

# LABORATORY ECONOMICS

*Competitive Market Analysis For Laboratory Management Decision Makers*

## MACs Back Off Proposed Toxicology Cuts

Six Medicare Administrative Contractors (MACs) have retired proposed Local Coverage Determinations (LCDs) that would have limited reimbursement for definitive drug testing to no more than 14 drug classes. *Details on page 7.*

## Where Will Excess PCR Testing Capacity Go?

The Public Health Emergency ended effective May 11, 2023. As a result, Medicare reimbursement for high-thruput Covid-19 PCR testing has been cut in half to \$51 and private health plans are expected to begin applying discounts to the new lowered Medicare rate, notes Michael Snyder, Executive Vice President Network Solutions for Avalon Healthcare Solutions (Tampa, FL). “There’s a lot of excess PCR testing capacity out there. Payers are concerned that some labs might attempt to market mega-panels for respiratory pathogens to maximize reimbursement,” notes Snyder.

*Continued on page 4.*

## Labcorp to Buy Jefferson Health Outreach Lab

Labcorp has agreed to buy select clinical lab outreach assets from Jefferson Health (Philadelphia), which is the largest health system serving Philadelphia and southern New Jersey. Jefferson will continue to own and operate its existing hospital labs for outpatient and inpatient testing services. The deal is expected to close by mid-year.

*More details on page 3.*

## Quest To Buy Haystack Oncology for Up to \$450M

Quest Diagnostics has agreed to acquire Haystack Oncology (Baltimore, MD) for \$300 million in cash (net of cash acquired) plus up to an additional \$150 million if certain milestones are met. Haystack has developed a proprietary blood test technology that uses circulating tumor DNA (ctDNA) for the detection of minimal residual disease (MRD) in recovering cancer patients. Quest plans to use the Haystack technology to launch a laboratory-developed test (LDT) for colorectal cancer next year, according to Kristie Dolan, General Manager of the Oncology Franchise at Quest.

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**QUEST TO BUY HAYSTACK ONCOLOGY FOR UP TO \$450M** (*cont'd from page 1*)

Haystack was founded in early 2021 by research professors at Johns Hopkins University as well as Chief Executive Dan Edelstein. Haystack raised \$56 million in late 2022 from a Series A funding round led by New York-based investment firm Catalio Capital Management (see *LE*, December 2022). Haystack, which has 60 employees, is in the process of moving into a new 20,000-square-foot lab and office space at the City Garage Science & Technology Center in South Baltimore. Edelstein will continue to manage Haystack after the acquisition is completed (by June 30).

Quest expects the Haystack acquisition to operate at a loss from 2023 to 2025 and become accretive to Quest's earnings in 2026.

Over the past few years, Quest had looked at other MRD testing companies. Dolan says that Quest chose Haystack because its technology has the lowest limit of detection for ctDNA—able to detect one fragment of cancer DNA per million non-cancerous DNA molecules.

If residual disease is detected, then additional treatment (e.g., chemotherapy) can be applied. Likewise, additional treatment can be avoided in patients whose tests show zero MRD.

Dolan also pointed to a study published last year in the *New England Journal of Medicine* (see *NEJM*, June 16, 2022; 386:2261-2272). A version of Haystack's test was used in a study of 455 stage II colon cancer patients who had undergone surgery. The test was shown to significantly reduce the need for adjuvant chemotherapy without compromising recurrence-free survival.

The commercial launch of a Haystack MRD test for colorectal cancer will be followed by similar tests for breast and lung cancer. The Haystack technology is suitable for most, if not all, solid tumors, according to Dolan.

Dolan notes that Quest employs about 400 pathologists through its AmeriPath division. "Most are subspecialized and many serve as medical directors at hospital labs. Our pathologists have existing relationships with ordering oncologists," notes Dolan.

Other labs with MRD tests for solid tumors include Guardant Health (Guardant Reveal), Invitae (PCM MRD Monitoring), Natera (Signatera), NeoGenomics (see page 8) and Foresight Diagnostics (see page 7).

Most MRD tests, including Haystack's, involve a two-step process, which includes tissue-based exome profiling to identify each patient's specific tumor mutations, followed by blood-based ctDNA testing for the identified mutations. Medicare—through Palmetto GBA's MolDX program—is currently reimbursing labs at a bundled rate of approximately \$5,900 for the two-step process.

The Guardant Reveal is a blood-only (tissue-free) MRD test for colorectal, breast or lung cancer that has a list price of \$3,500.

J.P. Morgan Securities acted as financial advisor to Quest, and Weil, Gotshal & Manges LLP (New York City) acted as Quest's legal advisor. Goldman Sachs acted as financial advisor to Haystack, and Goodwin Proctor LLP (New York City) acted as Haystack's legal advisor.

**Quest Paid \$275 Million for NY-Presbyterian Outreach Lab**

**O**n April 17, Quest Diagnostics completed its previously announced acquisition of select assets of the clinical lab outreach business of New York-Presbyterian (New York City). Quest's latest quarterly report revealed that it paid \$275 million in an all-cash transaction. Quest is now in the process of redirecting the acquired test volume to its regional lab in Clifton, New Jersey.

**LABCORP TO BUY JEFFERSON HEALTH OUTREACH LAB** (*cont'd from page 1*)

Labcorp is expected to shift Jefferson's routine nonpatient clinical lab tests to its nearest regional lab in Raritan, New Jersey (63 miles north of Philadelphia).

The deal with Labcorp does not involve Jefferson's anatomic pathology, molecular or genomic pathology, HLA testing, molecular virology or flow cytometry testing services.

The Jefferson Health System includes 18 hospitals, including specialty hospitals, as well as the health insurer Health Partners Plans, which covers about 300,000 members in the greater Philadelphia area.

Jefferson collected total Medicare Part B CLFS revenue of \$6.3 million in full-year 2021. *Laboratory Economics* estimates that Medicare Part B CLFS represents 20% of the overall revenue for Jefferson's clinical lab outreach business (total annual revenue estimated at \$31 million). Jefferson's largest outreach labs are based at Jefferson Abington Hospital (Abington, PA) and Thomas Jefferson University Hospital (Philadelphia).

Jefferson announced a restructuring, including an unspecified number of job cuts, in January.

Parent organization Thomas Jefferson University reported \$7.9 billion in revenue and a \$126 million operating loss for its fiscal year ended June 30, 2022. This followed \$5.7 billion of revenue and a \$6 million operating gain in fiscal year 2021.

**Jefferson Health's Clinical Lab Outreach Business: Medicare Volume and Revenue for 2021**

<i>Hospital</i>	<i>Staffed Beds</i>	<i>Total Medicare Part B CLFS Test Volume</i>	<i>Avg. Collected Revenue per Medicare Part B CLFS Test*</i>	<i>Total Medicare Part B CLFS Revenue</i>
Jefferson Abington Hospital	634	344,755	\$8	\$2,758,040
Thomas Jefferson University Hospital	882	260,321	\$6	\$1,561,926
Jefferson Cherry Hill Hospital	506	141,979	\$5	\$709,895
Einstein Medical Center Philadelphia	685	75,044	\$5	\$375,220
Jefferson Torresdale Hospital	457	61,635	\$5	\$308,175
Jefferson Lansdale Hospital	140	42,833	\$7	\$299,831
Einstein Medical Center Montgomery	175	60,620	\$4	\$242,480
Total	3,479	987,187	\$6	\$6,255,567

\*Includes phlebotomy services

Source: *Laboratory Economics* Hospital Outreach Laboratory Database

**Labcorp Acquires Your Health Lab in Texas**

Labcorp acquired Your Health Lab (Victoria, TX) in January. YHL is a routine independent lab based in south Texas. YHL was founded by the Gietz family in 2001. YHL has 100+ employees and estimated annual revenue of roughly \$20 million (with Covid testing).

**Dynacare Buys Valley Medical Labs**

Dynacare (Brampton, Ontario), a Labcorp subsidiary, has agreed to acquire Valley Medical Laboratories in British Columbia effective May 1, 2023. VML is an independent lab with more than 150 employees.

**WHERE WILL EXCESS PCR TESTING CAPACITY GO?** *(cont'd from page 1)*

Avalon has developed automated software programs with evidence-based guidelines that payers use to identify lab claims with unnecessary tests. Avalon clients include BCBS of Illinois, BCBS of Michigan, Blue Cross NC, BCBS of South Carolina, CareSource and Molina. Overall, there are currently 20 health plans covering approximately 38 million enrollees utilizing Avalon's claims review and lab benefit management programs.

Snyder says that the biggest commercial labs and most independent labs billed appropriately for Covid testing throughout the pandemic.

However, there was a handful of unscrupulous labs that took advantage of the high demand for Covid testing, according to Snyder. Examples include:

- Smaller out-of-network labs that routinely charged \$350 or more for Covid PCR tests.
- Urgent care centers that charged more than \$75 per rapid antigen test.
- Labs billing for custom respiratory virus panels that include Covid plus as many as 38 other pathogens.
- Labs billing for routine tests (eg., CBCs or lipid panels) and adding on Covid PCR tests.

Snyder says that now that PHE has ended, labs are expected to shift their coding for Covid testing from the terminated codes U0003-U0005 to 87635-87637 (see table below).

Furthermore, Covid testing is expected to shift from the solo PCR test (87635) to the higher reimbursed multiplex tests: Covid & flu A/B (87636) and Covid, flu A/B and RSV (87637). These tests are appropriate for coding and within Avalon's policy limits, according to Snyder.

However, Snyder says that Avalon has developed new pre-payment utilization algorithms that flag custom test panel claims that contain more than five respiratory pathogens. Avalon has similar algorithms that check the number of tests on claims for multiplex urinary tract infection and sexually transmitted diseases.

Claims with more than five pathogens are flagged for payment review. The specific payment policy for these claims is determined by each insurance client. "The Avalon software renders 'advice,' but it's the plan that adjudicates the claim," notes Snyder.

**Key Covid PCR Test Code Changes**

HCPCS Code	Description	2022 Avalon Client Volume	Current Medicare Rate (effective 5/11/23)	Previous Medicare Rate
U0003	Covid-19 Amp probe, high thruput	573,814	Terminated	\$75.00
U0004	Covid-19 any tech, high thruput	50,992	Terminated	\$75.00
U0005	Covid-19 high thruput, within 2 days TAT	520,921	Terminated	\$25.00
87635	Covid-19 Amp probe	4,952	\$51.31	\$51.31
87636	Covid-19 + Flu A/B Amp probe	42,437	\$142.63	\$142.63
87637	Covid-19 + Flu A/B + RSV Amp probe	3,369	\$142.63	\$142.63

\*Avalon client volume (primarily commercial insurance and Medicare Advantage plans)

Source: Avalon Healthcare Solutions

## Spotlight Interview with TruCore's Adam Cole, MD

**A**dam Cole, MD, is the founder and Chief Executive of TruCore Pathology (Little Rock, AR), which was formed in 2016 and specializes in uropathology. TruCore, which has three pathologists and a full-service histology lab, has been an early adopter of both digital pathology and AI. TruCore is in the process of merging with two other pathology groups (StarPath and Connect Pathology) to create one company named PathNet (see *LE*, April 2023). Below we summarize Dr. Cole's view on the future of uropathology, digital pathology and AI.



*Adam Cole, MD*

### **How is TruCore currently using digital pathology?**

We currently have 40 urology group clients in 33 states. Specimens are shipped to our histology lab in Little Rock. We use the Lumea BxChip which allows six prostate cores to be placed on one slide. Slides are prepared and then scanned. Digital images can be read on either a computer monitor or iPad Pro tablets. Results are reported within 48-72 hours after the specimen is shipped.

### **How do you use AI algorithms?**

We're using AI programs from Deep Bio Inc. and Google's Verily as a quality assurance tool to double-check our initial interpretations. On average, there is a discrepancy on about 5% of my cases. When that happens, I go back and review the digital image.

### **How has digital pathology and AI affected your productivity?**

It's increased my productivity by 4X and we're finding more cancer. The typical uropathologist might sign out an average of 1,000 to 2,000 prostate biopsy cases per year. In comparison, I am able to sign out between 5,000 and 10,000 cases. At the same time, TruCore has an average positivity rate of 60% on its prostate biopsies versus the overall pathologist average of 45% to 50%.

### **How does AI affect IHC staining?**

If there is an area that I think is an atypical small acinar proliferation [benign lesion] and the AI agrees, then I can forgo immunostaining. IHC would add another day to the diagnosis. But if I don't see anything and neither does the AI, then I feel much more confident about calling a case negative.

### **Can digital pathology and AI be used to attract clients?**

Yes. Urologists like the fact that we are able to detect more positive cases for watchful waiting (i.e., more office visits).

Many urology groups that brought pathology service inhouse are now disassembling their histology labs. Medicare's introduction of the lower-reimbursed G-code (G0416) for prostate biopsies in 2013 has been copied by other payers through lower CPT 88305 rates. As a result, urology groups, even larger practices, don't have the volume to sustain their labs.

Instead, urology groups are now more interested in investing in radiation therapy centers.

### **What's next for AI?**

Right now, AI programs are good at identifying cancer, especially low-grade prostate cancers that can get missed by a pathologist.

The next evolution of AI programs will give prognostic information on identified prostate cancers to determine whether treatment or watchful waiting is warranted. This is likely to be achieved by AI that analyzes the features such as a pronounced desmoplastic response, nuclear and chromatin morphology, mitosis counts etc. Currently gland morphology is the single determining factor when grading prostate cancer. Given outcomes data, it's likely the AI will correlate extraneous features to better guide a patient on a personalized treatment plan.



**What is the cost of using AI?**

It's in the ballpark of \$4 per slide. We benefit from using Lumea's BxChip, which combines six prostate biopsy cores on a single slide.

**What do pathologists misunderstand about AI?**

There is a general fear that AI will put pathologists out of work. But what it really does is take mundane tasks off our hands and free up time that we can use to focus on genetic testing. The real shame would be if other physicians begin to order and interpret genetic tests, rather than pathologists.

**Theranos CEO Elizabeth Holmes' Last-Minute Appeal Delays Jail**

**T**heranos founder Elizabeth Holmes delayed starting her 11-year and three-month prison sentence by filing a last-minute appeal on April 25. Holmes had been expected to start her sentence—most likely at Federal Prison Camp (Bryan, TX), a minimum-security prison—on April 27.

Holmes was convicted on four counts of fraud in January 2022 for duping investors about her failed blood-testing company that was once valued at \$9 billion.

Holmes will remain free for another month after filing an appeal with the 9th Circuit Court of Appeals in San Francisco. The move automatically delayed her surrender date until the court makes a decision on her appeal.

Holmes, age 39, has given birth to two children since her legal battle began, including one child in July 2021 and a second child earlier this year.

The legal tactic deployed by Holmes mirrors a move made last month by her former lover and Theranos President, Ramesh "Sunny" Balwani, 57, to avoid a prison reporting date of March 16. After the Ninth Circuit rejected his appeal three weeks later, Balwani reported to FCI Terminal Island prison in San Pedro, California on April 20. FCI Terminal Island is a low-security federal prison.

**Former Theranos Lab Director Sues Disney Over Miniseries**

**A**dam Rosendorff, MD, a pathologist and former lab director at Theranos, is suing Walt Disney over a recent Hulu miniseries that he says defamed him. Walt Disney is the majority owner of Hulu.

The complaint (No. 152734/2023) was filed on March 23 in New York Supreme Court in New York City. Rosendorff alleges that a character, Mark Roessler, in Hulu's "The Dropout" is an unfair depiction of him. Roessler was played by actor Kevin Sussman and appeared in three of the series' eight episodes.

"The character is portrayed and shown as covering up Theranos' fraudulent scheme, thereby endangering patients' lives, of abruptly leaving his employment with Theranos without providing notice or discussing his separation, and as otherwise unfit to practice medicine," according to the lawsuit.

According to Rosendorff, the portrayal has had a "devastating effect" on his reputation and career as a physician because media and even acquaintances have concluded that Roessler was based on him.

"At the time of the trial, (Rosendorff) was considered a heroic whistle-blower, a witness who was instrumental in the jury's verdict convicting Holmes," the filing said. "Now he has been falsely portrayed as a perjurer, a criminal, and of being completely unfit to practice his profession."

Rosendorff's lawsuit seeks unspecified damages from Disney, Hulu, the show's creator, and three other production companies.

## MACS BACK OFF PROPOSED TOXICOLOGY CUTS *(cont'd from page 1)*

The proposed LCDs would have resulted in effective Medicare reimbursement cuts of 21% for procedure code G0482 (definitive drug testing for 15-21 drug classes) and 37% for G0483 (22+ drug classes). This would have resulted in an estimated \$100+ million per year of lost Medicare revenue for toxicology labs (see *LE*, March 2023). Additionally, due to the draft LCDs proposed reduction to the number of recognized drug classes, most testing falling under procedure code G0481 (8-14 drug classes) would have been reclassified to procedure code G0480 (1-7 drug classes), which reimburses at \$114.43 vs \$156.59 for G0481.

The five MACs that had proposed limiting reimbursement for definitive drug testing to no more than 14 drug classes were CGS administrators, First Coast Service Options, Noridian, Novitas Solutions, Palmetto GBA and Wisconsin Physicians Service. Another MAC, National Government Services (NGS), had actually introduced the proposed changes by issuing a billing article late last year. NGS then issued a proposed LCD for capping definitive drug testing in February 2023.

However, all of the MACs, including NGS, retired the proposed changes in early April.

The American Clinical Laboratory Assn., the big commercial labs and numerous independent toxicology labs, with bipartisan and bicameral support from Congressional representatives, had all argued to the MACs against the proposed changes. Their reasoning included:

- 1) The proposed LCDs directly violated CMS's national coding and payment policies for definitive drug testing.
- 2) CMS had published clear guidance in 2016 that the definitive drug test codes (G0480-G0483) and payment rates—that providers must use—were set based on AMA CPT Manual listings of drugs and drug classes.
- 3) The proposed policies could cause significant disruptions to access for drug testing services during the ongoing opioid public health emergency.

“This outcome reflects the highly constructive dialog that occurred between all key stakeholders and a recognition of the importance of definitive drug testing services as a vital tool in combating the worsening opioid epidemic,” noted Joel Galanter, Chief Legal Officer of Aegis Sciences (Nashville, TN).

Newly proposed LCDs issued by the MACs are now focused on tweaking the language that describes patient risk assessments and documentation that doctors should use before ordering drug testing. There are no drug class caps on the definitive drug test codes (G0480-G0483) contained in the newly proposed LCDs.

## Foresight Diagnostics Raises \$59 Million to Commercialize MRD Test

**F**oresight Diagnostics (Aurora, CO) has raised \$58.75 million from a Series B funding led by Foresite Capital. Other investors included Civilization Ventures, Bluebird Ventures, Pear Ventures, Agent Capital, Stanford University, and The University of Colorado Healthcare Innovation Fund. Foresight had previously raised \$12.5 million from a Series A round in 2021.

Foresight intends to use the funds to commercialize its liquid biopsy testing platform (PhasED-Seq) for the measurement of minimal residual disease (MRD) for patients with solid tumors and hematologic cancers. Foresight's PhasED-Seq assay is based on a proprietary technology developed at and licensed from Stanford University.

Foresight operates a CLIA-certified lab in Aurora, Colorado.

## AI Predicts Pancreatic Cancer Three Years in Advance

A research study published in the journal *Nature Medicine* showed that an AI algorithm could identify individuals at high risk for pancreatic cancer up to three years before a diagnosis. The AI diagnosis was based solely on patient's medical records.

The study was titled *A Deep Learning Algorithm to Predict Risk of Pancreatic Cancer from Disease Trajectories* and published on May 8, 2023. The research was led by investigators at Harvard Medical School and the University of Copenhagen.

The AI algorithm was trained on two separate data sets totaling 9 million patient records from Denmark and the United States. The researchers "asked" the AI model to look for telltale signs based on ICD disease codes and the timing of their occurrence. The model was able to predict which patients are likely to develop pancreatic cancer in the future. Notably, many of the symptoms and disease codes were not directly related to or stemming from the pancreas.

The researchers said they believe the model is at least as accurate in predicting disease occurrence as are current genetic sequencing tests. An AI tool that identifies those at the highest risk for pancreatic cancer would ensure that clinicians test the right population, while sparing others of unnecessary biopsies and testing, the researchers said.

Compared with breast, cervix, colorectal and prostate, pancreatic cancer is harder and more expensive to screen and test for. Physicians look mainly at family history and the presence of genetic mutations, which often miss many at-risk patients.

About 44% of people diagnosed in the early stages of pancreatic cancer survive five years after diagnosis, but only 12% of cases are diagnosed that early. The survival rate drops to 2-9% in those whose tumors have grown beyond their site of origin. The American Cancer Society estimates that 50,550 Americans (26,620 men and 23,930 women) will die from pancreatic cancer in 2023.

Applied at scale, an AI screening tool could expedite detection of pancreatic cancer, lead to earlier treatment, and improve outcomes and prolong patients' life spans, according to study co-senior investigator Chris Sander, PhD, faculty member in the Department of Systems Biology in the Blavatnik Institute at Harvard Medical School.

## NeoGenomics Begins Marketing Radar MRD Test

NeoGenomics (Fort Myers, FL) launched its Radar test for minimal residual disease (MRD) for clinical use in March. The Radar assay is a laboratory-developed test (LDT) billed using CPT 81479 (Unlisted molecular pathology procedure) at an undisclosed rate. NeoGenomics has submitted data for the Radar test for breast cancer through the MolDX pathway for reimbursement and plans to submit data for two additional indications by year-end.

The Radar test includes tumor tissue whole-exome sequencing to identify up to 48 tumor-specific variants (4-week TAT), followed by a blood-based MRD test (1-week TAT). The tumor profile is performed once. The MRD test is repeated at one- to six-month intervals for up to five years.

NeoGenomics gained the Radar testing technology through its acquisition of UK-based Inivata in June 2021. NeoGenomics initially acquired a 20% stake in Inivata for \$25 million in May 2020 and then bought the remaining 80% for \$390 million in June 2021.

The competition to win MRD testing business will come down to lab relationships with ordering oncologists and the clinical outcomes for patients, said NeoGenomics CEO Chris Smith at the Banc of America Securities Health Care Conference on May 10.



## California Propose Medi-Cal Rate Cuts For 27 Lab Tests

The California Department of Health Care Services (DHCS) has proposed reimbursement cuts for 27 high-volume lab and anatomic pathology test codes on its Medi-Cal fee-for-service rate schedule effective July 1, 2023. The proposed rate cuts are based on a survey of private-payer rates paid to labs in calendar year 2021.

DHCS identified 431 independent labs and hospital labs required to submit their private payer rates. However, DHCS received only 217 provider data submissions. Nonetheless, this was still higher than the last DHCS survey, which was completed by only 132 labs (see *LE*, March 2021)

The DHCS conducts a lab rate survey every three years. The DHCS rate methodology for lab and pathology services is the lesser of the weighted survey rates or 80% of current Medicare rates.

Based on the data collected, DHCS has proposed Medi-Cal fee-for-service rate cuts for 27 clinical lab and pathology test codes.

These proposed Medi-Cal rates will be finalized (effective July 1, 2023) pending public noticing, comment, submission and approval.

The DHCS survey provides a glimpse into potential outcomes when CMS conducts its second national PAMA survey of private-payer lab rates. Under the current schedule, labs will be required to submit their payment data from 2019 to CMS in the first quarter of 2024. This information will be used to set Medicare CLFS rates for 2025.

### Sample of Proposed Medi-Cal Lab and Pathology Rate Changes Effective July 1, 2023

Procedure Code	Description	Medi-Cal Proposed Rate	Medi-Cal Current Rate	Proposed Medi-Cal Rate Change	Medicare CLFS Rate 2023	Proposed Medi-Cal as Percent Medicare
84154	PSA Free	\$12.87	\$16.35	-21%	18.39	70%
83525	Insulin total	8.00	10.16	-21%	11.43	70%
86480	Tuberculosis test	43.39	55.04	-21%	61.98	70%
87086	Urine culture/colony count	5.65	7.15	-21%	8.07	70%
87529	Herpes simplex DNA amp probe	24.56	30.73	-20%	35.09	70%
87591	N. gonorrhoeae DNA amp probe	25.36	31.07	-18%	35.09	72%
87491	Chlamydia trach DNA amp probe	25.59	31.17	-18%	35.09	73%
87522	Hepatitis C reverse transcript	31.51	38.08	-17%	42.84	74%
80074	Acute Hepatitis Panel	34.86	41.79	-17%	47.63	73%
82306	Vitamin D 25 hydroxy	20.72	24.79	-16%	29.6	70%
80307	Drug test(s), presumptive	43.50	51.72	-16%	62.14	70%
88313	Special stains group 2	34.26	38.56	-11%	82.68	41%

Source: California Department of Health Care Services

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## Public Lab CEOs Paid Average \$5 Million In 2022

The top 32 executives at 23 publicly traded lab companies were paid an average of \$5 million each last year, according to an analysis of shareholder proxy statements by *Laboratory Economics*. Altogether, the 32 CEOs earned a total of \$161 million, \$93 million of which came from stock and option awards alone.

The highest paid lab executive was **Adam Schechter**, 58, Chairman and CEO of **Labcorp** (Burlington, NC). Schechter received total compensation of \$14.9 million, including salary of \$1.3 million, stock awards of \$9.1 million, options valued at \$2.1 million, bonus and incentives of \$1.7 million and other compensation of \$729,207. Labcorp recorded net income of \$1.3 billion in 2022 down from \$2.4 billion for the previous year; revenue decreased by 8% to \$14.9 billion.

The next highest paid CEO was **Christopher Smith**, 60, at **NeoGenomics** (Fort Myers, FL), who earned total compensation of \$14.8 million. Smith received a salary of \$346,154, stock and option awards of \$11.9 million, bonus of \$455,438 and other compensation of \$2.1 million for relocation expenses. NeoGenomics recorded a net loss of \$144 million in 2022 versus a net loss of \$8 million in 2021; revenue increased by 5% to \$510 million.

**Quest Diagnostics' James Davis**, 60, Chairman and CEO, earned total compensation \$11.9 million. Davis received a salary of \$805,769, stock and option awards of \$9.8 million, bonus of \$1.1 million and other compensation of \$202,012. Quest recorded net income of \$946 million in 2022 versus \$2 billion in 2021; revenue fell by 8% to \$9.9 billion.

**CareDx's Reginald Seeto**, 51, President & CEO, was paid a total of \$12.8 million, including a salary of \$554,175, stock and option awards of \$11.8 million and bonus of \$399,614. CareDx reported a net loss of \$77 million in 2022 versus a net loss of \$31 million in 2021; revenue increased by 9% to \$322 million.

The lowest-paid lab executives were **Helmy Eltoukhy, PhD**, 44, Chairman & Co-CEO, and **AmirAli Talasaz, PhD**, 43, Co-CEO, at **Guardant Health** (Palo Alto, CA). They each received \$1 in salary plus about \$11,000 each in other compensation.

### \$79K Median Lab Employee Compensation

Separately, data from six of the largest publicly traded lab companies shows they paid their combined 144,000 employees an average of \$78,624 each in 2022. Median compensation at these six companies increased by an average of 4.8% per year between 2017 and 2022. The fastest increases were at Exact Sciences (6.6% per year) and Labcorp (6.2% per year). Exact Sciences had the highest median employee compensation of \$135,992, followed by Myriad Genetics at \$89,911 and NeoGenomics at \$82,000.

### Median Employee Compensation at Six Big Labs

Company	2022	2021	2020	2019	2018	2017	5-Year CAGR
Labcorp (Diagnostics & Drug Development)	\$56,191	\$57,614	\$41,670	\$41,834	\$43,230	\$41,609	6.2%
Quest Diagnostics	63,854	67,206	71,645	53,492	46,749	48,194	5.8%
Exact Sciences	135,992	128,893	110,616	113,869	98,783	98,724	6.6%
Opko Health (Diagnostics & Drug Development)	43,798	41,879	42,848	41,445	38,661	38,661	2.5%
Myriad Genetics	89,911	74,021	89,031	77,814	77,814	77,000	3.1%
NeoGenomics	82,000	74,000	76,844	74,903	70,258	69,825	3.3%
Averages for 6 lab companies	\$78,624	\$73,936	\$72,109	\$67,226	\$62,583	\$62,336	4.8%

Source: *Laboratory Economics* from company proxy statements

## 2022 Public Laboratory CEO Compensation

Company/Executive	Salary	Value of Stock & Option Awards	Bonus & Incentives	Other Comp*	Total Compensation
<b>Aspira Women's Health</b>					
Nicole Sandford, 52, President, CEO	\$416,667	\$87,845	\$0	\$493	\$505,005
<b>Biocept</b>					
Sam Riccitelli, 64, interim President and CEO	507,494	570,340	30,000	18,463	1,126,297
Michael Nall, 60, former President & CEO	64,875	\$0	\$0	535,806	600,681
<b>Biodesix</b>					
Scott Hutton, 51, President & CEO	515,000	2,122,529	114,869	2,134	2,754,532
<b>CareDx Inc.</b>					
Reginald Seeto, 51, President & CEO	554,175	11,831,561	399,614	920	12,786,270
<b>Castle Biosciences</b>					
Derek J. Maetzold, 60, President & CEO	660,000	6,102,902	771,375	18,300	7,552,577
<b>DermTech Inc.</b>					
John Dobak, MD, 57, Chief Executive	597,400	2,738,518	0	516	3,336,434
<b>Enzo BioChem</b>					
Hamid Erfanian, 53, Chief Executive	415,385	2,127,400	360,000	382	2,903,167
Elazar Rabbani, PhD, 79, former CEO	467,650	0	0	2,748,971	3,216,621
<b>Exact Sciences</b>					
Kevin Conroy, 57, Chairman & CEO	509,690	12,685,646	749,245	279,417	14,223,998
<b>Exagen</b>					
John Aballi, 38, President and CEO	111,056	850,500	22,330	0	983,886
<b>Fulgent Genetics</b>					
Ming Hsieh, 66, Chairman & CEO	947,917	3,572,400	713,556	0	5,233,873
<b>GeneDx</b>					
Katherine Stueland, 47, CEO	453,557	10,843,434	573,800	11,563	11,882,354
Eric Schadt, PhD, 58, former CEO	430,962	2,418,719	0	311,931	3,161,612
<b>Guardant Health</b>					
Helmy Eltoukhy, PhD, 44, Chmn & Co-CEO	1	0	0	11,631	11,632
AmirAli Talasaz, PhD, 43, Co-CEO	1	0	0	11,174	11,175
<b>Interpace Biosciences</b>					
Thomas Burnell, 61, President & CEO	433,854	0	185,000	15,315	634,169
<b>Invitae</b>					
Kenneth Knight, 62, CEO	610,577	3,551,300	786,875	2,000	4,950,752
Sean George, PhD, 49, former CEO	282,692	0	582,637	791,074	1,656,403
<b>Labcorp</b>					
Adam Schechter, 58, Chairman & CEO	1,317,500	11,205,369	1,675,221	729,207	14,927,297
Brian Caveney, MD, 49, Exec. VP, Pres. Diagnostics	538,000	1,783,925	641,792	44,750	3,008,467
<b>Myriad Genetics</b>					
Paul Diaz, 61, President & CEO	1,043,750	9,513,661	766,500	67,277	11,391,188
<b>Natera Inc.</b>					
Steve Chapman, 44, President & CEO	609,622	7,093,675	533,834	9,150	8,246,281
<b>NeoGenomics</b>					
Christopher Smith, 60, Chief Executive	346,154	11,850,000	455,438	2,146,930	14,798,522
Lynn Tetrault, 60, former interim CEO and current Chmn	391,184	180,000	1,500,000	0	2,071,184
Mark Mallon, 59, former CEO	171,346	5,947,510	0	1,577,000	7,695,856
<b>Opko Health Inc.</b>					
Phillip Frost, MD, 86, Chairman & CEO	960,000	0	0	12,200	972,200
Jon Cohen, MD, 69, former Exec. Chmn, BioRef Labs	600,000	0	0	1,012,200	1,612,200
<b>ProPhase Labs</b>					
Ted Karkus, 63, Chairman & CEO	675,000	0	200,000	27,200	902,200
<b>Psychemedics</b>					
Raymond Kubacki, Jr., 78, Chairman & CEO	470,138	130,200	0	0	600,338
<b>Quest Diagnostics</b>					
James Davis, 60, Chairman & CEO	805,769	9,792,392	1,082,853	202,012	11,883,026
<b>Veracyte Inc.</b>					
Marc Stapley, 53, Chief Executive	625,000	3,682,422	625,000	3,000	4,935,422
<b>Totals, 32 executives</b>	\$16,532,416	\$92,572,280	\$12,769,939	\$10,591,016	\$160,575,619
<b>Averages, 32 executives</b>	\$516,638	\$2,892,884	\$399,061	\$330,969	\$5,017,988

\*Other compensation includes reimbursement for financial planning services, car allowance, personal liability insurance, executive physical exams, home security systems, country club memberships, personal use of company jets and other perks. Source: *Laboratory Economics* from company proxy statements

## Lab Stocks Up 7% Year-to-Date In 2023

Twenty-four lab stocks have risen by an unweighted average of 7% year to date through May 12. In comparison, the S&P 500 Index is up 7% year to date. The top-performing lab stocks thus far in 2023 are NeoGenomics, up 109%; Enzo Biochem, up 71%; and Exact Sciences, up 60%. Labcorp is down 6% and Quest Diagnostics is down 16%.

Company (ticker)	Stock Price 5/12/23	Stock Price 12/30/22	2023 Price Change	Enterprise Value (\$ millions)	Revenue for Trailing 12 mos. (\$ millions)	Enterprise Value/Revenue
NeoGenomics (NEO)	\$19.35	\$9.24	109%	\$2,720	530	5.1
Enzo Biochem (ENZ)	2.45	1.43	71%	140	81	1.7
Exact Sciences (EXAS)	79.19	49.51	60%	15,880	2,200	7.2
Opko Health (OPK)	1.72	1.25	38%	1,560	913	1.7
DermTech Inc. (DMTK)	2.27	1.77	28%	23	14	1.6
Natera (NTRA)	51.10	40.17	27%	5,520	868	6.4
Myriad Genetics (MYGN)	17.83	14.51	23%	1,480	695	2.1
Exagen (XGN)	2.93	2.40	22%	23	46	0.5
Sonic Healthcare (SHL.AX)*	35.79	29.97	19%	19,450	8,670	2.2
Fulgent Genetics (FLGT)	35.49	29.78	19%	190	365	0.5
Psychemedics (PMD)	4.95	4.90	1%	28	25	1.1
Veracyte (VCYT)	23.52	23.73	-1%	1,540	311	4.9
Castle Biosciences (CSTL)	22.87	23.54	-3%	386	152	2.5
Guardant Health (GH)	26.37	27.20	-3%	3,220	482	6.7
Interpace Biosciences (IDXG)	1.00	1.04	-4%	62	32	1.9
Labcorp (LH)	220.77	235.48	-6%	25,480	14,755	1.7
Quest Diagnostics (DGX)	130.73	156.44	-16%	19,220	9,603	2.0
ProPhase Labs (PRPH)	7.93	9.63	-18%	141	94	1.5
GeneDx (WGS) <sup>1</sup>	6.89	8.71	-21%	58	224	0.3
Invitae (NVTA)	1.39	1.86	-25%	1,630	510	3.2
Aspira Women's Hlth (AWH) <sup>2</sup>	3.59	4.95	-27%	23	8	2.8
CareDx (CDNA)	8.05	11.41	-29%	196	320	0.6
Biosesix (BDSX)	1.50	2.30	-35%	122	38	3.2
Biocept (BIOC)	0.25	0.53	-53%	9.3	7	1.4
Totals & Averages			7%	\$99,100	\$40,942	2.4

1) GeneDx had a 1-for-33 reverse stock split on May 4. 2) Aspira had a 1-for-15 reverse stock split on May 11.

\*Sonic Healthcare's figures are in Australian dollars

Source: Laboratory Economics from SeekingAlpha.com

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## Excess Mortality: The Pandemic's True Death Toll

Everyone from the World Health Organization down now counts excess mortality as the measure of the pandemic's lethality. Excess mortality is the number of deaths that occur above and beyond what would be expected in a given time period.

The table below compares 25 countries in terms of their number of excess deaths per 100,000 people during the pandemic (2020-early 2023) above their average number of deaths during 2015-2019.

We looked at two sources of information to put together our excess mortality table: 1) *The Spectator* used unadjusted figures based on methodology used by the UK's Office for National Statistics; and 2) *The Economist* adjusted its figures to account for differences in population age for each country.

Our table weighted each method 50-50 and then ranked each country from lowest-to-highest overall excess mortality during the pandemic. New Zealand and Sweden are tied for the lowest excess mortality.

### Excess Deaths per 100,000 Population

(Excess deaths during the pandemic are calculated compared with 2015-2019 average.)

Rank	Country	<i>The Spectator</i> (Unadjusted)	<i>The Economist</i> (Demography Adjusted)
1 (tie)	New Zealand	155	4
1 (tie)	Sweden	73	85
3	Australia	135	67
4	Denmark	176	58
5	Norway	113	85
6	Canada	245	78
7	Switzerland	226	119
8	Costa Rica	74	150
9	Israel	178	124
10	France	283	102
11	Finland	268	115
12	Belgium	233	137
13	Germany	334	123
14	Austria	301	147
15	Netherlands	330	148
16	Spain	311	154
17	United Kingdom	292	169
18	Portugal	385	154
19	Italy	373	187
20	Greece	476	158
21	Chile	417	251
22	United States	528	235
23	Hungary	428	261
24	Poland	644	248
25	Mexico	600	640

Sources: *Laboratory Economics* from:

<https://www.spectator.co.uk/article/sweden-covid-and-excess-deaths-a-look-at-the-data/>

<https://www.economist.com/graphic-detail/coronavirus-excess-deaths-estimates> (updated daily)