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## ***'It's Like Groundhog Day': Coronavirus Testing Labs Again Lack Key Supplies***

Just weeks after resolving shortages in swabs, researchers are struggling to find the chemicals and plastic pieces they need to carry out coronavirus tests in the lab — leading to long waiting times.

By **Katherine J. Wu**

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Labs across the country are facing backlogs in coronavirus testing thanks in part to a shortage of tiny pieces of tapered plastic.

Researchers need these little disposables, called pipette tips, to quickly and precisely move liquid between vials as they process the tests.

As the number of known coronavirus cases in the United States passes 4 million, these new shortages of pipette tips and other lab supplies are once again stymieing efforts to track and curb the spread of disease. Some people are waiting days or even weeks for results, and labs are vying for crucial materials.

“That’s the crazy part,” said Dr. Alexander McAdam, director of the infectious diseases diagnostic laboratory at Boston Children’s Hospital, one of many institutions seeking the prized pipette tips. “Whenever there’s a shortage, it’s lab versus lab, city versus city, state versus state, competing for supplies.”

Fed into automated devices, pipette tips can help researchers blaze through hundreds of coronavirus tests in a matter of hours, sparing them grueling manual labor.

The Swiss company Tecan, which supplies pipette tips for machines used by hundreds of laboratories in the United States, has been slammed with orders from U.S. customers in recent months, according to Martin Brändle, the firm’s senior vice president of corporate communications and investor relations. The demand has

been so high, he said, that Tecan has tapped into an emergency stash, and is racing to install new production lines that he hopes will double the company's output by fall.

Pipette tips aren't the only laboratory items in short supply. Dwindling stocks of machines, containers and chemicals needed to extract or amplify the coronavirus's genetic material have clogged almost every point along the testing workflow.

The crisis is an eerie echo of the early days of the pandemic, when researchers scrambled to find the swabs and liquids needed to collect and store samples en route to laboratories.

"It's like Groundhog Day," said Scott Shone, director of the North Carolina State Laboratory of Public Health. "I feel like I lived this day four or five months ago."

In New York, researchers running low on chemicals are running machines at half capacity as test specimens pile up at the door. In Florida, where cases are spiking, labs are reporting turnaround times of seven to 10 days.

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And in New Mexico, researchers at TriCore Reference Laboratories — the state's largest medical laboratory — have revved up testing in the days after deliveries arrive, only to find themselves hamstrung by faltering supplies at week's end.



“It’s a merry-go-round of shortages,” said Karissa Culbreath, the laboratory’s scientific director of infectious disease, research and development. “Just when we think we’ve dealt with one issue, another challenge pops up.”



Long lines at a drive-through coronavirus testing site in Miami Beach, Fla., last month. Wilfredo Lee/Associated Press

TriCore and many other laboratories are now having to prioritize testing for the sickest patients, a trend that has troubled many as evidence mounts of the virus’s ability to spread from infected people before symptoms appear, if they do at all. For months, experts have underscored the need for more widespread testing, particularly among elderly people and the most vulnerable racial and ethnic groups, to slacken the coronavirus’s grip on the nation.

In interviews, public and private lab staffers in a dozen states said they were exhausted from marathon days of running tests on a shoestring supply chain. Some are regularly working 12-hour days. Others are taking overnight shifts to babysit machines running never-ending batches of tests at full capacity.



“I’ve come in at 4 a.m., I’ve come in at 3 a.m.,” said Felicia Rice, a laboratory technologist who conducts coronavirus tests at Mayo Clinic Arizona, where local demand has skyrocketed in lock step with the recent crest in cases.

More than 20 percent of the 72 institutions recently surveyed by the Association of Public Health Laboratories have said they will run out of at least one item required to do their tests within a week. About as many said they were unable to meet current testing needs.

Soaring demand has also exacerbated capacity issues at private laboratories such as LabCorp and Quest Diagnostics, which together have performed one-third of the nation’s tests.

Wait times for test results from both companies have ballooned to several days — in some cases stretching well over a week.

David Rohlfing, who took one of Quest’s tests at a walk-in site in Queens on July 6, said he still didn’t have his results 17 days later. That’s far longer than the four days he waited the last time he was tested at the same site, in early June. If he gets a negative result, it won’t help much, since he could have been exposed in the interim.

“If no one is getting test results,” Mr. Rohlfing said, “we do not actually know how the opening up is going here.”

After a person’s specimen is collected at a hospital, clinic or community testing site, it can go on to be processed in a dizzying bevy of places. Some are run in public health laboratories operated by governments at the federal, state or local level. Many of these facilities have been somewhat buffered from shortages by their access to the Centers for Disease Control and Prevention’s International Reagent Resource, which maintains stocks of supplies necessary to run the agency’s in-house coronavirus tests.

But most state public health labs are not set up to perform diagnostics en masse, Dr. Shone said. “We’re here for the initial emergency response, then the clinical lab system of the country typically takes on the lion’s share of testing.”

As demand ratchets up, it’s these commercial labs that have been left in a lurch. In a statement released on July 20, Quest noted that the dearth of equipment and chemicals comprised “the most significant gating factor” in its testing pipeline. And members of the American Clinical Laboratory Association, a group that represents

many of the country's private labs, have lamented the spotty availability of materials like chemicals and pipette tips, Julie Khani, the organization's president, said in an email.

"Any one constriction in the chain of supply can suddenly create a bottleneck," Ms. Khani said. "With more supplies and platforms, we could perform more testing, but the global supply chain remains constrained."

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The Coronavirus Outbreak ›

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Sputtering supply chains have started to shunt the onus of testing from some private laboratories to their public counterparts, Peter Iwen, director of Nebraska's Public Health Laboratory, said in an email. "We are now getting backlogged and will need to start rejecting specimens," he said.



A drive-through testing site in Jericho, N.Y., in March. Johnny Milano for The New York Times

In California, where the number of new cases has surged above 10,000 per day, regional public health laboratories, like the one in Sonoma County, are fighting tooth and nail to keep pace. “We’ve been over capacity for a long time,” said Rachel Rees, the institution’s director of laboratory services. Dr. Rees’s lab is currently processing samples from local hospitals that have run out of supplies.

To avoid halting testing entirely, many laboratories are maintaining stocks to run multiple types of tests at once — requiring technicians to maintain both the materials and mental wherewithal to perform many protocols, often at the same time. Researchers at Mayo Clinic Arizona must juggle four or five protocols; at TriCore, in New Mexico, that number has soared to seven.

This sort of bet-hedging wasn’t the norm for laboratories before, said Omai Garner, the director of clinical microbiology for the U.C.L.A. Health System, where he runs a laboratory of more than 100 people.

“No single manufacturer can give a laboratory enough tests to cover the entire volume they need to cover,” said Dr. Garner, who is in the process of adding a fifth type of coronavirus test to his team’s repertoire.

Shortages are so widespread that even backup options don’t always pan out.

Marilyn Freeman, who is deputy director of Virginia’s D.C.L.S. public health laboratory, said her team had been waiting months for its orders of machines that can automate coronavirus test processing, which would ease the burden on staff. Two of the devices in highest demand — the Hologic Panther and Hologic Panther Fusion, the same ultraefficient robots that take Tecan’s sought-after pipette tips — most likely won’t ship to Dr. Freeman’s lab until the fall.

What’s more, some of the biggest issues from the early days of the pandemic haven’t yet resolved. Erin Graf, who regularly clocks 80-hour weeks as the director of microbiology at Mayo Clinic Arizona, said her laboratory was still strained by an inconsistent supply of the specialized swabs needed to collect specimens — an added stress on top of the new round of obstacles her team is contending with.

“We’re used to dealing with challenges. We welcome challenges,” Dr. Graf said. “But it feels like the challenge is coming almost daily now.”

As fall approaches, many researchers are growing increasingly worried that the flu season will exacerbate shortages. The coronavirus isn’t the only pathogen circulating through the human population, or the only infection that laboratories need tools to test for. Though the C.D.C. and many private companies are currently developing tests that can detect multiple pathogens at once, the sheer volume of autumn illnesses is still expected to hit labs hard — and may force some teams to delay testing for other infections.

Already, labs like Dr. Graf’s have had to cut corners with testing for sexually transmitted infections, in part because several manufacturers have had to pivot supply chains toward coronavirus testing. “Some of the most basic tests that we do, we can’t do anymore,” Dr. Graf said. “Every resource is going toward Covid. That’s something we never would’ve thought would happen.”

Shifts toward point-of-care coronavirus tests, which are fast and simple enough to perform without the need for specialized equipment, could ease some of the burden on laboratories. Pooled testing for the coronavirus, in which samples from multiple people are combined and analyzed in batches, could cut down on material consumption as well. But these tests are not yet in widespread use, and depend on many of the same manufacturing pipelines.

In New Mexico, TriCore’s Dr. Culbreath worries that her next big shortage may be the laboratory’s most valuable supply of all: its people.

“I worry about my own staff, and burnout. Their ability to take care of themselves,” said Dr. Culbreath, who has pulled many weekend shifts and 10-hour days.

Eventually, she’ll “find someone to manufacture a plastic pipette tip,” she said. “But I can’t find someone with the years of training and certification of these amazing scientists.”