Children's Hospital of Philadelphia
PolicyLab

Study Confirms Social Distancing as Most Effective Intervention Against COVID-19

Philadelphia, Pa. – July 23, 2020 – Social distancing remains the most effective intervention that we have to reduce the spread of COVID-19, according to a new PolicyLab at Children's Hospital of Philadelphia (CHOP) study published today in *JAMA Network Open*. The study, which was among the first to look at the effects of weather on COVID-19 transmission, found spring-like temperatures were associated with some reduction in the spread of the virus, but the beneficial impact of temperature was easily diminished when social distancing was not implemented, particularly in densely populated areas.

Overall, the researchers sought to understand how time-varying factors at the county level, such as weather and social distancing, impact reproduction numbers (Rs), or the estimate of how many additional individuals will get COVID-19 for every one person infected. The researchers found that even with benefits of warming temperatures between February 25 and April 23, 2020, communities needed to maintain significant social distancing to keep Rs below one, indicating a slowing infection rate and an eventual decrease in cases over time. This concept of reducing the R below one is at the foundation of the mitigation strategies the White House Coronavirus Task Force shared with state governments last week.

The researchers monitored social distancing during the initial period of the pandemic using county-level cellphone data from Unacast, a human mobility data company, which estimates travel to non-essential businesses and compared that to pre-pandemic trends. The results of the study supported a reopening strategy that was cautious and delayed until case counts in the region were low. Given the amount of social distancing that was required to reduce Rs to safe levels, the results also illustrate why enforceable mitigation policies such as limitations on gathering sizes, reduced occupancy in places of business and universal masking requirements were so critical to containing viral transmission over the summer.

"Our data reveal that if the United States had collectively waited longer, opened more slowly, and then kept our gathering sizes small, we might have reduced case counts like Europe or Canada and experienced a relatively normal summer, free of extreme disease burden from COVID-19," said David Rubin, MD, MSCE, director of PolicyLab at CHOP, professor of Pediatrics at the University of Pennsylvania's Perelman School of Medicine and lead author on the study. "As the pandemic resurgence continues, we must commit to social distancing and universal masking nationwide in order to gain control of this epidemic and avoid a potentially catastrophic fall and winter season."

To study the effects of weather on COVID-19 transmission, the researchers used wet-bulb temperatures, which capture the combined effect of temperature and humidity and, at less than 100% relative humidity, are lower than the dry-bulb temperatures reported on the daily news. They found that wet-bulb temperatures between 60-65°F had the greatest benefit on reducing the spread of the virus. The researchers hypothesize that this temperature range is protective against transmission because colder weather may facilitate greater respiratory transmission, while warmer weather encourages gatherings of more people.

"As we've seen play out across the country in recent weeks, our study substantiates that higher temperatures alone were never going to be enough to stop the spread of this dangerous virus," said Gregory Tasian, MD, MSc, MSCE, faculty member at PolicyLab, associate professor of Surgery and Epidemiology and senior scholar

in the Center for Clinical Epidemiology and Biostatistics at the University of Pennsylvania's Perelman School of Medicine and senior author on the study. "However, we found that strong social distancing policies were far more important than warmer temperatures in reducing transmission at the county level."

The data and methodology from this study has since helped develop the COVID-Lab: Mapping COVID-19 in Your Community, which tracks and projects COVID-19 transmission at the county level. Researchers at PolicyLab at CHOP and the University of Pennsylvania developed the model to observe how social distancing, population density, daily temperatures and humidity affect the number and spread of COVID-19 infections over time across a county. Each week, the model is run to generate four-week case projections for 519 counties, representing 71% of the U.S. population and 88% of all identified coronavirus cases.

"Our model is unique in that it considers the impact of local-area effects on COVID-19 transmission, including temperature, humidity, social distancing and population density," said Dr. Jing Huang, faculty member at PolicyLab at CHOP, assistant professor of biostatistics in the Department of Biostatistics, Epidemiology and Informatics, and a senior scholar in the Center for Clinical Epidemiology and Biostatistics at the University of Pennsylvania's Perelman School of Medicine. "We've assessed the capabilities of our model weekly to make the best predictions possible, and in addition to seeing how accurate our forecasts have been over time, we have been encouraged to see how useful they have been to local policymakers during this crisis."

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About PolicyLab at Children's Hospital of Philadelphia: PolicyLab at Children's Hospital of Philadelphia (CHOP) is dedicated to achieving optimal child health and well-being by informing program and policy changes through interdisciplinary research. Founded in 2008, PolicyLab is a Center of Emphasis within the CHOP Research Institute, one of the largest pediatric research institutes in the country. With more than 30 highly regarded faculty and 60 passionate staff who bring expertise from myriad of fields covering health, research and health policy, our work focuses on improving public systems, improving health care delivery and improving child health outcomes. For more information, visit **http://www.policylab.chop.edu**.