



VARIDYN

UVD ROBOT FINANCIAL BENEFITS

Overview



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Time is Money...

Fig 1. Light travels in a straight line. Objects in the path of the light will cast a shadow.

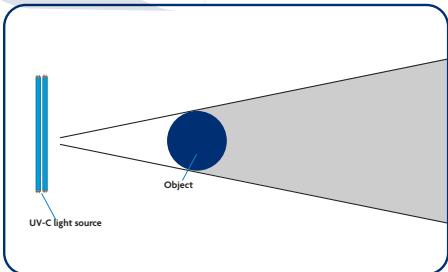
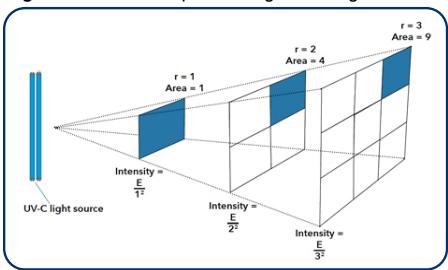


Fig 2. The inverse square law governs light intensity.



Before we can compare costs associated with UV-C room disinfection, we must understand the steps that must be taken to ensure the correct dosage of UV-C on all high-touch surfaces. While highly effective in the inactivation of harmful bacteria, UV-C disinfection has two significant limitations – **Shadow (Fig. 1)** & **Distance To Surface (Fig. 2)**. Fundamental laws of physics govern these limitations; therefore, it is critical to reposition any UV-C device to compensate for these limitations. Failure to do so will result in a low level of disinfection, putting people at risk from harmful bacteria. The simple rule of thumb for UV-C Light disinfection is... the more disinfection positions applied, the better the UV-C Light coverage, and therefore better disinfection is the result.

Moving the device cannot be discounted in the overall labor costs involved with whole a room disinfection.

In the single patient room example to the right, a minimum of five positions (four in the patient room, one in the bathroom) would be required to perform correct UV-C disinfection (**Fig. 3**). Less than five positions would not eliminate all Shadow and Distance to Surface limitations (**Fig. 4**). Logically, as the room size increases, so must the number of disinfection positions.

Fig. 3. A minimum of five positions ensuring optimal results

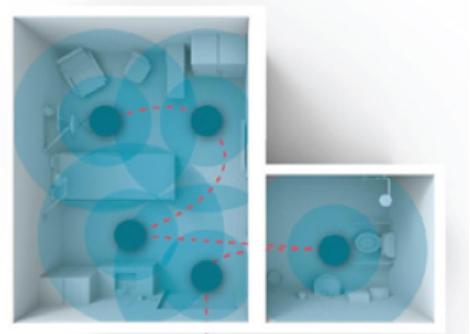
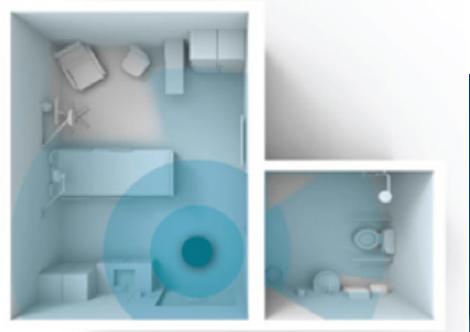


Fig. 4. Insufficient positions will result in a substandard disinfection



You cannot change the fundamental laws of physics governing light behavior, and UV-C is light. The issues of shadow and distance must be considered when applying UV-C light as a disinfectant. There are two options open to solve these issues, moving the UV-C source yourself, or having the source move the UV-C for you...

Now that we understand the repositioning requirements involved...

Let's address the staff workflow associated with achieving repositioning goals.

Disinfection with UV-C Light

The Labor Workflow Comparison

Task Description	Manual UV-C Device	UVD Robot
	5 mins/pos.*	10 mins/pos.*
Collecting the device from storage	10	10
Setting up the device at the 1st position	2	2
Disinfecting from the 1st position	5	10
Moving the device from 1st to 2nd position	2	2
Disinfecting from the 2nd position	5	10
Moving the device from 2nd to 3rd position	2	2
Disinfecting from the 3rd position	5	10
Moving the device from 3rd to 4th position	2	2
Disinfecting from the 4th position	5	10
Moving the device from 4th to 5th position	2	2
Disinfecting from the 5th position	5	10
Removing the device from the room	2	2
Bringing the device back to storage	10	10
Total labor requirements	57 mins	
		82 mins
		3 mins

*Although radiating from a distance of 1m for 5 minutes is sufficiently long enough to inactivate most organisms, radiating from a distance of 2m reduces intensity to only 25%. Unlike the UVD Robot, manual UV-C devices are switched off during repositioning, and therefore, they are not disinfecting. With only four positions in the patient room, there will be surfaces that are 2m away. The accumulated UV-C energy at 2m distance for 5 minutes is identical to the accumulated UV-C energy at 1m distance for only 1 minute and 15 seconds. Therefore, a minimum radiation time of 10 minutes from each position to compensate for distance limitations (the inverse square law) is recommended.

The Future of Disinfection...and Cost Control.



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We have now established the number of labor minutes required to perform a proper UV-C room disinfection. Now, let's now explore what the actual labor costs...

Time is Money...

According to the U.S. Bureau of Labor Statistics, janitors and building cleaners earn a median pay of \$13.19 per hour, or \$27,430 per year. This equates to a weekly rate of \$494.63 based on a 37.5 hour work week. At \$13.19 per hour, this further breaks down to a \$0.22 rate per minute.

Approx.
cost / min
\$0.22

Now, we know the labor per minute cost and the number of labor minutes required for a correct UV-C room disinfection, we can expand our comparison chart even further...

Task Description	Manual UV-C Device	UVD Robot
Total labor costs (1 room)	5 mins/pos.* \$12.54	10 mins/pos.* \$18.04
Total labor costs (5 room)	\$62.70	\$90.20
Total labor costs (10 room)	\$125.40	\$180.40

Finally, we get to the crux of the matter. You will want to put your UV-C device to work as often as possible as infections will not be prevented by devices held in storage. With that in mind, let's looks at the total labor costs involved with ten room disinfections per day, 365 days per year, for five years.

Total labor costs (5 years)	Manual UV-C device 5 mins/pos.* \$228,855	UVD Robot 10 mins/pos.* \$329,230
		\$12,045

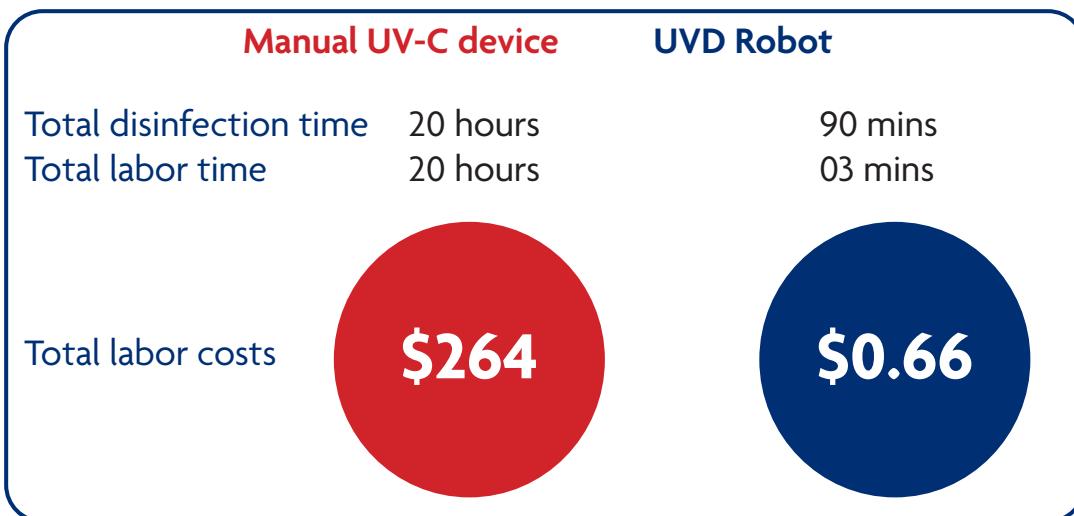
Are you seeing the bigger disinfection picture?

So far, we have analyzed the actual labor costs associated with the disinfection of a single patient room. **What about larger areas of disinfection?**

The Bottom Line...

In March 2019, a leading NHS hospital performed something never seen before in a disinfection process- The full disinfection of a 2000m² outpatient Oncology department in a staggering 90 minutes. Even more impressive was the fact that this disinfection required very minimal labor.

In comparison, two weeks previous, the very same disinfection was performed with a manual UV-C device. The disinfection took 20 hours of labor to complete. The disinfection plan created by the UVD Robot (see below) was based on the manual plan with the exception that the UVD Robot also disinfects while repositioning itself from one disinfection point to the next. This is a critical advantage of the UVD Robot.



Comparison of labor costs - 2000 m² outpatient Oncology department.

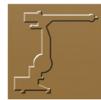
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