may be associated with conversion. Active COVID-19 surveillance helps early detection and decreases exposure time.
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Presentation Type:
Oral Presentation
Subject Category: Disinfection/Sterilization
Evaluating N95 Respirator Filtration, Seal, Qualitative and Quantitative Fit with Vaporous Hydrogen Peroxide Reprocessing
Christina Yen; Preeti Mehrotra; Dana Pepe; Sharon Wright; Patrick Gordon and Lalitha Parameswaran

Background: The COVID-19 pandemic has created personal protective equipment (PPE) shortages, particularly of N95 respirators. Institutions have used decontamination strategies including vaporous hydrogen peroxide (VHP) to augment respirator supplies. VHP can be used to decontaminate nonporous surfaces without compromising material integrity. However, little is known about its impact on N95 respirator efficacy. We assessed whether repeated VHP reprocessing altered 4 key respirator efficacy qualities: quantitative fit, qualitative fit, seal check, and filtration rate. **Methods:** We conducted a prospective cohort study from June 15 to August 31, 2020. In total, 7 participants were fitted to a 3M 1860 small or regular N95 respirator based on qualitative and quantitative fit testing. Respirators underwent 25 disinfection cycles with the Bioquell BQ-50 VHP generator. After each cycle, participants donned and doffed respirators and performed a seal check. Participants were given 2 attempts to pass their seal check. Every 10 cycles, qualitative fit testing was done using an aerosolized Bitrex solution. Quantitative fit testing was conducted using a PortaCount Pro 8038 Fit Tester to generate a fit factor score. Appropriate fit is defined as a fit factor score of 100 or greater. Quantitative testing was done at cycles 1, 3, 5, 7, 10, 15, 20, and 25. Filtration efficiencies of particles ≥0.3 μm in diameter were measured using the TSI Optical Particle Sizer 3330 at cycles 1, 5, 10, 15, 20, and 25. The Fisher exact test was used to assess qualitative fit and seal check. The Kruskal-Wallis test was used to analyze quantitative fit and filtration rate. **Results:** We observed no seal-check or quantitative-fit test failures during the study window. All participants passed qualitative fit testing. Although there was a significant degree of variability in fit factor scores across disinfection cycles (mean score 163.5, p <0.05), there was no significant difference between participants (p = 0.6) (Figure 1). There was no statistically significant change in mean filtration rate from cycle 10 to 25 (P = .05), and the filtration rate remained >95% by cycle 25 (Figure 2). **Conclusions:** VHP reprocessing did not diminish the efficacy of N95 respirators based on the 4 metrics we assessed: filtration rate, seal check, qualitative fit, and quantitative fit. Of significance, the filtration rate remained well above the 95% standard filtration for N95 respirators—even through 25 cycles of reprocessing. VHP reprocessing is a safe, viable strategy to disinfect N95 respirators and extend their use, particularly during supply shortages.
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Presentation Type:
Oral Presentation
Subject Category: Environmental Cleaning/Sterilization
Implementation of a Low-Cost Method to Reduce Bacterial Load in Patient-Room Sink Drains
Emilie Bédard; Marie-Ève Benoit; Thibault Bourdin; Dominique Charron; Gaëlle DeLisle; Stéphane Daraiche; Sophie Gravel; Etienne Robert; Philippe Constant; Eric Déziel; Caroline Quach and Michèle Prévost

Background: Sink drains can act as breeding grounds for multidrug-resistant (MDR) bacteria, leading to outbreaks. Drains provide a protected humid environment where nutrient-rich substances are available. Recent and growing installation of water and energy conservation devices have led to increased frequency of drain blockage due to biofilm accumulation. Ineffective drainage may lead to backflow and accumulation of water in the sink during use, increasing the risk of contaminated aerosols formation or direct contamination of surrounding material and equipment. Cleaning and disinfection procedures of sink drains need to be improved to prevent amplification and dispersion of MDR bacteria. The objective of this study was to investigate alternatives to reduce the biofilm and risk of contamination through aerosols. **Methods:** Sink drains from patient rooms were randomly selected in the neonatal intensive care unit of a 450-bed pediatric hospital. We tested 4 approaches: (1) new drain; (2) self-disinfecting heating-vibration drain; (3) chemical disinfection with 20 ppm chlorine for 30 minutes; and (4) thermal disinfection with > 90°C water for 30 minutes. A special device was used during disinfection to increase the disinfectant contact time with the biofilm. Treatments were conducted weekly, with prior sampling of drain water. Other drains were also sampled weekly, including a control drain with no intervention. Bacterial loads were evaluated using flow cytometry and heterotrophic plate counts. The drains were made of stainless steel, a heat-conductive material. **Results:** Preliminary results show that chlorine disinfection had a small impact (<1 log) on culturable bacteria at 48 hours after disinfection but not after a week or repeated weekly disinfection. Thermal disinfection using boiling water is promising, showing an important decrease of 4 log in culturable cells after 48 hours and a concentration still 100× lower 1 week after the disinfection. Repeated weekly thermal disinfection maintained lower culturable levels in the drain. No culturable cells were detected in water from the self-disinfecting drain 2 months after installation, whereas the new drain became fully colonized to concentrations similar to those of drains prior to interventions during the same period. **Conclusions:** Thermal disinfection of drains is a promising alternative

Figure 1. Change in quantitative fit test score

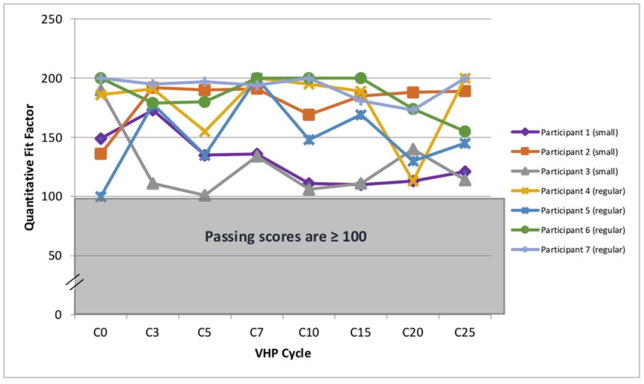

Figure 2. Change in mean filtration rate

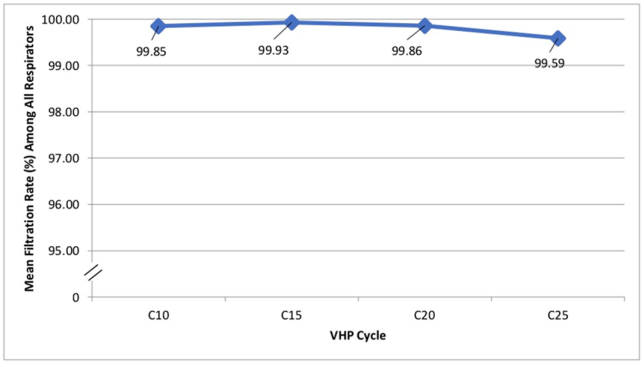

Figure 1.