Volume XXVII, Number 10 Monday, July 13, 2020

Special!

Lab Supply Chain in COVID Era!

- *More supplies for local labs, hospitals*
- *Setbacks from government management*
- *Clever ways to boost supplies, deliveries*
- *Telling the lab story on national news*

THE DARK REPORT

RELIABLE BUSINESS INTELLIGENCE, EXCLUSIVELY FOR MEDICAL LAB CEOs / COOs / CFOs / PATHOLOGISTs

Restricted information, see page 3

COMMENTARY & OPINION by...

R. Lewis Dark
Founder & Publisher

It's a Clinical Lab Moment … But No Advocates!

NEARLY EVERY DAY SINCE THE ONSET OF THE SARS-CoV-2 OUTBREAK, there have been stories in the national news about clinical laboratory testing for COVID-19. No laboratory professional alive today has seen such an endless stream of news stories about clinical lab testing. This is a once-in-a-lifetime event that could be quite favorable to the clinical lab profession.

Unfortunately, the overwhelming majority of these news stories deal with negative aspects of lab testing. National news outlets are asking important questions. Are COVID-19 tests accurate? Can medical labs rapidly increase the number of COVID-19 tests to meet the ever-increasing demand for these assays? What is required so that anyone can get a COVID-19 test? Why does it take days or a week or more for labs to return COVID-19 test results?

News anchors are asking these questions on their broadcasts. But they almost never ask board-certified clinical pathologists to appear and explain what a clinical laboratory must do to produce accurate, reproducible COVID-19 tests results. Instead, you've probably noticed that these daily news stories about the "problems" with COVID-19 testing feature a physician with no training in lab medicine. This is true, whether the national broadcast news outlet is *ABC*, *CBS*, *NBC*, *CNN*, *Fox News*, or *MSNBC*.

This is the worst possible outcome for the clinical laboratory profession. At the very moment when the entire nation is following the daily count of the number of COVID-19 lab tests performed and what percent of those tests are positive, clinical pathologists and clinical lab scientists are invisible. They are not on the national news programs to explain what is required to collect a proper specimen and what can happen to specimens between collection, the trip to the lab, and when they arrive at the bench for analysis.

Similarly, no clinical lab professional is on the nightly news explaining what a molecular COVID-19 test can and cannot do. That is even more true for explaining the complexities of serological COVID-19 testing.

Because of the COVID-19 pandemic, the entire nation is at a "clinical lab moment" and THE DARK REPORT is ready to help any lab professionals that want to organize some form of advocacy. Contact us with your ideas and resources that you would like to contribute to this effort. TDR

COVID-19 Pooled Testing: Good for Labs? Not IVDs?

As test volume runs short nationwide, officials now tout an old strategy to get more people tested

CEO SUMMARY: Pooled testing for COVID-19 could be a double-edged sword for clinical labs and in vitro diagnostics companies. Offering the advantage of reducing the number of standard tests for SARS-CoV-2, this testing method would cut lab spending on tests and testing supplies, while conserving standard non-pooled tests for symptomatic patients. But pooled testing also could cut into test manufacturers' revenue, a factor that could cause IVD firms not to adapt their FDA-issued authorizations to allow use of their assays for pooled-testing.

To increase the capacity of testing for the novel coronavirus, federal officials are recommending that clinical laboratories adopt a decades-old strategy called pooled testing.

This method of testing would help make the available number of COVID-19 tests go further, but widespread adoption of pooled testing changes the economics in different ways for COVID-19 test manufacturers and the clinical labs running those tests. As a result, pooled tests come with at least two pitfalls, according to a respected clinical pathologist and researcher.

The first pitfall is that pooled testing works best in areas of low virus prevalence, said Steven H. Hinrichs, MD, Chair of the Department of Pathology and Microbiology at the **University of Nebraska Medical Center** (UNMC). As of the second week in July, the prevalence of COVID-19 infections was rising in at least 37 states. Areas of low prevalence exist in all 50 states, but as infections spread, the number of low-prevalence areas decreases.

"For pooled testing, the ideal level of low prevalence would be an infection rate below 10%," Hinrichs reported. Many states have infection rates above 15%, according to published reports.

The second pitfall about pooled testing is that test manufacturers may not be inclined to modify the emergency use authorizations (EUAs) that the FDA issued for manufacturers' tests to allow for pooling because doing so might reduce standard testing and thus could cut into the test-makers' revenue, Hinrichs noted.

"For COVID-19 test manufacturers, pooled testing has the potential to reduce the number of standard tests labs run

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by roughly 40% to 60%, depending on the population being tested," explained Hinrichs. "Cutting the number of COVID-19 tests would be a disadvantage for test manufacturers because pooled tests would identify large numbers of uninfected individuals who would not require standard testing with EUA tests.

"On the other hand, this policy would be a significant advantage for U.S. labs because pooled testing would cut the number of standard tests," he continued. "Clinical labs would save money on tests, reagents, and other supplies. It would also ease the burden on the lab's technical staff."

A Theory with Merit

In an interview with THE DARK REPORT, Hinrichs allowed that the theory behind pooled testing has advantages in a pandemic. Under this theory, clinical labs would collect specimens from hundreds of individuals and pool samples together in defined batches. The ideal number of samples to pool appears to be five, although it's possible to pool more than five in each batch, said Hinrichs.

Hinrichs and colleagues from UNMC and the **University of Nebraska-Lincoln** conducted research showing that five is the ideal number to batch in a COVID-19 testing pool. Their research was published in an article, "Assessment of Specimen Pooling to Conserve SARS CoV-2 Testing Resources," on April 18 in the *American Journal of Clinical Pathology* (AJCP), Volume 153, Issue 6, June 2020, pages 715–718.

The objective of the research was to establish the optimal parameters for group testing of pooled specimens for the detection of SARS-CoV-2, the researchers wrote. "The most efficient pool size was determined to be five specimens," they added. *(See sidebar, "In Published Research, Scientists Describe a Proof of Concept for Pooled Testing," page 5.)*

Federal officials promoting the pooled-testing strategy may need to answer the question of how to get test manufacturers to adapt their EUA-allowed tests for pooled testing, Hinrichs said. Each test manufacturer with an EUA for a molecular test for SARS-CoV-2 would need to adapt their assays for pooling and apply to the FDA for a revised or bridged EUA, he noted. Some manufacturers may be reluctant to do so.

"We can pick a company that has an EUA from the FDA for a coronavirus test to serve as an example," he said. "Speaking hypothetically, let's say the company is **Roche**. They have a great essay for their cobas instrument. Would they be motivated to develop a pooling strategy? This is the question every test manufacturer will need to answer.

"The reason test manufacturers would not be motivated is that with pooled tests, they will lose test revenue because clinical labs would use fewer of their authorized tests," Hinrichs explained. "Instead, they will gain some revenue from pooled testing, but not as much as they get now from their standard tests or as much as they would get if pooled testing is not introduced.

Revenue Decline Predicted

"The reason revenue from the sale of COVID-19 tests would decline is that our research shows—and we know from our experience—that pooled testing could help labs save between 40% and 60% of their reagent costs," he noted. "That's good for us as consumers and as laboratory directors.

"But it may not be good for manufacturers," commented Hinrichs, a principal investigator for research that led to multiple national awards from the **Association of Public Health Laboratories** and two federal agencies, the **Centers for Disease Control and Prevention** (CDC) and the **Department of Defense**.

For clinical labs considering this strategy, it's important to note that pooled testing works best in areas of low virus presence and is less effective in areas of high prevalence. "In our study, we show that it's reasonable to pool five samples, although we realized that some people may want to pool 10 samples at once," noted

In Published Research, Scientists Describe a Proof-of-Concept for COVID-19 Pooled Testing

IN A STUDY THE *AMERICAN JOURNAL OF CLINICAL PATHOLOGY* PUBLISHED IN APRIL, researchers from the University of Nebraska Medical Center and the University of Nebraska-Lincoln described a proof-of-concept for testing pooled specimens for the detection of SARS-CoV-2 in a population.

To test for COVID-19 successfully with a pooled method, clinical labs would need to know at least the following:

- The limit-of-detection for the assay involved,
- The sensitivity and specificity levels of the assay, and
- The prevalence of disease in the population being studied.

The goals of the research were to establish the optimal parameters for group testing of pooled specimens and to determine a pool size that provides the greatest conservation of resources while maintaining reliable test performance. The researchers concluded that the most efficient size of each group of pooled tests was five specimens. Also, when the infection rate in a population is 10% or less, then pooled testing would be useful for screening large numbers of individuals to identify those who are infected and those who are not.

"When the incidence rate of SARS-CoV-2 infection is 10% or less, group testing will result in the saving of reagents and personnel time with an overall increase in testing capability of at least 69%," they wrote.

For many years, group testing of pooled samples has been used successfully for infectious disease testing and when hospitals and other entities are procuring blood, the researchers explained.

Hinrichs. "But even if one sample is positive in a pool of five, then testing five samples at once saves 80% of our costs if all of those samples are negative.

"But, if one sample is positive, each of those five samples needs to be retested using the standard test," he explained. "That's when a lab's costs start to rise."

Costs increase because clinical labs need to run six tests: one test for the pooled sample and five more tests to identify each possible positive result.

Low-Risk Areas

In a low-risk area, fewer pools will turn positive. "This is why pooled testing works best when a COVID-19 test program is working in what we would call a low-risk population. By that I mean a low-prevalence area," noted Hinrichs.

"If the testing is for a high-risk population, then more of those pools will turn positive," Hinrichs reported. "When they turn positive, the lab must test each member in the pool individually to identify which ones are positive.

"This is why my colleagues and I added a statistician when developing the research study published in AJCP. We wanted to ensure that all the math was done correctly to identify the ideal number of specimens, and how changing that number affects the number of specimens that need to be retested," he commented.

"We know that each sample in a pool with positive results needs to be retested, but that not all of the positives in the pool will be positive with retesting," he added. "Those samples in the pool that are truly negative will in fact be negative and the rest will be positive.

"We found that the ideal pool size does not save 80% of testing," Hinrichs noted. "Depending on the prevalence of disease in the population, the savings are between 40% to 60%." **TDR**

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Officials Differ on Value of COVID-19 Pooled Testing

Screening of asymptomatic people has benefits and is seen as a way to reopen schools, businesses

CEO SUMMARY: Some experts on testing strategies support pooled testing because this method may support reopening by schools and businesses and thus bring the economy back. But other experts have raised questions about this strategy. Rules from the federal Centers for Medicare and Medicaid Services say pooled testing is not diagnostic and so any lab can do these tests. But CMS also says any positive result from a pool would require retesting, which would be diagnostic, causing delays.

In contrast to population surveillance, use of the pooled testing method would signal a significant change in how testing for SARS-CoV-2 has been performed in the United States since February.

At the beginning of the coronavirus pandemic in the United States, testing with the reverse transcription polymerase chain reaction (RT-PCR) method was limited due to low availability. Therefore, the RT-PCR assay was used almost exclusively for testing symptomatic patients to determine proper hospital isolation and other protocols. Each specimen was tested with one test procedure.

Individual Risk Assessment

As the SARS-CoV-2 virus spread, health officials advocated for additional testing for surveillance and to trace the source of spread resulting in even greater demands for test capacity. The current national focus to screen large numbers of people as part of the effort to reopen commerce and society will require even larger numbers of tests, further stretching capacity. Aggregating patient specimens and testing by a pooled strategy could provide for greater national COVID-19 test capacity.

Pooled testing is designed to conserve laboratory resources—including test reagents and lab personnel time. It has the potential to increase the number of individuals who can be tested and support the idea of safely reopening schools, offices, and other places of work. As result, pooling tests has the support of top experts on the White House Coronavirus Task Force.

But other testing experts have expressed doubts about pooled testing. *(See sidebar on page 7.)*

Those in favor include Anthony S. Fauci, MD, director of the **National Institute of Allergy and Infectious Diseases** (NIAID), who said he and other federal health officials were in discussions about how to increase pooled testing for COVID-19. "We hope to get this off the ground as soon as possible," he commented in an interview with *The New York Times*. NIAID is a division of the **National Institutes of Health**.

For months, Fauci has recommended this strategy to federal officials without much success. But as the number of virus infections rose steadily in recent weeks, those officials have become more open to the idea, he added.

(Continued on page 8)

Public Health Officials Raise Questions About Use of Pooled Testing for COVID-19

ON JUNE 16, THE FOOD AND DRUG ADMINISTRATION outlined the steps test manufacturers would use to get their SARS-CoV-2 molecular RT-PCR tests authorized for broad screening of asymptomatic individuals using pooled testing.

Three days later, the federal **Centers for Medicare and Medicaid Services** (CMS) said it did not consider pooled testing to be diagnostic. Therefore, CMS said, any private or academic lab could use this method to screen patients for COVID-19 and reveal the grouped results from a pool to those patients who contributed samples.

CMS Directives

But under CMS' rules for diagnostic testing, if a batch tests positive, each patient's sample would need to be retested and that retest would be diagnostic. Therefore, that second COVID-19 test would need to be done in a CLIA-certified lab, CMS said. Sending those repeat tests out for diagnosis would add a delay of several days, experts told *The New York Times*.

Kelly Wroblewski, Director, Infectious Disease Programs, at the **Association of Public Health Laboratories**, told the *Times* that a delay raises questions about the value of pooled COVID-19 testing.

"That's where I think we probably start to disagree with pooling as a strategy," Wroblewski said. Since the FDA and CMS require diagnostic tests for COVID-19 to be done at CLIA-certified labs, a change in policy to facilitate pooled testing needs further discussion, she added.

Concerns about Delays

In response to concerns about delays, Steven H. Hinrichs, MD, Chair of the Department of Pathology and Microbiology at the University of Nebraska Medical Center, offered a clarification. "There is some confusion about the test protocol," he explained. "Our method uses the pooled approach to perform the screen, and only an aliquot of each of the original specimen is pooled, not the entire sample. Therefore, if a pool is found to be positive, each of the original samples in the pool is retested individually.

"There is no need to send the pools to a separate lab or to recollect the specimen from the subject," he said. "In our experience, the result is not delayed in reporting to the individual or the health authority."

Wroblewski had another concern, saying pooled testing is unlikely to be useful at most state labs. In most states, infection rates are at 15% or more, which is above the recommended 10% level of prevalence for pooled testing. "I don't think it's going to solve all our problems," she told the *Times*.

Test and Isolate

Another expert who raised questions was former CDC Director Thomas R. Frieden, MD, who said any COVID-19 testing strategy was unlikely to succeed without isolation of those tested until results are available. Anyone who is infected needs to be isolated away from the home, he added.

"What I find both frustrating and dangerous is the consistent failure to understand that testing, in and of itself, pooled or not, does little or no good," Frieden told the *Times* in an email. "What good is testing if the results take four days to come back and infectious people aren't isolated in the interim? What good is COVID-19 testing if contact tracing doesn't identify and warn exposed people quickly?"

Admiral Brett P. Giroir, MD, Deputy Secretary of the federal **Department of Health and Human Services** and the head of testing for the task force, said he expected a pooled COVID-19 testing program to be running by the end of the summer. As students return to universities, "pooling will be very mature," he said, the *Times* reported. "My assessment is that the data is very strong," he added.

Manoj Jain, MD, an Adjunct Professor and infectious disease physician at the **Rollins School of Public Health at Emory University**, said, "I'm just wondering why the federal government does not mandate now that this be done to preserve the testing capacity. We really haven't learned from our counterparts in Europe and Asia" who have used pooled testing, such as in China, Germany, Israel, and Thailand, the *Times* reported.

Steven H. Hinrichs, MD, Chair of the Department of Pathology and Microbiology at the **University of Nebraska Medical Center**, agreed, saying, "If you want to bring students back to school and you need to test everyone, you can't afford to perform the tests individually. Doing that would totally use up all the COVID-19 reagents, tests, and supplies. Therefore, you need to use a group testing strategy by pools, but you have to do so correctly.

Individual Risk Assessment

"We need to distinguish between individual risk assessment and public health screening," Hinrichs explained. "We'd like to see pooled testing used for low-risk public health assessment, meaning population risk assessment instead of symptomatic individual treatment assessment."

Hinrichs and colleagues from the University of Nebraska Medical Center and the **University of Nebraska-Lincoln** published research in April, "Assessment of Specimen Pooling to Conserve SARS CoV-2 Testing Resources," in the *American Journal of Clinical Pathology.*

Nebraska Lab Gets First Pooled Test with EUA

TODAY, CLINICAL LABS HAVE AT LEAST ONE COVID-19 TEST with an emergency use authorization (EUA) that can be employed for pooled testing.

In late June, Steven H. Hinrichs, MD, Chair of the Department of Pathology and Microbiology at the University of Nebraska Medical Center (UNMC) was aware of only one COVID-19 assay that obtained an FDA EUA for pooled testing. That assay was adapted from a lab-developed test—the NEcov19 RT-PCR Assay—that the UNMC sent to the FDA for an emergency use authorization in March.

An FDA test with an EUA must be adapted, or bridged, to be used for pooled testing, Hinrichs explained. The FDA allowed UNMC to write a bridging EUA based on its NEcov10 RT-PCR Assay.

"When a manufacturer or lab has an EUA for a SARS-CoV-2 test, and it provides data on how the test works, the FDA says that EUA can then be modified with a bridge," he said. "So, the data about the pooled testing bridges to the original EUA and then the FDA can accept it or not."

Other important questions to consider about pooled COVID-19 testing are the limits of detection and the sensitivity and specificity levels of the assay, Hinrichs added. "Another issue is the specimen-collection method," he continued. "Everybody wants to say that every type of specimen is the same and unfortunately they're not. In our experience, the nasopharyngeal swab is a much better specimen collection method than an oral swab or a saliva swab, depending upon the stage of infection or number of days of infection." TDR

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Why Local Labs Deserve More COVID-19 Supplies

Federal actions continue to give lesser priority to hospital labs, with consequences to patient care

CEO SUMMARY: As government officials and IVD firms divert the lion's share of COVID-19 tests to a handful of billion-dollar labs, in thousands of hospitals across the nation COVID-19 patients languish days longer before discharge because their hospital lab must send COVID-19 tests to outside labs and wait up to seven days for results. Yet, those same hospital labs have unused COVID-19 test capacity, but no supplies to run needed tests.

by Robert L. Michel

No government response to the COVID-19 pandemic has been a bigger failure than the concious decision by federal and state officials (including FEMA) to not deliver a larger portion of scarce COVID-19 supplies and test kits to the clinical laboratories of hospitals and health systems, as well as the few remaining community lab companies.

Every lab manager, pathologist, and lab scientist understands a fundamental principle of lab testing: the closer to the patient that a medical laboratory test is performed, the shorter the time to answer.

Faster Start to Therapy

The faster an attending physician can get the result of a COVID-19 test, the quicker that physician can start appropriate therapy. A faster start to the right therapy contributes to better patient outcomes and less mortality from a SARS-CoV-2 infection.

Local testing closest to the patient also comes with a major advantage that lab managers and pathologists understand. Local pathologists running the local lab know the referring physicians and often know those patients for whom the lab has provided testing over multiple years. This is a benefit because, as the 'doctor's doctor', the pathologist can often help diagnose complex cases and identify the best therapies. This is as true for COVID-19 as it is for any other disease or health condition.

Yet, from the inception of the COVID-19 pandemic, federal officials and their state counterparts have given preference to the nation's largest laboratories when deciding how to allocate the scarce supplies and SARS-CoV-2 tests labs need to meet the soaring demand. This decision automatically shortchanged hospital and health system labs, many of which are recognized as centers of excellence in laboratory medicine and diagnostics.

This favoritism was visible as early as March 4, in the earliest weeks of the pandemic. National news gave major coverage to the event that day at the White House where Vice President Mike Pence met with executives from a handful of clinical laboratory companies and *in vitro* diagnosics manufacturers.

All six of the the labs represented at this event were members of the **American Clinical Laboratory Association**. Apparently not invited to participate

in this press event about the plans to increase the number of COVID-19 test were representatives from such lab organizations as the **National Independent Laboratory Association**, **College of American Pathologists**, and **American Society of Clinical Pathology**.

Hospital Labs Not a Priority

The message could not have been clearer to all the clinical laboratory professionals working in the nation's 5,000 hospitals and independent lab companies. The federal government's priority would be to direct scarce supplies and COVID-19 tests to the nation's billion-dollar lab companies in preference to hospital and health system labs and community labs.

How has that worked out for federal officials and those state officials who followed that premise of "we can increase lab testing capacity faster by feeding the billion-dollar lab companies and shorting local labs"?

Yes, the ramp up at such lab companies as **Bio-Reference Laboratories**, **LabCorp**, **Quest Diagnostics**, and **Sonic Healthcare USA** (all in attendance at the White House press conference on March 4) was rapid. The number of COVID-19 tests performed the first week of March was a few thousand. By early April, it was 50,000 per week and by early May it was close to 120,000 per week.

But what has it cost the American public and patients infected with COVID-19 after the federal government decided to divert a major proportion of supplies and COVID-19 tests to a handful of big labs? And at what extra cost to the healthcare system?

In its interviews with many hospital and health system lab administrators and pathologists, The Dark Report has documented these two facts:

- First, every hospital lab interviewed reported that it had existing instruments and technical staff that gave it the capacity to do significant numbers of COVID-19 tests daily. But the supply chain often limited their actual COVID-19 test numbers to just 20% to 50% of their lab's capacity.
- Second, every hospital lab interviewed confirmed that the turnaround times for COVID-19 inpatient tests referred to outside labs were averaging three to eight days. That meant a COVID-19 inpatient was occupying a hospital bed for several days more than if the hospital's lab could have performed the COVID-19 test in-house.

This situation continues to the present day. The Dark Report is canvassing hospital labs weekly about their supply chain situation and the specific problems that an inadequate supply of COVID-19 tests creates for these labs and and their parent hospitals and health systems.

Hospital Labs with Capacity

All labs surveyed report continuing shortages of necessary supplies and tests required for COVID-19 testing. They also point out that their labs have the equipment and staff to do large numbers of COVID-19 testing locally, with same-day and overnight turnaround. But because they cannot get enough supplies, they are referring many COVID-19 tests to outside labs and waiting days for results.

The inability to perform the COVID-19 test locally and report results within 24 hours or less has a major negative impact on patient care. Using the example of COVID-19 testing for nursing homes, one lab director told The Dark Report, "It doesn't do those nursing homes any good to test all their residents for COVID-19 and then wait almost two weeks to get the results. That kind of delay means those nursing homes would have to test everybody all over again. That's why some lab directors say that testing individuals with a PCR test that takes 10 days to two weeks for results causes more problems than it solves." *(See "In Michigan, Short Supplies Constrain COVID Test Capacity," TDR, June 1, 2020.)*

Similarly, it is not good medicine to require a hospital lab to send an inpatient's COVID-19 specimen to an outside laboratory, then wait 48 hours to six days for results—particularly when that hospital lab has the analyzers in place and technical staff ready to do such tests.

Untapped Potential

It is accurate to say that the frustration level of lab administrators, pathologists, and lab scientists working in hospital labs and community labs is quite high. They recognize that both the IVD manufacturers and government officials are directing a very large proportion of scarce collection supplies, tests, reagents, and consumables to a select number of favored lab companies. They also see how much their labs could improve patient care—in their parent hospitals and their communities—if they could get enough supplies and test kits that would allow them to run their existing equipment to full capacity.

Politics has played a role in government decisions about how to allocate the limited supplies of collection swabs, viral transport media, COVID-19 test kits, and reagents. Government officials at all levels—federal, state, and local—face criticism and negative news coverage if it appears that they are not responding effectively to the COVID-19 pandemic.

Hospitals Silent on Supply

There is one more interesting aspect to this situation, where government actions to favor a handful of huge lab companies as a way to rapidly increase the daily number of COVID-19 tests performed has gone unchallenged. Because of the high value that a fast lab test result for a COVID-19 inpatient has to hospitals, why haven't hospital associations and hospital CEOs been more vocal about why hospital labs should be getting at least enough supplies to allow them to fully utilize their existing capacity to perform COVID-19 tests? TDR

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Short-Sighted Actions Affect Patient Care

LAST WEEK, THE BIG NEWS IN HAWAII was that the supply of COVID-19 tests to one of its two biggest clinical labs had just been cut by 50%. This action would restrict the availability of timely COVID-19 tests results across the entire state.

On July 8, the *Honolulu Civil Beat* published a concise description of the situation, writing:

> *A major Hawaii laboratory that has conducted a large portion of COVID-19 diagnostic tests in the islands has suffered a major blow to its testing supply chain, which could cause significant delays in test result turnaround times.*
>
> *The surge in COVID-19 cases in other U.S. states has cut **Diagnostic Laboratory Services** (DLS) off from chemical reagents from its primary vendor, **Roche Diagnostics.***
>
> *The reagents are used for the laboratory's fastest molecular-based testing machines, said Mark Wasielewski, president of DLS. Reagents are chemicals used to test patient swab samples.*
>
> *Major mainland laboratories such as Quest Diagnostic Laboratories and LabCorp of America are competing for the same supplies, he said.*
>
> *DLS' capacity will shrink from 800 tests per day to 250 tests per day and the laboratory will only conduct high-priority testing locally for the immediate future, he said in an email.*

At 198-bed **Holyoke Medical Center** in Holyoke, Mass, on June 29 *WGBH* reported that the hospital had been down to zero COVID-19 test kits two weeks earlier and that it was forced to cancel surgeries. *WGBH* quoted the lab director who described a two-day wait for outside test results, which was causing delays when a patient visiting the emergency department needed to be admitted.

Might 'inept' be apt description of FEMA's Supply Decisions?

Government Officials Intensify Broad Chaos In Clin Lab Supply Chain

➤➤ ***CEO SUMMARY: Clinical labs throughout the United States are ready to meet the challenges of the COVID-19 pandemic. At the same time, there is widespread recognition that many barriers to increasing labs' COVID-19 testing capacity are caused by the inappropriate actions of government officials at all levels. This is particularly true of ongoing disruptions to the supply chain of the products and COVID-19 tests needed by labs. Labs are also frustrated with the in vitro diagnostic firms, which are often caught in the middle.***

Never before have the nation's clinical laboratories battled so intensely to obtain the supplies and tests necessary—not only to maintain routine testing services—but to respond to the skyrocketing demand for COVID-19 tests.

From the earliest days of the SARS-CoV-2 outbreak, the shortage of supplies and kits has been pervasive. The Dark Report has yet to speak with a clinical laboratory that says it gets enough supplies to meet the demand for testing.

Throughout the United States, lab administrators and pathologists say their number one challenge is to obtain adequate quantities of collection supplies, viral transport media (VTM), test kits, reagents, and personal protection equipment (PPE).

Blame for this supply chain crisis—for it is a crisis because these widespread shortages put patients in many communities at risk if a timely routine test or COVID-19 test is unavailable—can be attributed to two factors.

The first factor is the fickle nature of the novel coronavirus. Since the onset of the SARS-CoV-2 pandemic in North America in February, the novel coronavirus has behaved unpredictably. Over the past six months, different states and different regions have seen the incidence of COVID-19 quickly surge, then rapidly wane—only to surge again weeks later. When it comes to the supplies labs need for COVID-19 testing, government officials are often caught flat-footed when the pandemic in their state or city suddenly accelerates, generating a flood of patients into physicians' offices and hospital ERs.

Second Supply Chain Factor

The second factor involves what many lab managers would characterize as poor decisions and mismanagement of the clinical laboratory supply chain by federal, state, and local officials. This applies equally to the *in vitro* (*IVD*) diagnostic manufacturers and other suppliers of the products needed by clinical laboratories. Every lab director has examples of actions that constrict his or her laboratory's access to essential collection supplies and COVID-19 test kits, thereby preventing the lab from using 100% of its existing capacity of instruments and technical staff to meet the demand for COVID-19 tests in its community.

If there is a third factor, it is the myriad of previously-unknown companies now offering clinical laboratories, hospitals, physicians, and other providers medical supplies and COVID-19 tests of uncertain quality. It is *caveat emptor* for labs when buying these items. Some buyers of COVID-19 supplies and tests have been stung by outright fraud, and news reports have identified some perpetrators as individuals with a known history of fraud and criminal activity.

FEMA's Frequent Fumbles

Singled out for frequent criticism is the **Federal Emergency Management Administration** (FEMA). Both clinical laboratories and IVD manufacturers express dissatisfaction with the decisions and actions this agency has taken once it was given authority to manage medical supplies, diagnostic products, and COVID-19 tests during the pandemic.

Most of these complaints are off the record because lab managers and the executives at IVD companies and lab suppliers understand that such comments might motivate officials at the agency to work against their organization's interests.

However, that has not stopped journalists from reporting the agency's missteps. One example is FEMA's award of a $10 million contract to a company named **Fillakit**, to supply lab specimen tubes. What the vendor delivered were plastic tubes used as blanks to produce 2-liter plastic beverage bottles. These were totally unacceptable for lab testing purposes. It was also reported that the owner had incorporated the company only a few days before he was awarded this contract, along with the fact that this individual had faced multiple claims of fraud in recent years.

Another example involves the distribution of collection supplies. An executive at a prominent lab company told The Dark Report how FEMA was diverting essential collection supplies in a way that was counterproductive to the goal of enabling more COVID-19 testing.

She said that her lab had a contract with a government agency to perform COVID-19 tests across a large urban area. However, in this same region, FEMA had diverted lab collection supplies to the counties involved in this testing program. In turn, the counties had sent lab collections supplies directly to the nursing homes.

What made this FEMA decision counterproductive, explained the clinical pathologist, is that CLIA requires clinical labs to validate the collection supplies used by the lab for the testing. Because FEMA and the counties sent the collection supplies directly to the nursing homes—without allowing the lab that would perform the tests to validate these supplies—it put the lab in violation of CLIA were it to go ahead and use those specimens for testing.

Additionally, there was legal risk to the lab, she continued. If it turned out that the specimen collection supplies did not meet specifications or were compromised in delivery and storage at the nursing homes, thus causing inaccurate results if the lab were to test specimens collected with these supplies, then the lab would be exposed to lawsuits or regulatory penalties.

Laboratory directors recognize the Catch-22 elements in this situation. Other lab managers have shared similar FEMA stories with The Dark Report.

Lab Supply Problems

Unfortunately for clinical labs, the providers they serve, and patients, there is no short-term solution to the severe problems in the COVID-19 supply chain. This is true, whether the products are personal protection equipment (PPE), nasopharyngeal swabs, saliva swabs, and viral transport media (VTM) or COVID-19 test kits, reagents, probes, and analyzers.

Take the problem of expanding production of lab testing instruments, collection supplies, test kits, reagents, and similar items. Over the past three decades, manufacturers moved production to the lowest-cost nations, particularly China. This has two consequences.

One, it means there is little or no manufacturing infrastructure in the United States where a company can increase production by running three shifts per day and operating plants on Saturdays and Sundays. Keep in mind, this approach was used when **Ford** and **GE** signed contracts with the federal government in April for $336 million to manufacture 50,000 ventilators. Both companies repurposed existing manufacturing plants to produce ventilators and launched production literally overnight.

Outsourcing Overseas

Two, if manufacturing is outsourced to companies overseas, the U.S. companies receiving those products have much less control and influence when requesting their contractors increase production. Again, this constrains the ability of U.S.-based firms to increase production of their collection supplies, instruments, and test kits.

There is a third issue with the existing supply chain for medical products, lab automation and analyzers, and test kits. This problem comes from the fact that the major IVD companies typically have their own multi-national supply chain for the component parts that go into their products. Therefore, even if they want to quickly ramp up production of the final assembly of their products to deliver to labs in the United States, they must work through production constraints unique to the different countries where the components are being manufactured.

All of these are factors in what lab managers consider to be a non-functioning supply chain. Current indications are that quick improvements to supply chain problems should not be expected. TDR

International IVD Manufacturers Must Serve Multiple Nations with COVID-19 Lab Supplies

ONE SUPPLY CHAIN FACTOR OFTEN OVERLOOKED BY LAB ADMINISTRATORS AND PATHOLOGISTS here in the United States is the fact that many vendors manufacture in multiple countries and sell their products to labs worldwide.

This is true of the IVD manufacturers that dominate the lab testing market in the United States. As multi-national companies, they are major suppliers to other countries across the globe.

For example, **Roche** is headquartered in Switzerland, with major manufacturing sites in Germany. **Siemens Healthineers** is headquartered in Germany. **Sysmex** is headquartered in Japan.

Thus, even as federal and state officials here in the United States press these companies to deliver more collection supplies, instruments, and test kits, government officials in other countries are making similar requests and demands. IVD executives face political pressure from many countries at the same time. Which countries will get the biggest slices from the supply pie?

Exports of IVD Products

This very issue surfaced when THE DARK REPORT interviewed pathologist Mario Plebani, MD, Professor of Clinical Biochemistry and Clinical Molecular Biology at the **University of Padova**. The interview was published in the April 20, 2020 issue. The following exchange illustrates how different countries can pressure IVD companies for access to supplies during this pandemic:

EDITOR: *Within the European Union, is there a shortage of lab instruments and supplies for COVID-19 testing?*

PLEBANI: *In Germany, for instance, they want to run these COVID-19 tests on instrumentation produced in Germany. Does that mean labs here in Italy won't be able to get the instruments we need?*

EDITOR: *In the United States, the FDA has approved COVID-19 test kits that a growing number of IVD manufacturers have developed under emergency-use rules. One of those IVD companies is Roche Diagnostics, which has manufacturing and distribution plants in Europe. Are you getting access to those kits in Italy?*

PLEBANI: *Oh, yes, Roche offered a lot of cooperation to our government and to our National Institute of Health. But I know that our government now has the problem of understanding the number of COVID-19 tests that we need. It's not the offer of assistance. It's how many tests do we need—not only in Italy, but in other European countries. As you know, Roche is not established in Italy. It's established in Switzerland and partly in Germany. So, we have problems because it's not easy to manage the shipment of reagents and instrumentation [across national borders]. It's much more difficult now than it has been in the past.*

In fact, as the pandemic surfaced in Europe, the European Union swiftly enacted export controls on certain medical devices like PPE and other such protective equipment. Items covered by this directive require authorization before they can be exported. The United Kingdom-based *Medical Plastic News* wrote that the new directive may make it "difficult for medical device companies contractually obliged to supply devices to countries outside of the EU [such as the United States—Editor]."

Labs Still Confront New Supply Shortages Daily

Testing for the novel coronavirus is well short of capacity as vendors fail to fill orders for supplies

CEO SUMMARY: For three lab directors in the Midwest, a seemingly endless cycle of COVID-19 lab-supply shortages crops up almost daily. These labs might not have enough test kits one day, and be short of reagents, transport vials, or specimen collection swabs the next. To address these problems, the lab directors have cobbled together a variety of solutions, but they continue to run short of full capacity were all constraints to be removed, and one lab still operates at only about 20% of full volume.

As the COVID-19 pandemic enters its sixth month, clinical laboratories seeking adequate supplies to test patients for the novel coronavirus face a significant problem of continuing shortages.

Hospital and health system laboratories and regional and community lab companies all seem to be at the end of the supply chain as *in vitro* diagnostics manufacturers and government agencies, such as the **Federal Emergency Management Administration** (FEMA), decide how to allocate supplies of reagents, test kits, specimen-collection swabs, transport media, and other equipment.

Continuing Supply Shortages

Over the past two months, The Dark Report has interviewed about a dozen clinical laboratory professionals at hospitals and health systems, including lab directors at two hospital systems who explained the problems they encounter every day without enough supplies to do routine and SARS-CoV-2 testing. All three asked not be identified so that they could speak freely.

From about mid-March through mid-June, all three lab directors said their facilities had trouble getting the supplies they need to run these tests at full capacity. The lessons they learned from this experience include being persistent with all supply vendors by calling them on the phone almost daily and by seeking out new supply vendors whenever possible.

In addition, they learned to take a more drastic step—by adding new assays—that they might not pursue otherwise. One lab even went so far as to spend almost $100,000 to add a new analyzer for COVID-19 testing. In normal times, these labs might hesitate to buy, install, and validate new testing platforms because of the huge outlay required in time and capital. But these are not normal times, and so the lab directors have learned that when supplies run short from one or more of their legacy vendors, they can switch testing to another manufacturer's equipment and vice versa.

As the lab directors use these stopgap measures to address the supply shortages, they continue to receive inconsistent answers about why their labs' supplies continue to run out six months after the first death due to COVID-19. A lab director at one of largest health systems east of the Mississippi said some vendors have explained the problem and others have not.

Six Months After First Infection, Lab Directors Ask: Why Are SARS-CoV-2 Supplies Still Short?

IN THE UNITED STATES, THE FIRST PATIENT with the novel coronavirus was diagnosed on Jan. 19 in Snohomish County, Washington, according to the *New England Journal of Medicine*.

Within weeks, clinical laboratories nationwide began adding SARS-CoV-2 tests but were soon stymied in their efforts to test at full capacity due to limitations in the number of nasopharyngeal swabs, reagents, test kits, and viral transport media, among other supplies. Six months after that first diagnosis, those shortages continue to plague labs today, according to clinical lab directors and experts who monitor testing nationwide.

"In our experience, the reasons for supply shortages of critical lab supplies are multifactorial," said one lab director from a Midwest hospital who asked not to be named. "Every day, we have what seems like a supply problem—whether it's a shortage of test kits, extraction reagents, transport media, or something else.

"There are so many pieces that could be short on any given day," he added. "And that's what happens: each day brings a new problem. Out of necessity, our lab has done things differently than we've ever done before, and we've done things that we didn't want to do."

In January, this lab director had three analyzers capable of running the reverse-transcription polymerase chain reaction test for the SARS-CoV-2 coronavirus. Since then, he's added testing on three more machines and has ordered a fourth new analyzer.

"Right now, we have five different vendors so that we can test our patients in some capacity," he explained. "But having all those analyzers means the lab staff needs to be nimble enough to move on demand from one machine to another.

"Because of the various supply chain issues we've had, we may have one or two vendors that are constrained for whatever reason," he explained. "When that happens, we move on to another machine that has the testing capability for a certain number of COVID-19 tests.

"But then that vendor may have a problem and we'd have to move again," he added. "It seems like the dust never settles, which has become the new normal. That's why we now have multiple testing platforms just so we can address these supply chain issues."

"**Abbott Laboratories** has been very forthright in saying that our lab's capacity is directed by the government," the lab director noted. "We have yet to learn which department of the government, however."

Another vendor has been less than straightforward about the shortages. "We still have difficulty getting supplies from **Cepheid**," he added. "And company representatives won't say why those supplies to our lab are short.

"I don't know if the shortages are a result of some government action, or it is simply that our vendors keep selling more new equipment to their laboratory customers, but then continue to send only the same number of test kits and other supplies as they shipped normally.

"We keep hearing from lab vendors that we're among the few hospitals getting the most COVID-19 test kits, and that we get even more than their other hospital clients get," this lab director added. "That's bad, because if we're not getting much, those other hospitals must be getting even less.

"Even now, months into the pandemic, we are forced to limit our COVID-19 molecular tests to just 500 to 700 tests each day because our supply of nasal swabs is very limited," he said. "Our

lab's testing capacity is more than 3,000 COVID-19 molecular tests per day."

This lab's SARS-CoV-2 molecular tests are the reverse-transcription polymerase chain reaction (RT-PCR) assays that require analysis of specimens collected with nasopharyngeal swabs. Those swabs have been in short supply nationwide since March.

"Toward the end of April, we were running about 500 of the RT-PCR tests, and now two months later, we can do about 600 to 700 of those tests every day," he added. "That's not much of an increase, mostly because we've had supply chain problems."

This health system has more than 3,000 beds and during the first three months of the pandemic, the state reported some of the highest numbers of cases and deaths per 100,000 residents among all states.

"Back in February, we heard that Cepheid was planning to send us 20,000 rapid viral test kits, but we never saw any part of that," he noted. "We worked with our U.S. Senators to get us some of those kits, but that didn't help much.

Need for Faster TAT

"At about that time, we were told to send the tests we couldn't run to **LabCorp** and **Quest Diagnostics**, but those labs were unable to deliver results fast enough," he added. "Then we were told to send the tests we couldn't run to **NxGen MDx** in Grand Rapids, Mich." NxGen MDx is a private lab that specializes in next-generation sequencing which reportedly had reagents and some idle equipment.

"But sending to NxGen was a problem, because we don't have a contract or an electronic interface with them," the lab director noted. "That means we had to enter all the patient data for each test manually. Typing all that information into the electronic health record for thousands of tests is a recipe for disaster.

"When you want your lab to do 3,000 or more of these tests a day, every part of the process needs to go smoothly because any bumps can lead to mistakes," he added.

Since March, Laboratory Corporation of America and Quest Diagnostics increased their testing capacity and cut their turnaround times dramatically. Therefore, the health system has sent any COVID-19 tests it cannot run to those labs. But doing so extends the turnaround time for results and reduces revenue.

Patients Are First Priority

"We'd certainly prefer to run all of these tests ourselves for our own economic health, but our first priority is to take care of our patients," he commented. "If we could, we'd like to use the Cepheid machines in our lab, because we can get those results in about an hour. We'd prefer that and so would our physicians, because waiting three days for a COVID-19 test result is usually not helpful.

"At the moment we use our send-out COVID-19 testing for pre-op patients," he reported. "That means we test those patients four or five days ahead of their surgery and tell them to quarantine themselves and not get exposed for those days before the surgery.

"That saves our in-house SARS-CoV-2 testing capacity, so that when patients come in who are symptomatic and we suspect they have the COVID-19 illness, we can swab them and tell right away if they're positive or negative," he added. "More SARS-CoV-2 testing that produces rapid answers, such as when patients arrive for surgery, would be better for everyone.

"Testing our pre-op patients is important because published studies show that patients who are COVID-positive, and who will have major surgery, have worse outcomes than people who are COVID-negative," he explained.

"As it is, we need to use a testing algorithm, because we're facing these shortages," he concluded. "An algorithm would help us to preserve our rapid COVID-19 tests for the most urgent patients and conserve the COVID-19 tests that produce results in several days for other patients." TDR

INTELLIGENCE

LATE & LATENT

Items too late to print, too early to report

On July 9, eight national laboratory associations sent a letter to Vice President Mike Pence to request that the White House Coronavirus Task Force take action to resolve major obstacles that constrain the ability of their member laboratories to perform molecular and serological tests for COVID-19. Specifically, the lab associations want action and resolution on supply chain issues. The letter noted that "At times, our members have even received faulty or unusable equipment, including swabs from the Strategic National Stockpile, which has further impeded our work to combat this pandemic."

MORE ON: *White House Letter*

One important request in the letter is for the government to provide a list of the names and contact information for the individuals that currently oversee the supply chain in each state. The lab associations also offered to be a conduit between the state officials directing supply distribution and the labs that need COVID-19 supplies. Signing the letter were the:

- **American Association of Bioanalysts,**
- **American Association for Clinical Chemistry,**
- **American Medical Technologists,**
- **American Society for Microbiology,**
- **Association of Public Health Laboratories,**
- **Association for Molecular Pathology,**
- **College of American Pathologists,**
- **National Independent Laboratory Association.**

TRANSITIONS

• **ARUP Laboratories** of Salt Lake City announced retirements of three long-serving individuals.

• July 1 was retirement day for Carl Wittwer, MD, PhD, Medical Director of Immunologic Flow Cytometry. As a pathology resident, he arrived at the **University of Utah School of Medicine** and ARUP Laboratories in 1988. Wittwer holds "dozens of U.S. patents and their foreign equivalents." He invented the LightCycler system, an instrument that led to the creation of the company that evolved into **BioFire Diagnostics**.

• July 2 was retirement day for Noriko Kusukawa, PhD, Vice President of Innovation and Strategic Investments at ARUP. She served for 20 years and is the wife of Carl Wittwer, MD, PhD.

• Karl Voelkerding, MD, Medical Director of Genomics and Bioinformatics at ARUP, is retiring after 17 years at ARUP. No retirement date was provided. Prior to ARUP, he was on the faculty of the **University of Wisconsin School of Medicine** for 11 years.

That's all the insider intelligence for this report. Look for the next briefing on Monday, August 3, 2020.

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Resources and Help for Labs During SARS-CoV-2 Pandemic

STAT INTELLIGENCE BRIEFINGS

A Service of The Dark Intelligence Group

Today, every clinical lab is on the front lines of the SARS-CoV-2 pandemic. Pathologists and lab managers face unprecedented challenges and much uncertainty about the best responses.

Cash flow is dropping. Test mix is changing as routine testing falls off and demand for COVID-19 testing increases. Specimen collection and transport is disrupted.

To help you stay informed and provide you with actionable intelligence, The Dark Report and DarkDaily.com launched the COVID-19 STAT Intelligence Service.

Check **www.covid19briefings.com** for daily news and lab innovations.

To share your lab's innovations and successes, contact our Editor at: rmichel@darkreport.com

UPCOMING...

- ***Amazon Is Building Several Clinical Labs for COVID-19 Testing: Does It Want to Enter the Clinical Laboratory Marketplace?***
- ***Statewide Clinical Lab Network with 138 Participating Labs Works with Public Health Lab to Address COVID-19 Outbreak.***
- ***Coding, Billing, and Collecting for COVID-19 Tests: Why Payers Are Challenging Claims and How Labs Can Win More Appeals.***

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