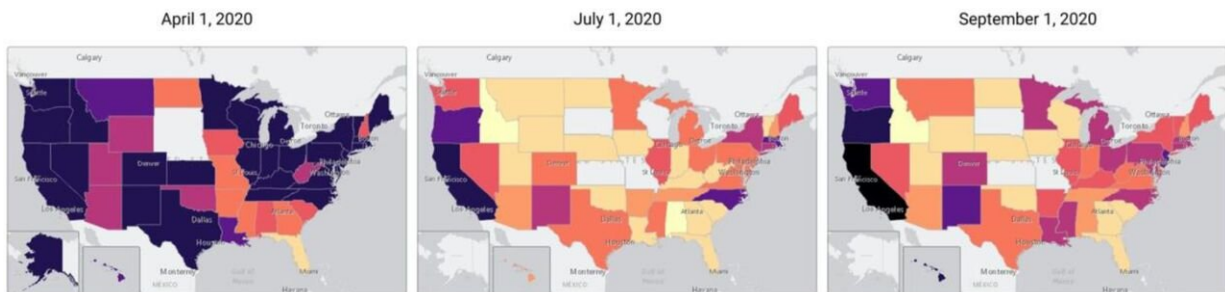


States urged to cooperate on COVID-19 mitigation

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Spatial temporal maps showing state NPI score over time display heterogeneity in state responses. Each restriction was out of a maximum of one point. States had the maximum score of five points when all five categories had restrictions at 100%, (i.e., either full closure or extreme limitations, depending on the category). The darker the color of a state the stronger the NPI restrictions (and the higher the score). Credit: DOI: 10.1101/2021.07.28.21261286

Non-pharmaceutical interventions can be effective at limiting the spread of COVID-19, but individual states need to consider their geographical neighbors for mitigation strategies to be successful, argues a new analysis by University of Pittsburgh and Carnegie Mellon University (CMU) scientists.

The study also found that these interventions need at least three to four weeks to have a measurable effect in dampening COVID-19 spread.

Given the urgent need for high-quality data informing public health preparedness for a possible new wave of coronavirus infections, Pitt and CMU researchers published their findings in medRxiv, a preprint website, and announced their results today, ahead of peer-reviewed publication.

"Simple measures like masking mandates and restrictions on gatherings can have considerable impact on the number of cases and trajectory of infections," said senior author Seema Lakdawala, Ph.D., associate professor in the Pitt School of Medicine's Department of Microbiology & Molecular Genetics. "As we face an uptick in SARS-CoV-2 infections and suboptimal vaccination rates, it is important to identify strategies that can keep virus-related hospitalizations down."

In the months after the World Health Organization declared COVID-19 a global pandemic, states across the nation implemented varying strategies to control the spread of the virus. To compare different interventions and determine which strategies were most effective, Lakdawala and colleagues partnered with Rebecca Nugent, Ph.D., the Stephen E. and Joyce Fienberg Professor and department head, Statistics & Data Science at Dietrich College of Humanities and Social Sciences at CMU, and other scientists in CMU's Department of Statistics & Data Science. They scoured [state government](#) and governors' websites of all 50 states and the District of Columbia to painstakingly reconstruct the progression of the pandemic over the past year.

The analysis revealed that, not surprisingly, stronger statewide interventions—such as universal masking mandates, gathering restrictions and restaurant and bar closures—implemented between March 2020 and March 2021 were associated with fewer COVID-19 deaths.

Of the 23 states that implemented a robust combination of the three

measures mentioned above, only about 35% had a mortality rate above the national average. In contrast, of the 28 states with less stringent [mitigation strategies](#), nearly 75% had a mortality rate exceeding the national average.

The scientists also discovered that neighboring states with different [intervention](#) strategies and coronavirus restrictions had similar COVID-19 case trajectories, cautioning public health officials to pay attention to states in close proximity.

"We discovered that some groups of states located geographically close to one another—such as in the Midwest—had similar patterns in case counts, despite the fact that their mitigation strategies were different," said Nugent. "The clustering that we observed may be correlated with environmental conditions, such as temperature and humidity, but we think that it's most likely a reflection of intermingling due to travel."

The researchers also found that nearly a month is needed to observe whether the interventions had a desired effect on reduction of COVID-19 cases.

"When tracking the efficacy of public health interventions, it's important to be patient. There was a three- to four-week lag between when interventions were put in place and when their effects became apparent," said Nugent. "It may take a while to see the impact of restrictions, so it's important not to lift them prematurely. We should also consider implementing them earlier when cases begin to go up, before it's too late to stop the large surges in case numbers."

The researchers have created an interactive dashboard, [PhightCOVID.org](#), that reflects the dynamics of implementation of non-pharmaceutical interventions and COVID-19 cases. They urge [local governments](#) to consider these insights in guiding the public health

response and pandemic preparedness as the Delta variant gains a foothold in areas of the country with low vaccination rates.

"Vaccines remain the single most effective way to control the spread of the virus and lead us out of this pandemic," said Lakdawala, also a member of Pitt's Center for Vaccine Research. "But vaccines aren't the only [strategy](#) that we have available. Simple interventions, like universal masking mandates, are extremely effective in curbing the spread of this deadly virus and should be used when other options aren't available."

More information: Annika J. Avery et al, Variations in Non-Pharmaceutical Interventions by State Correlate with COVID-19 Disease Outcomes, (2021). [DOI: 10.1101/2021.07.28.21261286](https://doi.org/10.1101/2021.07.28.21261286)

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