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The modes of transmission of SARS-CoV-2 and other respiratory viruses: What we know now, and how to protect ourselves

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The modes of transmission of COVID 19 have been the subject of intense controversy. Overwhelming evidence supports that COVID 19 transmission is mostly airborne: some infected people (those with high viral load) exhale little balls of respiratory fluid and saliva that contain the virus ("respiratory aerosols"), that float in the air like an invisible smoke, following air currents. Aerosols infect when we inhale them, and easily explain substantial transmission in close proximity, superspreading events, and why transmission indoors is far larger than outdoors. Surface transmission is difficult, and not a single case of surface transmission has been demonstrated. A small fraction may go through ballistic "WHO" droplets, mostly important when an infected person coughs or sneezes on someone's else face. The causes of the WHO's extreme resistance to aerosol transmission are rooted in a century of denial of airborne transmission, since the work of American public health luminary Charles V. Chapin in 1910. I will present some ideas about how to protect ourselves better from COVID 19 in the coming months and also from other respiratory diseases, focusing on the ones that appear to be underappreciated: (1) the use of visible CO2 monitors in all public spaces where we share air with others; (2) the critical importance of mask fit; and (3) the types of air cleaners, of which some are very useful (filters and UV) and others are likely or certainly dangerous (those based on chemistry such as ions, plasmas, and hydroxyls, or those based on spraying chemicals in the air). Resources include: Lancet: https://doi.org/10.1016/S0140-6736(21)00869-2; Science 1: https://science.sciencemag.org/content/372/6543/689; Science 2: https://www.science.org/doi/10.1126/science.abd9149; Scientist's frequently asked questions: http://tinyurl.com/faqs-aerosol; Presentation slides: http://Bit.ly/COVID-Aerosols3; Estimator of COVID-19 transmission: http://tinyurl.com/covid-estimator; Twitter: http://twitter.com/jljcolorado