

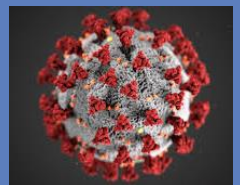


# COVID-19 and Indoor Airborne Transmission

## Clean Air Act Advisory Committee

### EPA ORD Research Activities Paul White, Center for Public Health and Environmental Assessment

December 8-9, 2020



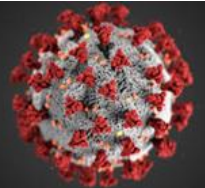
# ORD Aerosol transport research

## Increased recognition of airborne transport of aerosols in disease transmission

- CDC: Scientific Brief: SARS-CoV-2 and Potential Airborne Transmission. <https://www.cdc.gov/coronavirus/2019-ncov/more/scientific-brief-sars-cov-2.html>
- WHO: Coronavirus disease (COVID-19): How is it transmitted? <https://www.who.int/news-room/q-a-detail/coronavirus-disease-covid-19-how-is-it-transmitte>
- Growing scientific literature and commentary. Example: L Morawska and DK Milton. It is Time to Address Airborne Transmission of COVID-19. Clinical Infectious Diseases, July 2020. <https://academic.oup.com/cid/article/doi/10.1093/cid/ciaa939/5867798>

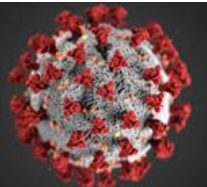
## Sparse information to gauge the magnitude of potential risks in an ordinary office environment.

- Managers have limited basis make decisions about potential risks.
- Concerns of employees returning to the workplace.
- Data on benefits from mitigating actions needed.

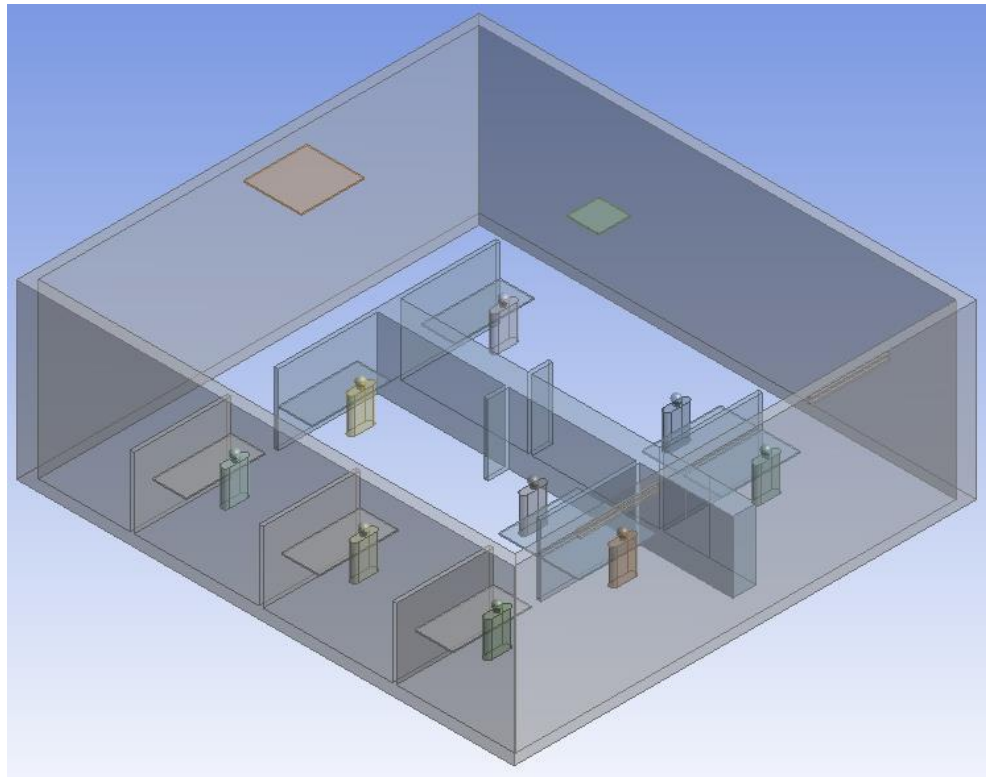


# ORD Aerosol transport research

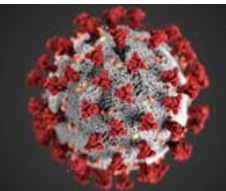
- Computational fluid dynamics (CFD) modeling of particle transport has proven value for viral exposures in medical facilities and aircraft.
- ORD applying CFD modeling to open office/cubicle work environment
  - assumed asymptomatic infected individual at work,
  - estimating aerosol levels that reach other work stations.
- Test the impact of practical office modifications that may reduce viral exposures, e.g., partition heights, overall ventilation, airflow patterns, etc.
- Literature review for estimates of viral release and current understanding of infectivity (dose-response for inhaled virus).
- Collaboration across multiple ORD Centers, OAR Indoor Environments Division, EPA Facilities personnel.



# ORD Aerosol transport research



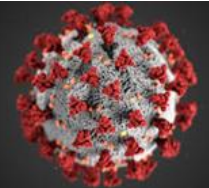
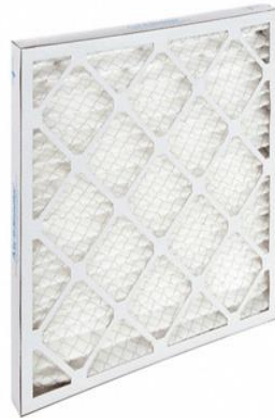
Office Space Prototype



# Aerosol Treatment Research

## Challenge

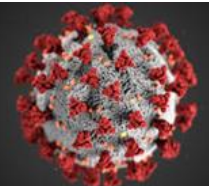
- Growing desire and need to repopulate indoor spaces and much interest in devices that claim to reduce the risk of airborne transmission.
- Need for verification of claims.



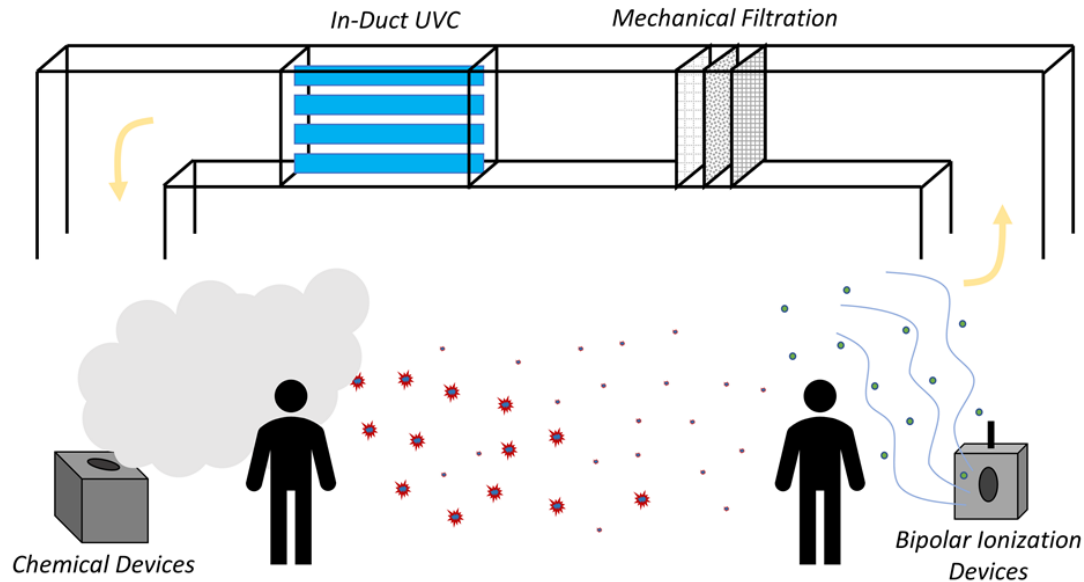
# ORD Aerosol Treatment Research

## Approach

- Evaluate technologies designed to operate in occupied spaces and that may reduce SARS-CoV-2 in air.
- Research using multiple large-scale controlled aerosol test chambers in Research Triangle Park, NC facility
- Collaboration including large transit authorities and EPA's Office of Pesticide Programs.



# ORD Aerosol Treatment Research



## Categories under consideration

- UVC devices. e.g., upper-room germicidal UVC, in-duct UVC, far UVC (*proposed* to be safe for use in occupied areas)
- Chemical devices, in-room or in-duct. e.g., low-concentration ozone, low-concentration hydrogen peroxide, bipolar ionization devices
- Physical removal: e.g., MERV-13 and specialized filters, passive air cleaners

