

DISINFECTION IN A FLASH

# The Power of UV Disinfection in Hotels and Hotel Facilities



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# Introduction

Hotel guests have an expectation that their room will be clean upon arrival. They have scoured online reviews or taken recommendations based on the belief that their room will be clean and free from germs.

However, studies have repeatedly demonstrated that the bacteria levels in hotels are often higher than those found at home, on airplanes or in schools. Many travel magazines or blogs recommend guests come prepared to disinfect their entire hotel room, not touch the bedding or floor, and to avoid using convenience items, from the hair dryer to the coffee pot and ice bucket. And with the advent of the worldwide COVID-19 pandemic, even more attention has been drawn to how hotels and hotel facilities can create the safest and cleanest travel experiences for their guests, staff and visitors.

This white paper, written by PURO Lighting's technology partner Violet Defense, lays out the challenges that hotels face in overcoming both this real and perceived lack of cleanliness, and how advancements in UV disinfection technology will change the way they think about cleaning their spaces.

# The Value of Cleanliness

Hotels are constantly monitoring trends to assess the factors that may give them an edge in terms of attracting new guests, increasing customer satisfaction, and instilling brand loyalty in their guests and visitors.

The factors that contribute to these positive metrics have been heavily researched. The top attributes that consistently emerge in the findings include location, room, service, value/price and cleanliness.<sup>1</sup> However, there is a distinction between factors that may affect where a customer books (i.e. location, price) and the experience they will have while at a hotel (customer service and cleanliness).<sup>1</sup>

“The cleanliness of our environment is clearly top of mind and of the utmost importance to travelers no matter where they’re staying...”

Allison Gutterman  
President of Jelmar

Several studies have shown that cleanliness is found to be one of, if not, the most important factor in selecting a hotel. A survey of US leisure travelers asked respondents to rate how important cleanliness is when selecting a hotel, with 84% stating that it is very important (an additional 13% ranked it as somewhat important).<sup>2</sup>

Further analysis of ratings of over 100 brand name hotels revealed that cleanliness was responsible for the greatest portion of variation in a customer’s overall rating of a hotel. In fact, the magnitude of its effect was 4 times greater than that of location and value, and three times more impactful than staff rating.<sup>1</sup>

Surveys have found that customers are even willing to sacrifice other “essentials” such as internet access to ensure cleanliness of their rooms.<sup>3</sup> There is also a segment of customers that value cleanliness so much they actually clean their hotel room or a vacation rental property upon arrival.<sup>3</sup>

## OTHER MARKET TRENDS

A number of hotels have emerged in recent years with a special emphasis on wellness for health-oriented travelers. From WestinWORKOUT® rooms that offer a treadmill or bike, fitness DVDs, and stability balls, to the Bulgari Hotel in London that has changed the look of its mini bars to provide nutritious options, hotels are trying to create experiences to speak to customers that want to maintain their healthy lifestyle even while away from home.

Customers have also become increasingly interested in the green practices of the hotels they select. Therefore, hotels have been finding ways to market to this unique set of customers by adopting sustainable programs and guidelines, which may provide them a competitive edge against other brands.

Green practices have been found to be a significant driver of hotel performance and there is indication that customers are willing to pay higher premiums for those attributes.<sup>4</sup>

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In response to this unique set of customers, TripAdvisor recently started rating the green practice levels of hotels. A survey from TripAdvisor reported that almost 25% of Americans are consciously trying to make eco-friendly choices when it comes to their hotel stays.<sup>5</sup> The site also reported that they see a 20% higher rating for properties with TripAdvisor Green Leader Status.<sup>5</sup>

While green practices often refer to reusing bathroom towels or more eco-friendly building materials, it can also include practices such as reducing the use of hazardous chemical products by the housekeeping department.

### RETURN ON INVESTMENT IN CLEANLINESS

Ultimately, hotels that can combine strategies to achieve customer demand for cleanliness with other enticements, such as improved health and wellness, and green or sustainable practices, could potentially yield increased customer satisfaction, higher occupancy rates and/or premiums.

In 2012, Best Western launched its “I Care Clean” program as a way to set themselves apart. According to Best Western executives, they “found that no one hotel chain in the midscale category was recognized by consumers as being cleaner than others.”<sup>6</sup> They saw this as an opportunity to bring advanced cleaning technologies used in hospitals, such as UV wands to help them “sterilize high touch points in the hotel, such as telephones, clocks, light switches, door handles, bathroom fixtures and common areas.” As a result of this and a few other tweaks to their protocols, they yielded a 13% increase in satisfaction scores for overall experience and a 12.4% increase in “intent to recommend” among customers.<sup>6</sup>

A series of hotel chains, including MGM Grand, the Mirage, Marriott, and now Wyndham have adopted the Stay Well program by Delos, a series of wellness amenities for rooms that include air quality and circadian lighting for improved sleep. This program also includes improved cleaning protocols, including the use of UV wands. MGM officials reported after adopting the program that they were seeing an average daily rate premium of \$30 per night (a 20% increase) and maintaining a 96% occupancy rate, on part with their regularly priced rooms.<sup>7</sup>



# The State of Hotel Cleanliness



Research clearly supports that hotels must pay attention to cleanliness, both real and perceived, to satisfy customers. While there are very few reports of outbreaks or major illnesses attributed directly to hotel stays, there are an abundance of reports about high bacteria levels or poor practices among housekeeping staff.

Recent studies have shown that 81% of surfaces in hotels have some fecal bacteria.<sup>8</sup> Locations, including light switches, TV remotes, toilets, and bathroom sinks may all be contaminated with bacteria.

Reynolds reported that bacteria can make its way throughout the bathroom. After flushing the toilet, contaminants are dispersed throughout the space, including floor, back of the toilet (80% of the time), the wall behind the toilet (40% prevalence), on the handle (22%), and on the toilet paper dispenser (17%).<sup>9</sup>

Challenges with bacteria are not limited to highly rated hotels. Studies investigating the bacteria levels in 3-, 4-, and 5-star hotels found alarming levels of bacteria at all rating levels. Bathroom counters in 4-star hotels were found to have an average of 2.5 million Colony Forming Units (CFU) per square inch of space. In comparison, a typical home bathroom has 452 CFU per square inch. Microbes including *Bacillus spp*, a cause of stomach and respiratory infections, were also found on remotes that had an overall bacterial load of up to 2 million CFU per inch.

There are an assortment of items in a hotel room, including ice buckets, coffee makers, light switches, bedding, and more that may not be cleaned as often or as thoroughly as they need to be. In one expose, housekeeping staff were seen on camera rinsing glasses with water only and using dirty towels from prior guests to dry them off. Another camera found a housekeeper who did not change out of the latex gloves worn to clean the toilet to rinse drinking glasses.<sup>11</sup>

While this may have been several instances of negligent staff, studies in general have found that mops and cleaning cloths from cleaning staff are often contaminated with germs. A study published in Food and Environmental Virology tracked a sample virus planted in a hotel room to see what would happen. Researchers watched as hotel cleaning staff spread that virus to three other rooms nearby.<sup>12</sup>

“Sometimes the act of cleaning does more harm than good because you’re just spreading the germs to new areas.”

Kelly Reynolds  
Associate Professor of Environmental  
Health University of Arizona

Findings indicated that both guests and staff were responsible for spreading the viruses between hotel rooms, conference areas, and a communal kitchen area. Hygiene interventions, including disinfection strategies did help reduce the spread of the viruses.<sup>12</sup>



Companies have found that design changes driven by improved cleanliness can lead to a willingness to pay more.<sup>14</sup>

Hotels like Best Western and chains adopting the Stay Well program have all turned to technology to help raise their disinfection game. While UV is a highly effective disinfection solution (see page 9), the deployment method matters a great deal to their reliability.

For example, hand-held UV wands, the tool of current use in these programs, typically require users to hold the device 1/2" from surface and hold it there for 10 seconds — covering approximately 12" wide area at a time. Even if just used on high touch areas, that can still be a major time commitment for staff that are charged with cleaning 13-15 rooms per day.<sup>13</sup>

WoodSpring Suites, an extended-stay hotel chain, has adopted a 99-point cleaning process. However, they have realized that “you need to have thought about the cleaning before you ever build the hotel or put a piece of furniture in it.”<sup>14</sup> They have implemented mobile furniture solutions, including headboards that can be moved between guests to ensure cleaning can occur in every inch of the room, but also to be able to check for other health concerns, such as bed bugs. They have also modified their flooring choices to be more conducive to regular cleaning, versus extended turnover times that occur when shampooing carpets.

The company also made changes based on customer perception of cleanliness. Their prior floral-patterned bedspreads were not being perceived as clean by customers, in spite of washing comforters between every guest. Changing to all white bedding improved satisfaction. They have also found that design changes driven by improved cleanliness have led to a willingness to pay more among customers as well.<sup>14</sup>

# Benefits of UV Disinfection



Advancements in the technology have made it more viable and cost-effective to deploy UV in everyday spaces.

While high bacteria-levels may be expected given the number of people in a hotel at any given time, the current protocols in place are leaving far too many germs behind. Furthermore, with the intrinsic value placed on cleanliness for customers, it is critical that hotels have both strategies to actually reduce these potentially harmful bacteria levels, but also to market that benefit to its guests.

While not a “new” disinfecting technology, UV light has rapidly been growing in use in hospital settings as it is a proven disinfectant for surfaces, instruments, and air. With over 140 years of research behind it, UV light has been proven effective at killing bacteria, viruses, mold, and fungi.

Ultraviolet light attacks microorganisms at the DNA and RNA level. Microbes are not able to develop resistance to ultraviolet light, compared to their ability to form resistance to certain types of chemical disinfectants.

Ultraviolet light has been repeatedly proven effective against pathogens, including *C. diff*, MRSA, *E. coli*, Salmonella, Norovirus, coronaviruses and many more. The ability of UV light to kill microorganisms is directly related to the energy dosage produced by the UV source as a function of spectrum, time and distance to the target.

UV light, particularly UV-C, has also been shown to have great benefits when combined with other cleaning methods for optimal results. Researchers at Duke University and the UNC Schools of Medicine found an additional 94% reduction in epidemiological-important pathogens when UV was added to the standard use of quaternary compound disinfectants.<sup>15</sup>

Another potential benefit is the ability to reduce the labor and/or cost of chemical cleaning. A study using pulsed UV for routine once-daily disinfection of hospital surfaces cut the number of housekeeping hours required in half, compared to using alcohol wipes in manual cleaning.<sup>16</sup>

Given its effectiveness and health benefits, UV technology has begun to expand beyond healthcare facilities. Advancements in the technology have made it more viable and cost-effective to deploy UV in everyday spaces.

With both less expensive mobile options for room disinfection and installed options that can disinfect bathrooms automatically, hotels now have opportunity to reap the marketing benefits of incorporating UV, but in a way that will actually help them disinfect their rooms in a timely and realistic fashion.



# Conclusion

Ultraviolet light has an extensive history of effectively killing microbes in the air and on surfaces, which has been proven to reduce the infection rates of MRSA, *C. diff*, VRE, coronaviruses, and other harmful pathogens.

As a result of the miniaturization of this technology, it is now possible to deploy UV disinfectant technology in dramatically more settings than ever before, thereby creating cost-effective deployments to fight off harmful germs, particularly when used in combination with existing cleaning protocols.

Given the value that customers place on cleanliness, ultraviolet light should become a key component of cleaning protocols for hotels to not only implement better disinfection, but potentially drive higher guest satisfaction, increased premiums and occupancy rates.

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## ABOUT PURO UV DISINFECTION LIGHTING

Launched in 2019 in Lakewood, Colorado, PURO™ Lighting products, powered by Violet Defense™ technology, have set out to take proven UV light disinfection technology to the next level by making it more powerful, more affordable and most importantly, smaller and easier to utilize. PURO Lighting products can rapidly disinfect any room of any size and at any time using the proprietary miniaturized, pulsed Xenon Light Engine System. Our high intensity broad-spectrum UV disinfection units rapidly kill up to 99.9% of viruses and bacteria and can significantly reduce the growth of fungi such as yeasts and molds. All in remarkably small, yet powerful fixed or mobile units designed for any sized space. For more information, visit [www.purolighting.com](http://www.purolighting.com).

## ABOUT VIOLET DEFENSE

Founded in 2012, Violet Defense is on a journey to find new ways to protect people from harmful germs that have grown resistant to traditional forms of cleaning and disinfecting. Its patented technology is the only known Pulsed Xenon UV solution that can be installed into a room full-time, creating continuous way to address disinfection needs of all types of settings, including healthcare and non-healthcare alike. Designed to bring hospital-grade disinfection to everyday spaces, Violet Defense has cost-effective solutions to kill up to 99.9% of bacteria and viruses, including *E. coli*, Salmonella, MRSA, Norovirus and *C. diff*. For more information, visit [www.violetdefense.com](http://www.violetdefense.com).



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