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Mucosalivary droplet clouds and deposition fields from synthetic coughs and sneezes[1] BRIAN CHANG, RAM SHARMA, TRINH HUYNH, ARSHAD KUDROLLI, Clark University — Mounting evidence shows that the main transmission mode of the COVID-19 disease caused by the novel coronavirus is through aerosol and droplet generated by expiratory events, such as breathing, talking, coughing, and sneezing. We present a systematic study of mucosalivary droplet dispersal through the air and their deposition distribution on surfaces after expiratory events. We developed a mechanical apparatus that produces synthetic droplets with a controlled size and speed distribution corresponding to the wide range of exhalations. The rheology of the mucosalivary droplets is varied by changing the mucin content to study its effects on the dispersal dynamics. Using laser profilometry, we find that the viscoelastic properties of the medium has significant effects on the distance traveled by the droplet cloud and deposition onto surfaces. Complementary experiments were conducted to test the efficacy of mask fit and material on the spatial temporal evolution of the droplet distributions. This study provides improved guidelines for safe physical distancing practices to mitigate the COVID-19 pandemic and other respiratory diseases.

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