CONCURRENT SESSION 2 – COVID-19 RESEARCH EFFORTS

Evaluating Aerosol Treatment Methods for Reducing the Risk of Exposure to Airborne Pathogens

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The COVID-19 pandemic has highlighted the role that airborne transmission can play in the spread of disease. Consequently, there has been an increasing focus on technologies that claim to reduce or eliminate aerosolized pathogens in indoor occupied spaces. There are many different types of air treatment methods and technologies, including ultraviolet (UV) light devices, ionization devices, photocatalytic devices, chemical products, mechanical air filtration, and combinations thereof. The efficacy of many of these emerging technologies has not been well characterized, because few independent studies have been conducted. Most testing to date has been conducted at a small scale relative to real-world conditions, making it difficult to extrapolate results to spaces where these technologies would be deployed. Moreover, there is no standard test method or protocol for evaluating these aerosol treatment devices and products, which complicates comparing efficacies across technology types and different laboratory studies. Here, we present research conducted in a large-scale EPA test chamber (3000 ft3) using a standardized testing approach to evaluate the efficacy of different types of aerosol treatment technologies. Testing was conducted using the non-pathogenic bacteriophage MS2, which is a non-enveloped virus that is expected to be more resistant to inactivation than enveloped viruses (e.g., SARS-CoV-2). This presentation will focus on comparing results generated while testing different components of a 3-stage air cleaning system that has been proposed for use in transit vehicles to testing with more traditional mechanical filters. The 3-stage system contains an actively charged electrostatic filter, a UV-C radiation component, and a bipolar ionization component. With the input of stakeholders (including large transit agencies), different combinations of these components were evaluated, as were different types of mechanical filters provided by transit agencies (including those that have been in service). This research informs what added benefit the various components of the 3-stage system and different filter types may have as part of an overall strategy to reduce aerosolized pathogens in a mass transit setting.