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Turbulent dispersivity under conditions relevant to airborne disease transmission between laboratory animals SIOBHAN HALLORAN, Dept. Chemical Engineering and Materials Science, University of California Davis, ANTHONY WEXLER, Dept. Mech. and Aerospace Eng; Air Quality Research Center; Dept Civil and Environ. Eng.; and Dept Land Air Water Res. University California Davis, WILLIAM RISTENPART, Dept. Chemical Engineering and Materials Science, University of California Davis — Virologists and other researchers who test pathogens for airborne disease transmissibility often place a test animal downstream from an inoculated animal and later determine whether the test animal became infected. Despite the crucial role of the airflow in modulating the pathogen transmission, to date the infectious disease community has paid little attention to the effect of airspeed or turbulence intensity on the probability of transmission. Here we present measurements of the turbulent dispersivity under conditions relevant to experimental tests of airborne disease transmissibility between laboratory animals. We used time lapse photography to visualize the downstream transport and turbulent dispersion of smoke particulates released from a point source downstream of a standard axial fan, thus mimicking the release and transport of expiratory aerosols exhaled by an inoculated animal. We demonstrate that the fan speed counterintuitively has no effect on the downstream plume width, a result replicated with a variety of different fan types and configurations. The results point toward a useful simplification in modeling of airborne disease transmission via fan-generated flows.

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