

# Efficacy of Portable Air Cleaners and Masking for Reducing Indoor Exposure to Simulated Exhaled SARS-CoV-2 Aerosols — United States, 2021-Dataset

## Dataset Description

### Introduction

SARS-CoV-2 can be spread by droplets and aerosols expelled by infected people when they cough, talk, sing, or exhale. To reduce exposure to these droplets and aerosols while indoors, CDC recommends measures including physical distancing, universal mask wearing, and room ventilation. Ventilation systems can be supplemented with portable air cleaners to remove infectious material from the air more quickly and provide greater protection. We conducted a case study using respiratory simulators to examine the efficacy of portable High Efficiency Particulate Air (HEPA) air cleaners and universal masking at reducing exposure to simulated exhaled aerosol particles from an infected meeting participant in a conference room. We found that, in a room with good air mixing, the use of two HEPA air cleaners meeting the EPA recommended Clean Air Delivery Rate (CADR) reduced the overall exposure by up to 65%, and that the combination of the HEPA air cleaners and universal masking reduced exposure by up to 90%. The air cleaners were most effective when they were close to the aerosol source. Our results demonstrate that portable HEPA cleaners can be an effective method to reduce exposure to airborne particles while meeting indoors, especially in combination with universal masking.

### Methods Collection

- A respiratory aerosol simulator (source) and three breathing simulator (recipient) were placed in a conference room.
- HEPA air cleaners were placed at different locations in the room.
- Aerosols were exhaled into the room by the respiratory aerosol simulator.

- Simulators were tested with and without face masks.
- Aerosol concentrations for 0.3 to 3  $\mu\text{m}$  particles were measured using aerosol optical particle counters.

## Citations

William G. Lindsley, Raymond C. Derk, Jayme Coyle, Stephen B. Martin, Jr., Kenneth R. Mead, Francoise M. Blachere, Donald H. Beezhold, John T. Brooks, Theresa Boots, and John D. Noti (2021). Efficacy of Portable Air Cleaners and Masking for Reducing Indoor Exposure to Simulated Exhaled SARS-CoV-2 Aerosols — United States, 2021. MMWR Morbidity and Mortality Weekly Report 70(27):972-976.

## Acknowledgements

This project was supported by the National Institute for Occupational Safety and Health (NIOSH), US Centers for Disease Control and Prevention (CDC).

<i>Authors</i>	<i>Affiliations</i>	<i>Email</i>
William G. Lindsley	CDC/NIOSH/HELD/ACIB	wdl7@cdc.gov
Raymond C. Derk	CDC/NIOSH/HELD/ACIB	rhd8@cdc.gov
Jayme Coyle	CDC/NIOSH/HELD/ACIB	nti2@cdc.gov
Stephen B. Martin, Jr.	CDC/NIOSH/RHD/FSB	stm9@cdc.gov
Kenneth R. Mead	CDC/NIOSH/DFSE	kcm3@cdc.gov
Francoise M. Blachere	CDC/NIOSH/HELD/ACIB	czv3@cdc.gov
Donald H. Beezhold	CDC/NIOSH/HELD	zec1@cdc.gov
John T. Brooks	CDC/DDID/NCHHSTP/DHP	zud4@cdc.gov
Theresa Boots	CDC/NIOSH/HELD/BB	oph6@cdc.gov
John D. Noti	CDC/NIOSH/HELD/ACIB	ivr2@cdc.gov

## Contact

Allergy and Clinical Immunology Branch  
National Institute for Occupational Safety and Health (NIOSH)  
1000 Frederick Lane, M/S 4020  
Morgantown, WV 26508-5402  
Phone: 304-285-6285