

Reconnecting Society and Reopening the Economy

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A few weeks ago, MIT Connection Science held its annual Sponsors' Meeting online. The virtual meeting included a number of very interesting presentations. Given its critical importance, I want to focus my discussion on Reconnecting Society After a Pandemic, a talk given by visiting professor Esteban Moro.

Moro started his presentation by showing a slide borrowed from this article. The slide illustrates that if we had done nothing, or just relied on soft mitigation and herd immunity to contain the spread of the Covid-19 virus, the number of cases and deaths would have gone up very rapidly, - overwhelming healthcare systems around the world. Instead, many national and state governments adopted two distinct sets of actions, *the hammer* and *the dance*.

The hammer is the somewhat draconian social distancing policies aimed at containing the spread of the virus, especially in regions like the New York metro area where the number of cases were escalating at a very pace. *The dance* starts once the spread of the virus has been brought under reasonable control, - albeit at the price of huge economic costs and societal disruption. The *dance* is the longer term effort to keep the virus contained until there's an effective vaccine while reopening the economy and bringing life as close to normal as possible.

How successful has the social distancing *hammer* been? Earlier this year, Moro and collaborators evaluated the effectiveness of social distancing policies in the NY metro area by analyzing anonymized geolocation data. They found that NY's social distancing policies had indeed led to major changes in where people spend their time and how they interact with each other. As of late March: "distance travelled everyday dropped by 70% from a weekend average of 25 miles in February to 7 miles"; "the number of *social contacts* in places decreased by 93% from 75 to 5," where *social contact* is defined as being within 25 meters (82 feet) of each other for at least 5 minutes; and "the number of people staying home the whole day has increased from 20% to 60%".

In his Reconnecting Society talk, Moro explained the research now being pursued by a team of fourteen collaborators from around the world to understand the kinds of *dance* policies that will allow restarting the economy and getting back to a more business-as-usual lifestyle. The Reconnecting team built a model that allowed them to explore strategies for the lifting of social distancing interventions in conjunction with testing, the isolation of those who test positive, and the tracing and quarantining of their exposed contacts. Using the model, the team compared the impact of different mitigation and containment strategies aimed at minimizing the risk of additional pandemic waves while providing an acceptable trade-off between economic and public health objectives.

"The new coronavirus disease 2019 (COVID-19) has required the implementation of severe mobility restrictions and social distancing measures worldwide," wrote the team in a recently published paper on their research. "While these measures have been proven effective in abating

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the epidemic in several countries, it is important to estimate the effectiveness of testing and tracing strategies to avoid a potential second wave of the COVID-19 epidemic.”

To do so, the team analyzed the impact of various social distancing, testing, contact tracing and quarantine policies using anonymized, privacy-enhanced data from mobile devices in the Boston metropolitan area, as well as socio-demographic and census data. As was the case in the earlier social distancing analysis in the NY metro area, the Boston mobility data comes from [Cuebiq](#), a geolocation-based intelligence and measurement company, and in particular, from Cuebiq’s [Data for Good](#) initiative which makes its data available for academic research and humanitarian programs.

“We find that enforcing strict social distancing followed by a policy based on a robust level of testing, contact-tracing and household quarantine, could keep the disease at a level that does not exceed the capacity of the health care system,” said the team. The research paper explains their models and analytical methods in great detail. Let me briefly summarize the paper’s findings and recommendations.

The overriding finding is that “gradually removing the restrictions imposed by social distancing could lead to a second wave with the potential to overwhelm the healthcare system if not combined with strategies aimed at the prompt testing of symptomatic infections and the tracing and quarantine of as many of their contacts as possible.” More specifically, if stay at home and social distancing policies are lifted after 8 weeks by reopening most work and community places other than restaurants, theaters and similar locations, resurgence of the epidemic and a second COVID-19 wave are inevitable.

On the other hand, “a proactive policy of testing, contact tracing and contacts ’household quarantine allows the gradual reopening of economic activities and workplaces, with a low COVID-19 incidence in the population and a manageable impact on the health care system.” For example, “Assuming the identification of 50% of the symptomatic infections, and tracing of 40% of their contacts and households, only about 9% of the population would be quarantined at any time.” However, this will only work if those who test positive are isolated at home, and their household members and contacts are successfully quarantined for two weeks.

While still a significant fraction of the population, this is a much better option when compared to the more massive social distancing *hammer* policies first deployed to contain the escalating spread of the virus. Moreover, in his presentation at the MIT online meeting, Moro showed that tracing 20% of the contacts of those infected, - while not as effective as 40% contact tracing, - will still work and be much, much better than not tracing contacts at all, as long as contacts and household members quarantine for two weeks.

These modeling methods can be used to evaluate reconnecting and reopening strategies for any other cities and metropolitan areas as long as similar data is available.