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# Intelligent Ultraviolet Light Surface-Disinfecting Devices for Prevention of Hospital (Advanced Sanitization Machine)

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**Abstract** The project is based on Disinfecting the Area where it is mounted. As We are using Ultraviolet Rays for disinfection the area, which is harmful for the Living Beings, hence for providing the prevention we have used the motion sensor for detecting any living beings entering inside the room while disinfection and will be automatically switch off the whole system. The technology is based on AVR Microcontroller and PIR Sensor with Relay interfacing and Motor for Rotating the UVC Mounted system in a 360 rotation.

**Keywords:** AVR Microcontroller, PIR Sensor, Relay interfacing, UVC Mounted system.

## 1. INTRODUCTION

Hospital-acquired infections (HAIs) are infections that patients contract while in the hospital that were neither present nor developing at the time of admission. In Canada an estimated 10% of adults with short-term hospitalization have HAIs. According to 2003 Canadian data, between 4% and 6% of these patients die from these infections. The most common HAIs in Ontario are caused by Clostridium difficile. The standard method of reducing and preventing these infections is decontamination of patient rooms through manual cleaning and disinfection. Several portable no-touch ultraviolet (UV) light systems have been proposed to supplement current hospital cleaning and disinfecting practices.

## 2. OBJECTIVE

This health technology assessment evaluated the effectiveness and budget impact of portable ultraviolet (UV) light surface-disinfecting devices for reducing hospital-acquired infections (HAIs).

## 3. PROBLEM STATEMENT

As We Humans Weren't ready for the novel coronavirus and neither were the machines. The pandemic has come at an awkward time, technologically speaking. Ever more sophisticated robots and AI are augmenting human workers, rather than replacing them entirely. While it would be nice if we could protect doctors and nurses by turning more tasks over to robots, medicine is particularly hard to automate. It's fundamentally human, requiring fine motor skills, compassion, and quick life-and-death decision-making we wouldn't want to leave to machines. "Robotics and automation could play a major role in combating infectious diseases, such as Covid-19," As epidemics escalate, the potential roles of robotics are becoming increasingly clear. "Additionally, robots could enable a form of telemedicine that would keep humans out of areas of contagion. "SARS COVID-19 could be a catalyst for developing robotic systems that can be rapidly deployed with remote access by experts and essential service providers without the need of traveling to front lines," they wrote. A cruel irony of the coronavirus pandemic is that medical professionals know better than anyone that social distancing is critical for slowing the rate of new infections, yet they're forced to be the closest to the disease. And those that need social interaction perhaps more than anybody the elderly are the ones who need to isolate the most, since they're the most susceptible to the disease.

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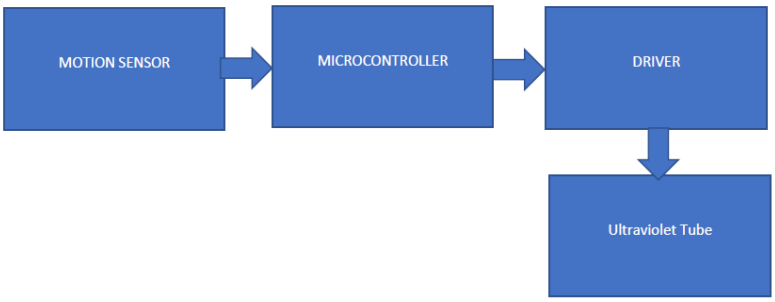
## 4. BLOCK DIAGRAM




## 5. METHODOLOGY

We searched for studies published from inception of UV disinfection technology to January 23, 2017. We compared portable UV surface-disinfecting devices used together with standard hospital room cleaning and disinfecting versus standard hospital cleaning and disinfecting alone. The primary outcome was HAI from C. difficile. Other outcomes were combined HAIs, colonization (i.e., carrying an infectious agent without exhibiting disease symptoms), and the HAI-associated mortality rate. We used Grading of Recommendations Assessment, Development, and Evaluation (GRADE) to rate the quality of evidence of included studies. We also performed a 5-year budget impact analysis from the hospital's perspective. This assessment was limited to portable devices and did not examine wall mounted devices, which are used in some hospitals.

## 6. REFERENCE DESIGN

Our Design consisting of Motion Sensor with Rotating UV top and base with Cluster Wheel for freely movement.

## 7. RESULT

The database search for the clinical review yielded 10 peer-reviewed publications that met eligibility criteria. Three studies focused on mercury UV-C–based technology, seven on pulsed xenon UV technology. Findings were either inconsistent or produced very low-quality evidence using the GRADE rating system. The intervention was effective in reducing the rate of the composite outcome of HAIs (combined) and colonization (but quality of evidence was low). For the review of economic studies, 152 peer-reviewed publications were identified and screened. No studies met the inclusion criteria. Under the assumption that two devices would be purchased per hospital, we estimated the 5-year budget impact of $586,023 for devices that use the pulsed xenon technology and of $634,255 for devices that use the mercury technology.

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## 8. CONCLUSION

We are unable to make a firm conclusion about the effectiveness of this technology on HAIs given the very low to low quality of evidence. The budget impact estimates are sensitive to assumptions made about the number of UV disinfecting devices purchased per hospital, frequency of daytime use, and staff time required per use.

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