



**Special Communication to City of Burlington
Emergency Operations Center and Mayor
Regarding COVID-19**

To: Brian Lowe

From: Nancy Stetson, Kayla Donohue, Meagan Tuttle of City Analytics Team

RE: Details on U.S. testing strategy, examples of other testing strategies

Date: March 27, 2020

Updated: April 10

Key Messages

- Vermont is testing more people per capita than all but 4 other states, with a positive test rate of 7.8%. New York State, which has tested more people both per capita and overall than any other state, has a positive test rate of over 40%.
- **Total positive test results likely underestimate the true extent of the outbreak** for a number of reasons:
 - Testing for Covid-19 is unlikely to result in false positives, but false negatives are likely. So some amount of those who tested negative in the state were likely infected.
 - People with mild symptoms are not encouraged to seek testing, and to instead consider themselves infected
 - Where testing has been widespread, including in Vo, Italy, the Diamond Princess Cruise Ship, and in Iceland, **half of all people tested are asymptomatic**. Under the current testing structure in Vermont, people without symptoms would not be aware they were infected.
- **Testing for immunity, by testing the blood for antibodies, will be especially crucial for relaxing social distancing rules, both for individuals and possibly for communities.** Antibody tests starting to be distributed and used around the country. These tests should be obtained in order to test frontline essential workers who are not able to self isolate and may have been previously exposed to the virus.
- Vermont's recent efforts to expand testing capacity per-capita, and train law enforcement officers to conduct contact tracing are incredibly valuable tools to help us plan for post "Stay Home Stay Safe" order. **Widespread testing and contact isolation is critical to alleviating the need for wide-spread social distancing, shortening the duration of social distancing measures in place, and to determine when and how to continue or relax mandated social distancing measures.**
- While some additional complementary measures have been implemented in countries with robust testing schemes, certain tools may be less effective or potentially risky without a well-resourced, and rapid testing regime. Strategies such as temperature screenings may be

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insufficient to identify asymptomatic people, while fever clinics may put uninfected individuals at unnecessary risk while awaiting test results.

Key Resources

- [VT Health Alert, March 20, 2020](#)
- [VTDigger on the expansion of testing in Vermont 3/27](#)
- [New blood tests for antibodies could show true scale of coronavirus pandemic \(Science\)](#)
- [We need a hard pause, and a soft start \(The Atlantic\)](#)

Summary of Research

About the Tests

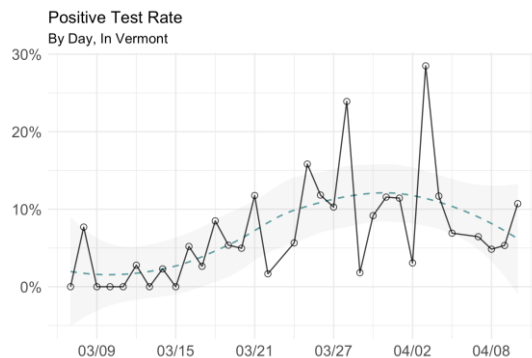
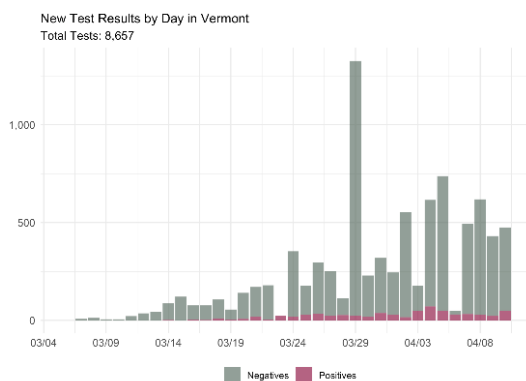
Most tests for Covid-19 are “real-time polymerase chain reaction tests”, collected by a healthcare provider swabbing the back of the nose or throat, and take 4 to 6 hours to run in a lab. These tests are specific, meaning they are unlikely to give a false positive. However, they are not very sensitive, meaning that the tests are sometimes unable to detect the virus even when it is present.

- A person with COVID-19 has a 15% to 25% chance of testing negative, [according to some estimates](#). A [factsheet for medical providers](#) from the FDA states that “A negative result does not exclude the possibility of COVID-19.”
- The US test appears to be more sensitive than the test used in China, which missed many positives and was sometimes backed up by CT chest scans.

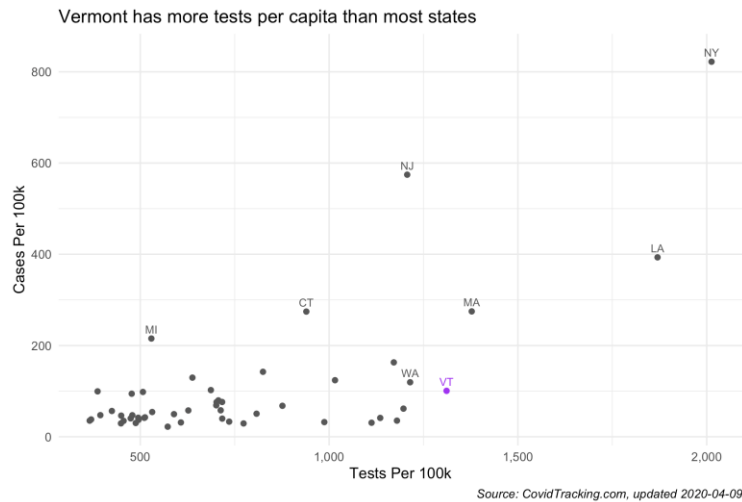
[Testing requires five separate inputs](#) that all are at risk of shortages: **masks and other PPE** to protect people giving the tests, the **swabs** to collect the samples, **extraction kits** and **chemical reagents** used in those kits, and **trained people** to administer the tests.

Testing in Vermont- Updated Apr 10

Since March 6, 8,657 tests have been received in Vermont. Of those, 679 were positive, at a rate of 7.4% over the past month. Recent results have seen a slightly higher positive rate: 9.8% of results reported in the last 3 days were positive. For every 100,000 residents, Vermont has tested 1,387 people, the fourth highest testing rate out of all the states, behind only New York, Louisiana, and Massachusetts, states where there are significant and early outbreaks of the virus.



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In Vermont, tests are collected and prioritized by the UVM Medical Lab, and then tested either at the Health Department Lab, for high priority tests, or sent to private labs for lower priority tests.

- High priority groups include: hospitalized, immunocompromised, requiring dialysis, residents of non-acute care facilities, incarcerated individuals, health care workers, and deceased individuals
- All specimens are going to the UVMMC lab for processing, coordination, and prioritization; couriers pick-up daily and bring to appropriate lab (VDHL or private)
- Turnaround time: 24-48 hours for priority specimens, and 3-4 days for non-priority specimens

On March 27th, the health department announced that it was loosening criteria for testing. Health care providers can request tests for symptomatic patients, and while previously tests were reserved for more severe cases or other high risk groups, people with mild or moderate symptoms are now eligible for testing. Health Commissioner Mark Levine also noted that the state managed to obtain additional extraction kits to accompany the increase in tests. [VTDigger] The state has also tested everyone, symptomatic or not, at the Northwest Correctional Facility after an inmate tested positive. If there is a single positive case at any communal living facility (e.g. a correctional facility, a long-term care facility, a nursing home) all residents and staff will be tested regardless of symptoms.

In the past seven days Vermont has averaged 41 new cases a day out of 490 tests a day. As of this week, Vermont now has capacity to conduct [1,800 rapid, point-of-care tests](#), using 15 rapid testing machines from Abbott referenced below. It is not clear how this relates to the state's changes in testing threshold, and if there is adequate supply to test all who meet the new criteria. Although the total number of rapid tests are limited at this point, these tests could be useful in hospital or nursing homes to figure out if quickly which patients need to be isolated.

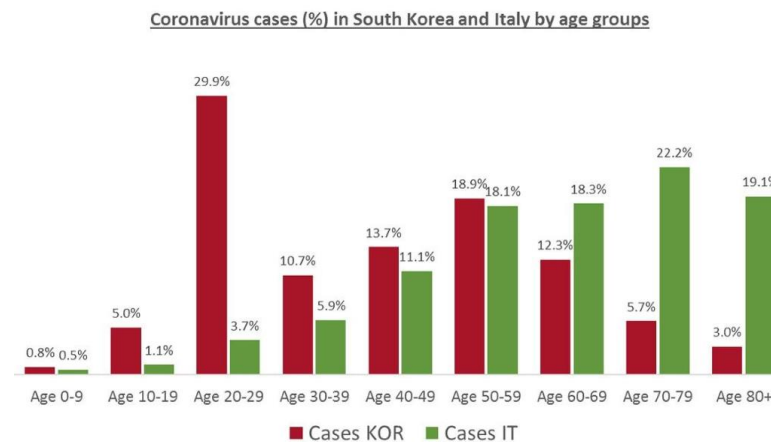
COVID-19 Testing Strategies Worldwide

South Korea's government opted against localized lockdowns, **concentrating instead on testing large numbers of people in an attempt to identify infection "hotspots", along with encouraging social distancing.** The country is conducting about 15,000 tests a day, free of charge, and has carried more

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than 200,000 screenings so far. It has also set up about 50 drive-through testing centers and distributed smartphone alerts about the movements of people who have tested positive. [\[source\]](#).

- In South Korea, where testing is far more widespread than in Italy, cases are much more likely to be younger. If tests are limited to symptomatic people, cases will be missed, particularly in younger people. [\[source\]](#)



Singapore, a major business hub with large numbers of international visitors, has a strictly enforced home quarantine system and an exhaustive contact-tracing program. **This is underpinned by clear messaging from officials, who have repeatedly emphasized the need for collective social responsibility.** Authorities have also warned of harsh penalties for those who break guidelines (fines of up to \$10K or 6 months in prison) but are also offering financial assistance (\$100 per day) to self-employed workers who are not able to work during quarantine. [\[source\]](#)

Vo, Italy, a small (pop ~3,000) town outside Venice, **tested its entire population** in late February, then again two weeks later.

- 3% (88 people) were infected in the first round, half without symptoms
- Two weeks later, after the entire village was quarantined, 0.25% (7 people) tested positive, none with symptoms
- [On asymptomatic transmission](#)

The Diamond Princess cruise ship, with ~3,700 passengers and crew, did not initially test everyone on board. Eventually everyone on board was tested, the virus had spread to 20% of population (634 people). **Of those, 52% (328) did not have symptoms when they tested positive.**

[San Miguel County in Colorado \(pop 8k\) is partnering with United Biomedical to use blood draws to test all residents.](#)

- The test is being sponsored by the CEO's of United Biomedical, who are part time residents of Telluride.
- In the [first round of testing](#), less than 1% of residents tested positive for coronavirus, 97% tested negative, and 2% of the tests were indeterminate. 1,598 tests were performed over two days last week.

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- [Testing was halted](#) and then resumed due to delays in processing the tests. 6,000 tests were collected, but only 1,600 have been processed.

The Greater Seattle Coronavirus Assessment Network (SCAN) is beginning **representative sample testing** via at home kits across **Seattle-King County**.

- SCAN will test a representative sample from the community, including asymptomatic individuals, to understand the spread of the virus in the Seattle Area, with participation among a cross-section of neighborhoods, age groups.
- It will testing 300 voluntary kits per day, as well as 100 residual samples from other medical procedures to build a model for how the disease behaves and to help evaluate the effectiveness of social distancing measures.
- Partnership between the Seattle Flu Study, King Co. Public Health, the Washington State Health Department, CDC, and support from the Bill & Melinda Gates Foundation.

Future Testing Technologies

[It will be crucial to eventually be able to test for immunity, by testing the blood for antibodies.](#)

- Testing for antibodies will allow researchers to understand the extent of the spread of the virus.
- On an individual level, a positive test for antibodies in the blood, and the confirmed immunity, will allow individuals to move freely as they will no longer be potentially infectious.
- The testing in San Miguel County, CO is using this type of test, however the project has not identified widespread infection in the county.
- This type of test has been used in [Singapore](#), and [companies are racing to develop their own tests](#).
- Dr. Fauci, the White House top infectious disease expert, [announced today](#) that antibody testing should come online “within a week”.

Various companies are creating tests which allow for faster results, or use more convenient equipment:

- [New York State Department of Health](#) created their own test which is less invasive than the traditional test, and therefor limits exposure for providers. It can also be self-administered by health care professionals. The state has also developed an antibody test to detect immunity and expects to be able to perform 1,000 of these tests daily next week.
- [Rutgers developed a test](#) which can process thousands of samples a day, and crucially only requires saliva, versus a more invasive nasal swab. The test is currently awaiting FDA approval.
- [Stanford University used pooled samples](#) to test for community prevalence in the Bay Area. The researchers used nearly 3,000 samples from individuals with respiratory symptoms in late January and early February, who had tested negative for other virus, and then tested them in groups of 10 to conserve tests. Only two individuals tested positive for coronavirus. While the project was not used for clinical purposes, pooled samples, or combining samples into groups to test, could be a way to conserve testing resources while expanding testing, especially for groups at low risk of exposure.

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- [Henry Schein](#), a medical company out of Long Island, released a blood test which will test for antibodies. The firm has said that several hundred thousand of these tests will be available by March 30. [The company](#) does caveat that “Results from antibody testing should not be used as the sole basis to diagnose or exclude SARS-CoV2 infection to inform infection status”.
- [Abbott Labs](#) received clearance from the FDA to distribute new point-of-care tests that can produce a result in under 15 minutes, in small machines that is already in use across the country. [Walgreens](#) plans to open 15 drive through testing locations across seven states using this test soon.
 - On April 8, Mark Levine announced at a press conference that Vermont received limited rapid testing capacity, with 15 testing machines, 120 tests per machine, and 1,800 total tests.
- [Cepheid](#) designed a test which takes 45 minutes and uses machines which are already widespread.
- A [test](#) out of Oxford University could get results in 30 minutes.
- [Bioconcept test with results in 15 minutes](#), but with low sensitivity – more likely than the traditional test to give a false negative. Could possibly be used to confirm an infection, but a negative result would need a traditional test to confirm.
- Mammoth Biosciences and UC San Francisco report that tests on clinical samples produced results with accuracy rates comparable to PCR in just 30 minutes, using a method that could be used at home, however it still need regulatory approval.
- A company called [Everlywell](#) planned to introduce at home testing kits on March 23rd, but the FDA blocked all direct to consumer testing. Everlywell is now offering the tests to hospitals and other medical facilities.

Sources

[On how to test for, and the importance of testing for antibodies/immunity](#) (Twitter thread by Yale Professor and Physician)

[On moving beyond priority testing](#)

[South Korea “phonebooth” testing to limit risk of exposure to healthcare providers](#)

[More background on testing \(538\)](#)

[Serology-based tests for COVID-19, Johns Hopkins Center for Health Security](#)

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