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A temporary coronavirus testing fix: Use each kit on 50 people at a time.

We don't have enough tests. Group testing offers a way to make best use of them.

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Before backing away from the proposal after an outcry from health officials, President Trump floated the idea of lifting some of the rules on self-isolation as early as Easter — to limit economic damage. Epidemiological models, on the other hand, suggest that social lockdowns should be eased up only very gradually over the coming 12 months.

The kernel of truth at the core of the president's unwise suggestion is that a long recession, or depression, caused by the novel coronavirus would itself exact a heavy toll on human health, well-being and life expectancy. Restarting economic life is indeed important. Yet the key to resuming other activities, lies in testing the U.S. population — and then permitting only healthy people to exit mandatory isolation.

The problem is that without sufficient testing, we don't know who is healthy (given that people can have the disease but no symptoms). And even though the United States, after a shamefully slow start, is now testing 100,000 samples per day, according to Health and Human Services Secretary Alex Azar, that still means the nation will be playing catch-up for many weeks to come.

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One solution to the mismatch between the scale of the problem and the shortage of tests? Test people in groups — that is, examine DNA samples drawn from multiple people at the same time.

That approach isn't as effective as testing each person daily, as Boston University economist Laurence Kotlikoff has proposed, which might be the ideal course of action if we had unlimited access to tests. But combining samples of, say 50 people, and then “clearing” the group — or, alternatively, requiring all members to remain at home — would nudge social and economic life toward normality more quickly than the rudderless testing path the United States has embarked on. Depending on the perceived urgency of getting people back to work, officials could either go on to test each member of the groups that tested positive, or keep the focus on identifying virus-free groups.

Group testing is not a new idea. It was developed by Robert Dorfman, a professor of political economy at Harvard University, during World War II to efficiently remove from the Army men who had syphilis. Using Dorfman's brainchild, blood samples from groups of men were tested together. If the test was negative, all men were deemed good to go; if it returned positive, then at least one man was known to be syphilitic, and all men in the group would be tested individually.

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The idea is being revived in the current crisis. In the case of the coronavirus, the best method of testing involves two steps: taking samples from individuals, then using a powerful method known as PCR to detect the virus DNA in the sample. The first step is relatively cheap and manageable, given enough swabs, but the second has become a bottleneck. Faced with that problem, researchers in Israel, Nebraska and, more recently, Germany have begun to experiment with pooling samples. In fact, Nebraska's Public Health Lab put the idea into practice — and started looking at five samples at a time, given a shortage of testing resources.

The obvious advantage of the Dorfman method is that it allows for the testing of a much larger population for any given number of tests. The real number of coronavirus cases in the population is difficult to know; the official U.S. number of more than 160,000 cases is certainly vastly underestimated, as it has been in other countries. With the number of cases doubling every three days, as much as 2 percent of the population could be infected soon.

Let's say we test samples from groups of 10 people with the Dorfman method. Assuming 2 percent of the population is infected, 82 percent of groups will be deemed clean — and therefore released. Of the remaining 18 percent of groups, a further 10 tests will be needed. Still, overall, that means four times as many people can be tested, for any given number of tests.

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Enhancing test capacity by a factor of four is a huge improvement, to be sure. But if test shortages persist, and if economic collapse makes it imperative that healthy people return to work as soon as possible, officials could use a more rough-and-ready approach: You could test groups, but skip the step of individually testing those in the “positive” groups. In this case, we recommend vastly increasing the size of groups — testing in groups of 50. After that change, again assuming a 2 percent infection rate, 36 percent of groups will come up negative, and all 50 people in each of those groups can be returned to the workforce. On average, each test administered will allow 18 people to return to work — a mechanism that could save both lives and the economy.

Of course, such a procedure is only desirable if testing is accurate enough. Testing in groups magnifies the problem of false negatives. Fortunately, according to specialists — including the teams at Technion (the Israel Institute of Technology) and the Frankfurt University Hospital at Goethe University working on group testing — PCR is extremely accurate, and dilution doesn’t make detection less effective.

Another objection to our (second) procedure is moral: How can officials not test individuals in a group once they know at least one is infected? But consider that this approach closely resembles current protocols in the United States. If anyone in such a group developed strong symptoms, they would seek medical attention, and an individual test would be performed; so long as symptoms remained manageable, they would stay at home. That's essentially what is happening now.

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Running this strategy with a capacity of 100,000 tests per day — the current capacity, according to Azar — would allow the United States, we calculate, to safely release 13 million people back into the economy each week. We could beat the virus by keeping infected people confined yet save the economy by releasing most of the labor force within a few months.

We are by no means claiming a scientific breakthrough here; group testing dates back some eight decades. But the gravity of the situation, and the shortage of coronavirus tests demand creative thinking. Stay-in-place orders will certainly bend the curve of viral transmission. But we won't know it's safe to go back to work without tests. And until we have enough tests for everyone, group testing is a very solid "second best" solution.

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Updated March 31, 2020

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