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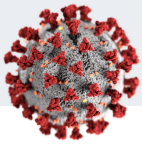
Athens Covid Update
Issue No. 23



COVID-19 testing:

Success Lies in Frequency, Accessibility, and Turnaround Time.

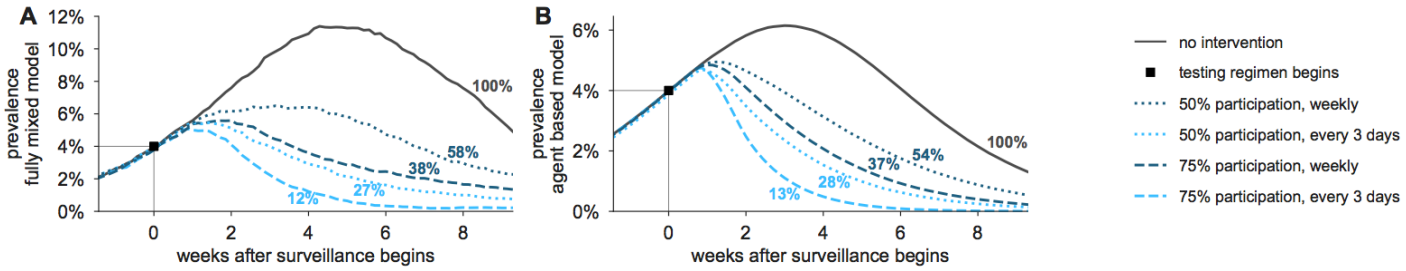
The scientific community has heavily debated the control of the COVID-19 pandemic over the past 7 months. Treatment therapies, isolation guidance's and vaccine developments have all changed as we have continued to learn more about SARS-CoV-2 dynamics. What hasn't changed however is the scientific community's tests and testing strategy.

A recent study awaiting peer review looks into a different type of testing philosophy to improve access, price and frequency of SARS-CoV-2 testing[2]. Since the pandemic began, the gold standard of testing has been PCR tests. PCR tests can detect a small amount of SARS-CoV-2 virus at early points of infection, making this highly sensitive test ideal for diagnostic testing. While this test may be reliable, delayed lab times and accessibility are its limiting factors. PCR tests are great at detecting infections in people who are asymptomatic and pre-symptomatic, but the percentage of the population that gets tested while asymptomatic is relatively low. Since these asymptomatic and pre-symptomatic people are less likely to get tested, it would be assumed they are more likely to transmit the virus. What Larremore et al. covers in his paper is the need for such sensitive PCR testing as the United States's only means of testing and how a more readily available test with lower sensitivity could improve pandemic response.

"Surveillance testing of 75% of individuals every 3 days was sufficient to drive the epidemic toward extinction within 6 weeks"

Through mathematical modeling, Larremore et al. studies the effect of implementing more frequent but less sensitive surveillance testing systems with an almost instant response time. This ideal testing system's efficacy was modeled in two scenarios, a less dense but active area with lower prevalence of infection (think college towns) and a densely populated city that already has a high prevalence if infection (think New York). In both scenarios, researchers simulated an outbreak accounting for ongoing prevention efforts, false negative test rate and the idea that not everyone would be interested in participating. The model produced hopeful results, finding that if 75% of the population participated in surveillance testing every 3 days, localized epidemics would end within 6 weeks. In other scenarios, weekly testing of 50% of the population shows significant improvement as well. Estimated Epi curves, something all of us have gotten familiar with, can be seen in the graph below.

Surveillance testing suppresses an ongoing epidemic.
Graph A represents smaller population with low disease prevalence, graph B represents larger population with higher prevalence.



While these findings are exciting, what exactly would this Utopian testing strategy look like in real life? Still focusing on the main characteristics, these lower sensitivity tests would ideally be done at-home or easily and quickly accessible. In addition to accessibility, the time it takes to get results would be same day or less than 15 minutes. There have been similar tests passed by the FDA, but worries about low sensitivity and false negatives keep these tests from being rapidly used [1]. Although there are possibilities of undetected infection, the key to this surveillance testing efficacy would be the frequency of the tests.

Example: If an infected individual were to test a negative on Monday (false negative, because viral load was below the detectable threshold) by the time they are tested next, let's say Wednesday their viral load would be above the infectious threshold and test positive.

The model also relies on the fact that a surveillance testing method tests should be free or low cost to the public to ensure these tests could be used by all. They are cheaper and easier to manufacture. PCR testing would still be used, but for a diagnostic purpose and still remain our gold standard. Chick here to view the full article.

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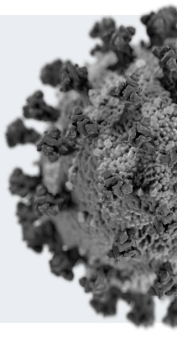

1. Coronavirus (COVID-19) Update: FDA Informs Public About Possible Accuracy Concerns with Abbott ID NOW Point-of-Care Test [press release]. 2020.
2. Larremore DB, Wilder B, Lester E, et al. Test sensitivity is secondary to frequency and turnaround time for COVID-19 surveillance. *medRxiv*. 2020:2020.2006.2022.20136309