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Antibody testing for SARS-CoV-2

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How it all started on March 15, 2020..

It's Dangerous to Test Only the Sick

By Neeraj Sood

President Trump says 1.4 million tests for the novel coronavirus will become available this week. That's welcome news. But officials are about to make a mistake. The president said testing will be limited to people who believe they may be infected. "We don't want everybody taking this test, it's totally unnecessary," he said.

This would make sense if there were a cure. Without one, this strategy won't curtail either the epidemic or the anxiety associated with it. We will continue to bleed billions of dollars in economic costs from disruption of normal life.

Testing has two purposes apart from diagnosing individual cases. The first is to obtain accurate information on the virus's infectivity and mortality rates. If the true rates for the coronavirus are similar to those of the flu, then it isn't necessary to shut down the global economy and lose trillions of dollars. But if they're much higher, drastic measures are imperative.

Testing only sick or symptomatic patients will not get us to the truth. To see why who we test matters, consider the flu. Its mortality rate is around 0.1%—meaning that of *everyone* infected with the flu, tested or not, 1 in 1,000 die of it. If we only tested people who are hospitalized with flu-like symptoms, the mortality rate jumps 75-fold. Similarly with the coronavirus, testing only sick and symptomatic people will result in an overestimate of mortality, which would heighten fear and anxiety and worsen their economic effects.

Random sampling is essential to learn the truth about virus spread and deadliness.

The way to learn the truth is to test a random sample of the population in major cities with an outbreak. Random testing would reveal the true mortality rate and also how many people have the virus, an important factor in determining its infectivity. Authorities need to start conducting random testing now, with statisticians in the coronavirus command center guiding the design. If the infectivity and mortality rates turn out to be similar to those of the flu, this approach could avert billions of dollars in economic loss and calm public fears.

The second purpose of testing is to avert spread by isolating those who are infected. In this regard, it is unclear that relying exclusively on people who are volunteering for the tests makes sense. These are probably people who are exhibiting symptoms and heeding public-health messages to isolate themselves at home, as they would do for seasonal flu. A study of flu-vaccine strategies (of which I am a co-author) shows that self-selection doesn't get at the high-risk populations.

A good strategy would be to combine drive-thru tests with targeted testing of high-risk populations to try to catch people who are unwittingly spreading coronavirus.

The response to the coronavirus has already cost billions of dollars due to shutdowns and other economic disruptions. A global recession may be in the offing. That is a big price to pay as insurance against a risk that is not well understood. We don't need to accept all the fear and anxiety as inevitable. Proper statistical testing can give us the answers.

Mr. Sood is a professor at the University of Southern California's Schaeffer Center for Health Policy and Economics.

Progress as of May 07, 2020

- Conducted seroprevalence study in Santa Clara county on April 4, 2020
- Conducted seroprevalence study in Los Angeles county in collaboration with Los Angeles County Public Health Department on April 10, 2020
  - Second wave today
- MLB tested employees in 25 cities, working on analyzing the data
- Seroprevalence studies of first responders and children underway
- Helping numerous counties/cities within the US and cities across the world conduct seroprevalence studies

What we have learnt so far

- Number of confirmed COVID-19 cases are a poor proxy for the extent of infection in the community.
- The true extent of infection is about 50 fold higher than the number of confirmed cases
- Results are robust to accounting for accuracy of tests and non-response bias
- Several of those who are infected did not experience symptoms consistent with COVID-19 (fever with cough, fever with shortness of breath, loss of sense of smell/taste)
- Loss of sense of smell/taste is important predictor of infection
- Infection rates vary by geography, income, and race/ethnicity

What does this mean for policy?

- Mortality rate and hospitalization rate lower than estimates based on confirmed cases
  - Need to update models/forecasts based on new evidence
  - Chances of virus overwhelming the health care system are lower than initially assumed/forecasted
- Contact tracing is challenging
  - Many more infected
  - Many are asymptomatic
- Need a longer time horizon to evaluate policy decisions
  - Still far away from herd immunity/end of epidemic

Some thoughts on policy

- Social distancing or lockdowns do not change the number of infections over a long time horizon; they just change the timing of infections
- Benefits of stringent social distancing:
  - reduces the probability of overwhelming the health care system, which could reduce COVID-19 mortality
- Costs of stringent social distancing:
  - Increases chances of higher peak in second wave as further from herd immunity
  - Leads to reduced quality of life and social problems
  - Leads to economic costs for citizens, businesses, non-profits, governments
  - Delayed care seeking and associated health effects
  - Children out of school
- The key is to choose the level of social distancing that maximizes benefits, net of costs
- Consider options other than stringent social distancing
  - Risk segmentation
  - Investing in health care