

Aerosol Transmission and Air Quality in a Generic Conference Room - Impact of Low-Momentum Ventilation

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ABSTRACT

At the beginning of the COVID-19 pandemic the role of airborne transmission was controversially discussed. Nowadays, based on the available data, it has been that indoor transmission outstrips outdoor transmission as well as smear infection by far. In general, there are two modes of indoor airborne transmission: droplet transmission over short distances and long-distance transmission via aerosols. Indoors, the predominant transport mode is via aerosols due to longer exposure times combined with convective airflows and dissipation, which finally results in a transmission of pathogens throughout the room. Hence, indoor ventilation plays a key role in the spread of airborne diseases. Especially against the backdrop of the globalisation, the occurrence of another pandemic is becoming more and more likely. Therefore, ventilation concepts that lead to a lower viral load in rooms are highly desirable.

In a room with an air conditioning system, the airflow is determined by the superposition of forced convection due to the ventilation and thermal convection caused by the heat release of a human body or other heat sources. This mutual interaction can lead to an uncontrolled and undesired dispersion of aerosols. With the objective of reducing the global, and in particular, the local aerosol concentration in critical areas – in the vicinity of the face - in the room, we have investigated the impact of a low-momentum ventilation on aerosol dynamics and air quality. At the conference we would like to present the experimental set-up, the measurement techniques developed inhouse and the results of the aerosol measurements. Therefore, our conference contribution is divided into two parts: “Comparison of Aerosol and Tracer-Gas-Based Methods” introducing the experimental set-up and the applied measurement techniques in detail and “Impact of Low-Momentum Ventilation” presenting an analysis of the aerosol dynamics, the removal rates and the air quality regarding low-momentum ventilation.