Reopen Mapping Project shows health and job tradeoffs for policies in US cities

August 17 2020, by Morgan Foy

As states and cities grapple with how to reopen businesses, schools, and other staples of everyday life amid surges in COVID-19 infections, Asst. Prof. Abhishek Nagaraj and a team of researchers across four universities are building an interactive website that shows how different policies affect employment and the number of deaths from the virus.

The Reopen Mapping Project illustrates that the same limits on social interactions can have very different consequences in different locations, underscoring that the most effective policies must be tailored to local characteristics such as population density, age, and employment and movement patterns, Nagaraj says. It also illuminates a phenomenon that's playing out in real time: Denser cities and places that were relatively less affected early in the pandemic are likely to see faster growth in cases as they loosen restrictions

"In different cities, the patterns in which people mix and meet each other is extremely local," he says. "Every specific city has its own fingerprint in terms of mobility, and that of course has a major impact on the spread of the virus."

The website, which Nagaraj is building with a team of economists and transportation scientists from Berkeley, Stanford University, Harvard University, the University of Chicago and the urban planning platform Replica, aims to complement ongoing studies across epidemiology, public health, and social science to forecast trade-offs between different reopening policies.

The interactive site is based on a database of anonymous cellphone location data to model how individuals within a city move around on a typical day, allowing the researchers to estimate the number of "contacts" the average person encounters—whether it be a family member, co-worker, or someone in the grocery store. The model also incorporates electronic medical records data, surveys on people's ability to work from home, and insights from the growing global body of COVID-19 epidemiology literature.

(The site is meant as a preliminary tool, and the researchers encourage anyone interested in applying it to a real-world application to contact them. They've also open-sourced the data and code behind their models on Github.)

Currently, the online tool allows users to choose a city—initially it's Chicago, Kansas City, New York City, Houston and Sacramento, but the researchers plan to add data for more cities as it becomes available—and then choose a policy mix. They can then see how that mix changes the number of jobs lost and the estimated number of lives lost due to the coronavirus.

Chicago vs. Sacramento

In a recent working paper that served as the basis for the Reopen Mapping Project website, the researchers considered differences across two of the cities: Chicago and Sacramento. On a typical day before COVID-19, the average person under the age of 50 in Chicago encountered twice as many people relative to someone over 80. This gap was much less pronounced in Sacramento, however.

They also found differences across industries in the two cities. For example, health workers in both cities encountered over 350 contacts daily pre-pandemic. Yet the simulation revealed that the average worker in Chicago—across all industries—encountered about 50 more people daily than the average worker in Sacramento.

The model allowed the authors to construct estimates of the number of specific contacts people had across age groups. Unsurprisingly, the results illustrate that the majority of a person's interactions are with people in the same or similar age groupings. But in terms of protecting the most vulnerable, it is important to also know how many encounters the average young person has with the elderly population: In Chicago, for instance, adults under 50 were in contact with people over 60 for about 50% more time relative to adults in Sacramento.

The researchers modeled how infection and employment rates evolve when a city moves from a policy of only essential workers going in to work (what they call Phase 2) to a less-restrictive cautious reopening policy where people go back to work and school, but social interactions are still limited (Phase 3). In both example cities, they modeled what would happen when most of the workforce returns to in-person activities under cautious reopening. In Chicago, this would cause infection rates to rise to the point where about 4% of the population would become infected. A similar pattern emerges in Sacramento, but with a considerably lower rate of infection—peaking at about 1%.

They then considered alternative Phase 3 reopening scenarios that have been proposed. In the first hypothetical scenario, which they call isolate 60+, mobility is not restricted for younger people but people aged 60 or older must limit their movement to only visiting local stores. Under the second scenario, work from home if possible, those who can work from home do so, but schools reopen. Lastly, under an alternating schedule scenario, people return to work and school but at different times: either alternating mornings and afternoons, or alternating days of the week.

Density matters

In Sacramento, the four different policy scenarios produced very similar results in terms of mortality rates, but implementing relatively more restrictive policies like alternating schedules led to an additional 8 million lost work days. In Chicago, however, the different policies have larger consequences on mortality. For example, work from home resulted in about 700 fewer deaths relative to the less restrictive cautious reopening scenario, with similar impacts on employment. Moreover, work from home is better for both mortality and employment relative to isolate 60+. If limiting deaths is the only goal, alternating schedules ranks as the best policy. The authors note that a hybrid solution, where those who can work from home do so, while other workers alternate schedules, would likely be even better for both health and the economy.

Provided by University of California - Berkeley

Citation: Reopen Mapping Project shows health and job tradeoffs for policies in US cities (2020, August 17) retrieved 4 May 2024 from https://phys.org/news/2020-08-reopen-health-job-tradeoffs-policies.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.