Strategic Directions International, Inc.

Instrument Business Outlook

Strategic Information for the Analytical & Life Science Instrument Industry

Instrument Business Outlook (ISSN 1061-2203) is published twice a month by Strategic Directions International, Inc.

Volume 27, Issue 8
July 31, 2018

Instrument Providers and California Cannabis Testing Labs Race to Meet a Spike in Demand

The spreading legalization of cannabis by US states is opening up a torrent of market opportunities for many parties, from growers and vendors to testing labs and testing instrument providers. Recreational cannabis became legal in California at the start of 2018. A transitory period allowing cannabis providers to meet all statutory and regulatory requirements ended June 30.

A summary of these requirement is found in a California Bureau of Cannabis Control's (BCC) fact sheet. The list of now-enforced regulations that must be met by all cannabis goods sold in the state affects packaging and labeling, potency limits for edible cannabis products, the ingredients listed on and appearance of cannabis packages, and lab testing requirements. ***IBO*** spoke with California cannabis testing lab Steep Hill, as well as Agilent Technologies and Shimadzu Scientific Instruments, two instrument companies that provide cannabis testing equipment to labs, about the cannabis testing market in general and in light of California and other states' recent legalization and new regulations.

Steep Hill, Steep Demand

Steep Hill has been providing testing for medicinal cannabis for more than 10 years, according to director of marketing Kelly Kaufman, even before testing was mandated. The testing company has labs in Alaska, Arkansas, Hawaii, Maryland, New Mexico, Pennsylvania, Washington and Washington DC, and is also contracted for labs in Canada, France, Germany, Italy, Israel, Jamaica, Mexico, Spain, Switzerland and the UK.

Congruent with its size and history, the company has implemented an advanced approach to cannabis testing, including standardization of testing methods and procedures. "With 10 years established credibility, we've seen just about everything there is to test and have established SOPs to do so, which allows us to interface and influence regulatory bodies (like the DOH [Department of Health]) in specific and/or emerging jurisdictions," explained Ms. Kaufman. "We've refined best practices and SOPs, including ISO 17025 certification, continued PT [proficiency testing] and accreditation above local jurisdiction regulations."

> ***"We've implemented new plans to add additional instrumentation to our lab to better meet and support new demands on our business model."***

Discussing California's new testing requirements, Ms. Kaufman stated, "California's BCC Emergency Regulations technically went into effect January 1, 2018, and we did see a steady increase in sample volume." But the effect on Steep Hill's business only continues to increase. "However, leading up to the July 1, 2018 shift to enforceability is where we've truly seen the scope of the impact of cannabis legalization and regulation on our business, and consequently, on our plans for expanding our instrumentation." The company is currently looking to open new lab space in the state to meet the increasing testing volume.

The increase in testing volume has also influenced the decision to purchase new lab instrumentation. "We've realized that what was adequate instrumentation in a pre-legalized market quickly will be unsustainable in the new landscape, where we've seen (conservatively) a 130% uptick in our sample intake," continued Ms. Kaufman. "In order to keep our turnaround times reliable and efficient for the amount of testing coming through our pipeline, we've implemented new plans to add additional instrumentation to our lab to better meet and support new demands on our business model."

Opportunities for Instrument Companies

With the higher testing volume described by Steep Hill, instrument providers that outfit labs are also expected to see higher demand. Both Agilent and Shimadzu began to see an increase in customer inquiries before the July 1 regulations went into effect. "Agilent began to see a significant increase in demand and sales for cannabis testing in late summer/early fall of 2017," said Anthony Macherone, PhD, senior scientist at Agilent and visiting scientist at John Hopkins University School of Medicine. The demand spans a range of testing techniques that the company offers. "The platforms included headspace GC/MS for terpenes and residual solvents, LC-MS/MS for residual pesticides and mycotoxins, GC-MS/MS for residual pesticides, ICP-MS for metals testing, HPLC for potency and real-time PCR for microbial screening." And the growth has not shown any signs of slowing down. "Demand and sales into this market space have continued on a sharp upward trajectory ever since," added Dr. Macherone.

Shimadzu's experience has been similar. "We saw increasing demand for cannabis testing instrumentation during the six-month transition period before the July 1, 2018 deadline requiring products to pass additional checks for

cannabinoid potency levels and terpene profiles, as well as contaminates such as pesticides, heavy metals, residual solvents and mycotoxins/aflatoxins," explained Bob Clifford, PhD, general manager of Marketing at Shimadzu. "This is likely the result of laboratories preparing their facilities in advance in order to maintain production and efficiency."

> ***"Demand and sales into this market space have continued on a sharp upward trajectory ever since late summer/early fall of 2017."***

Although California's cannabis testing regulations are now in effect, standards organization are still catching up. As for testing methods, the BCC regulations state that a lab is required to develop, implement and validate test methods for sample analysis, and to work in accordance with guidelines put forward by the US FDA's 2016 *Bacterial Analytical Manual*, the 2016 20th edition of the AOAC's *Official Methods of Analysis for Contaminant Testing*, and the USP and National Formulary's 2016 *Methods of Analysis for Contaminant Testing*.

However, published guidelines are not yet cannabis specific. "AOAC has reached a consensus for standard method performance requirements for four different cannabis testing methods, but has yet to publish any approved methods," explained Dr. Macherone and Mary McBride, director, Global Market Regulations and Standards Strategy, Segment Marketing and Market Development at Agilent. "USP established an expert review panel for cannabis in 2017, but to date have not completed development of any active standard test methods for cannabis or any cannabis-associated compounds. ASTM also established a new Technical Committee (D-37) in early 2017."

Shimadzu has worked with labs that incorporate various testing guidelines. "Generally speaking, Shimadzu has worked with laboratories that follow both USP or AOAC guidelines; it seems to be dependent on their familiarity level with the respective organizations," detailed Dr. Clifford. "Labs with roots in the pharmaceutical industry may generally follow USP guidelines, whereas those with roots in the food industry may follow AOAC guidelines for their validation practices."

Testing Requirements and Methods

Outlining the the testing requirements detailed in the California BCC's Text of Regulations, Dr. Clifford, who works with Steep Hill, and Ms. Kaufman stated: "A licensed laboratory shall obtain ISO/SEC 17025 accreditation for the testing of the following: (1) Cannabinoids; (2) Heavy metals; (3) Microbial impurities; (4) Mycotoxins; (5) Residual pesticides; (6) Residual solvents and processing chemicals; and (7) if tested, terpenoids." They continued, "The platforms utilized in the testing can vary depending on the cost of instrumentation, speed of analysis, sample preparation, experience of the user, multiple tests on single instrument, multiple tests in a single run, etc."

> ***"Many cannabis QC testing labs are moving to turnkey analyzers, which are easier to operate and require less than one day to complete installation and training."***

Because of this flexibility, labs have the capability to choose instruments based on which factors are most important to them, such as cost, speed and user-friendliness, in addition to the analyte being tested for. "Cannabinoid analysis can be analyzed on a HPLC with a UV detector, which doesn't require a high-level chemist," explained Dr. Clifford and Ms. Kaufman. "Some prefer to analyze on an HPLC with a photo diode array (PDA) detector looking for other impurities. If speed is an issue, the analyst may switch from an HPLC to a more expensive UHPLC with a higher operating cost." Multiple factors determine lab's purchase. "Analysts could choose a very expensive LC-MS/MS because then the lab only has room for a limited number of instruments, and other tests, such as pesticides and mycotoxins, may be analyzed on the same instruments. Thus, there is more than one way to achieve a goal."

Generally, trends point toward customers prioritizing ease of use, according to Dr. Clifford and Ms. Kaufman. "Many cannabis QC testing labs are moving to turnkey analyzers, which are easier to operate and require less than one day to complete installation and training," they said. "These analyzers, which include all reagents, columns and standards, as well as simplified software, help increase quality by standardizing operation. They also decrease cost by obviating method development and performing rapid, fit-for-purpose analyses." According to them, Steep Hill was one of the first multi-lab cannabis testing companies to enter the cannabis testing market using this approach.

For each category of regulated compounds, there are multiple methods for testing for them in cannabis, as Dr. Clifford and Ms. Kaufman explained. For example, they noted, heavy metals like lead, mercury, cadmium and arsenic can by analyzed using either AA, ICP or ICP-MS, with the latter method being the most popular due to its combined speed and sensitivity. Mycotoxins and aflatoxins analysis can be achieved through HPLC or LC-MS(/MS). LC-MS/MS is usually used for pesticides analysis. But GC-MS/MS may be needed for certain compounds as the testing requirements continue to evolve in different states and around the globe.

For example, either headspace GC or GC/MS can be used to analyze residual solvents. “GC only provides retention time as the indicator of the type of solvent, whereas GC/MS may utilize a library search as well to identify the compound,” stated Mr. Clifford and Ms. Kaufman. “Similarly, [this] is true for terpenoid testing, but the analyst may switch from headspace sampling to solid phase microextraction (SPME) for measuring lower levels.”

The growing cannabis industry is showing no signs of slowing down, which is providing a wealth of opportunities for cannabis testing labs and, therefore, instrument providers working with such labs. New regulations such as California’s requirements further define the role of testing for labs like Steep Hill, which not only drives demand for testing services, but also shapes the reputation of the cannabis industry in general. “Above and beyond regulatory testing services, Steep Hill is committed to providing our clients the best possible final product we can through services tailored to the entire life cycle of cannabis production,” said Ms. Kaufman. “We hold our vision tightly to our business strategy.”

IMV ServiceTrak Awards: Users Choose Clinical Instrument Winners

IBO is proud to announce the winners of IMV’s 2018 ServiceTrak™ Awards for clinical analyzers. Established in 1977, IMV provides market research and publications covering the medical imaging and clinical diagnostic instruments markets. IMV is part of the Science and Medicine Group of companies, which also includes Strategic Directions International, ***IBO***’s publisher.

> ***In total, the surveyed labs have an installed base of 4,750 instruments.***

The winners of the ServiceTrak™ Awards are recognized by users as the leading companies in 7 categories of clinical analyzers across 3 functions—system performance, customer satisfaction and service. The workhorses of clinical laboratories, clinical analyzers perform thousands of tests each day that are necessary for the diagnosis and treatment of patients. As Scott Lamb, senior project manager at IMV, told ***IBO***, “While there are many other types of diagnostic equipment in the health care environment, these 7 areas are available in almost every hospital/clinic so the installed base is very large.”

The ServiceTrak™ clinical instrument awards are the result of phone interviews conducted earlier this year with 2,075 hospital laboratories. In total, the surveyed labs have an installed base of 4,750 instruments. Award winners are selected based on satisfaction ratings calculated on a 10-point scale. The biggest awards winner this year is Ortho Clinical Diagnostics, which is recognized in 9 categories. bioMérieux, Inc. is the winner in 5 categories.

Earlier this year, the IMV PET Imaging ServiceTrak™ Awards were announced. Reports detailing survey results in depth for all major vendors in each category of clinical instrument and PET imaging systems are published annually by IMV.

The 2018 IMV ServiceTrak™ Award Winners for Clinical Analyzers

Chemistry

Best System Performance: Ortho Clinical Diagnostics

Best Customer Satisfaction (tie): Ortho Clinical Diagnostics and Siemens Healthineers

Best Service: Ortho Clinical Diagnostics

Immunoassay

Best System Performance: Ortho Clinical Diagnostics

Best Customer Satisfaction: Ortho Clinical Diagnostics

Best Service: Ortho Clinical Diagnostics

Integrated Systems

Best System Performance: Ortho Clinical Diagnostics

Best Customer Satisfaction: Ortho Clinical Diagnostics

Best Service: Ortho Clinical Diagnostics

Hematology

Best System Performance: Sysmex America, Inc.

Best Customer Satisfaction: Sysmex America, Inc.

Best Service: Sysmex America, Inc.

Coagulation

Best System Performance: Diagnostica Stago, Inc.

Best Customer Satisfaction: Diagnostica Stago, Inc.

Best Service: Siemens Healthineers

Antibiotic Susceptibility Testing (AST)/Identification

Best System Performance: Beckman Coulter

Best Customer Satisfaction: bioMérieux, Inc.

Best Service: bioMérieux, Inc.

Blood Culture

Best System Performance: bioMérieux, Inc.

Best Customer Satisfaction: bioMérieux, Inc.

Best Service: bioMérieux, Inc.

Danaher Plans Second Spin-off

Washington, DC 7/19/18—Danaher has announced that it intends to spin-off its Dental segment into a publicly traded company. The Dental business, made up of the Nobel Biocare, Ormco, and KaVo Kerr businesses, recorded $3 billion in revenues last year and has 12,000 employees. "Through recent growth investments and productivity initiatives, combined with the team's strong commitment to continuous improvement and the Danaher Business System, the Dental segment is in a better position today to accelerate its growth trajectory, drive continued margin expansion, and pursue M&A opportunities," commented Danaher President and CEO Thomas P. Joyce. The deal will be tax-free to shareholders. Amir Aghdaei, the current Group Executive responsible for the segment, will become president and CEO of the new company. Dan Daniel, executive vice president at Danaher, and Daniel Raskas, senior vice president, Corporate Development at Danaher, will also serve on the spin-off's Board. In addition, Danaher Executive Vice President and CFO Dan Comas will be a special advisor. The transaction is expected to be completed in the second half of 2019.

Accounting for the spin-off, "remaining Danaher" (the company as it will exist once the Dental business is spun-off) would have had 2017 annual revenues of $15.5 billion and consist of three segments: Diagnostics (37% of revenues), Life Sciences (37%) and Environmental & Applied Solutions (26%). In 2017, it would have recorded EBITDA margins of over 20 and adjusted gross margins of around 55%.

Remaining Danaher will be more weighed toward consumables, which will account for 70% of revenues, compared to about 65% currently, and direct distribution, with 75% of company products directly distributed, compared to 70% currently.

Comprising the Dental business, Nobel Biocare provides dental restoration products, Ormco specializes in orthodontics, and KaVo Kerr sells dental office equipment and suppliers. In 2017, the Dental business recorded gross margins of approximately 55% and EBITDA margins in the high-teens.

In July 2016, Danaher completed the spin-off of three of its more industrially focused businesses to form publicly held Fortive (see **IBO** *7/31/16). Danaher aims to derive similar benefits with this spin-off, organizing businesses with similar characteristics each into their own company with higher-growth companies making up "remaining Danaher."*

Waters Buys DESI Technology

Milford, MA 7/23/18—Specialty measurement firm Waters has acquired exclusive rights to DESI (desorption electrospray ionization) technology from Prosolia and the Purdue Research Foundation (PRF). "DESI mass spectrometry imaging provides complementary and actionable data when compared to classical histopathology imaging technologies with major advantages in analyzing the molecular fingerprint within a sample, thus delivering deeper biological insights," stated Waters Chairman and CEO Chris O'Connell. Waters and PRF also announced a new relationship that includes the installation of a Waters' Synapt G2-S*i* TOF MS at PRF. Prosolia will provide DESI technology for other vendors' MS configurations through September 30, 2019.

Like Waters' REIMS (Rapid Evaporative Ionization Mass Spectrometry) technology, DESI is a direct-from-sample MS technique. "Where the two technologies complement one another is that DESI is an MS imaging technique providing analysis of spatial distribution of molecules in tissue. REIMS allows an accurate mass MS profile to be collected in the space of a just few seconds for specific sites within a sample tissue," said Jeff Mazzeo, vice president Marketing, at Waters. The company recently launched the direct-from-sample DART-QDa with Live ID system (see **IBO** 6/15/18*). "These technologies all represent our efforts continuously democratize the use and application of mass spectrometry."*

Asked about Waters' view of the long-term market prospects for DESI as a technique for cancer diagnosis, Mr. Mazzeo told ***IBO****, "Waters recognizes the potential of digital molecular imaging in histopathology for clinical research. DESI imaging mass spectrometry provides complementary and actionable data when compared to classical staining imaging technologies with one major advantage: it provides in situ localization of the molecular fingerprint within the tissue, thus providing deeper biological insights."*

Metrohm Adds to Raman Product Line

Herisau, Switzerland 7/27/18—Metrohm, a maker of chemical analysis instruments, has acquired B&W Tek's Spectroscopy Solution Business, B&W Tek and several of its foreign subsidiaries for an undisclosed amount. The B&W Tek Spectroscopy Solution Business supplies LIBS , NIR and UV/VIS spectrometers. "We are pleased to strengthen our product portfolio in spectroscopy by the acquisition of B&W Tek's R&D, production and sales organizations," commented Metrohm CEO and President Dr. Christoph Fässler. Metrohm will retain the B&W Tek brand as well as the company's sales and service organization.

*This is one of several recent Raman technology purchases by Metrohm (see **IBO** 3/15/16, **IBO** 11/30/17 and **IBO** 1/31/18). B&W Tek specializes in mobile spectroscopy instruments, an area that Metrohm has targeted with its other purchases and one of the fastest growing segments of the Raman spectrometer market.*

NanoString Tops Second Quarter Forecast with Preliminary Results

Seattle, WA 7/16/18—NanoString Technologies, a life science tools and molecular diagnostic company, announced preliminary second quarter revenues of $20.4 million. The company had forecast sales of $18.5–$19.5 million. "I'm pleased with our performance in the second quarter, which included 11% growth in our product and service revenue, bringing our growth through the first half of 2018 to approximately 13%," commented NanoString President and CEO Brad Gray "Instrument installed base grew 22% year over year, with SPRINT accounting for approximately 50% of units sold during the quarter. Consumable pull-through was at the high end of our guided range, with panel sales growing just over 30% and record Prosigna revenue. In addition, customer interest in our Digital Spatial Profiling continued to grow, resulting in strong service revenue growth driven by our Technology Access Program." Product and Service Revenue consisted of $10.3 million in consumable revenue, $5.5 million in instrument revenue, $2.5 million in Prosignia revenue and $2.1million in service revenue. The installed base of nCounter Analysis Systems totaled 670 at the end of the quarter.

Based on these figures, second quarter revenues for consumables, instruments and collaboration all decreased, down 6.4%, 8.3% and 72.4%, respectively. However, service revenue climbed 75% and Prosignia sales increased 38.9%. The company faces a tough year-over-year companies as total revenues climbed 52.9% in the second quarter of 2017.

Sequencing Firm Raises $60 Million

San Diego, CA 7/30/18—Omniome has completed a Series B financing raising $60 million in new funding. The company's Sequencing By Binding technology promises greater precision of nucleotide and DNA matching. "We have been able to validate the tremendous power of our proprietary sequencing biochemistry. Now we are directing our efforts on product development to rapidly advance our first commercial instrument prototypes," stated Omniome President and CEO Dave Mullarkey. "We appreciate the continued support from our current investors and welcome new investors Decheng Capital, Hillhouse Capital, Lam Research Capital and Nan Fung Life Sciences."

The label-free sequencing technology utilizes plasmonic nanohole arrays and imaging detection. Founded in 2013, the company has 40 employees, according to its website.

Bionano Sets IPO Terms

Washington, DC 7/19/18—Genomic technology firm Bionano Genomics will offer 3,350,000 shares at a price of $8–$10 per share for its IPO (see ***IBO*** 6/30/18). The company expects to raise $38.5 million. The company will trade on the NASDAQ exchange under the symbol "BNGO." Underwriters will be given the option to purchase up to 502,500 additional shares of common stock.

The company is scheduled to go public on August 1. In the first half the year, company revenues grew 31.7% to $5.2 million. Net loss declined 41.1% to $7.2 million.

IVD Company Buys Antibody Maker

Paris, France 7/16/18—Eurobio Scientific, a publicly held French company that supplies diagnostic and life science products, has purchased Dendritics for an undisclosed amount. Dendritics develops, manufactures and sells antibodies, specializing in antibodies targeting immune system cells. In 2017, Dendritics generated revenues of €350,000 ($393,258 at €0.89 = $1). "This merger allows Eurobio Scientific to strengthen its production activities by offering custom antibody manufacturing services as well as an extensive portfolio of proprietary monoclonal antibodies," stated Jean-Michel Carle, chairman of Eurobio Scientific's Management Board. "By using the innovative technology of Dendritics, we will also be able to develop new proprietary products, particularly in the field of diagnostics.",

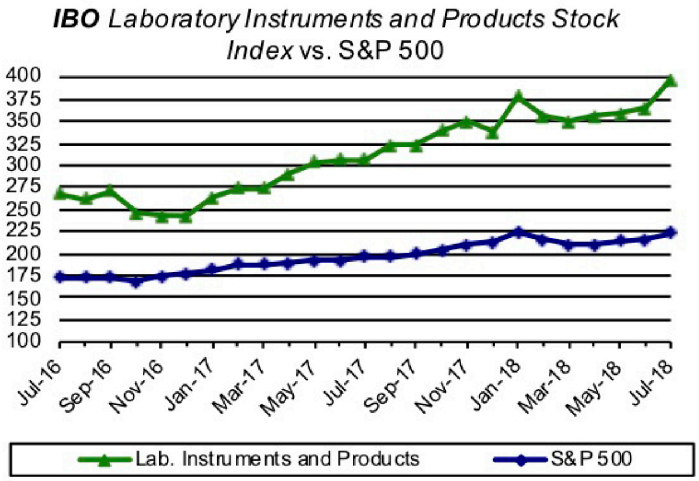
Eurobio Scientific offers and is developing diagnostic tests for for immunology and infectious diseases, as well as the FDA-approved Allomap gene expression test for heart transplantation recipients. In the first half of 2018, its revenues, including Dendritics, rose 28.1% to €25.1 million ($30.2 million at €0.83 = $1).

The purchase expands the company's offering by adding antibody manufacturing capabilities, as well as a catalog of antibody products that can be used both to develop new tests and for direct sale.

Strong Earnings Results Benefit IBO Stock Indexes

Despite currency concerns and the implementation of US and Chinese trade tariffs on July 7, the major US stock indexes showed strength in July, reflecting positive economic news and strong corporate earnings results. Good news came on July 27 when the US Commerce Department announced a preliminary estimated of 4.1% US GDP growth in the second quarter, versus 2.2% in the first quarter, making it the fastest quarterly growth since 2014.

For the month, the Dow Jones Industrial Average, NASDAQ and S&P 500 finished the month with gains of 4.7%, 3.6% and 2.2%, respectively. For the the first half of 2018, the NASDAQ leads the three Indexes, having risen 11.1%.



Click to enlarge

Laboratory Instruments and Products Stock Index

The *Laboratory Instruments and Products Index* rose 8.9% for the month, as share prices for 16 of the 20 companies in the *Index* increased. The Index has increase 17.9% through the first half of the year, with only 5 companies showing declines year to date.

All six companies in the *Index* that reported quarterly earnings this month beat analysts' adjusted EPS estimates, noting strong end-market demand. Two of the six companies raised their full-year adjusted EPS forecasts.

Company	Date Rep.	Fiscal Quarter	2018 Adj. EPS	Analyst Consensus	Vs. Estimate	YOY Growth	2017 Adj. EPS
Laboratory Instruments and Products Stock Index							
HBIO	26-Jul	Q2	$0.07	$0.06	$0.01	133.3%	$0.03
ILMN	30-Jul	Q2	$1.43	$1.11	$0.32	74.4%	$0.82
MTD	26-Jul	Q2	$4.65	$4.58	$0.07	18.6%	$3.92
QGEN	31-Jul	Q2	$0.33	$0.32	$0.01	10.0%	$0.30
TMO	25-Jul	Q2	$2.75	$2.63	$0.12	19.6%	$2.30
WAT	24-Jul	Q2	$1.95	$1.92	$0.03	10.8%	$1.76
Diversified Laboratory Stock Index							
AME	31-Jul	Q2	$0.83	$0.78	$0.05	27.7%	$0.65
DHR	19-Jul	Q2	$1.15	$1.09	$0.06	16.2%	$0.99
HON	20-Jul	Q2	$2.12	$2.01	$0.11	17.8%	$1.80
ITW	23-Jul	Q2	$1.97	$1.98	-$0.01	18.7%	$1.66
ROP	26-Jul	Q2	$2.89	$2.70	$0.19	29.0%	$2.24
XYL	31-Jul	Q2	$0.73	$0.71	$0.02	32.7%	$0.55

Click to enlarge

On July 30, **Illumina** reported strong earnings and revenue growth (see Bottom Line), beating analysts' estimates, and, for the second time this year, raising 2018 estimates for each. The company increased its 2018 adjusted EPS guidance approximately 12% to $5.35–$5.45 per share due to higher revenues, an upward revision of gross margin and a more favorable tax rate.

Thermo Fisher Scientific also beat analysts' second quarter earnings and revenue forecasts, announcing its results on July 25. The company also raised its 2018 estimates for both. Full-year adjusted EPS was increased for the second time this year to $10.89–$11.01, from $10.80–$10.96. In doing so, the company cited operational strength, which is expected to offset the effect of tariffs in the second half and stronger currency headwinds. The revision marks 15%–16% growth in adjusted EPS year over year.

Also surpassing analysts' quarterly adjusted EPS and revenue guidance was **Mettler-Toledo** which announced its financial results on July 26. Despite an expectation of unfavorable tariff effects and currency headwinds in the second half, the company maintained its full-year adjusted EPS target of $20.10–$20.25. Third quarter EPS is estimated to increase 14%–15% to $4.97–$5.02.

Waters reported second quarter results on July 24, beating analysts' adjusted EPS estimates but missing on revenues. As currency effects are now expected to be neutral, the firm revised downward its full-year guidance downward from $8.10–$8.30 to $8.05–$8.20. Third quarter adjusted EPS is estimated to be $1.85–$1.95, an increase from $1.76 in the third quarter 2017. Janney Montgomery Scott downgraded the stock on July 17 from a "buy" to a "neutral" rating.

QIAGEN reported second quarter financials on July 31, maintaining its adjusted diluted EPS guidance for the year of adjusted diluted EPS of $1.31–$1.33. Third quarter adjusted diluted EPS are expected to be about $0.33–0.34, compared to $0.30 for the same period a year ago.

Also announcing earnings this month was **Harvard Bioscience**. The company reported an increase in second quarter adjusted EPS on July 26, narrowly beating analysts' estimates. The company cut its net loss per share year over year.

In other news, **NanoString Technologies** completed a public offering of four million shares of common stock on July 23 at $12.50 per share, resulting in net proceeds of $46.8 million. The news comes days after the company announced preliminary second quarter sales results above its forecast (see Executive Briefing).

Diversified Laboratory Stock Index

The *Index* climbed 7.5% in July as 7 of the 8 companies reported earnings. All eight companies reported share gains, led by Corning, which was up 20.8%. Year to date, only one *Index* company, Illinois Tool Works (ITW), has declined. Teledyne Technologies leads all year-over-year gainers, having climbed 21.1%.

Danaher kicked off the ***IBO*** Stock Indexes' earnings seasons on July 19 with a strong showing, beating analysts' estimates for both second quarter earnings and revenues. The company also raised its adjusted EPS forecast for the year from $4.38–$4.45 to $4.43–$4.50. Danaher forecasts third quarter EPS of $1.05–$1.08, compared to $0.99 in the same period a year ago.

The three other Index companies reporting earnings results this month also announced stronger-than-expected results. **AMETEK** announced its second quarter results on July 31, which surpassed analysts' estimates for EPS and sales. The company raised its full-year diluted EPS forecast from $3.06–$3.12 to $3.16–$3.20, resulting in an anticipated 21%–23% increase year over year. The company's third quarter diluted EPS is set to rise 15%–18% to $0.76–$0.78.

Also on July 31, **Xylem** beat analysts' estimates for adjusted EPS and revenues. The company narrowed its full-year adjusted EPS forecast to $2.85–$2.95, representing a 19%–23% increase year over year.

On July 20, **Honeywell** reported quarterly adjusted EPS of $2.12 per share, handily beating analysts' estimates. The company raised both its 2018 revenue and EPS guidance. Full-year EPS is now forecast to be $8.05–$8.12, an increase from the previously raised guidance of $7.85–$8.05.

Although missing analysts' estimates, on July 23, **ITW** reported double-digit adjusted EPS growth. The company also updated its 2017 adjusted EPS outlook to reflect adverse currency effects. ITW now expects full-year adjusted EPS of $7.50– $7.70 per share, compared to the previous estimate of $7.60– $7.80 per share, due to updates of the expected currency impact. Third quarter EPS is expected to be $1.80 –$1.90 per share, versus $1.86 a year ago.

International Stocks

Despite trade tensions, major Asia Pacific Indexes were up this month. Japan's Nikkei 225 rose 3.5%, while China's

Shanghai Composite Index increased 3.2%. Less robust, South Korea's KOSPI index finished the month up 1%, while the Hong Kong Hang Seng was flat.

Only one Japanese company in the ***IBO*** Stock Table reported earnings this month. On July 24, **Hitachi High-Technologies** reported fiscal 2019 first quarter adjusted EPS of ¥76.90 ($0.70) per share, down from ¥85.19 ($0.78) per share a year ago.

Major European stock indexes also had positive results for the month. The UK's FTSE 100 Index rose 1.5%, Germany's DAX Index rose 4.1% and France's CAC 40 Index was up 3.5%.

Of the 5 European stocks in the ***IBO*** Stock Table, 3 showed gains in July. For the year, 3 companies are up double digits. The largest monthly gain belonged to Sartorius, with a 9.7% increase in share price. On July 24, **Sartorius** reported adjusted EPS of €0.62 ($0.74) per share for the second quarter, up 19%, as half-year sales and net profit each rose double digits. The firm raised its 2017 revenue forecast due to an upward revision of sales in the Bioprocess Solutions Division.

Biotage slid 3.7% for the month even though the company announced on July 16 second quarter EPS of SEK 0.79 ($0.09) per share, up 36% from a year ago. The EPS gain was helped by favorable currency effects.

Two of the six UK stocks in the ***IBO*** Stock Table declined in July. The hardest hit was **Spectris**, falling 12.3%. Shares declined even though, on July 24, **Spectris** reported first-half results of £0.46 ($0.63) per share adjusted EPS, a 9% increase. The company also announced a 7% increase in dividend to £0.21 ($0.29) per share, payable in November.

The fastest monthly gainer was **Abcam.** On July 12, Abcam released a trading update for its fiscal year ending June 30, detailing 10.7% constant currency revenue growth. The stock ended the month up 10.8%.

On July 27, **Scientific Digital Imaging** reported adjusted EPS of £1.62 ($2.21) for the year ending April 30, a 95% increase. Revenue grew 35%.

Circular Dichroism

Polarimetry is a molecular spectroscopy technique that measures the properties of molecules using polarized light. Normally, light scatters in many directions, but polarized light is limited to a particular orientation. When polarized light is rotated by a sample, that sample is considered optically active. For example, dextrose, or D-glucose, rotates polarized light to the right (from the Latin *dexter* meaning "to the right").

The angle of rotation at a particular wavelength is proportional to the concentration of the sample. The technique has been used since the early 19th century to determine the concentrations of sugars and syrups. In a more contemporary context, the technique is still found in the food industry and is also used in life science applications to better understand the structure of biomolecules, often using circular dichroism (CD) systems.

CD is a technique that utilizes circularly polarized light to analyze the structure of optically active molecules. If one could see the electromagnetic fields associated with light, circularly polarized light would appear to be rotating clockwise or counterclockwise, whereas linearly polarized light would appear to be oriented in one direction, usually horizontally or vertically (as in polarized sunglasses). Biomolecules can absorb left circularly polarized (LCP) light and right circularly polarized (RCP) light differently, and this difference gives insight to the molecular structure.

Most modern CD instruments are the result of work done in the 1960s and remain largely similar today. Typically, a sample is exposed to alternating LCP and RCP light at a specific wavelength, and the differential absorption of the light is measured to produce a CD spectrograph. Magnetic CD works the same, but also applies a strong magnetic field parallel to the direction of light. Vibrational CD extends the range of CD into the IR and NIR ranges.

These instruments are largely used in life science applications to understand the structure of proteins, nucleic acids and other biomolecules, but these instruments can also be used to analyze semiconductor thin films. In the life sciences, the secondary structure of proteins each have characteristic spectra, which change based on the

conformation of the molecule. Due to the spectra being based on the conformation of the molecule, denaturation and structural changes from bonding can be studied using CD. This information can also be used to determine thermodynamic properties.

Other analytical techniques like NMR or MS give more specific information on the molecular structure, but CD is much quicker and less expensive than those techniques. As such, CD is often used in combination with other analytical techniques to create a more detailed picture of a molecule's structure and properties. One new innovation to better integrate techniques is a CD microplate reader introduced Hinds Instruments in July 2017.

Despite CD being related to polarimetry in general, very few polarimeter vendors make CD-specific instruments. The overall CD market is relatively small at less than $10 million. The potential for growth is strong as the pharmaceutical and biotechnology sector continues to perform well and seeks to better understand biomolecular structures. JASCO is the leading vendor in the CD market, offering the J-1000 Series spectropolarimeters and FVS-6000 VCD spectrometer. Other vendors include Applied Photophysics, Bio-Logic, BioTools, Hinds Instruments and Olis.

CD at a Glance:

Leading Vendors

- JASCO
- Applied Photophysics
- Olis

Largest Markets

- Biotech
- Pharmaceuticals
- CROs

Instrument Price

- $15,000–$80,000

Energy

Primary energy consumption around the world grew 2.2% on average in 2017, the fastest rate since 2013. China represented the largest growth market for energy for the 17th year in a row, with consumption rising 3.1% in 2017.

Natural gas consumption increased 3%, and was largely driven by China, the Middle East and Europe; in contrast, natural gas consumption in the US decreased 1.2%. The global rate of natural gas production also increased, jumping 4% to almost 2 times the 10-year average growth rate, led by Russia and Iran.

Carbon emissions from energy usage grew 1.6% in 2017, the first substantial growth in three years. In addition, annual oil prices rose for the first time since 2012, averaging $54.19 per barrel, an increase of 23.9%. Globally, oil consumption grew an average of 1.8% to approximately 1.7 million barrels per day (b/d), with China and the US contributing the most to growth at 500,000 b/d and 190,000 b/d, respectively.

In 2017, renewable power generation spiked 17%, the highest incremental increase on record, with wind power accounting for over half of all renewables growth. China largely drove this sector, with its renewable power generation rising by 25 million tons of oil equivalent (mtoe), the largest in China's history, and one of the biggest contributions to global primary energy growth.

In contrast, hydroelectric power increased just 0.9%, far below the 10-year average of 2.9%. China's growth was its slowest since 2011 and European output dropped 10.5%, or 16 mtoe. Global nuclear generation increased 1.1%, as growth in China and Japan, at 8 mtoe and 3 mtoe, respectively, was partially offset by decreases in South Korea and Taiwan, which dropped 3 mtoe and 2 mtoe, respectively.

Source: *BP Statistical Review of World Energy*

Biopharmaceuticals

Deloitte has released its latest survey and analysis of the adoption of real-world evidence (RWE) by the biopharmaceutical industry, and how it relates to real-world data (RWD). RWD is defined as "health care data gathered from a variety of sources, outside of randomized controlled clinical trials [including] electronic medical records, health insurance claims, genomic data, and data from health apps, wearables and other biometric devices."

RWD is closely connected to RWE, which *Deloitte* describes as "the insights that are generated from [RWD]." While RWD has been used in many sectors, health care organizations are now able to use RWD to address complicated issues in health care, such as examining what products work, for whom they work, in what context they work and cost. The survey features responses from 20 RWE, IT, scientific, medical and business executives in life science companies around the world.

Survey results found that RWE is a major factor when it comes to business strategy, with 13 respondents indicating that their companies are investing in obtaining health care data through vendors and external collaborations with technology companies, payers, advocacy groups and health systems. According to the respondents, these companies, more so than others, are using RWE to implement value-based contracting and are using AI machine learning for RWE analytics. According to a survey analysis, 90% of respondents either already have RWE capabilities or are undergoing efforts to establish RWE capabilities.

Respondents stated that the most significant areas of impact of current and future RWE applications include a better understanding of subpopulations as well as the heterogeneity of treatment effects; understanding the complexity of diseases; and pharmacovigilance, or the monitoring of patient safety.

Source: *Deloitte*

Clinical

While technologies such as CRISPR that can change a patient's DNA to thwart diseases are on the rise, researchers have been looking for alternate ways to insert healthy DNA into the cells of patients. Usually, doctors depend on viruses that are developed in specialty labs, known as viral vectors, that are disabled and used to alter genetic code. However, due to spiked demand, the supply of viral vectors is oftentimes backlogged. But finding alternative methods to viral vectors would likely have a significant impact on drug manufacturing and development costs.

Earlier this month, *Nature* magazine published an alternative method for T cells that could help make medications quicker and cheaper to manufacture, and more effective. The method involves placing T cells alongside the desired DNA and CRISPR/Cas9 in a small well, and using an electric charge to break down the cell membrane so that CRISPR can target the T cell genome and insert the new genetic code. The method shows promise for CAR-T therapies, which have thus far had mixed results in patients and can be costly.

Source: *Bloomberg*

India

The leading 100 pharmaceutical companies in India reported slow growing financial results for the year ending in March, with sales increasing 3.3% to INR 2,07,447 crore ($301.7 billion; 1 crore = INR 10 million), the lowest growth in the past five years. This is largely due to US FDA rulings related to product quality and a difficult time

finding footing in the US generic drug pricing environment. Other factors such as price cuts, competition, implementation of GST taxes and exchange rates also contributed to the disappointing performance.

Of the top 100 companies, 35 reported pharmaceutical sales over INR 1,000 crore ($145.5 million). Seven of these companies reported sales over INR 10,000 crore ($1.5 billion), such as Aurobindo Pharma, Cipla, Dr. Reddy's Laboratories and Sun Pharmaceuticals. Merck and Dr. Lal PathLabs joined the list of the top 35 companies for the first time, each with net sales of more than INR 1,000 crore ($145.5 million).

While 13 companies' net sales increased more than 20%, 31 companies achieved only single-digit growth in sales during the year, and 36 companies' net sales decreased. After adjustments, net profits of the companies on the list fell 11.8% to INR 22,516 crore ($3.28 billion).

Source: *PharmaBiz*

East Asia

Investment in R&D in East Asian countries is rising rapidly. Although China and Japan have the largest economies in the region and therefore receive the most attention, Hong Kong, Malaysia, Singapore, South Korea and Taiwan have established themselves as strong proponents of science R&D. Malaysia's R&D investments have grown rapidly since 2011 to total almost 2% of the country's GDP in 2015.

The business sector is the largest investor in R&D in South Korea and Taiwan, while contributing approximately 50% of R&D investments in Hong Kong, Malaysia and Singapore, similar to the UK and US. Apart from China and Japan, South Korea has the greatest number of researchers in the region, followed by Singapore and Taiwan.

Last year, South Korea's scientific article output was significant, with 65,000 research articles published in the Scopus database and contributing almost 3.5% of global article output. Malaysia's output volume jumped in 2009 and has maintained a steady rise, representing over 1% of global scientific articles published in 2016. Taiwan is the only East Asian country whose output is decreasing as a share of world research.

Source: *Nature*

Turkey

According to the latest figures on Turkish central government budget appropriations and outlays for R&D in 2018, federal investments in R&D increased 17.5% in 2018 to total TRY 10.7 billion ($2.2 billion). For 2017, this represented 0.34% of the country's GDP and 1.4% of total central government budget expenditure. The figures include federally backed R&D that is performed in government institutions, as well as federally backed R&D in the business enterprise, nonprofit, higher education and international sectors.

In 2017, indirect R&D support, which is calculated using data from the Ministry of Finance and includes tax incentives and exemptions, equaled TRY 2.88 billion ($605.2 million), an increase of 35.0%. The majority of federal budget appropriations, or 41%, went towards general advancement of knowledge, which includes R&D financed from general university funds. Defense received 29% of government R&D expenditures, while 8% and 5% went towards industrial production and technology, and education, respectively. Transport, telecommunication and other infrastructures accounted for 4% of federal R&D appropriations, and all other R&D objectives made up the remaining 14%.

Source: *Turkish Statistical Institute*

Broad-Based Companies

Company Introductions

In June, the Gillingham & Shaftesbury News reported that **Merck Life Science** is investing €9 million ($10 million) to add 56,511ft^2 (5,250 m^2) to its 102,257 ft^2 (9,500 m^2) distribution facility in Gillingham, UK. The facility is scheduled to open in early 2019.

In July, **Shimadzu** acquired **infraserv Vakuumservice** (IVG), which services turbomolecular pumps in Europe. IVG will now work with European customers previously served by Shimadzu's North American subsidiary. Shimadzu's turbomolecular pump sales rose 34% last year. Shimadzu aims to increase IVG sales to €21 million ($24 million) by 2022. In 2017, IVG generated revenues of €4.9 million ($5.5 million).

Agilent Technologies announced in July a collaboration with Singapore's **Nanyang Technological University** to develop new approaches to testing and monitoring Southeast Asia's water supply for emerging contaminants.

In July, **Agilent Technologies** named Robert W. McMahon, CFO of **Hologic**, to replace senior vice president and current CFO Didier Hirsch, effective September 1.

Working with **Health Innovation Manchester**, **QIAGEN** announced in July a partnership with multiple organizations to support the creation of the Genomic Health Innovation Campus in Manchester, UK. QIAGEN currently employs 270 at its operations in Manchester, the location of the company's European Center of Excellence for Precision Medicine.

In July, **GE Healthcare** reported second quarter sales for its Life Sciences business increased 5%. Segment orders rose 12%, 9% on an organic basis, as Bioprocess orders grew 14% organically.

Oxford Instruments announced in July the death of Chairman Alan Thomson. Stephen Blair, senior independent director, has taken over as interim chairman.

Mettler-Toledo's second quarter revenue for its Laboratory segment grew 14% in US dollars and 10% in local currency to $361.7 million, or 51% of total company sales. The acquisition of **Biotix** (see ***IBO*** 11/15/17) added 3% to segment growth. Lab sales in China rose more than 20%. The company also disclosed that the Process Analytics business makes up 10% of segment sales.

In July, **Spectris** named Andrew Heath as chief executive designate, effective September 3. He will become chief executive no later than September 28. He previously served as CEO of **Imagination Technologies**.

Sequencing

Company Announcements

In May, **Illumina** and **PerkinElmer** announced a joint effort to develop a standard and optimized NGS workflow protocol that enables critical metagenomics studies to be more performed more accurately. The companies have developed a scalable, high-quality automated sample-to-answer workflow solution for metagenomics profiling of human stool samples.

China-based **OrigiMed** announced in July an agreement with **Illumina** to develop and promote its advanced molecular clinical tumor applications based on Illumina's NGS technologies.

In a June **SEC** filing, **Foundation Medicine** announced the amendment and restatement of its supply, service and support agreement with **Illumina**, extending the agreement to June 2023.

In July, **BC Platform** partnered with health care IT provider **Tieto** to advance precision medicine for Nordic health care providers. The companies work will together to develop solutions and engage in joint marketing efforts.

MGI, a subsidiary of **BGI**, announced in July that its MGISEQ-2000 and MGISEQ-200 sequencers received Medical Device Registration Certificates from the **China Food and Drug Administration**. In total, the company has obtained certification for four of its sequencing systems.

In July, **Pacific Biosciences** announced that a multi-institutional consortium of maize researchers is using its Sequel System to create a 26-line pangenome reference collection as part of the **NIH**-funded $2.8 million Plant Genome Research Project. **BioNano Genomics**' optical mapping technology is also being used in the Project.

Quantapore, developer of an ultra-low-cost nanopore DNA sequencing platform, closed a Series 3 financing round in July. The round, led by **Northern Light Venture Capital**, **Tsingyuan Ventures** and **Sangel Venture Capital**, will to be used to fund the launch of a beta product.

Under an agreement announced in July with **Enzyvant**, a biopharmaceutical firm developing treatments for people with rare diseases, **PerkinElmer Genomics** will leverage its network of global labs and testing platforms to offer eligible providers and patients access to collection packs for patient sample intake in order to screen for mutations in the ASAH1 gene. Mutations in ASAH1 typically manifest as Farber disease, a rare lysosomal storage disorder that causes a wide range of symptoms throughout the body.

In July, **Lifebit** closed a $3 million seed funding round led by **Pentech** and **Connect Ventures**.

Pacific Biosciences announced in July the appointment of Christian Henry to its Board. Most recently, he served as executive vice president & chief commercial officer at **Illumina**.

In July, **10x Genomics** announced that **BioLegend** and **Immudex** will be the first 10x Compatible Partners providing products for its new single-cell Feature Barcoding Technology. The resulting product innovations, available at the end of 2018, will enable simultaneous gene and protein expression of the same cell, as well as cellular characterizations and mapping responses. The new products offered by BioLegend, TotalSeq B and TotalSeq C, will be fully compatible with 10x Genomics' Chromium Single Cell Gene Expression Solution or Single Cell Immune Profiling Solution with Feature Barcoding Technology. Using the 10x Chromium Single Cell Immune Profiling Solution with new Feature Barcoding Technology and Immudex DNA barcoded MHC-peptide multimers, researchers will be able to link full-length, paired TCR alpha and beta chain sequences and transcriptional profiles to the identity of their target antigens in the same cells with high specificity and sensitivity.

Product Introductions

In June, **BioDiscovery** released Nexus Copy Number 10.0, calling it a single solution for copy number estimation from arrays, WES, WGS, and shallow and targeted sequencing. The software is capable of both copy number calling and downstream statistical analyses. Features include the export of the distance matrix for clustering, user-specified event colors, and plotting of BAF (Ballele frequency) for the BAM ngCGH (matched) algorithm.

In July, **New England Biolabs** launched its NEBNext Direct Custom Ready Panels, which employ its NEBNext Direct target enrichment technology. The Panels utilize a library of ~850 pre-synthesized gene targets.

In July, **Lifebit** launched its first product, Deploit, calling it the world's first AI-powered genomic data analysis platform. The platform integrates with all major cloud providers and features a high level of automation.

Sales and Orders of Note

In July, **SOPHiA GENETICS** announced that 3 new healthcare institution in Brazil have adopted its SOPHiA AI Hereditary Cancer Solution for clinical NGS data analysis, bringing its total number of customers in the country to 10. The new customers are genomics lab **GeneOne**, the **Hospital de Amor** and the **2018 TechEmerge Project**.

GC & GC/MS

Company Announcements

In May, **Electronic Sensor Technology** named **US Nuclear** as a distributor.

DataApex announced in May that **Apix Analytics** is now a distributor of PixL Lab, the OEM version of its Clarity Chromatography Software.

In July, at **Coca-Cola**'s Charlotte, North Carolina facility, **Alpha MOS** completed the final phase a beverage testing project that used the Heracles QA Solution technology for detecting the presence of off-flavors.

Driven by security sales, **INFICON**'s first quarter sales for its Security & Energy business rose 56.5% to $7.2 million, or 7% of total company sales.

Product Introductions

PAC AC Analytical Controls preannounced in February the introduction of the next generation DHA (Detailed Hydrogen Analysis) software for its XLNC suite, a software suite for GC-based DHA systems.

In May, **Phenomenex**, a **Danaher** company, introduced the Zebron ZB-624*PLUS* GC columns for VOC analysis. The columns are stable up to 300/320 °C.

Atomic Spectroscopy

Company Announcements

Rigaku announced in June the 10-year anniversary of its collaboration with Poland's **AGH University of Science and Technology** for product development, including the development of integrated circuits.

In July, **Shimadzu** announced the development of a LIBS-based system for measuring trace quantities of metals in semiconductor wash solutions. The system is scheduled for release in 2020. It is anticipated that the technology can be used in other fields as well.

Product Introductions

In May, **Bruker** released the new TRACER 5g handheld XRF elemental analyzer. It features improved light-element sensitivity, enabling new applications for handheld XRF in the fields of geology, agriculture and materials science.

In June, **Bruker** debuted the S6 JAGUAR benchtop WD-XRF spectrometer, featuring a compact WDXRF goniometer, closely coupled X-ray optics and 400 W excitation power for higher performance in a more compact footprint.

In June, **PerkinElmer** launched Syngistix for AA Express software, the latest addition to the Syngistix Atomic Spectroscopy Software platform and the newest instrument control software option for the PinAAcle 900 H flame/furnace AA spectrometer. Syngistix for AA Express features a streamlined, three-step workflow.

Teledyne CETAC Technologies introduced in June the Oils 7400 Homogenizing Autosampler. Built on the Teledyne CETAC ASX7000 automation platform, it is designed for sample introduction of oils, wear oils and coolants for ICP-OES. New features include a dual-rinse design and faster X-Y-Z movement.

In July, **Teledyne CETAC Technologies** introduced the HDIP Software for its laser ablation systems, designed to simplify the processing of the huge data files generated by elemental imaging applications.

Hitachi High-Tech Analytical Science released in July the ExTOPE Connect data management and storage service for its Vulcan and X-MET handheld XRF systems and LAB-X500 benchtop industrial analyzers. Users can gain real-time access to results and instrument management from any computer; results can be uploaded into the cloud.

In July, **Spectro Scientific** unveiled an updated and improved version of its SpectrOil M Elemental Analyzer, calling it the only oil elemental analyzer approved by the **US Department of Defense Joint Oil Analysis Program** (JOAP). The new system features a redesign of the Analyzer's mechanical and electrical systems, and increased ruggedness.

SPECTRO Analytical Instruments introduced in July a new version of its SPECTRO GENESIS ICP-OES. The system's new laterally diffused metal oxide semiconductor generator delivers up to 1,700 W of power.

Sales and Orders of Note

In July, distributor **AXT** announced the installation of a **Rigaku Oxford Diffraction** XtaLAB Synergy-S XRD system at the **University of Melbourne** in Australia.

Dalton Pharma Services announced in July the installation of an **Agilent Technologies** 7800 ICP-MS quadrupole analyzer in order to expand its elemental analysis capabilities and comply with the updated **ICH** Q3D elemental impurities regulatory guidelines for drug products.

Reported Financial Results

$ USD in Millions	Period	Ended	Sales	Chg.	Op. Prof.	Chg.	Net Prof.	Chg.
AMETEK	Q2	30-Jun	$1,209	13.6%	$270.1	17.7%	$194	28.8%
AMETEK (Electronic Instruments)	Q2	30-Jun	$744	13.2%	$193.8	18.4%	NA	NA
Corning (Life Sciences)	Q2	30-Jun	$245	10.9%	NA	NA	$31	40.9%
Danaher	Q2	30-Jun	$4,981.0	10.4%	$867.5	28.2%	$673.8	20.9%
Danaher (Life Sciences)	Q2	30-Jun	$1,605.2	16.0%	$291.5	31.5%	NA	NA
Danaher (Environmental & Applied Solutions)	Q2	30-Jun	$1,091.5	11.0%	$251.0	6.7%	NA	NA
Harvard Bioscience	Q2	30-Jun	$31.5	66.3%	($0.4)	-42.0%	($1.5)	-284.3%
Illumina	Q2	30-Jun	$830	25.4%	$227	58.7%	$200	66.7%
Mettler-Toledo	Q2	30-Jun	$722.0	10.5%	$169.3	14.8%	$111.5	9.7%
QIAGEN	Q2	30-Jun	$377.2	8.1%	$53.3	137.9%	$36.8	162.9%
Roper Technologies	Q2	30-Jun	$6,078.0	21.8%	$937.0	25.1%	$752.0	22.9%
Roper Technologies (Medical & Scientific Imaging)	Q2	30-Jun	$373.7	6.5%	$125.6	3.5%	NA	NA
Roper Technologies (Energy Sysems & Controls)	Q2	30-Jun	$151.0	15.7%	$41.9	27.4%	NA	NA
Thermo Fisher Scientific	Q2	30-Jun	$1,293.7	14.0%	$399.2	20.2%	$228.4	27.2%
Thermo Fisher Scientific (Life Science Solutions)	Q2	30-Jun	$1,569	11.7%	$522	16.5%	NA	NA
Thermo Fisher Scientific (Analytical Instruments)	Q2	30-Jun	$1,311	12.4%	$291	25.4%	NA	NA
Thermo Fisher Scientific (Specialty Diagnostics)	Q2	30-Jun	$932	8.1%	$253	8.1%	NA	NA
Thermo Fisher Scientific (Laboratory Products and Services)	Q2	30-Jun	$2,550	42.3%	$337	37.6%	NA	NA
Waters	Q2	30-Jun	$596.2	6.8%	$179.2	16.4%	$155.7	18.1%
Other Currencies in Millions								
Biotage	Q2	30-Jun	SEK 236.1	20.3%	SEK 50.0	34.4%	SEK 51.9	37.3%
Hitachi High-Technologies	Q1	30-Jun	€ 173,018	5.3%	€ 15,991	2.6%	€ 10,576	-9.7%
Hitachi High-Technologies (Science & Medical Systems)	Q1	30-Jun	€ 473,000	19.1%	€ 71,000	57.8%	NA	NA
Sartorius	Q2	30-Jun	€ 393.5	9.5%	€ 67.5	23.9%	€ 44.30	44.3%
Sartorius (Bioprocess Solutions)	Q2	30-Jun	€ 286.9	10.8%	€ 83.6	16.8%	NA	NA
Sartorius (Lab Products & Services)	Q2	29-Jun	€ 106.6	6.2%	€ 17.2	3.0%	NA	NA
Spectris	H1	30-Jun	£728.0	2.5%	£70.5	6.0%	£88.8	178.4%
Spectris (Materials Analysis)	H1	30-Jun	£233.9	17.2%	£19.6	62.0%	NA	NA

NA = not available, NM = not meaningful
Click to enlarge