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From the Desk of R. Lewis Dark...

THE DARK REPORT

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

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COMMENTARY & OPINION by...

R. Lewis Dark

Founder & Publisher

Are Live Lab Industry Conferences Returning?

FOR SEVERAL MONTHS, MANY OF YOU HAVE USED CONVERSATIONS AND EMAIL to encourage us to conduct a live *Executive War College* before the end of 2021. It was because of this support that we arranged a hotel in a state that has supported a return to more normal activities. Thus, our conference will take place on Nov. 2-3, 2021, in San Antonio, Texas, at the **Hyatt Riverwalk Hotel**.

Meanwhile, some major healthcare conferences are showing the way forward. The large HIMSS (**Health Information and Management Systems Society**) held its annual meeting in Las Vegas last month as a live event. Attendance was down from pre-pandemic levels and several lab vendors reported that, although traffic at their exhibits was down, attendees felt safe and business was being conducted that justified their participation at the HIMSS conference.

For the lab profession, the next major annual conference to happen as a live event will be put on by the **American Association of Clinical Chemistry** (AACC). It will be in Atlanta on Sept. 26-30. Because such a large number of attendees come from overseas, AACC has the challenge of establishing COVID-19 protocols that will meet the standards of different countries. For that reason, its website describes its "COVID-19 Health and Safety Plan" as requiring all participants to be vaccinated, "to have received a negative PCR or antigen COVID-19 test within 72 hours of arriving at the convention center," and "to wear a face mask covering their nose and mouth at all times they are indoors."

In planning our 27th annual *Executive War College*, we are consulting with travel industry experts and our COVID-19 health and safety policy will follow the guidelines provided by the **Centers for Disease Control and Prevention** (CDC). Details of the policy will be announced shortly. Several factors are shaping our thinking about this policy. First is the fact that CDC data shows 174 million Americans are fully-vaccinated and 38 million have been infected and have some level of antibodies. This means that a large proportion of our participants will be vaccinated.

Second is the remarkable fact that 100% of our registered participants, sponsor representatives, and speakers have committed to come to San Antonio and are comfortable attending a live conference. They will be amply rewarded with compelling speakers and the usual high-level of networking. TDR

All Labs Are Threatened by Encryption, Ransomware

Attorneys, consultants warn labs that attacks are happening weekly and increasing in number

CEO SUMMARY: Cybercrime—in the form of encryption attacks followed by ransom demands—is now a threat to every clinical laboratory and anatomic pathology group in the United States. Experts recommend that all labs elevate the attention they pay to their incident response teams tasked with defending their organizations' information systems and databases. They also advise labs to harden their defenses against encryption attacks that become ever more sophisticated and successful.

EVIDENCE CONTINUES TO ACCUMULATE THAT ENCRYPTION ATTACKS AND RANSOM DEMANDS are major threats to all healthcare providers, including clinical labs and pathology groups. Yet many labs either have not recognized this threat or they've not taken steps to harden their defenses against such attacks.

Lack of attention by owners and managers of clinical labs and pathology groups is due to the fact that the majority of encryption attacks never become known to the public. A victim of an encryption attack and/or a ransom demand has a sensible reason to keep this news from becoming known to the public.

That's because public news that a company or healthcare organization was encrypted and paid a ransom to obtain a de-encryption key encourages other hackers to target that company on the theory that if it paid ransom once, it will pay ransom a second time.

For this reason, a large proportion of the encryption attacks and ransom demands experienced by hospitals, clinical lab organizations, and other healthcare providers are kept secret. It is why the attacks happening weekly throughout the United States often are a surprise to the victimized organization's management team. *(See TDR, "Ransomware Attackers Target Health Providers," May 24, 2021.)*

These and more valuable insights were shared during a recent webinar produced by THE DARK REPORT, titled, "Ransomware Protection & Response for Clinical Labs, Hospitals, and Pathology Groups: Effective Steps for Protecting Your LIS, EHR, and Other IT from an Encryption Attack." The webinar recording is available for on-demand viewing.

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SUBSCRIPTION TO THE DARK REPORT INTELLIGENCE SERVICE, which includes THE DARK REPORT plus timely briefings and private teleconferences, is $15.27 per week in the US, $15.27 per week in Canada, $16.05 per week elsewhere (billed semi-annually).

In simple terms, an encryption attack locks some or all of the victim's information systems and databases and prevents access by the victim. All workflow in the laboratory or pathology group that depends on access to operating software stops. Databases cannot be accessed.

Use of Paper Forms

In cases where the encryption attack and ransomware demand is reported by local news outlets, journalists often describe how physicians and staff attempt to continue operations manually and with the use of paper forms.

The most successful encryption attacks also succeed in locking access to back-up systems and even cloud-based data storage. This risk from an encryption attack should be recognized by clinical laboratory managers and pathology practice administrators.

Once files have been encrypted, systems and files cannot be decrypted without a mathematical key known only by the attacker. Victims receive a message that notifies them that their files are now inaccessible and will only be decrypted if the victim sends an untraceable Bitcoin or other cryptocurrency payment to the attacker.

Disruption of Patient Services

The disruption to a lab's regular operations can be substantial following an attack that encrypts some or all information systems, including databases. This is particularly true because labs typically serve hundreds of physicians and thousands of patients every day. A lab's clients notice almost immediately that something is wrong because they are unable to access patient results or use email, customer service portals, and appointment programs.

Upon discovery of an attack, experts recommend that the clinical lab, pathology group, hospital, or other provider engage three types of consultants. First is a law firm to provide guidance on the provider's obligations under state and federal laws. This includes addressing a possible breach of protected health information (PHI).

In these instances, the lab's response becomes more comprehensive and complicated. If the breach involved data on a large number of patients, the lab is obligated to report the breach to the federal government, notify patients affected by the breach and offer them help in securing their data, and alert the news media about the PHI breach with a press release or similar notice.

Cybersecurity Consultants

Second is to engage a consulting firm with expertise in cybersecurity and information systems. These consultants have experience in dealing with encryption attacks, use of the de-encryption keys provided by the attackers after a ransom is paid, and knowledge of how to bring all software, databases, and information systems back to full function. This is particularly important in attacks where the de-encryption key fails to restore access to all systems or where the provider decided to not pay ransom and must restore the operating systems on its own.

The third type of expert is skilled in negotiating with the hackers who launched the encryption attack and are now demanding ransom in exchange for the de-encryption key. In discussions with victims of these ransomware attacks, THE DARK REPORT has learned that there are unspoken rules of negotiation that must be followed.

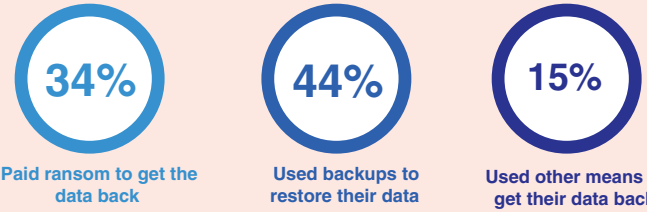
For example, the organization's negotiators know how frequently the hackers will email or telephone. They understand the consequences should the organization not communicate with the hackers. If the victimized laboratory doesn't respond to the satisfaction of the hackers, they may decide to go silent. That leaves the victimized lab or pathology group with encrypted systems that it must resolve on its own.

But there is another side to the negotiations. In conversations with TDR,

34% of Healthcare Organizations Report Ransomware Attacks during Past Year

RANSOMWARE ATTACKS THAT TARGET HEALTHCARE ORGANIZATIONS are increasing in frequency. In a report it released in May, **Sophos Group plc,** a British security software and hardware company, published the results of a survey that included 328 respondents from healthcare. The three circles below highlight key findings from the Sophos survey, most notably that 34% of these respondents experienced a ransomware attack during the prior year.

Sophos' survey determined that, following encryption, 93% of healthcare organizations got their data back. However, 34% of these organizations paid ransom to obtain a de-encryption key.



Sophos' ransomware survey showed that, following an encryption attack, healthcare organizations reported an average loss of $1.3 million when all costs, including ransom paid, are considered. Below are highlights from the survey:

- 34% of healthcare organizations were hit by ransomware in the past year.
- 65% of those that were hit by ransomware in the last year said the cybercriminals succeeded in encrypting their data in the most significant attack.
- 44% of those whose data was encrypted used backups to restore data.
- 34% of those whose data was encrypted paid the ransom to get their data back in the most significant ransomware attack.
- However, on average, only 69% of the encrypted data was restored after the ransom was paid.
- 89% of healthcare organizations have a malware incident recovery plan.
- The average bill for rectifying a ransomware attack, considering downtime, people time, device cost, network cost, lost opportunity, ransom paid, etc., was US$1.27 million. While this is a huge sum, it is also the lowest among all industry sectors surveyed.

Source: Sophos Group plc; State of Ransomware in Healthcare 2021, May, 2021

ransomware victims described how, over a few days or several weeks, they were able to negotiate a ransom payment that was 50% or 25% less than the original amount demanded. Following payment of the ransom in the form of Bitcoins or other cryptocurrency, they received a de-encryption key and were successful in regaining functionality to most of their information systems and databases.

Labs Attacked, Encrypted

During THE DARK REPORT's webinar on encryption and ransomware, attorney Emily Johnson, JD, of **McDonald Hopkins**, a law firm based in Cleveland, provided examples of labs that were attacked by hackers.

In July 2019, one specialty testing division recently acquired by **Labcorp** was attacked. Labcorp's team acted swiftly and it is believed that no Labcorp data was removed from its systems. Johnson presented a slide showing that the hackers demanded a ransom of $6,000 in Bitcoin for each machine that was hacked, for a total demand of $52,000 to unlock all encrypted devices.

Johnson also showed a slide with details of a ransomware attack in July 2020 on **Apex Laboratory** of Farmingdale, N.Y. That attack led to patient data being stolen and posted on a leak website. The impacted data included patient names, dates of birth, test results, social security numbers for some individuals, and phone numbers. Executives at Apex Laboratory learned of the attack when certain systems in its environment were encrypted and inaccessible.

Cybersecurity Expert Access

At the upcoming *Executive War College*, which takes place on Nov. 2-3, 2021, in San Antonio, there will be a session led by a cybersecurity expert with experience both in hardening data systems from attack and in negotiating ransom with attackers. This will give lab administrators and pathologists details about the newest tactics hackers are using to attack labs, hospitals, and healthcare organizations.

All labs face the threat of an encryption attack and disruption to clinical and business services that can last weeks and months. Beefing up the lab's defenses today is a sound strategy. An ounce of prevention is worth the pound of cure. TDR

Fed Agency Recommends Two-Factor Authentication

RECOGNIZING THAT ENCRYPTION ATTACKS AGAINST HEALTHCARE ORGANIZATIONS are increasing, one federal agency recently declared one-factor authorization as an informatics "bad practice."

On Aug. 30, the federal **Cybersecurity and Infrastructure Security Agency** (CISA) issued an update to its "bad practices" list, which reads:

Today, CISA added the use of single-factor authentication for remote or administrative access systems to our Bad Practices list of exceptionally risky cybersecurity practices. Single-factor authentication is a common low-security method of authentication. It only requires matching one factor—such as a password—to a username to gain access to a system.

Although these Bad Practices should be avoided by all organizations, they are especially dangerous in organizations that support Critical Infrastructure or National Critical Functions.

CISA encourages all organizations to review the Bad Practices webpage and to engage in the necessary actions and critical conversations to address Bad Practices. For guidance on setting up strong authentication, see the CISA Capacity Enhancement Guide: Implementing Strong Authentication.

CISA's full list of bad practices is at: *https://www.cisa.gov/BadPractices.*

PathAI Buys Poplar Health, Creates Unique Company

PathAI gains access to 50,000 patient specimens that Memphis-based Poplar Healthcare has collected

CEO SUMMARY: Pathologists were surprised this summer when a company developing image analysis software announced the acquisition of one of the nation's largest independent anatomic pathology (AP) laboratories. The technology company PathAI is now the owner of Poplar Healthcare Management, in Memphis. It may turn out that this provocative combination of a pathology image analysis company and a sizeable AP laboratory accelerates the use of AI in pathology image analysis.

One of this year's more intriguing developments in the anatomic pathology (AP) profession came in July when **PathAI**—a technology company in Boston that develops image analysis software—acquired **Poplar Healthcare Management**, of Memphis, an anatomic pathology (AP) group with a large regional and national base of clients.

This acquisition creates a unique player in the anatomic pathology profession. It combines a company developing artificial intelligence-powered digital imaging tools with a regional and national provider of anatomic pathology services. Poplar Health's lab facilities, management team and 350 employees now comprise PathAI's diagnostics division. In 1995, Patrick J. Dean, MD, founded **Poplar Healthcare**, which today has 25 pathologists.

Moreover, with this bold action, PathAI may have accelerated its ability to achieve three goals. First, it gains access to Poplar Healthcare's sizeable archive of about two million or more glass slides and diagnoses reaching back several years. These materials have significant value for PathAI as it tunes its machine-learning algorithms and its artificial analysis software to analyze whole-slide images.

Second, ownership of Poplar Healthcare allows PathAI to pursue contracts for pharmaceutical research studies and clinical trials. Not only is this business potentially profitable on its own, but it expands the company's access to more images and case data to improve its machine-learning software tools.

Preparing for FDA Review

Third, as PathAI prepares to submit its image analysis products to the federal **Food and Drug Administration** (FDA), Poplar Healthcare can be a trial site, cutting the time PathAI will need to gather the clinical data to support its application to the agency for pre-market review.

A fourth possible benefit is that Poplar Healthcare's staff and client pathologists will become the first to use PathAI's analytical tools and artificial intelligence algorithms in daily clinical care. That development may help Poplar Healthcare gain additional market share and revenue.

In addition, PathAI's digital analysis tools are likely to contribute to improved

productivity and accuracy among Poplar Healthcare's pathologists, cutting costs and increasing the laboratory's profitability as part of the diagnostics division of PathAI.

Artificial Intelligence Tools

Founded in 2016, PathAI uses artificial intelligence and machine learning software tools to expedite the examination of human tissue and to facilitate the work that AP groups do every day. It already has pharmaceutical companies and contract research organizations (CROs) as customers, and it expects that the addition of Poplar Healthcare will help it expand its presence in both markets.

"Pharma companies, CROs, clinical laboratories, and other healthcare companies are developing companion diagnostics for patients with cancer and other chronic conditions," said Andrew H. Beck, MD, PhD, PathAI's co-founder and CEO. "Each of these organizations can use the artificial intelligence tools that PathAI has developed to make that work more efficient."

PathAI plans to deploy its AI image-analysis system in a variety of clinical situations that previously have been closed to anatomic pathologists, he noted. "We've built a platform that allows our technology to be deployed in different settings, such as translational research, prospective clinical trials, and in clinical settings."

Venture-Backed Growth

Over the past five years, PathAI has been building that capability while also raising $255 million in venture capital to support its efforts, Beck noted. In the spring, PathAI closed on $165 million in funding through the healthcare provider organization **Kaiser Permanente** and **D1 Capital Partners**. Earlier, PathAI received funding from **General Catalyst**, a venture-capital company in Cambridge, Mass., and from the pharmaceutical company **Bristol Myers Squibb**, according to published reports.

Some of that recent funding was used to acquire Poplar Healthcare. PathAI also has used that capital to develop image-analysis software to identify complex patterns in patient specimens to detect the presence of cancer and other diseases.

One immediate consequence from the acquisition of Poplar Healthcare is that the AP lab now has full access to PathAI's image analysis software and its algorithms to increase the efficiency and accuracy of its diagnostic work, Beck noted.

"Poplar is a top-tier laboratory with a dedicated team known for their accuracy of diagnosis and turnaround time," Beck said, when the company announced the deal on July 26. "PathAI's investments in digital pathology and artificial intelligence will further enhance Poplar Healthcare's value proposition to providers across the United States."

Improving AP Workflow

In an interview with THE DARK REPORT, Beck explained the plan that PathAI will follow to improve the workflow for digital pathology.

"We've invested heavily in building robust generalizable algorithms to address the most challenging areas of pathology that we think could have the biggest impact on patient outcomes," he said. "To do that, we have a large technology-focused team here in Boston of more than 225 employees who will build the platform to enable us to learn what we can from Poplar's millions of slides.

"In addition, we have a large network of more than 400 board-certified pathologists who help us develop the annotation data we need to build and validate some of the models we're developing for AP groups to use in their work," Beck added.

"With the acquisition of Poplar Healthcare Management, the PathAI diagnostics division is now centered in Memphis," he continued. "Our goals are to improve workflow efficiency, quality, and reproducibility across the entire spec-

trum of work that happens to each specimen in anatomic pathology.

Manual Processes in AP

"To date, our AI tools have largely been deployed in research settings," Beck commented. "But they also can be used in clinical settings to help anatomical pathologists work faster and be more accurate and to work with colleagues more efficiently.

"With the acquisition of Poplar Healthcare Management, we intend to use our AI software tools to optimize workflow for increased speed, reproducibility, and accuracy," he added. "Those three factors are the core processes in any AP group, particularly reproducibility and accuracy.

"For anatomic pathologists, increased speed is a by-product of the way that computational tools work, primarily because AI allows pathologists to accomplish many steps in parallel," Beck noted. "But the real mission is to get the right diagnosis every time. That's our main focus.

"Increased efficiency also can have an indirect effect on workflow because boosting throughput may mean a pathologist can see more cases," he commented. "Greater throughput may enable the pathologist to provide value to more patients and to more referring physicians each day.

Accuracy and Reproducibility

"While increased efficiency is important, our top priorities are focused on accuracy and reproducibility," he added. "That way we can ensure that all patients—whether in research settings or in clinical practice settings—are getting the right diagnosis.

"We are not tied to any specific biomarker or any specific tissue type," Beck noted. "Our AI tools are used across many major cancers and ultimately we're aiming to be involved in helping pathologists and researchers working on all cancers. By that I mean, PathAI aims to work across any type of tissue that can be viewed on a whole-slide image. That can include certain other types of diseases.

"One such example is a type of liver disease called NASH or non-alcoholic steatohepatitis," Beck explained. "We currently work with researchers to develop tools for NASH. There are other major non-oncology diseases for which we are developing analytical tools. Our technology enables us to develop AI-powered tools for any number of diseases that require pathology slides for diagnosis." TDR

Contact Andrew H. Beck, MD, PhD, at 617-500-8457 or Andy.Beck@PathAI.com.

AI Software Can Help Improve Workflow

"CURRENTLY, MUCH OF THE WORKFLOW OF PATHOLOGISTS is done manually as they review image after image from referring physicians," said Andrew H. Beck, MD, PhD, CEO and co-founder of PathAI. "Our artificial intelligence software is designed to help pathologists analyze stained images.

"If you think about all the steps that occur within a pathology laboratory for both research and clinical practice, the opportunity exists to optimize those steps, many of which are manual," Beck explained. "We are developing our AI tools to provide the most efficient workflow for pathologists. These tools can have a positive effect on a lot of those steps—including the steps that involve the interpretation of images.

"In addition, AI can improve other workflow considerations, such as data entry, image management, triaging specimens, and the reporting of results," he added. "When you think about the full range of what happens daily in every AP group, there are a lot of elements that, at their core, involve the transfer of information. By leveraging artificial intelligence into computing and informatics systems, we can help pathologists make the right diagnosis as efficiently as possible."

Lab Briefs

DOJ Obtains $140 Mil. Settlement in Drug Testing Case

LAST FRIDAY, THE **U.S. DEPARTMENT OF JUSTICE** (DOJ) ANNOUNCED a settlement totaling $136,025,077 with multiple defendants accused of using illegal inducements to encourage physicians to refer urine drug tests to the defendants.

The judgement was issued by the U.S. District Court for the District of South Carolina. The defendants included:

- **Oaktree Medical Centre P.C.**,
- **FirstChoice Healthcare P.C.**,
- **Labsource LLC**,
- **Pain Management Associates of the Carolinas LLC**, and,
- **Pain Management Associates of North Carolina P.C.**

Another charge in this case was that a lab and a clinic owned by one defendant billed federal healthcare programs for medically-unnecessary urine drug tests.

This is a *qui tam* case. Multiple whistleblowers filed individual cases against the defendants and the DOJ consolidated these cases. This settlement originated from a complaint filed by the DOJ in 2019.

Abbott Labs Destroyed Millions of COVID Test Materials

IT IS NOT JUST CLINICAL LABORATORIES THROUGHOUT THE U.S. that struggle to anticipate the demand for COVID-19 tests. It is an equally significant challenge for *in vitro* diagnostics (IVD) firms.

Last month, *The New York Times* reported that **Abbott Laboratories** had destroyed "millions of paper testing cards" used in its BinaxNow COVID-19 Ag Card Home Test. This was done as the demand for COVID-19 testing declined earlier this year, from April through June.

The *NYT* also reported that Abbott had laid off 400 people involved in the production of these tests and was now actively hiring hundreds of workers so it could ramp up production of these COVID-19 test kits.

In a public statement it released on Aug. 20, Abbott said "We have not destroyed any finished BinaxNOW product, nor have we destroyed any usable test components needed by the market that could have been donated. In fact, because Abbott maintained usable test components, we're now able to scale up."

Microbiome Tests May Fuel Next Wave of Lab Fraud

HUMAN MICROBIOME TESTING MAY BECOME the next source of rampant fraud and abuse in the lab testing industry. Several news outlets are reporting on how consumers are being offered expensive microbiome tests that have questionable clinical value.

Few of these tests are covered by health insurance. Thus, consumers must pay for them. And yet, consumer response to advertisements of microbiome tests that promise insights into obesity, gastrointestinal problems, and immune system health is generally positive.

Crunchbase reports that $1 billion in venture capital flowed into microbiome startup companies between 2015 and 2020. Similarly, **PitchBook** reports that it found more than a dozen companies that offer direct-to-consumer gut health services.

Pathologists can expect that some physicians will recommend microbiome tests to their patients, particularly if microbiome labs find ways to pay inducements to physicians in return for test orders. TDR

Genomics Update

NeoGenomics Acquires Inivata to Access Liquid Biopsy Technology

FDA gave Inivata's RaDaR technology designation as a 'breakthrough device'

SOME BELIEVE THAT LIQUID BIOPSY TECHNOLOGY has the potential to develop into a Holy Grail of cancer diagnostics. Yet progress in this field has been slow. Now a recent lab acquisition may accelerate the development of clinically-useful liquid biopsies.

There is keen interest in how to achieve the noninvasive diagnosis of cancer. Investors have ploughed tens of millions of dollars into companies developing their version of a liquid biopsy. Financial analysts point out that one reason why **NeoGenomics** acquired **Inivata** may have been to gain access to Inivata's ongoing liquid biopsy development program.

NeoGenomics of Fort Myers, Fla., provides cancer genetic testing services and offers an oncology testing menu to doctors worldwide. The company also works with pharma on clinical trials and drug development.

On June 18, Neogenomics announced it had closed its purchase of Inivata, which is based in Cambridge, U.K. It paid $390 million (having earlier invested $25 million in Inivata in 2020). Inivata says it has liquid biopsy platforms at the ready.

"Part of our opportunity [in acquiring Inivata] is the new diagnostics, with next-generation sequencing and liquid biopsy," stated Mark Mallon, NeoGenomics' CEO, in an interview with *Clinical Omics*. "We are particularly enthusiastic about Inivata's highly sensitive RaDaR assay, targeting the emerging and significant opportunity for minimal residual disease testing."

Pathologists and clinical laboratory leaders may see NeoGenomics move liquid biopsy assays through **U.S. Food and Drug Administration** (FDA) clearance and to the market within a couple of years.

Specifically, company leaders and analysts alike believe there is great potential for Inivata's liquid biopsy assay. The FDA seems to agree. In March, RaDaR received the FDA's Breakthrough Device Designation. Inivata says RaDaR "allows highly sensitive detection of residual disease and recurrence."

On its website, Inivata says RaDaR uses a blood draw and enables tracking of 48 genetic variants with "exceptional sensitivity" in detecting circulating tumor DNA.

Bullish on Liquid Biopsy

Neogenomics is bullish on this liquid biopsy technology. "We plan on leveraging our established oncology diagnostics leadership position, human capital, strong pharma and clinical market relationships, and robust balance sheet to accelerate the development of this assay," Mallon said in a news release.

"The addition of Inivata bolsters our leading market position today and further establishes us as a leader in the rapidly evolving liquid biopsy testing space," Mallon added. Mallon succeeded Douglas VanOort in April to lead NeoGenomics to what VanOort (now Executive Chairman of the Board of Directors) called "a next level of performance."

Inivata becomes a new division of NeoGenomics. Other divisions at

NeoGenomics address clinical, pharma, and informatics.

"By leveraging our combined resources, we expect to accelerate the development of our promising RaDaR minimal residual disease assay and accelerate commercialization efforts with biopharma before driving a successful launch in the clinical setting," said Clive Morris, Inivata Chief Medical Officer, in a news release.

Detects Residual Disease

In a company conference call, Morris noted results from earlier RaDaR research, especially as it relates to discovery of circulating tumor cells in the blood and the potential for precise follow-up treatment of cancer patients, *Clinical Omics* reported.

"While the published clinical data and high levels of sensitivity for RaDaR are compelling, perhaps the most exciting aspect about RaDaR and minimal residual disease testing in general is the paradigm-shifting impact it can have for patients along their cancer journey," Morris said.

"In the adjuvant post–surgery setting, RaDaR can potentially be used to help select patients for adjuvant therapy based on the presence of residual circulating tumor DNA in the blood, indicating that the patient has not been cured by the surgery. In the future, the test may also be able to help optimize the dosing or duration of therapy. RaDaR testing can also be used to monitor for disease recurrent for cancer patients in remission," added Morris, who will report to Mallon under the new arrangement.

Michael Matson, a Needham analyst, told *TipRanks* he anticipates NeoGenomics will commercialize RaDaR in 2022.

Matson is also bullish about another Inivata liquid biopsy assay—InVisionFirst-Lung—which has been commercially available through NeoGenomics in the U.S. and internationally. It is used, Inivata said, in treatment decisions for people with advanced non-small cell lung cancer (NSCLC). NeoGenomics anticipates InVisionFirst-Lung will generate the lion's share of the $5 million in Inivata sales in 2021, *MedTech Dive* reported.

Pathologists and clinical laboratory executives should consider it significant that NeoGenomics was willing to invest $390 million to acquire Inivata and gain control of its liquid biopsy products. TDR

Trapelo Health Helps with Decision Support

COMING FAST IS THE NEED FOR ALL CLINICAL AND PATHOLOGY LABS to become masters of data and informatics. The need is twofold. One need is to streamline and automate the processes of lab ordering, reporting, billing, and collections. The other need is to deliver actionable intelligence that helps physicians make faster, more accurate diagnoses.

NeoGenomics knows this, which is why it added to its data management capabilities. Earlier this year, NeoGenomics paid $65 million to acquire Burlington, Mass.-based **Trapelo Health**, a precision oncology decision-support software provider.

Trapelo's decision-support platform aids doctors, labs, and payers by enabling information about testing and treatment, a news release explained. Clynt Taylor, Trapelo CEO, told *Clinical Omics* that the platform:

- Identifies biomarkers for which cancer patients should be tested.
- Lists labs that can do the tests for those biomarkers.
- Identifies available reimbursement by payers.

Neogenomics recognizes that the more it can automate and interface with payers' prior-authorization systems, the easier it becomes for physicians to order genetic tests and for Neogenomics to get payment for its test claims.

Digital Pathology Update

UK Hospitals to Deploy AI to Speed Prostate Cancer Diagnoses

National Health Service will provide $194 million to use artificial intelligence to analyze cancer specimens

SEEKING TO SPEED UP THE PRODUCTION OF TEST RESULTS for men suspected of having prostate cancer, six hospitals in the United Kingdom (UK) will get funding to determine if artificial intelligence (AI) can diagnose prostate cancer quicker and more accurately than pathologists.

Anatomic pathologists in the United States will want to watch the progress of this innovative program. The UK's **National Health Service** (NHS) hopes to demonstrate that AI-powered digital image analysis tools can make a primary diagnosis of prostate cancer with accuracy that is comparable to human pathologists.

In the largest multi-site deployment of AI in the UK, six hospitals in the NHS will get £140 million (US$194 million) to use AI technology to detect prostate cancer automatically and accurately from images of biopsied prostate specimens, according to published reports.

Detect and Grade Cancer

At the six participating hospitals, AI will be used to examine prostate specimens from 600 men over 14 months, according to *National Health Executive*. In the study, researchers will evaluate how well AI can be used to detect and grade prostate cancer.

Data published by the NHS shows that more than 25% of cancer patients wait longer than the target 62 days from a "GP [general practice] urgent referral to a first treatment for cancer." This use of AI for prostate cancer is part of an effort in the UK to counteract a severe shortage of histopathologists. Matthew Gould, CEO of **NHSX**, told *The Daily Mail*, "We are currently caught between having too few pathologists and rising demand for biopsies. This technology could help give thousands of men with prostate cancer faster, more accurate diagnoses."

'Busting the Backlog'

Health Secretary Sajid Javid confirmed this assessment when he said, "Cancer diagnosis and treatment has remained a top priority throughout the pandemic, and I am committed to busting the backlog in cancer care," according to *National Health Executive*.

In the study, clinicians will use an AI algorithm called Galen Prostate from **Ibex Medical Analytics**, an Israeli company, *The Daily Mail* reported. The system is 98% effective at detecting prostate cancer, according to research published last year in *The Lancet*.

In the UK, some 100,000 men undergo prostate biopsies each year and 40,000 are diagnosed with prostate cancer, *The Daily Mail* added. Those cases of cancer lead to about 12,000 deaths annually.

The hospitals involved in the study are **Imperial College Healthcare NHS Trust**, **University College London**, **University Hospital of Coventry and Warwickshire NHS Trust**, **Chelsea and Westminster Hospital NHS FT** (both Chelsea and West Middlesex sites), and **University Hospital Southampton NHS FT**. TDR

2020 Rankings of the World's Largest IVD Corporations

IN VITRO DIAGNOSTICS (IVD) MANUFACTURING continues to be dominated by a handful of companies, all of which sell their products worldwide. As the rankings below demonstrate, for 2020, just 11 companies accounted for 82.7% of international IVD sales.

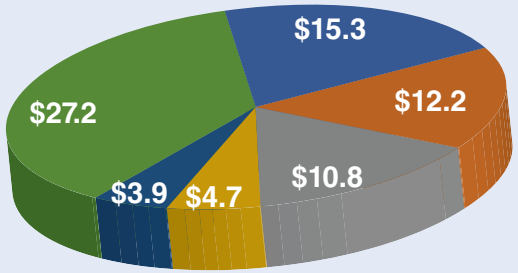
The COVID-19 pandemic and the need for unprecedented numbers of SARS-CoV-2 tests—both molecular and serological—gave these IVD companies a huge boost in revenue. Demand for COVID-19 tests continued through the end of 2020. For most IVD companies, there was some fall-off in the sales of routine testing analyzers and test kits as fewer people sought healthcare from hospitals and physicians' offices during 2020.

Top 11 IVD Companies by Global Revenue in 2020 (in billions)

IVD Corporation	2020 revenue	Cumulative revenue	Percent	Cumulative percent
1. Roche Holdings–Diagnostics Division *Basel, Switzerland, founded 1896*	$15.3	$15.3	20.6%	20.6%
2. Thermo Fisher Scientific–Lab Products Div. *Waltham, Mass., founded 1956*	$12.2	$27.5	16.5%	37.1%
3. Abbott Laboratories–Diagnostics Division *Abbott Park, Ill., founded 1888*	$10.8	$38.3	14.6%	51.7%
4. Becton Dickinson–Life Sciences Division *Franklin Lakes, N.J. founded 1897*	$4.7	$43.0	6.3%	58.0%
5. Siemens Healthineers–Diagnostics Division *Erlangen, Germany, founded 1896*	$3.9	$46.9	5.3%	63.3%
6. bioMérieux *Marcy-l'Étoile, France, founded 1963*	$3.1	$50.0	4.2%	67.5%
7. Sysmex Corporation *Hyōgo, Japan, founded 1968*	$2.7	$52.7	3.6%	71.1%
8. Bio-Rad Laboratories *Hercules, Calif., founded 1952*	$2.5	$55.2	3.4%	74.5%
9. Danaher Corporation–Diagnostics Division *Washington, D.C., founded in 1969*	$2.2	$57.4	3.0%	77.5%
10. Hologic–Diagnostics Division *Marlborough, Mass., founded 1985*	$2.1	$59.2	2.4%	80.3%
11. Ortho Clinical Diagnostics *Raritan, N.J., founded 1939*	$1.8	$59.2	2.4%	82.7%
Total Market Share Top 11 IVD Firms	$61.3	$61.3	82.7%	82.7%
Market Share, Other IVD Firms	$12.8	$12.8	17.3%	17.3%
Total Global IVD Revenue in 2020 (est.)	**$74.1**	**$74.1**	**100.0%**	**100.0%**

Source: Company documents, news reports, financial analysts' reports.

Five Global Giants Dominate In Vitro Diagnostics



Roche Holdings *(Diagnostics Division)*

Thermo Fisher Scientific

Abbott Laboratories *(Diagnostics Division)*

Becton Dickinson *(Life Sciences Division)*

Siemens Healthineers *(Diagnostics Division)*

All Other Global IVD Revenue in 2020 (est.)

WORLDWIDE SALES OF *IN VITRO* DIAGNOSTIC PRODUCTS are estimated to be approximately $74.1 billion during 2020. This is an increase of 7.4% from 2019, when worldwide sales were $69.0 billion. Compared to previous years, this is a much larger year-over-year growth rate. The dramatic increase in demand for COVID-19 tests was somewhat offset by a reduction in routine testing because of how COVID-19 lockdowns kept people from going to hospitals or doctors for routine care for the last nine months of 2020.

Lab managers and pathologists familiar with the Pareto Principle—also known as the 80/20 rule or the law of the vital few—will understand why just 11 global IVD corporations generated 82.7% of total global IVD sales during 2020. The pie chart above illustrates how the Pareto Principle applies in the worldwide IVD market. It shows the market clout of the five biggest IVD companies. In fact, the diagnostics divisions of the three largest IVD manufacturers—Roche, Thermo Fisher Scientific, and Abbott Laboratories—represent more than half of all IVD products sold globally during 2020. Collectively they hold an impressive 51.7% share of the global IVD market.

Regulatory Update

Comment Period Closing on Federal Surprise Billing Rule

Pathology groups and clinical labs had until September 7 to comment on an interim final rule that provides federal protections against surprise billing and limits out-of-network (OON) cost sharing under many of the circumstances in which surprise bills arise most frequently.

On July 1, 2021, four federal agencies issued an interim final rule (IFR) with comment period, which will implement various provisions of the No Surprises Act, which was enacted in December 2020 and takes effect Jan. 1, 2022. The rule was published in the *Federal Register* on July 13, 2021.

Designed to Protect Patients

The No Surprises Act is designed to protect patients from surprise medical bills for non-emergency services furnished by out-of-network providers at in-network healthcare facilities, emergency services, and out-of-network air ambulance services. The act also sets the framework for procedures to determine payment amounts by the patient and health plan or insurer for OON services and will require disclosures by nonparticipating providers.

The IFR sets forth rules under which healthcare facilities are prohibited from charging out-of-network cost-sharing for non-emergency services obtained at an in-network facility by an OON provider. This provision is intended to prevent situations where a beneficiary goes to an in-network healthcare facility, but a member of the care team is out of network.

The IFR defines "healthcare facilities" to include hospitals, hospital outpatient departments, critical access hospital, and ambulatory surgery centers. The federal **Department of Health and Human Services** (HHS) specifically solicited comments on whether there are other facilities that should fall within the definition of "healthcare facilities."

The IFR balance billing protections cover all services provided at the in-network facility, as well as the "furnishing of equipment and devices, telemedicine services, imaging services, laboratory services, and preoperative and postoperative services" associated with the visit, regardless of whether the provider furnishing such items or services is at the facility.

According to Lauren Moldawer, an attorney with **Mintz** in Washington, D.C., this statement captures items and services ordered at the in-network facility but potentially provided by OON providers.

"For example, any lab service ordered by the in-network facility that may be sent to an off-site, out-of-network lab would be considered part of the network 'visit' and would be covered by the balance billing protections of the IFR," she wrote in an advisory.

OON Rate Paid to Facilities

The IFR specifies that cost-sharing amounts for services furnished by nonparticipating emergency facilities and nonparticipating OON providers at participating in-network facilities must be calculated based on one of the following:

- The amount allowed under an applicable All-Payer Model Agreement, which some states may have entered into with HHS.
- If there is no such applicable All-Payer Model Agreement or specified state law, the lesser of the billed charge or the

The Devil Is in the Details: Labs Must Now Determine a 'Qualifying Payment Amount'

WHILE THE INTERIM FINAL RULE IMPLEMENTING THE SURPRISE BILLING ACT does set out a process for determining a qualifying payment amount (QPA) to be paid to providers, it does not actually specify a minimum payment amount, which could be a sticking point between payers and providers.

As defined by the statute, the qualifying payment amount is the median of the contracted rates recognized by the plan or issuer for similar services in a geographic region as of 2019, updated annually by the percentage increase in the consumer price index for all urban consumers.

In general, the median contracted rate for an item or service is calculated by arranging in order from least to greatest the contracted rates of all plans of the plan sponsor or all coverage offered by the insurer in the same insurance market for the same or similar item or service. Importantly, **Medicare**, **Medicare Advantage**, and **Medicaid** are not included in the QPA calculation, which is something for which the **College of American Pathologists** (CAP) advocated.

Of note, the IFR uses specific CPT codes in determining the QPA calculation, rather than using a family of codes, which can have a wide range of payment rates. The surgical pathology code "family" of 88300-88309, for example, has payment rates ranging from $15.70 to $441.75. This level of specificity will help ensure that QPA amounts are accurate for a given service, said Jonathan L. Myles, MD, Chair of the CAP's Council on Government and Professional Affairs and a pathologist at the **Cleveland Clinic**.

One area of concern for laboratories and pathologists is that while the IFR sets out the methodology for calculating the QPA, it does not establish any minimum amount for the initial payment, though the rule notes that several states have set standards for minimum initial payment amounts.

"The insurer must share with the provider the QPA amount at the time of the initial payment, but there is nothing in the rule that says the payer has to pay you the QPA," Myles explained. "Let's say you bill $100 for a service, and the insurance company pays $10, but you don't know what the calculation of the QPA is for that service. The rule says the insurer must provide you with the QPA amount at the time of their initial payment, so if they pay you $10 but the QPA is $50, you will know that up front."

Once providers receive the initial payment or denial of payment from the insurer, they enter into a 30-day "open negotiation period" to try to agree on a payment amount. If at the end of the 30 days there is no agreement, the parties have four days to decide whether to bring the claims to the independent dispute resolution process.

Arbitration of Cases

Noting that one benefit of requiring a minimum initial payment amount is that it may help reduce the number of cases that go to arbitration, the rule specifically asks for comment on whether a minimum payment amount should be required, and if so, what the payment rate or methodology or methodology should be.

"For example, a minimum payment rate could be a specific percentage of the Medicare rate, a specific percentage of the plan or issuer's QPA for the item or service, an amount calculated in the same way the plan or issuer typically calculates payment for the specific item or service to nonparticipating providers or facilities, an amount representing the highest amount that would result from applying two or more of these or other methodologies, or any other method," the IFR states.

plan's contracted rate, referred to as the qualifying payment amount (QPA). *(See sidebar "The Devil Is in the Details: Labs Must Now Determine a 'Qualifying Payment Amount,' on page 17.)*

- If none of the above conditions apply, an amount is determined by an independent dispute resolution (IDR) entity. Of note, this IFR does not set forth the IDR process. Further rulemaking this year will establish the specifics of the IDR process.

Notice and Consent

The IFR provides an exception to the balance billing and cost-sharing protections for certain post-stabilization services and non-emergency services, so long as the facility meets the notice and consent requirements.

To meet the requirements, the facility must provide written notice to the beneficiary in a form specified by HHS that includes a good-faith estimate of the out-of-pocket costs. The notice must clearly state that the individual is not required to consent to receive such items or services from the nonparticipating provider, or nonparticipating emergency facility.

However, this notice and consent exception does not apply to all situations. Specifically, it does not apply to ancillary services and diagnostic services (including lab and pathology services). There are still ways, though, for patients to find out what they will pay for laboratory testing.

Tools to Estimate Test Cost

Kyle Fetter, Chief Operating Officer of **XIFIN Inc.** in San Diego, notes that there are tools available that will allow physicians to estimate what a patient will pay for a laboratory test, which benefits the patient, the physician, and the laboratory.

"Patients get clarity on the front end while they are in the physician's office, and it's a unique opportunity for lab providers to reduce their bad debt," he explained. "We believe in giving customers information up front and having things be as clean as possible on the front end." TDR

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Independent Dispute Resolution Rules

THOUGH THE RULES IMPLEMENTING THE INDEPENDENT DISPUTE REVIEW (IDR) HAVE NOT YET BEEN PUBLISHED, they will play an important role in determining how providers and insurers resolve disputes over payment.

The IDR process will be used if providers and payers are unable to agree on a payment amount when payment amounts are not already set by state law or are covered by an All-Payer Model Agreement.

"Because the IDR process is the backstop for determining payment to OON providers when the parties can't otherwise come to an agreement, the mechanism has the potential to create leverage for one party—provider or payer—if the other is disadvantaged in the process," said Elizabeth Sullivan, an attorney with **McDonald Hopkins** in Cleveland. "Therefore, if the IDR process creates unreasonable demands on provider resources, the heavy burden on providers and/or their billing companies could discourage full use of the IDR process."

For this reason, an IDR process that is balanced and fair to both the provider and payer is critical, Sullivan noted. Taking it a step further, "an IDR process that incentivizes payers to settle on a mutually agreed payment to the provider before the parties reach the IDR process would be beneficial to labs," she said, advising labs and pathologists to review and comment on the IDR rule once it is published.

"In the meantime, this rule does address determining OON rates before reaching IDR, so labs should focus efforts on understanding that aspect for now," she added.

INTELLIGENCE

LATE & LATENT

Items too late to print, too early to report

New diagnoses of cancer in the United States fell by almost 30% in the early months of the SARS-CoV-2 pandemic. That's one conclusion in a paper authored by **Quest Diagnostics** and published on Aug. 31, in *JAMA Network Open*. Quest looked at the new diagnoses of eight common types of cancer during four periods:

- Prepandemic period. January 2019 to February 2020 was baseline.
- Period 1: March 2020 through May 2020 showed a decrease of 29.8% in new cancer diagnoses.
- Period 2: June to October 2020 showed a decrease of 9.6% in cancer diagnoses.
- Period 3: November 2020 to March 2021 showed a decrease of 19.1% in new cancer diagnoses.

MORE ON: *Decrease in New Cancer Diagnoses*

A total of 799,496 new diagnoses of cancer were made between January 2019 and March 2021. The eight cancer types covered in the Quest study were: breast, colorectal, lung, pancreatic, cervical, gastric, esophageal, and prostate. The study authors called the decrease in new diagnosed cancer cases following the onset of the pandemic "concerning" and said that "many cancers may remain undiagnosed." They added that "the impact of delayed diagnosis may vary with the type of cancer and the extent of delay but could lead to presentation at more advanced stages, with potentially poorer clinical outcomes. Our findings call for planning to address the consequences of delayed diagnoses, including strengthened clinical telehealth offerings supporting patient-clinician interactions.

IT'S 12 YEARS FOR XIFIN ON LIST

For the twelfth time, San Diego-based **XIFIN** was named to *Inc.* magazine's annual list of the 5,000 fastest growing companies in America. XIFIN noted that other 12-time honorees on this list include **Intuit**, **Microsoft**, and **Oracle**. In a press release, XIFIN said it grew 60% in the past three years. XIFIN describes itself as providing "cloud-based revenue cycle management, healthcare informations, and laboratory information systems" for diagnostic providers.

TRANSITIONS

- Randy Pritchard was appointed as CEO and a board member by **Pillar Biosciences** of Natick, Mass. He formerly worked at **Roche Diagnostics**, **ICOS Corporation**, and **GlaxoSmithKline**.

- **Premier Medical Laborarory Services** of Greenville, S.C., announced that Brian Krueger, PhD, was its new Chief Scientific Officer. Krueger came from **Labcorp** and previously worked at **Columbia University Medical Center**.

That's all the insider intelligence for this report. Look for the next briefing on Monday, September 27, 2021.

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