

Density Is New York City's Big 'Enemy' in the Coronavirus Fight

New York is more crowded than any large city in the country. That helps explain why it is the U.S. epicenter of the outbreak.



By Brian M. Rosenthal

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New York has tried to slow the spread of the coronavirus by closing its schools, shutting down its nonessential businesses and urging its residents to stay home almost around the clock. But it faces a distinct obstacle in trying to stem new cases: its cheek-by-jowl density.

New York is far more crowded than any other major city in the United States. It has 28,000 residents per square mile, while San Francisco, the next most jammed city, has 17,000, according to data from the U.S. Census Bureau.

All of those people, in such a small space, appear to have helped the virus spread rapidly through packed subway trains, busy playgrounds and hivelike apartment buildings, forming ever-widening circles of infections and making New York the nation's epicenter of the outbreak.

"Density is really an enemy in a situation like this," said Dr. Steven Goodman, an epidemiologist at Stanford University. "With large population centers, where people are interacting with more people all the time, that's where it's going to spread the fastest."

The challenge facing New York and other tightly cramped cities around the United States can be seen by comparing the country's largest city to its second biggest, Los Angeles.

As of Monday, there were more than 13,000 confirmed cases of coronavirus in New York and about 500 in Los Angeles. New York reported 125 deaths; Los Angeles reported seven.

The population of Los Angeles is about half of New York's, and it has conducted significantly fewer tests for the coronavirus. But researchers said one of the biggest reasons for the difference may be that in general, California residents live further apart from each other.

"Out here, we're spread out," said Dr. Lee Riley, professor of infectious diseases at the University of California Berkeley School of Public Health. "People use cars, the public transportation system is terrible. Whereas in New York City, you have the subways, the buses, Times Square, people living in your small apartment buildings."



New York's subways and buses bring millions of people close together on a normal day. Demetrius Freeman for The New York Times

By almost any measure, New York has more bustling humanity living, working and playing side-by-side than anywhere in the country.

On an average workday, more than 5 million people jostle onto the city's subway trains — as many trips as Los Angeles sees in half a month. Far more people live in cramped public housing units in New York — 400,000 — than in any other city. And nearly 40 million people visit Times Square every year, making it one of the busiest tourist attractions in the world.

In the past weeks, as the coronavirus crept into the country, that crush of people was a vulnerable target.

Dr. Deborah L. Birx, the White House's coronavirus response coordinator, said on Monday that the "attack rate" — the percentage of the population infected with the virus — was nearly one in 1,000 in the New York area, five times higher than in other parts of the country.

"So, to all of my friends and colleagues in New York, this is the group that needs to absolutely social distance and self-isolate at this time," she said. "Clearly, the virus had been circulating there for a number of weeks to have this level of penetrance into the general community."

Concerns about density were also at the forefront as New York officials discussed the spread of the virus in increasingly alarmed tones. New York City is now among the worst hot spots in the world: The city now has more coronavirus cases per capita than Italy, the world's epicenter of the virus outside of China,

where it originated.

Gov. Andrew M. Cuomo said more than 20,000 people throughout New York state had tested positive for the virus so far, and 157 had died. More than 2,600 remained hospitalized.

Hospitals across New York City and surrounding areas reported increasing numbers of cases as administrators announced new restrictions on visitors, and workers warned about shortages in protective equipment. Mr. Cuomo announced plans to send hundreds of thousands of masks, gloves and gowns to health care facilities, and said the Jacob K. Javits Convention Center in Manhattan would be repurposed into four "emergency hospitals."

But he said that initial measures to control the spread of the virus were not working, especially in New York City, where people had been gathering in parks over the weekend and not staying far enough away from each other.

He said he was still awaiting a plan from the city to prevent residents — especially young people — from getting too close, perhaps by imposing more controls on public spaces and opening some streets to pedestrians.

"I touch this table — the virus could live here for two days. You come tomorrow, I'm gone, you touch that spot," Mr. Cuomo said. "In New York City, all that density, a lot of people are touching a lot of spots, right? Park bench, grocery counters. Just picture the city in daily life."



Crowds shopped at the Union Square Greenmarket in Manhattan on Saturday despite government orders that people stay inside and avoid getting too close to each other. James Sprankle for The New York Times

Gov. Ron DeSantis of Florida said on Monday that he would sign an executive order directing the state's surgeon general to require anyone flying to the state from New York or New Jersey to observe a mandatory 14-day quarantine.

Many coronavirus cases in Florida, especially in counties that include Miami, Fort Lauderdale and West Palm Beach, have been tied to New York, and a recent uptick in travel from the region suggested New Yorkers were flying to Florida to flee restrictions.

Coronavirus appears to spread from person-to-person through droplets produced by coughing, sneezing and spitting, according to the initial research. It is mostly transmitted by people with symptoms of the virus, but asymptomatic transmission also appears possible.

The Coronavirus Outbreak

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Updated June 16, 2020

- **I've heard about a treatment called dexamethasone. Does it work?**
The steroid, dexamethasone, is the first treatment shown to reduce mortality in severely ill patients, according to scientists in Britain. The drug appears to reduce inflammation caused by the immune system, protecting the tissues. In the study, dexamethasone reduced deaths of patients on ventilators by one-third, and deaths of patients on oxygen by one-fifth.

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It has spread throughout the world, including in cities and countries that are not very crowded.

But researchers have noticed that New York City has a similar population and a somewhat similar density to that of Wuhan, the Chinese city where the virus originated.

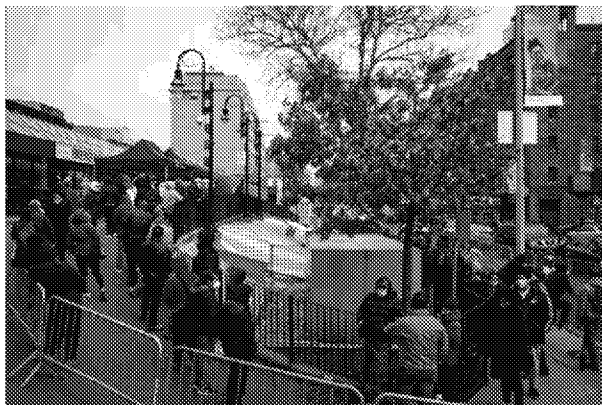
No American city is like New York, a regional economic hub that is also a magnet for international commerce and tourism, drawing in 60 million visitors a year. Before the onset of the coronavirus ground the city to a halt, more than 3,000 planes were landing at its airports every day.

Drawing in travelers and commuters from neighboring states, the city holds about 10 million people at any given time.

Certainly, there may be other reasons aside from density that cities such as Los Angeles have such a lower rate of coronavirus cases compared with New York, researchers said.

Los Angeles has taken longer to implement widespread testing, and it has partially shied away from testing, fearing that it would waste resources. Andrea Garcia, a spokeswoman for Mayor Eric Garcetti, said that there were four testing sites in the city, but the locations were only disclosed to those who qualified for the test.

On Monday, officials in Los Angeles County said they planned to significantly increase its testing soon.



Elmhurst Hospital in Queens has drawn large groups of people waiting to get tested for the coronavirus. Dave Sanders for The New York Times

Another factor in the differing rates between New York and Los Angeles may be the warmer weather in Southern California, a climate that some early analysis suggests may slow the spread of the virus.

Regions with average temperatures above 64.4 degrees Fahrenheit (or 18 degrees Celsius) account for fewer than 6 percent of global cases so far, according to researchers at the Massachusetts Institute of Technology.

Other possible factors include better containment measures, or just the randomness of who happened to contract the virus first, and where they went.

Still, public health experts said that density was likely the biggest reason for why the virus has torn through New York City and not yet hit to the same degree elsewhere. They urged other cities and towns around the country to pay attention.

"New York City is often the first to get hit because of how dense it is, and how many international travelers come through," said Thomas R. Frieden, the former director of the Centers for Disease Control and Prevention as well as the New York City health department. "The question now is whether the rest of the U.S. will learn from New York and avoid the situation that it is facing and is likely to get worse in the coming days and weeks."

Patricia Mazzei, Adam Popescu and Liam Stack contributed reporting. Susan Beachy contributed research.