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News

SCALING UP
SARS-COV-2
TESTING



Number of tests performed
at North West London Pathology
in 24 hours

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Rising To Meet The COVID-19 Challenge





Stepping Up During a Global Pandemic

Five award winners show how clinical laboratories reacted to COVID-19 with speed and innovation.

BY KIMBERLY SCOTT

At the beginning of the COVID-19 global pandemic in 2020, clinical laboratories around the world were called on to ramp up diagnostic testing for the SARS-CoV-2 virus to help mitigate spread of the infectious disease. From North America to Europe to the Middle East and beyond, labs moved quickly to validate new systems, enact new protocols and deliver test results in a timely manner. These actions were essential for healthcare organizations to continue providing much-needed patient care.

AACC, Abbott and other leading healthcare organizations have recognized a number of these clinical laboratories through the UNIVANTS of Healthcare Excellence Program, a prestigious global award program designed to celebrate innovative efforts that have improved patient

care. Interdisciplinary teams, which either include laboratories or are led by laboratory professionals, are scored on development of integrated care initiatives that achieve measurable impact within healthcare systems. Below, we highlight five COVID-19-related initiatives that were recognized with “distinction” or with “achievement” in 2020. (A sixth initiative, “Novel Collaborative Approach among Public and Private Sectors for Streamlined SARS-CoV-2 Testing Toward Optimized Patient Outcome During COVID-19 Pandemic,” was highlighted in the December 2020 issue of *Clinical Laboratory News*).

MAXIMIZING RESOURCES FOR TIMELY COMMUNICATION

When the COVID-19 pandemic began to affect the province of Nova Scotia in spring 2020, leaders recognized that contacting patients with their test results would be a challenge. As testing ramped up, more than 60 Nova Scotia Public Health staff members were responsible for delivering test results to more than 40,000 Nova Scotians by phone. Most results were given within a 48-to-72-hour timeframe — a pace that threatened to overwhelm the staff.

Leaders at Nova Scotia Health began considering ways to notify patients with negative results via email to save the staff time. Patients whose test results came back positive would get a phone call from the Public Health Department. The organization developed a fully automated and secure in-house application that combines data from two systems (the registration systems and lab information system) and identifies which patients the email notifications should go to. The notification includes a link to a webpage managed by Nova Scotia Health, where patients can view their results.

The solution went live in June 2020. Between June and December 2020, 85,849 emails were sent, with 71,776 people accessing their online information via a unique link, said Lauren MacDougall, senior communication adviser for Nova Scotia Health. By clicking on the link and entering the last four digits of their provincial health card number, individuals are

able to access their results. There is no personal information in the email itself.

“Patients are now receiving negative test results within a day, whereas prior to this technology it would have taken two to three business days,” said MacDougall. “A decrease in wait times provides patients and their families peace of mind sooner, reducing overall stress and anxiety.”

Given that each phone call or voicemail to deliver a negative test result takes two to three minutes, the solution is estimated to have saved staff 3,577 hours between June and December 2020, for an approximate savings of \$107,310 CDN. Staff that otherwise would be calling patients are now able to spend their time supporting schools and community partners.

The initiative, which was recognized by the UNIVANTS of Healthcare Excellence program with achievement, is being scaled up within the province, noted MacDougall. “Nova Scotia Health has adapted the application to be used for mandatory postsecondary student testing, and we continue to work with our partners and other testing scenarios that the application could be used for to deliver negative test results,” she says.

STRATEGIC SARS-COV-2 TESTING FOR WORKERS AND PATIENTS

The ability to track, trace and quarantine individuals infected with SARS-CoV-2 is essential to minimizing transmission and maximizing the health of the population. Protective measures are especially crucial in hospitals, where risk of transmission is high and potentially lethal. A team at Marienhospital in Stuttgart, Germany, early in the pandemic developed and implemented new policies and procedures to maximize the health and safety of patients and healthcare workers. These policies and procedures have resulted in low transmission of the virus to healthcare workers and patients and have allowed the hospital to return to almost normal operations.

Under the new procedures, all inpatients are tested upon admission. Nasopharyngeal swabs are collected from high-risk patients one day prior to admission; for low-risk patients, the swabs are collected on

day of admission. High-risk patients are quarantined until test results are available, while low-risk patients are treated with normal precautions, such as wearing face masks and social distancing. High-risk healthcare workers, such as those working on COVID-19 wards, are tested every other day. Low-risk healthcare workers and outpatients with risk of transmission (e.g., dental patients) are tested every four weeks, according to Matthias Orth, MD, PhD, head of the Institute of Laboratory Medicine.

Average turnaround time on the tests is 10 hours, and more than 95% of the test results are reported on the same day. Not only does the quick turnaround time allow for rapid quarantining of infected patients, it also reduces avoidable anxiety among those waiting for results, Orth noted.

In total, the hospital has had about 200 healthcare workers believe to have contracted COVID-19 outside of the hospital. Until the fall, when the region began experiencing a second wave of infection, there were no cases of healthcare workers being infected on the job, or iatrogenic infection. However, during the second wave, there were two small outbreaks that started with patients who tested negative on admission and became positive afterward. In one case, the patient contracted COVID when dialyzed in her dialysis center (not within the hospital). In the other case, a patient became infectious five days after admission and transmitted the virus to healthcare workers and other patients.

“Both outbreaks were detected by our sentinel screening scheme, but it took quite some time and effort to stop the outbreak — the second infected patient was on three different wards with lots of contacts,” said Orth. “Our patients are admitted with bacterial pneumonia or a rather bad health status, and it is difficult to detect the beginning of a COVID-19 infection in these sick patients.”

85,849

The number of SARS-CoV-2 results sent by email between June and December 2020

3,577

The estimated staff hours saved, for an approximate savings of \$107,310 CDN

In 2020, the hospital treated 372 patients with COVID-19, with 52 fatalities. In January of 2021, the hospital treated about 100 patients, with 15 fatalities. The hospital also transformed three wards to COVID-19 wards, and one of its two intensive care units was treating only COVID-19 patients.

Implementation of strategic SARS-CoV-2 testing and COVID-19 protective measures has enabled Marienhospital to resume operations at 95% capacity, a more than 50% increase since the start of the pandemic. Despite some federal compensation for strategic distancing, the resumed capacity has enabled

hospital revenue comparable to the services rendered pre-COVID, said Orth.

Healthcare workers who require a two-week quarantine incur at least 2,500 euros in direct-labor costs to the healthcare system, along with additional lost labor costs.

Because of its sentinel testing system the hospital estimates potential cost avoidance as high as 1.5 million euros in direct labor costs for healthcare workers alone in a three-month period.

With limited outbreaks tied to patients within the hospital, the testing initiative, which was recognized by UNIVANTS with achievement, is a success, noted Orth. “The concept gave a very high level of safety for patients and personnel,” he said. “We had the chance to introduce the sentinel testing system in late spring when the prevalence was low. With the second wave coming last fall, we were very well prepared and were able to solve our challenges very smoothly.”

SUPPORTING BETTER OUTCOMES THROUGH DATA, INNOVATION, COLLABORATION

At the beginning of the COVID-19 pandemic, Public Health England (PHE) laboratories had a considerable backlog of tests for SARS-CoV-2, and National Health Service (NHS) laboratories were asked to provide additional support to hospitals. In March 2020, North West London Pathology (NWLP), an

NHS pathology partnership serving three major London hospital trusts (Imperial College Healthcare NHS Trust, The Hillingdon Hospitals NHS Foundation Trust and Chelsea and Westminster NHS Foundation Trust) began providing in-house testing for COVID-19, which enabled the three trusts to stop sending their SARS-CoV-2 tests to the PHE labs.

NWLP introduced multiple SARS-CoV-2 assays to ensure that the testing service was flexible, resilient and could cope with any challenges, such as supply shortages, explained Saghar Missaghian-Cully, managing director of NWLP and pathology incident director for the network. Teams within NWLP worked closely together to ensure there was enough staff to cope with the increased demand to process tests. Staff within NWLP were deployed from other teams to work in the Infection and Immunity Division to support and assist colleagues. For example, staff within the renal transplant service were deployed into a new laboratory set up solely for SARS-CoV-2 testing.

“We collaborated with colleagues from Imperial College London and the Dementia Research Institute to set up a dedicated COVID-19 laboratory using a novel diagnostic solution,” said Missaghian-Cully. “The solution repurposed high-throughput robotic technology first used in our laboratories in April 2020 with more testing modules purchased a few months later to increase capacity. Unlike the vast majority of testing equipment worldwide, the new platform was not reliant on specific reagent suppliers. This means our service was more resilient, as different kinds of kits could be used on the same platform.”

NWLP was able to ramp up testing quickly while also reducing turnaround time. The practice went from having no COVID-19 testing to having the ability to process more than 2,400 tests in a 24-hour period. NWLP currently has the capacity to process 3,000 tests per day and is able to meet the demand for testing. The current average turnaround time is nine hours from receipt within the laboratory, and 100% of samples are processed in 24 hours.

According to Missaghian-Cully, NWLP expanded its testing capacity

95%
of test results
reported on the
same day

10 hrs
average turnaround time
for SARS-CoV-2
tests

50%
increase in hospital
capacity since phase I of
the pandemic



by introducing new assays and different platforms, including rapid testing options. It is an ongoing process, she says, noting that NWLP continuously reviews its service to see how it can improve and utilize its labs and staff as effectively as possible.

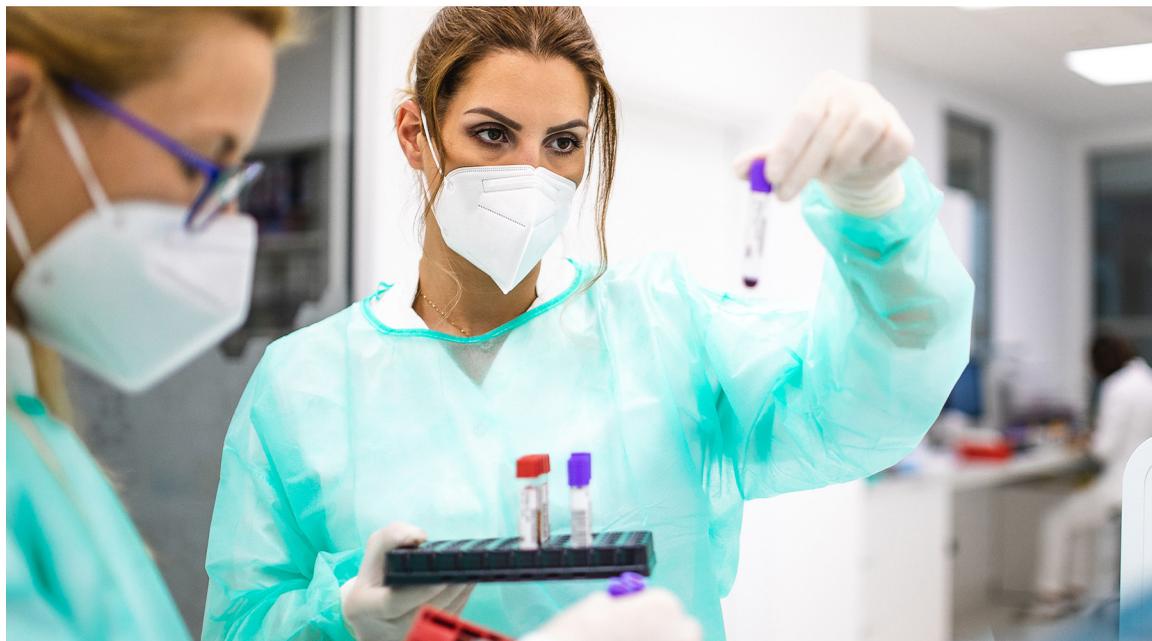
“Using data has been incredibly important — it has enabled us to monitor the situation in real time,” she explained. “We are able to use the data to monitor and review our performance on a daily basis, such as turnaround times, staffing levels, number of tests processed each day, patient epidemiology and to identify hospital-acquired infections. We produce daily reports to share relevant data with our key stakeholders in each of the hospital trusts we serve.”

The data was used to drive decisions to ensure the service was operating as efficiently and effectively as possible, noted Missaghian-Cully. NWLP’s senior management team was able to use the data during its daily operational updates to determine such things as staff sickness rates, which could have affected the service’s capacity to deal with the pandemic.

The clinical care initiative, which was recognized with achievement, is highly scalable, said Missaghian-Cully. She notes the way the teams worked together and across disciplines was exemplary. “We could implement the same or similar structures for any project bringing expertise from across our organization to achieve success,” she said.

LABORATORY-LED SCREENING FOR BACK-TO-WORK PROGRAMS

In an effort to help businesses reopen safely in the midst of the COVID-19 pandemic, a multidisciplinary team within Dr. Suliman Al Habib Medical Group (HMG) Hospital in Riyadh, Saudi Arabia, identified an opportunity to leverage insights and services from the clinical laboratory to develop a COVID-19 screening program for employees returning to work. The initiative involved offering both PCR diagnostic testing to identify active viral replication as well as antibody testing to identify past viral exposure and potential transient immunity. The group offered screening services to diverse companies,



institutions and sports centers, according to Faisal Abdullah Al Owaidi, laboratory director at the hospital.

“Our care team focused on risk mitigation through strategic collaborations with industrial business owners via employee-wide screening programs in support of their returning back to work business strategies and timelines,” said Al Owaidi. “The goal was to maximize productivity and employee safety while minimizing virus transmission and loss of work due to new infection and quarantines.”

Early results from a screening of 267 employees at one company showed that 79% of them (210) had no active virus, but that 56% of those (118) were positive for the SARS-CoV-2 IgG antibodies, indicating a past infection. Identifying active infection is critical for quarantining infected individuals and reducing transmission, but identifying those with antibodies is also important, noted Al Owaidi.

“During pandemics, fear can prevent many individuals from seeking care when they need it while triggering other individuals to seek care when they don’t,” he said. “Patients with known antibody presence are more likely to seek care without fear of infection, and patients who now know that they do not have the disease aren’t coming to my facility for fear that they might.”

The PCR and antibody testing allowed the company to quarantine only those employees with active infection, while those with no infection or past infection could continue to work using safety protection and social distancing. With an average salary of 6000 Saudi Riyal (SAR) per employee, the company avoided lost labor as well as paid sick leave in up to 79% of the company employees, according to the hospital’s data.

The new screening initiative, which was recognized with achievement, has created a new revenue stream for the clinical laboratory and is helping offset some of the revenue that was lost during the early days of the pandemic.

The creation of algorithms and consultation on test interpretation were important first steps in support of the return-to-work program, noted Al Owaidi. While companies must pay for the testing and services provided, the value of risk mitigation and the health and financial benefits far outweigh the cost of testing.

MAINTAINING HIGH QUALITY CARE DURING THE PANDEMIC

Early in the pandemic, the Österreichische Gesundheitskasse (ÖGK), the largest social health

2,400
Number of tests North West
London Pathology can perform in
24 hours

9 hrs
Average turnaround time
for SARS-CoV-2 tests

insurance fund in Austria serving more than 7.2 million people, established strict safety measures to protect both patients and employees. In Vienna, the ÖGK Hanusch Hospital (HKH) and four ÖGK healthcare centers tightly controlled hospital and ambulatory patients to minimize infection rates until treatment or vaccinations became available.

The Hanusch Hospital is a third-priority hospital in Vienna, taking in COVID-19 patients only when priority one and two hospitals reach capacity. In the first stage of the pandemic, a multidisciplinary team — including laboratory, hygiene, infection control, and clinicians — prepared a safety protocol for the HKH and the four

ÖGK healthcare centers. This protocol consisted of PCR testing for SARS-CoV-2 with results within eight hours, a separate entrance for patients and healthcare workers, patient entrance control and use of protective masks, according to Johann Bartko, MD, PhD, a specialist for medical and chemical laboratory diagnostics.

All patients admitted to the hospital were tested prior to admission. Ambulatory patients and ÖGK healthcare workers were tested if there was any suspicion of infection. During

lockdown from mid-March to the end of April 2020, patient care, including elective surgeries in the HKH and the healthcare centers, was reduced by up to 70%. The safety protocols allowed the healthcare centers to reopen access to care, which reached almost 90% of prepandemic levels by the end of July with no uncontrolled transmission seen among patients and healthcare workers.

In June 2020, the ÖGK offered all their employees antibody testing so they could find out their immunity status. Overall seroprevalence in ÖGK employees in Vienna was 2.67% (66 out of 2470). Asymptomatic infections were seen in 34% (23 out of 66) of healthcare workers. No uncontrolled transmission was seen in the slow reopening that began in mid-April, said Bartko.

From the end of March to the end of July, 8,304 tests were performed with a confirmation rate of 0.41% (nine confirmed healthcare workers, eight hospital patients and 16 patients in ambulatory care). These results are an indication that the safety protocols were successful in reducing the spread of the virus, which allowed the

healthcare centers to continue serving patients, including those in need of emergency care

who may have put off coming to the hospital, said Bartko.

“Between mid-March 2020 and mid-April 2020, the lab was running at only 50% capacity, compared with the same time period in 2019,”

he said. “This was partially due to shift work, which was established in the lab to avoid the spread of COVID-19 among employees. Reduction in testing also included troponin, the key biomarker in the diagnosis of myocardial infarction. There were only 110 elevated troponin results during the lockdown period, in contrast to the 213 positive results in the year before. Notably, the number of patients with elevated troponin results are now approximating the prelockdown rates.”

Given the low number of patient and healthcare worker infections that occurred after implementation of the safety protocols, the initiative is considered a success, said Bartko. He notes that patient care can be maintained even when community spread of the virus is increasing.

90%
level of ambulatory care possible by July 2020 after 70% reduction during lockdown

2.67%
Overall seroprevalence in ÖGK employees in Vienna in June 2020

56%

of employees at one company tested positive for the SARS-CoV-2 IgG antibodies, indicating past infection

Teams Recognized In This Issue

Strategic SARS-CoV-2 Testing for Risk Mitigation and Optimal Health of Healthcare Workers and Patients | Marienhospital
Matthias Orth, Markus Bauer, Stefan Reinecke, Sr., Karin Johanna Haase

Maintain High Quality Patient Care During the COVID-19 Pandemic | Institut für Medizinische und Chemische Labordiagnostik, Mein Hanusch Krankenhaus
Nazanin Sédille-Mostafaie, Johann Bartko, Andreas Krauter, Elisabeth Zwettler, Felix Keil, Andrea Schlögl

Maximizing Delivery Method and Clinical Resources for Timely Patient Communication of COVID-19 Status | Nova Scotia Health
Lauren MacDougall, Jamey Martell, Amy MacDonald, Pam Butler, Don Doiron, Linda Plummer, Mark Ralph, Karen Drakes, Andrew Smith

Laboratory-Led Company-Wide Screening Programs for Safe, Back to Work Strategies during COVID-19 Pandemic in Saudi Arabia
Dr. Suliman Al Habib Medical Group
Faisal Abdullah Al-Owaidi, Abdullah Nasser Al-Jurayyan, Tarif Imadeddin Bizrah, Nasser Mohammed Al-Huqbani

COVID-19: Using Data, Innovation, and Collaboration to Support Better Patient Outcomes (1372) | North West London Pathology
Saghar Missaghian-Cully, Paul Nacmanson, Paul Randell, Gabriel Roberts, Panos Pantelidis, Leanne Hughes, Helen Hobson

QUICK RESPONSE TO PANDEMIC IMPROVES PATIENT CARE

The initiatives highlighted above are just a few of the many projects across the world in which clinical laboratories reacted quickly to the COVID-19 global pandemic. Beyond simply providing test results, clinical laboratories take an active role in improving patient care and enabling healthcare institutions to continue serving their communities, even as they confront an infectious disease. To learn more about these initiatives, as well as others recognized by the UNIVANTS of Healthcare Excellence awards, go to www.diagnosticsabbott/us/en/univants-healthcare-excellence or www.univantshce.com. ■

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