

Abstract Submitted  
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**Aerosol Emission during Human Speech** SIMA ASADI, WILLIAM RISTENPART, Dept. Chemical Engineering, University of California Davis — The traditional emphasis for airborne disease transmission has been on coughing and sneezing, which are dramatic expiratory events that yield easily visible droplets. Recent research suggests that normal speech can release even larger quantities of aerosols that are too small to see with the naked eye, but are nonetheless large enough to carry a variety of pathogens (e.g., influenza A). This observation raises an important question: what types of speech emit the most aerosols? Here we show that the concentration of aerosols emitted during healthy human speech is positively correlated with both the amplitude (loudness) and fundamental frequency (pitch) of the vocalization. Experimental measurements with an aerodynamic particle sizer (APS) indicate that speaking in a loud voice ( 95 decibels) yields up to fifty times more aerosols than in a quiet voice ( 75 decibels), and that sounds associated with certain phonemes (e.g., [a] or [o]) release more aerosols than others. We interpret these results in terms of the egressive airflow rate associated with each phoneme and the corresponding fundamental frequency, which is known to vary significantly with gender and age. The results suggest that individual speech patterns could affect the probability of airborne disease transmission.

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