

Urban density is not linked to higher coronavirus infection rates, is linked to lower COVID-19 death rates

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A new study suggests that denser places, assumed by many to be more conducive to the spread of the coronavirus that causes COVID-19, are not linked to higher infection rates. The study, led by a researcher at the Johns Hopkins Bloomberg School of Public Health, also found that dense areas were associated with lower COVID-19 death rates.

The study was published online June 18 in the *Journal of the American Planning Association*.

For their analysis, the researchers examined SARS-CoV-2 [infection](#) rates and COVID-19 death rates in 913 metropolitan counties in the U.S. When other factors such as race and education were taken into account, the authors found that county density was not significantly associated with county infection rate.

The authors also found that denser counties, as compared to more sprawling ones, tended to have

lower death rates—possibly because they enjoyed a higher level of development including better health care systems.

On the other hand, the authors found that higher coronavirus infection and COVID-19 mortality rates in counties are more related to the larger context of metropolitan size in which counties are located. Large metropolitan areas with a higher number of counties tightly linked together through economic, social, and commuting relationships are the most vulnerable to the pandemic outbreaks.

"These findings suggest that [urban planners](#) should continue to practice and advocate for compact places rather than sprawling ones, due to the myriad well-established benefits of the former, including [health benefits](#)," says study lead author Shima Hamidi, Ph.D., a Bloomberg Assistant Professor of American Health in Environmental Challenges in the Department of Environmental Health and Engineering at the Bloomberg School.

Recent polls suggest that many Americans now consider an exodus from big cities likely, possibly due to the belief that more density equals more infection risk. Some [government officials](#) have posited that urban density is linked to the transmissibility of the virus.

Hamidi, whose research background is in urban planning and architecture, and colleagues found otherwise. She and her colleagues, Sadegh Sabouri, a doctoral student, and Reid Ewing, Distinguished Professor of City and Metropolitan Planning at the University of Utah, examined data from January 20 through May 25 on 913 metropolitan U.S. counties, using an approach known as Structural Equation Modeling and taking into account factors such as [population size](#), education levels, and demographic variables

including age and race, and health care infrastructure such as ICU bed capacity.

The researchers determined from this analysis that, when controlling for other factors, a measure of density that they termed the "activity density"—which takes into account both residents and workers in a given area—did not have a significant association with SARS-CoV-2 infection rates. Higher activity density did, however, have a significant association with COVID-19 death rates, but an unexpected one.

"The fact that density is unrelated to confirmed virus infection rates and inversely related to confirmed COVID-19 death rates is important, unexpected, and profound," says Hamidi. "It counters a narrative that, absent data and analysis, would challenge the foundation of modern cities and could lead to a population shift from urban centers to suburban and exurban areas."

The analysis found that after controlling for factors such as metropolitan size, education, race, and age, doubling the activity density was associated with an 11.3 percent lower death rate. The authors say that this is possibly due to a faster and more widespread adoption of social distancing practices and better quality of health care in areas of denser population.

The authors conclude that a higher county population, a higher proportion of people age 60 and up, a lower proportion of college-educated people, and a higher proportion of African Americans were all associated with a greater infection rate and mortality rate.

The researchers have been updating the data as the pandemic progresses, and are finding that the associations they have uncovered are becoming even stronger, Hamidi says. The team is also conducting a [longitudinal study](#) that tracks the relationships among density, the county-level SARS-CoV-2 infection rates and mortality rates, and explanatory factors as they change over time, and have found consistent results regarding the inverse relationship between [density](#) and the COVID-19 mortality rate.

"Does Density Aggravate the COVID-19 Pandemic? Early Results and Lessons for Planners" was written by Shima Hamidi, Sadegh Sabouri, and Reid Ewing.

More information: Shima Hamidi et al, Does Density Aggravate the COVID-19 Pandemic?, *Journal of the American Planning Association* (2020). [DOI: 10.1080/01944363.2020.1777891](https://doi.org/10.1080/01944363.2020.1777891)

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