.[6] After an extensive follow-up on the water disinfection program at another hospital, Cambridge University Press published, “Ultraviolet light usage was associated with negative water cultures and lack of clearly documented nosocomial Legionella infection for 13 years.”[7]

UV-C Doses

The UV-C doses below will neutralize many bacteria and viruses that can be found in nursing homes—in the air, on surfaces, and in water. Millijoules per square centimeter (mJ/cm^2) measure energy produced by germicidal lamps over a certain amount of time.

Microorganism	UV Dose (mJ/cm^2)
Staphylococcus aureus (MRSA)	6.60
Staphylococcus epidermidis	5.80
Norovirus	15.0
SARS-CoV-2	7.80
Influenza	1.20
Clostridium difficile (C. diff)	16.0
Mycobacterium tuberculosis	10.0
Klebsiella pneumoniae	7.0
Enterobacter cloacae	12.80
Pseudomonas aeruginosa	3.90
Serratia marcescens	6.160
Legionella	12.30
Acinetobacter baumannii	1.80

Table 1: UV-C Doses to Neutralize Various Microbes

UV-C Air & Surface Solutions

Upper Room UVGI

Our Hygeaire® models project long, uninterrupted ultraviolet rays across the upper room air, neutralizing bacteria and viruses carried by air circulation. These models mount seven feet or higher in patient rooms, public areas, and waiting rooms. Wall mounted models must be installed on a plumb, vertical surface that is at least 7 feet from the floor and able to support 16 pounds.

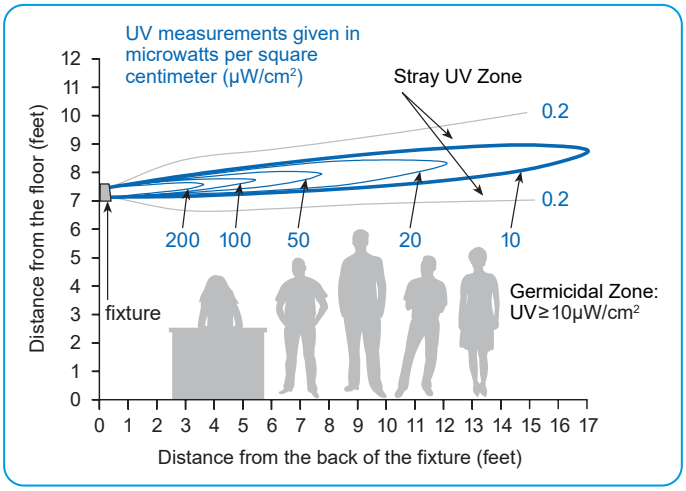

Figure 1: Distribution of UV rays from Hygeaire®

Upper room UV disinfection had the lowest cost per equivalent room air change when compared with four other room air cleaners. It is also found to be nearly 10 times more cost-effective than mechanical ventilation.[8]

Room Air Disinfection

Sanitaire® is another UV disinfection model designed for occupied areas. It uses a blower to constantly draw air into its reflective exposure chamber, subject it to ultraviolet light, and release it back into the space. Models are available for wall mounting, ceiling mounting, or mobile use in various room sizes. For well-ventilated areas, we recommend a model that yields 3 room air changes per hour.

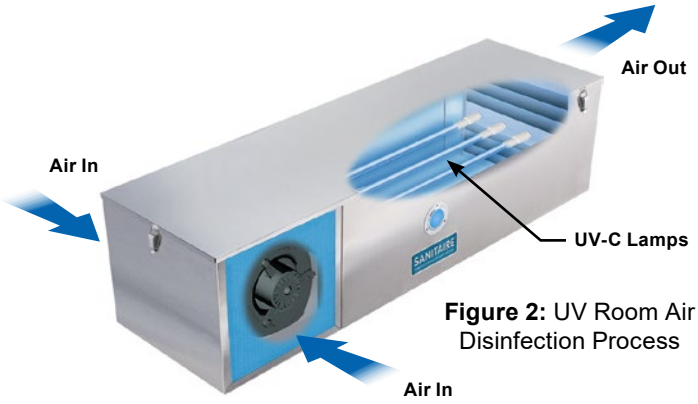

Figure 2: UV Room Air Disinfection Process

HVAC System Disinfection

Our AeroLogic® UV disinfection models can be easily installed inside HVAC systems. For best results, mount perpendicular to airflow and direct at the condenser coil, where microbes tend to grow and thrive. In-duct systems are most efficient when installed in a long, straight run allowing at least 0.25 seconds of UV exposure.[9] We can recommend the model that best fits your duct or air handling unit size, air speed, and air temperature.

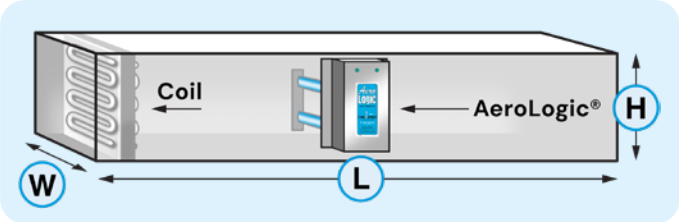

Figure 3: UV Disinfection Installed Horizontally in Air Duct

Direct Air & Surface Disinfection

To treat contaminants on surfaces such as countertops, furniture, windows, and curtains, simply carry or roll one of our Sanidyne® UV Portable Area Sanitizers into the desired room and program the exposure time. With 4 or 8 lamps, it will emit lethal UV-C light in every direction, wreaking havoc on any microbial DNA within its sphere of influence. UV surface disinfection can also neutralize the waterborne pathogens from Table 1 that may be present on water devices, fixtures, and drains.

To avoid exposure to direct UV-C rays, these models must only be used in unoccupied spaces (with caution signs posted at all entrances). If someone accidentally enters the room during a treatment session, occupancy sensors will detect movement and shut off the unit.

Instrument Disinfection

Medical tools and instruments, grooming devices, and any other small objects found in senior centers can be disinfected in our innovative SaniUV-Cube™. Place the objects you wish to disinfect into the sizable chamber and watch through the protective window as UV-C light disinfects them. SaniUV-Cube™ has 4 high output UV-C lamps, removeable/washable quartz shelves, and a safety switch to shut off power when the door is opened.

UV-C Water Solutions

Water can be disinfected at two places within nursing homes and assisted living facilities: the point of entry or the point of use. Point of entry models can neutralize microbes of concern in facility-wide water systems, including *P. aeruginosa*, *Serratia marcescens*, *A. baumannii*, *Klebsiella*, *Legionella*, and *Enterobacter cloacae*. As a secondary disinfection point, installing UV disinfection at the site of sinks, bathtubs, showers, and hydrotherapy pools will treat water in the line immediately before the point of use.

Table 2: Comparison of UV Water Purifier Models

	Point of Entry		Point of Use		
Feature	**Sanitron®**	**Megatron®**	**Bio-Logic®**	**Minipure®**	**Mighty Pure®**
Flow Rate (GPM)	3–40	90–450	1.5 or 3	1–9	3–20
Lamp/Quartz Clearance	17–50"	71"	13⅞–19½"	10⅜–29"	16–49"
Gland Access	6"	12–24"	6"	6"	6"
Lamp Indicator(s)		✓	✓	✓	
Sight Port	✓	✓		✓	✓
Drain Fitting(s)	✓	✓			✓
HMI Touchscreen		✓			
Dual-Action Wiper	Manual	Manual or Auto			
UV Monitor	Optional	Standard			Optional
Audio Alarm	Optional		Standard	Standard	Optional
Solenoid Valve	Optional			Optional	Optional
Flow Control Valve	Optional		Optional	Optional	Optional

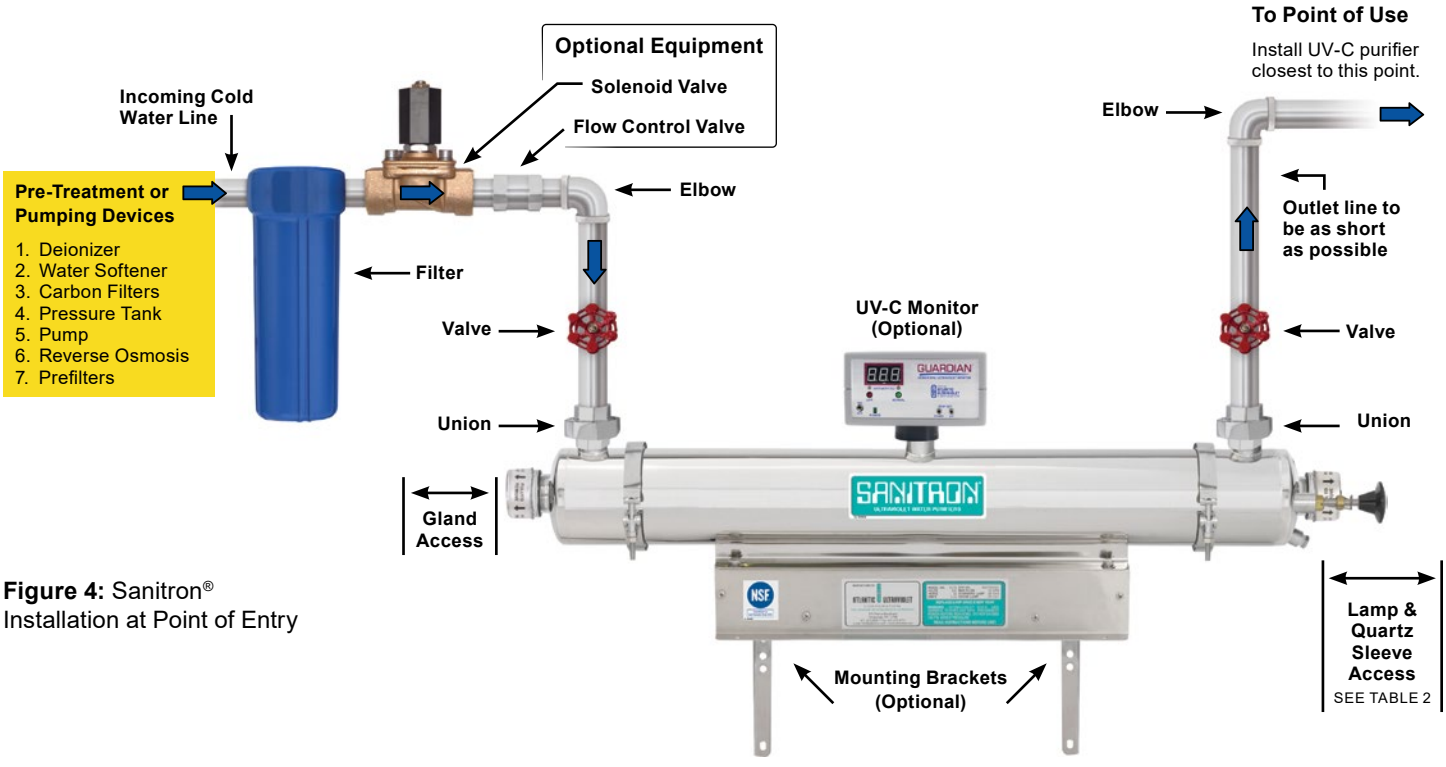

Figure 4: Sanitron® Installation at Point of Entry

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