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## A new UV-LED device for automatic disinfection of stethoscope membranes.

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### Abstract

**BACKGROUND:** Stethoscopes are widely used by doctors and nurses. Poor stethoscope hygiene is a potential source of nosocomial infection. This study aimed to propose an innovative solution, based on the latest advances in ultraviolet (UV) light-emitting diodes (LEDs), for disinfecting stethoscope membranes automatically and efficiently.

**METHODS:** Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, and Enterococcus faecalis were sown on 28 stethoscope membranes and then transferred to Petri dishes. Treatment involved illuminating exposed Petri dishes with a UVC LED for 1 minute. For each microbe, the number of colony-forming units (cfu) at 36°C was compared in control and treated dishes using the Wilcoxon signed-rank test. The Kruskal-Wallis test was used to assess percent reductions in bacteria. Statistical significance was set at 99%.

**RESULTS:** A significant reduction in cfu counts after UV treatment ( $P < .01$ ) was found for all bacteria: 85.5% for E faecalis, 87.5% for S aureus, 94.3% for E coli, and 94.9% for P aeruginosa. No significant differences in percent reduction in cfu were found between bacteria ( $P > .01$ ).

**CONCLUSION:** The stethoscope, symbol of medicine and health care professionals, has been demonstrated to be a carrier of microorganisms. The treatment technique was effective and efficient in disinfecting the membranes. These promising results represent a step forward toward eliminating stethoscope membrane contamination with an innovative approach.

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**KEYWORDS:** Biotechnology; Disinfection; Health care-associated infection; Stethoscope; UV-LED

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