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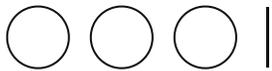


OPINION

Opinion: What secondhand smoke tells us about the coronavirus

Mark Gerstein and Jordan Peccia

Updated: Dec. 12, 2020 12 a.m.



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The Centers for Disease Control and Prevention has changed its guidance, now suggesting COVID-19 can be transmitted via an airborne route, involving aerosols.

This change has caused considerable confusion; for many grappling with aerosols can be disconcerting: how do we build an intuition about something we cannot see, feel, taste or smell? A simple way is to think about a much-maligned culprit from years ago: secondhand smoke.

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First, some review: traditionally, the coronavirus that causes COVID-19 is thought to be mostly transmitted by large droplets. These droplets are released when an infected person talks, coughs or even exhales. The droplets are too large to remain airborne and fall to the ground like rain around a person's radius.

Six feet is easy for people to understand, and v

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Commonly called aerosols, airborne viruses are different from droplets in three crucial aspects. First, they are much smaller, so small that they don't fall to the ground and so can move along with building air currents, potentially around barriers, and travel distances much farther than 6 feet. Second, there are more than 100 airborne virus particles for every droplet, but in open air, their dispersion is very rapid. Third, surgical and cloth masks (but not N95 masks) are less effective at shielding us from airborne viruses than droplets.

Airborne transmission has a significant impact on how people deal with COVID-19, particularly now that people are spending more time indoors for the fall and winter. It was even relevant for a recent presidential debate: The candidates were socially distant, but commentators wondered whether Joe Biden could have received an infective viral dose from Donald Trump's airborne emissions.

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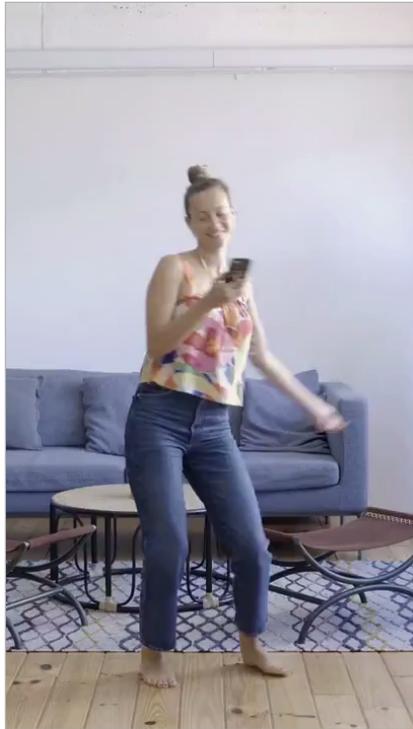
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Particles in cigarette and cigar smoke are aerosols, and they move and disperse in a building or outdoors in a similar fashion to airborne viruses. However, a key difference is that people can see and smell them and are quite used to avoiding them. Because of concerns about secondhand smoke, people have great intuition about when they would smell it, such as in a stuffy indoor room versus outdoors with a breeze. Room air mixes rapidly, and even if one is sitting 15 feet away from a smoker in a restaurant, the cigarette won't escape detection. Moreover, we know that a person was smoking in a room even after leaving it, or opening a window or running an air filter reduces the smell (and exposure). Finally, unlike the droplet situation, where facing directly at a speaker is the most vulnerable position, people even intuitively recognize that the secondhand smoke cast off by someone walking in front of them accumulates behind in a wake, although they aren't facing the smoker.

All of these intuitions can be carried over to the coronavirus: imagining going into a room where there are smokers provides a good intuition about how to be careful about aerosol transmission of the virus. Don't get into crowded situations, especially indoors. With time, airborne virus concentrations decrease due to dispersion and die off. Ventilation can make this occur more rapidly, as can opening windows. Well-ventilated buildings are much more protective. Note that homes are typically poorly ventilated compared to schools or office buildings.

While the chances of infection by aerosols are likely small, those at high risk need to take every precaution available. Treating air smoke provides a powerful way to think about

Mark Gerstein is the Williams Professor of Bio

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and disease. Jordan Peccia is the Golden Professor of Environmental Engineering at Yale University and studies human exposure to microbes in buildings.

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Written By

Mark Gerstein and Jordan Peccia

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