

## A Low-cost Solution for Retrofitment of HEPA Filter in Healthcare Facilities Providing Care to COVID-19 Patients

The whole world is currently facing an unprecedented threat due to the spread of the COVID-19 virus. The healthcare workers seem to be particularly at risk from the disease given the high incidence of infection in healthcare workers caring for COVID-19 patients.

One of the major causes of risk to healthcare workers may be the increased viral load in their environment when treating the patients who release the viral particles as aerosols [1]. High Efficiency Particulate Air (HEPA) filters of higher grades are considered to be very effective (efficiency up to 99% as against N95 masks which are 95% efficient) in removing air-borne virus particles [2-4]. Ultraviolet light (UV) sterilization may also afford significant protection against the spread of the virus [5].

It is known that many healthcare facilities, especially in low- and middle-income countries, do not have isolation areas fitted with HEPA filtration. Even if they do, in the face of the current rapid increase in the numbers of COVID-19 patients requiring admission, the additional space that needs to be created may not have proper air management.

In this situation, one alternative may be to deploy adequate numbers of regular room air-purifiers with HEPA filters that are commonly used in households for air-pollution, especially the ones with UV light for sterilizing the passing air without releasing UV light into the open environment that may risk exposing the user directly. The United States Centers for Disease Control and Prevention has acknowledged in-room air cleaners as alternative technology for increasing room ventilation when this cannot be achieved by the building's heating, ventilation, and air conditioning system [3].

Such air purifiers placed at bed-level next to the admitted patients may significantly reduce the virus load in the environment. The air-purifiers may be recommended in

high aerosol generating zones like ICUs, operation theaters, procedure rooms, autopsy chambers and swab collection or processing stations. Other patient contact areas like triage areas and CT scan and X-ray units may also be of benefit. Similar purifiers placed in isolation setups for the suspected patients too may reduce the possibility of cross infections from the positive patients.

The use of this low-cost, easily available, off-the-shelf technology may provide HEPA filtration at COVID facilities lacking it, in a simple, cost-effective and plug-and-play manner with zero lag-time, potentially saving lives of frontline healthcare workers.

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### REFERENCES

1. Sayburn A. Are UK doctors getting sufficient protective equipment against covid-19? *BMJ*. 2020;369:m1297. Available from: <https://www.bmj.com/content/369/bmj.m1297>. Accessed on April 10, 2020.
2. Schentag JJ, Akers C, Campagna P. SARS: Clearing the Air. *In: Institute of Medicine (US) Forum on Microbial Threats; Knobler S, Mahmoud A, Lemon S, et al., editors. Learning from SARS: Preparing for the Next Disease Outbreak: Workshop Summary. Washington (DC): National Academies Press (US); 2004. Available from: https://www.ncbi.nlm.nih.gov/books/NBK92445/*. Accessed on April 5, 2020.
3. Medical Advisory Secretariat. Air cleaning technologies: An evidence-based analysis. *Ontario Health Tech Assess Ser*. 2005;5:1-52.
4. Malaithao K, Kalambaheti T, Worakhunpiset S, Ramasoota P. Evaluation of an electronic air filter for filtrating bacteria and viruses from indoor air. *Southeast Asian J Trop Med Public Health*. 2009;40:1113-20.
5. Franklin D, Parra MC, Brown JR, Loftus RW. Perioperative COVID-19 defense: An evidence-based approach for optimization of infection control and operating room management. *AnesthAnalg*. 2020 Mar 26 [Epub ahead of print]. [https://journals.lww.com/anesthesia\\_abstract/publishahead/Perioperative\\_COVID\\_19\\_Defense\\_An\\_Evidence\\_Based.95734.asp](https://journals.lww.com/anesthesia_abstract/publishahead/Perioperative_COVID_19_Defense_An_Evidence_Based.95734.asp). Accessed on April 10, 2020.