

Abstract Submitted
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Novel Use of a Common Respiratory Treatment: Diminishing COVID-19 Transmission¹ WAYNE STRASSER, REID PRICHARD, Liberty University, SCOTT LEONARD, Vapotherm — This paper demonstrates the use of a 130-million cell hex-dominant mesh to study the spread of aerosolized particles. Our model consists of a full hospital room including two patients and four caregivers. All six airways were accurately modeled using medical imagery and resolved with 0.5 mm mesh elements. Independent breathing curves were represented using sophisticated time-varying boundary conditions that capture key characteristics such as unique sinusoidal inspiratory and exponential expiratory curves, as well as randomly varying tidal volumes. We present results from multiple sets of numerical methods to demonstrate numerical accuracy. Based on these results, we offer general findings on the spread of contagion within a hospital room and demonstrate the effectiveness of a novel respiratory apparatus at reducing aerosol emission. This apparatus consists of a high velocity nasal insufflation cannula in conjunction with a PVC face mask connected to suction.

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