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Modeling of Indoor Airborne Disease Transmission via Human Expiratory Activities SIMA ASADI, ANTHONY WEXLER, University of California Davis, NICOLE BOUVIER, Icahn School of Medicine at Mt. Sinai, WILLIAM RISTENPART, University of California Davis — Infectious disease transmission between humans by expelled respiratory aerosol particles persists as an important public health issue. Coughing, sneezing, speaking, and breathing are all known to cause micron-scale infectious particles to be emitted into the air, but it remains unclear which expiratory activities contribute most heavily to airborne disease transmission. Here, we use a transient eddy diffusion model with an isotropic turbulent diffusivity to predict the spread of pathogens in an indoor environment. We implement this model to assess the probability of transmission to a nearby susceptible individual when a single infector (a point source) releases pathogen-laden aerosol particles into the air while breathing, speaking, coughing, or sneezing. We also investigate how the presence of"speech superemitters," individuals who release an order of magnitude more aerosol particles than others, affect the probability of transmission. Our results suggest that in some circumstances speaking can lead to higher probabilities of transmission than coughing and sneezing.

William Ristenpart
University of California Davis

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