Poster 1919

Implementation of Hydrogen Peroxide Vapor (HPV) Decontamination of N95 Respirators for Reuse During the COVID-19 Pandemic

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ABSTRACT

To ensure an adequate supply of N95 respirators in response to the global shortages caused by the COVID-19 pandemic, we evaluated and implemented hydrogen peroxide vapor (HPV) to reprocess disposable N95 respirators. Previous work performed by our team showed that HPV was effective in eradicating viable viruses from experimentally contaminated N95 respirators and that they retained their breathability and filtering efficiency for 3 cycles of HPV disinfection[1].

1. Kenney PA, Chan BK, Kortright KE, Cintron M, Russi M, Epright J, Lee L, Balcezak TJ, Havill NL, Martinello RA. Hydrogen peroxide vapor decontamination of N95 respirators for reuse. Infect Control Hosp Epidemiol. 2022 Jan;43(1):45-47.

BACKGROUND

The COVID-19 pandemic led to unprecedented changes in the utilization of healthcare resources and global shortages of personal protective equipment (PPE), including N95 respirators. N95 respirators are regulated by The Centers for Disease Control and Prevention (CDC) National Institute for Occupational Safety and Health (NIOSH) and Occupational Safety and Health Administration (OSHA). N95 respirators are intended for use in a health care setting as a single-use, disposable respiratory protective device to be worn by health care personnel to protect both the patient and health care personnel from the transfer of microorganisms, body fluids, and particulate material. The CDC modified PPE recommendations and provided “crisis alternate strategies” if the respirator supply is exhausted, In addition, the CDC has stated that decontamination and reuse of N95 respirators may need to be considered as a crisis capacity strategy to ensure continued availability.

Reprocessing Center Built

Collection Process Developed

PPE Liaison Teams Trained

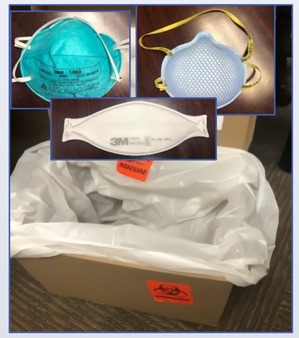
Respirators sorted and hung

HPV Decontamination

Respirators Repackaged

Respirators Ready for Redistribution

Process Map for HPV Decontamination of N95 Respirators



METHODS

A multidisciplinary team performed experiments and PDSA cycles to develop the ultimate process. Key processes and stakeholders were identified and engaged in operations decisions.

A PPE liaison program was developed and implemented to educate and provide guidance to the staff regarding the appropriate handling of used respirators.

A courier process was implemented to collect, transport and deliver bulk containers of respirators between facilities.

Facility Services designed and constructed a centralized respirator reprocessing center to include a receiving location, a negative pressure decontamination area to sort and stage the respirators on racks, two HPV reprocessing rooms and a clean room to receive the reprocessed N95s and to repackage and label for distribution.

Standard operating procedures, staff training and competencies, and Quality Assurance logs for documentation were created.

An application to the FDA for an Emergency Use Authorization was submitted and issued.

RESULTS

Within 18 weeks (March 13, 2020 through July 2020), nearly 32,000 N95 respirators were reprocessed and packaged for redistribution utilizing the 2 HPV disinfection rooms and 5 full time employees. As built, there was capacity to reprocess 5,000 respirators per day.

CONCLUSION

This scalable program enabled YNHHS to ensure an adequate supply of respirators for the safety of staff during the COVID-19 pandemic and global shortages of PPE. A multidisciplinary team and leadership commitment to provide resources for space and personnel were critical for program success.