

Harnessing the Power of AI-Enhanced UV-C Robots for Healthcare Disinfection



HIGHLIGHTS

- Effective pathogen reduction
- Improved terminal cleaning
- Reduced human error
- Cost saving
- Time saving

Healthcare-associated infections (HAIs) pose a significant threat to patient safety, accounting for millions of infections and tens of thousands of deaths worldwide.

These infections contribute to the development of anti-microbial resistance (AMR), a growing health concern, prolonged hospital stays and increased healthcare costs.

1 in 15
Patients Acquire
HAIs in UK

300.000
Patients
Annually in UK

House of Commons Library 2018

Environmental contamination

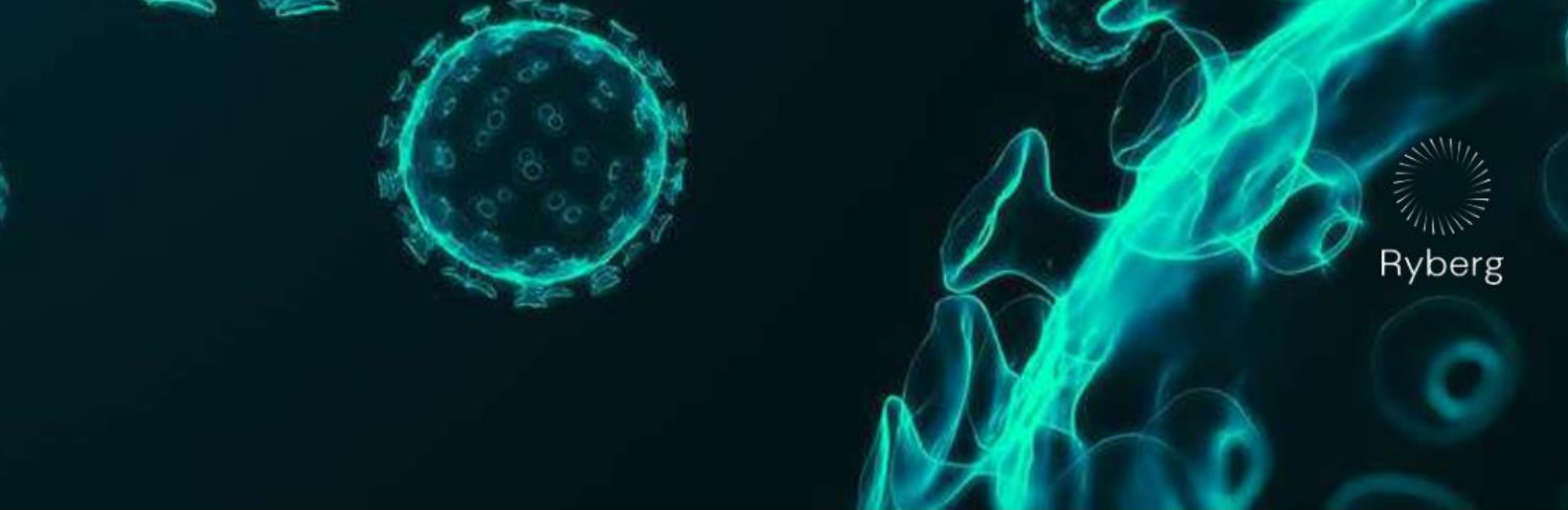
Environmental contamination plays a crucial role in the transmission of HAIs, and traditional disinfection methods, using chemical disinfectants, have limitations in ensuring consistent and thorough decontamination of hospital environments.

Human error, incomplete coverage, residual contamination, and the emergence of resistant microorganisms can compromise the effectiveness of these disinfection methods.

Ryberg's solution

UV-C disinfection deactivates pathogens at the cellular level, providing a safer and more environmentally friendly alternative to chemical disinfection methods. UV-C disinfection has been used for decades to disinfect drinking water, air, and surfaces.

By using Ryberg's AI-enhanced UV-C robots, hospitals can potentially reduce their reliance on chemical disinfectants, thereby minimizing the associated environmental and health risks.



Ryberg's integration of artificial intelligence (AI) into UV-C disinfection technology has further enhanced its potential for healthcare applications.

Ryberg's AI-enhanced robots can autonomously navigate complex hospital environments, for more comprehensive and consistent disinfection.

They can act independent of human interventions which may lead to reduction of mistakes in the infection prevention and control processes

The robots employ algorithms and sensors to map hospital environments, identify high-touch surfaces, and deliver targeted UVC doses to effectively eliminate pathogens.

- **Significantly reduce healthcare-associated infections:** Ryberg's robots can achieve high disinfection efficacy, reduce infections and improve patient outcomes while saving facilities in avoided treatment costs.
- **Enhance coverage and consistency:** By automating disinfection, Ryberg's robots can provide more complete, consistent, and optimal disinfection, compared with manual methods.
- **Save staff time and reduces costs:** Ryberg's autonomous approach can save manual labor needed for traditional disinfection, allowing staff to focus on higher-value tasks while reducing costs.

Clinical Studies Supporting UV-C Disinfection

Multiple clinical studies have shown that adding UV-C disinfection to standard cleaning protocols reduces healthcare-associated infections.

99,99999%
Pathogen
Reduction



Improve
terminal
cleaning



- Nerandzic et al. described the effects of a fully automated UV-C system against hospital pathogens. The device was tested in the laboratory and patient rooms and was shown to significantly reduce *C. difficile* (80%), VRE and MRSA (93%) contamination on frequently handled hospital surfaces.
- McGinn et al, has demonstrated that UV-C robots can effectively inactivate germs on commonly touched surfaces in radiology suites.
- Napolitano et al, studied UV-C interventions with continuously monitored and frequently UV-C-treated patient environment. This approach to UV-C disinfection was associated with a decreased incidence of HAIs up to 34,2%.
- Casini et al, notate that the addition of UV-C disinfection to the standard cleaning and disinfection procedure had effective results in reducing hygiene failures in terminal room disinfection of wards, intensive care units, and operating theaters.

¹ <http://dx.doi.org/10.1186/1471-2334-10-197>

² <https://www.frontiersin.org/articles/10.3389/frobt.2020.590306/full#B35>

³ <https://pubmed.ncbi.nlm.nih.gov/26277574/>

⁴ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10001687/>

Several studies have been conducted to evaluate the effectiveness of Ryberg's AI-enhanced UV-C disinfection robots in reducing the incidence of HAIs in hospital settings.

In one study conducted by Sure Labs in The Netherlands in 2021 found that the use of Ryberg's UV-C disinfection robots was associated with a significant reduction in the incidence of MRSA infections in laboratory settings.

In multiple studies conducted with SEHA and Aman Labs in the United Arab Emirates in 2021, the use of the robots were associated with a significant reduction in the incidence of MRSA in healthcare settings.

Ryberg continues to evaluate the effectiveness of its UV-C disinfection robots in different healthcare settings to ensure that it is integrated into a comprehensive infection prevention and control strategy. The initial results show a significant impact, and the development of Ryberg's next generation technology is an important step forward in the fight against HAIs.

Impact on Healthcare Costs

Ryberg's AI-enhanced UV-C robots can be used for facility-wide UV-C interventions to improve patient safety and reduce healthcare costs.

Raggi et al, compared the HAI rates of 5 multi-drug-resistant bacteria from 6 culture sites before and after a 12-month facility-wide UV-C intervention, and generated a direct cost savings of \$1,219,878 over the 12-month period.

⁵ Sure Labs <https://shorturl.at/vDNU4>

⁶ Aman Labs <https://shorturl.at/kyGK4>

⁷ <https://www.sciencedirect.com/science/article/abs/pii/S0196655318306400>

Costs
saving
potential



Time
saving
potential



Effectiveness in Operating Rooms

Operating rooms (ORs) are critical environments where maintaining a high level of sterility is essential to prevent surgical site infections (SSIs). SSIs can lead to prolonged hospital stays, increased healthcare costs, and even patient mortality.

Ryberg's AI-enhanced UV-C robots can streamline the terminal cleaning process, making it faster and more effective. They autonomously navigate through the OR, ensuring that surfaces are disinfected. This can save time and labor compared to manual cleaning methods.

Birchansky et al, conducted a study to determine the efficiency of an UV-C robot in disinfecting rooms in a healthcare facility. The UV-C robot was able to reliably disinfect 16 rooms within an eight-hour shift and 20 rooms within a 10-hour shift, with each setup taking 10 minutes.

Conclusion

Ryberg's AI-enhanced UV-C robots are a next generation technology in healthcare disinfection, offering an effective solution to combat HAIs and improve patient safety. Their ability to deliver comprehensive, consistent, and adaptable disinfection, coupled with their potential of large cost savings, makes them a potentially valuable asset for hospitals and healthcare facilities worldwide.

Ryberg is a Dutch-based health technology company that is committed to designing and delivering artificial intelligence (AI), robotics, and sensor technologies and solutions for disease prevention on a large scale.

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