PolicyLab Studying Effect of Weather, Social Distancing on Local COVID-19 Spread

Population Health Sciences

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Editor's note: This blog post originally appeared on "Cornerstone," the blog of Children's Hospital of Philadelphia's Research Institute.

Researchers in PolicyLab at Children's Hospital of Philadelphia are working on a model that may help state and local officials decide when it may be safe to loosen restrictions imposed to combat the COVID-19 pandemic.

They are using real-time data from 260 counties throughout the country to determine the impact that social distancing and weather are having on the transmission of the novel coronavirus at the local level. Current models, particularly the Institute for Health Metrics Evaluation (IMHE) model that has become the mainstay for federal government projections of COVID-19, focus on the disease's impact on large areas, namely states.

"When all is said and done with this epidemic, every city is going to realize its own experience with COVID-19," said David Rubin, MD, MSCE, director of PolicyLab at CHOP. "What we're doing differently is that we are trying to help people in these local areas better understand what is happening in their own backyards, to inform how they might make decisions to safely reopen their communities. It assumes that local areas don't necessarily follow the national pattern."

The 260 counties represent the major metropolitan areas in the United States, and include about 50% of the population. Each state is represented in the study. The researchers are culling data from several sources, including direct daily downloads of SARS-CoV-2 cases from the New York Times, temperature and humidity data from the National Oceanic and Atmospheric Administration, and the movement of individuals within the counties. Other data sources include the U.S. Census.

The model aims to provide complementary information to existing models, such as the IMHE model, which is mainly measuring deaths and the strain on healthcare systems at the state level.

“The reason that this can provide complementary information is that it will allow local and state governments and national leadership to make informed decisions about the transmission in the area,” said Gregory Tasian, MD, MSc, MSCE, faculty member at PolicyLab, Assistant Professor of Urology and Epidemiology, and senior scholar in the Center for Clinical Epidemiology and Biostatistics at the University of Pennsylvania Perelman School of Medicine. “We are measuring the impact of not only temperature on that transmission, but other characteristics that are unaccounted for in current models, mainly the characteristics of cities and counties and their populations, as well as the impact of social distancing, directly measured by the movement of individuals within the area.”

The model will allow officials to understand where they are now, in terms of transmission, but the researchers are also examining how well the model will predict the future of COVID-19 transmission.

Dr. Rubin said that the volume of research that comes out of CHOP, not only pediatric research, but also multidisciplinary health services research in general, is what makes CHOP an ideal place to conduct this study.

“To me, it’s the right people, at the right time, asking the right questions, and then we quickly crowdsource an amazing team,” Dr. Rubin said. “All of that comes together to create a unique modeling team that is going to add tremendous value in terms of understanding the epidemic. In addition, CHOP’s networks run wide and deep. We’re already connected to the local, state, and federal levels, and will be using these prestigious connections to disseminate our information.”

Although the model is currently designed specifically for COVID-19, there is potential that with some fine-tuning and after peer-review, it can be utilized for future pandemics.

“This is a new method that we are learning and validating with the COVID-19 pandemic,” said Jing Huang, PhD, assistant professor of Biostatistics in the Center for Clinical Epidemiology and Biostatistics and the University of Pennsylvania Perelman School of Medicine, and assistant professor of Biostatistics in Pediatrics at CHOP. “If we validate that method, it could be potentially used in the future for a similar infectious disease crisis.”