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It's the Aerosols, Stupid

Few sentient residents of the United States will forget the state of ignorance that we faced when the COVID-19 pandemic landed on us in March 2020. Could we open packages, could we pump our own gas, or could we talk to neighbors across the street? Hugs, shaking hands, or even fist bumps were out. Almost none of us have touched an acquaintance outside of our immediate households in over a year.

We know more now. In a fascinating article in the *New York Times* (<https://www.nytimes.com/2021/05/07/opinion/coronavirus-airborne-transmission.html>), Dr. Zeynep Tufekci takes us through the state of the science that has not always been shared with us. Within the past week, the World Health Organization (WHO) wrote the following on its web site (<https://www.who.int/news-room/q-a-detail/coronavirus-disease-covid-19-how-is-it-transmitted>)

The “Three C’s” are a useful way to think about this. They describe settings where transmission of the COVID-19 virus spreads more easily:

- **C**rowded places;
- **C**lose-contact settings, especially where people have conversations very near each other;
- **C**onfined and enclosed spaces with poor ventilation. [*emphasis added*]

The risk of COVID-19 spreading is especially high in places where these “3Cs” overlap.

Dr. Tufekci notes that for the most part these are INDOOR transmissions. We can plan golf and tennis. We take long outdoor walks. Within limits we can start to populate outdoor stadiums, and (possibly) outdoor music events.

It is all about *aerosols*. She notes that aerosols are smaller respiratory particles that can float. The virus (according to WHO) can also be transmitted “in poorly ventilated and/or crowded indoor settings,” because “aerosols remain suspended in the air or travel farther than 1 meter.”

This is a health economics blog, and your blogger (YB) is a long-time academic with a particular interest in what happens on college campuses. What can we reopen, and when? What does all of this say about crowded bars and restaurants, indoor concerts, or religious services. Bars have tens or hundreds of people in close proximity engaging in oral contact lubricated by liquids. Large lecture halls, concert halls, dormitory halls, church and synagogue chapels, or dormitory rooms are crowded, and most often not well ventilated. Singing, or playing the clarinet or trumpet, are all about aerosols. This is what singers and wind instruments do, and bands and choirs do it *en masse*. Indoor areas where these events occur are teeming with aerosols.

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The answers are vaccination and/or ventilation. Detroit's venerable Orchestra Hall is close to 100 years old, and no one can ventilate it properly. During a winter's concert, one has over a thousand concert-goers in a closed hall, literally on top of each other. The answer is vaccination of the patrons (with vaccine passports the best way to verify) and the players. Ventilation can be a worthwhile alternative. It is good for its own sake, and new building should mandate appropriate ventilation, but it is expensive (billions of dollars for all of the building in the United States) and time-consuming (probably taking a decade or more).

All of this suggests that we can possibly open the Big House in Ann Arbor, but possibly not Hill Auditorium, or Crisler Arena. Large and crowded classrooms, restaurants, or dining halls, are still probably a year or more away. Cruise ships? No time soon. No one is happy about this, but we are still facing 800 to 1,000 deaths per day from COVID-19, with the current national total pushing 600,000 (in less than 14 months), depending on the data source.

YB hates to be a scold, but it's the aerosols, stupid! Let's use the science to inform our policy.

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