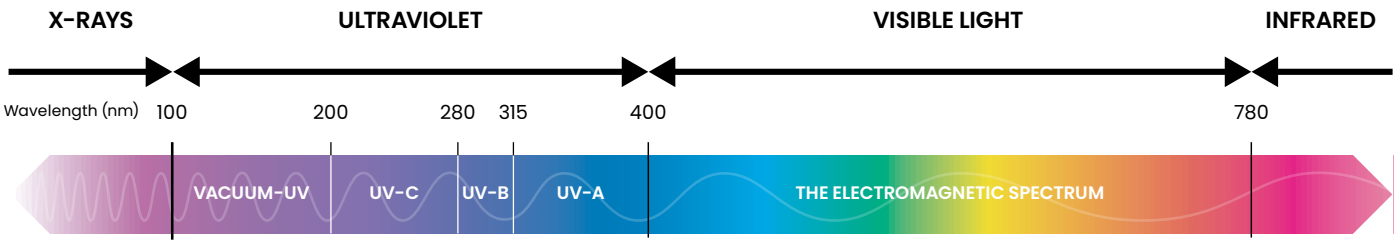
Frequently Asked Questions about UV-C Disinfection for Healthcare Settings

The Basics of UV-C Disinfection



How does UV-C disinfection work?

UV-C is invisible light with a wavelength between 200nm and 280nm. UV-C damages the DNA and RNA of microorganisms and disrupts vital cellular functions, preventing these microorganisms from replicating or spreading. The germicidal properties of UV-C have been studied and proven for over 100 years, and researchers have published thousands of peer-reviewed studies proving UV-C's germicidal efficacy.

What is the difference between UVGI and Far-UVC?

Within the spectrum of UV-C light, there are different wavelengths of light whose use cases vary. Upper room ultraviolet germicidal irradiation (UVGI) or upper room germicidal UV is one application that may use 254nm or 265nm UV-C light to disinfect the air in the upper portion of an occupied space. As air naturally rises, the air passes through an ultraviolet irradiance zone and is disinfected. UV-C towers for unoccupied spaces may also use GUV or UVGI at 254nm or 265nm. Far-UVC applications most commonly use 222nm UV-C light to disinfect the air and surfaces in an occupied space. Unlike other wavelengths of UV-C light, Far-UVC cannot penetrate the outer layers of human skin and eyes and is consequently safe for human exposure – hence its use in occupied spaces.

What regulatory bodies govern the use of UV-C disinfection? Is the CDC affirming UV-C's effectiveness?

UV-C devices are regulated by the FDA and the EPA. In addition, the CDC, ASHRAE, and WHO have all acknowledged UV-C as a valid disinfection method. Within the UV-C industry, the International Ultraviolet Association (IUVA) also functions as a thought leader and provider of education and resources on UV applications.

UV-C Applications in Healthcare

Are there any examples of UV-C applications in a dental setting?

Researchers have explored UV-C in dental practices. For example, an Italian study of alternative disinfection methods deployed in a dental setting noted that "UV-C systems have numerous advantages" versus other methods, including ease of use and speed. Another study out of Brazil suggested that UV disinfection in dental offices could be an effective disinfection protocol during the COVID-19 pandemic.

What are the recommendations for the use of UV-C technologies in multi-bed patient room settings or shared patient spaces?

UV-C can be used to augment existing ventilation in occupied spaces or to achieve whole-room disinfection in unoccupied spaces. In a recent article for TIME, Dr. Edward Nardell noted that UV applications have been used in healthcare settings for decades and recommended UV disinfection as a method for cleaning indoor air properly.

What advantages does UV-C disinfection present versus air filtration?

While air filtration is effective at filtering out airborne contaminants, it only captures rather than kills airborne microorganisms. By contrast, UV-C is proven to inactivate 99.99 percent of certain microorganisms. Furthermore, upper room UV-C or upper room GUV can inactivate rather than just capture airborne microorganisms before they can spread. In addition, GUV or upper room UVGI can treat a large volume of air at once, is not flow-limited like ventilation, and doesn't require air capture to treat the air.

How can UV-C technology replace certain cleaning practices such as electrostatic spraying?

Chemical exposure can damage the lungs, skin, and eyes. Disinfecting with UV-C light offers 15 times less risk than electrostatic spraying by reducing the acute hazard potential of chemical exposure.

Given Far-UVC's efficacy on bacteria, what impact might Far-UVC have on natural, healthy skin microflora?

The human microbiome is tough, particularly the skin microbiome. Human skin is exposed to scrubbing with antimicrobials, skincare products, sunshine and environmental conditions, and more. Far-UV should not pose any greater risk to the human skin and the human microbiome than the risks posed by typical human behavior and exposure.

Are there potential issues with drug-resistant organisms that might be able to spread more rapidly if natural flora are reduced by UV-C light?

Drug-resistant organisms become drug-resistant because some particular location inside the bacteria has mutated, making the bacteria resistant to some particular drug. They have to be introduced into a body where they can be exposed to antibiotics in order to become resistant. By contrast, UV-C does not target specific locations in bacteria. UV-C causes random damage within a microorganism's DNA or RNA. Consequently, drug-resistant organisms are still susceptible to inactivation by UV-C. In fact, some studies have found that the addition of UV-C light to manual cleaning in healthcare settings can reduce the MDRO burden in the patient room environment.

How do UV-C applications help in crowded spaces where microbial counts may be higher?

The efficacy of UV-C to address close-range microbial exposure is somewhat unknown and difficult to study experimentally. When a droplet has only a few microseconds to travel between individuals in close proximity to one another, crowding together or even sharing air, environmental interventions are going to be less effective.

Understanding how UV-C can fit into disinfection protocols is important. Ideal UV-C partners are vendors that can identify how to integrate with existing janitorial processes, provide options, and offer solution customization for maximum efficiency and effectiveness. If you would like to learn more about R-Zero's suite of UV-C disinfection solutions, visit rzero.com.

ABOUT R-ZERO

R-Zero's thoughtfully designed and data-enabled disinfection ecosystem goes beyond typical UV-C to continually evaluate risk and enhance layered cleaning protocols in healthcare settings. R-Zero's suite of thoughtfully designed, hospital-grade technologies and science-backed protocols reduce the number of harmful microorganisms in healthcare settings. Through the use of sustainable UV-C disinfection, we enable safer indoor environments and healthier shared spaces with significant economic benefits. Our connected devices and device dashboard create an auditable trail of activity to make the traditionally invisible disinfection process visible. For more information, visit www.rzero.com/healthcare.