



Research Highlight: COVID-19 in the United States during 2020

Study Estimates that One in Three Americans Had COVID-19 by the End of 2020

[DMS-funded researchers](#) have modeled the spread of the SARS-CoV-2 coronavirus, finding that fewer than one-quarter of infections (22%) were accounted for in cases confirmed through public health reports based on testing. The study estimates that 103 million Americans, or 31 percent of the U.S. population, had been infected with SARS-CoV-2 by the end of 2020.

The study is the first to comprehensively quantify the overall burden and characteristics of COVID-19 in the U.S. during 2020. The researchers simulated the transmission of SARS-CoV-2 within and between all 3,142 U.S. counties using population, mobility, and confirmed case data. The study's implications include the following.

Infections were more widespread in some areas of the country. In areas of the upper Midwest and Mississippi valley, including the Dakotas, Minnesota, Wisconsin, and Iowa, more than 60 percent of the population is estimated to have been infected by the end of 2020. In five metropolitan areas the researchers examined, 48 percent of residents of Chicago, 52 percent of Los Angeles, 42 percent of Miami, 44 percent of New York City, and 27 percent of people in Phoenix, had been infected.

Testing picked up on a growing number of infections but offered an incomplete picture. The portion of confirmed cases reflected in the study's estimates, i.e. the ascertainment rate, rose from 11 percent in March to 25 percent in December, reflecting improved testing capacity, a relaxation of initial restrictions on test usage, and increasing recognition, concern, and care-seeking among the public. However, the ascertainment rate remained well below 100 percent, as individuals with mild or asymptomatic infections, who could still spread the virus, were less likely to be tested.

One in 130 Americans was contagious at year's end. Roughly 1 in 130 Americans (0.77%) was contagious with SARS-CoV-2 on December 31, 2020. A similar percentage (0.83%) was estimated to be latently infected, i.e. infected but not yet contagious. In some metropolitan areas, the percentage of individuals who was contagious at year's end was much higher.

Cities peaked at different times of the year. New York and Chicago experienced strong spring and fall/winter waves but little activity during summer; Los Angeles and Phoenix underwent summer and fall/winter waves; and Miami experienced all three waves. Los Angeles County, the largest county in the U.S. with a population of more than 10 million people, was particularly hard-hit during the fall and winter and had a community infection rate of 2.4 percent on December 31.

Pei, S., Yamana, T.K., Kandula, S. *et al.* Burden and characteristics of COVID-19 in the United States during 2020. *Nature* (2021). <https://doi.org/10.1038/s41586-021-03914-4>

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