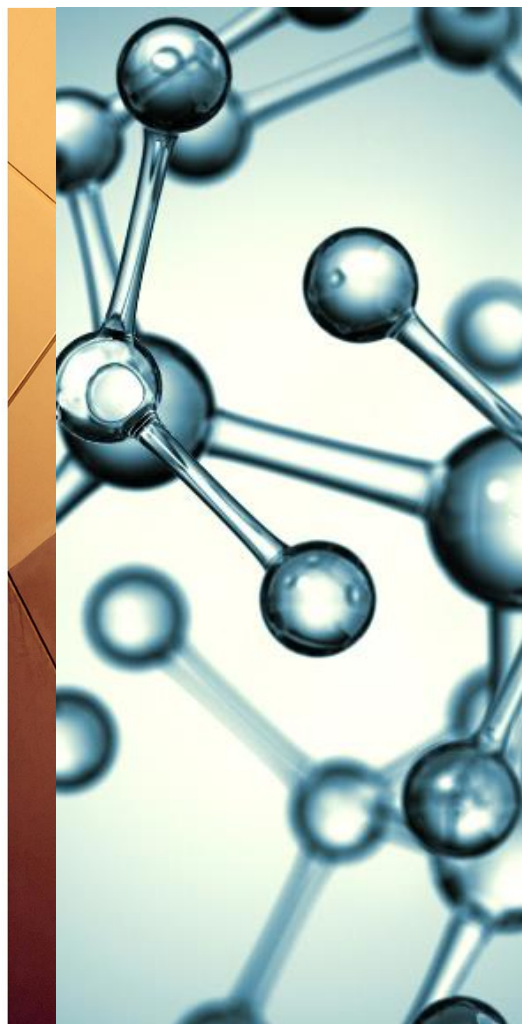


COVID-19: Opportunities in the Asian Diagnostics Sector

June 2020



Overview

While there has been broad discussion on how businesses and markets have responded to the coronavirus outbreak and how they will adapt to a post-COVID-19 world, arguably, **no industry has received as much attention as clinical diagnostics**. With the heightened focus on testing, terms such as antibody test and nasopharyngeal swap have jumped from medical journals to the front pages of newspapers the world over.

Thanks to previous experience with SARS, **Asian IVD companies in many cases have led innovation in combating SARS-CoV-2**. Regulators worldwide are closely studying the rapid response and mobilization of testing resources seen in China and Korea at the outset of the pandemic. However, even with the situation stabilizing in East Asia, companies in the region continue to innovate – developing **more rapid point-of-care tests and antibody testing platforms**, not to mention the urgent research into a **possible vaccine** being led by companies like **CanSino** and **Shenzhen Geno-immune** in China, **Bharat Biotech** in India, **SK Biopharma** in South Korea, and **Takeda** in Japan, to name only a few examples.

While the response to the pandemic has **lifted the valuations of diagnostic tools and technologies companies globally**, Asian companies have been trading, on average, at over **30x trailing EBITDA**, led primarily by premium valuations achieved by Chinese diagnostic tools companies. We expect the spike in valuations will **create opportunities in the space and accelerate consolidation efforts** in the region, especially in China where the IVD market is less concentrated and the rise of import substitution in the diagnostic products space has attracted increased investment from both healthcare companies and firms in other industries looking to capitalize on the trend.

While year-to-date M&A activity has been muted across all industries, **BDA and our partners William Blair continue to participate in deal activity in the diagnostics space**, including the recently announced sale of **FountainVest's stake in Chinese IVD business Shanghai Kehua Bio-engineering** in China and the sales of **Stratos Genomics to Roche** and of **Exalenz to Meridian Biosciences** in the US and Israel, respectively. We have also seen **significant capital markets activity** in the diagnostic tools and technology space so far this year.

In many ways, the coronavirus pandemic has **accelerated a growth trend already taking place in Asia**. Thanks to a focus on preventative care to reduce healthcare costs and the increasing prevalence of diagnostic testing, **the Asian IVD industry had been poised to achieve double-digit growth over the next five years, even before the first cases of COVID-19 were reported**.

While it could be argued that the **impact from COVID-19 on the diagnostics space will be short-term**, BDA has seen an interesting dynamic emerge where demand for more routine test kits, such as flu tests, have fallen due to COVID-19. We expect this will be temporary and not dampen mid-term demand. If anything, the **pandemic has triggered increased spending on development that will spur further innovation for years to come**.

Diagnostics valuations on the rise

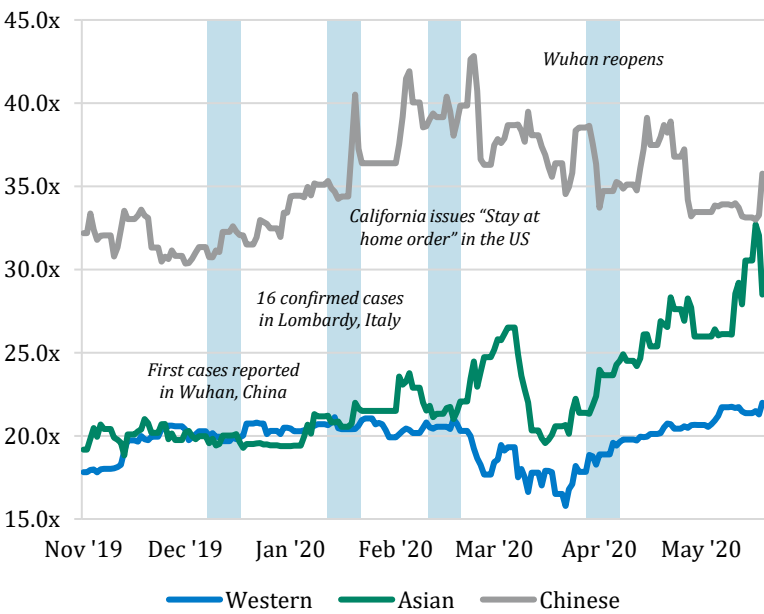
Both public companies and recent M&A are seeing an uplift in valuations

Despite seeing moderate decreases once the full extent of the pandemic became apparent, **valuations of diagnostics products businesses have expanded markedly since the start of the year.**

Asian diagnostics tools businesses saw the effects earlier as cases proliferated in East Asia, but valuations in the region have rebounded sharply by, on average, **1.0x revenue** and **10.0x EBITDA**, led in large part by strong valuations in China.

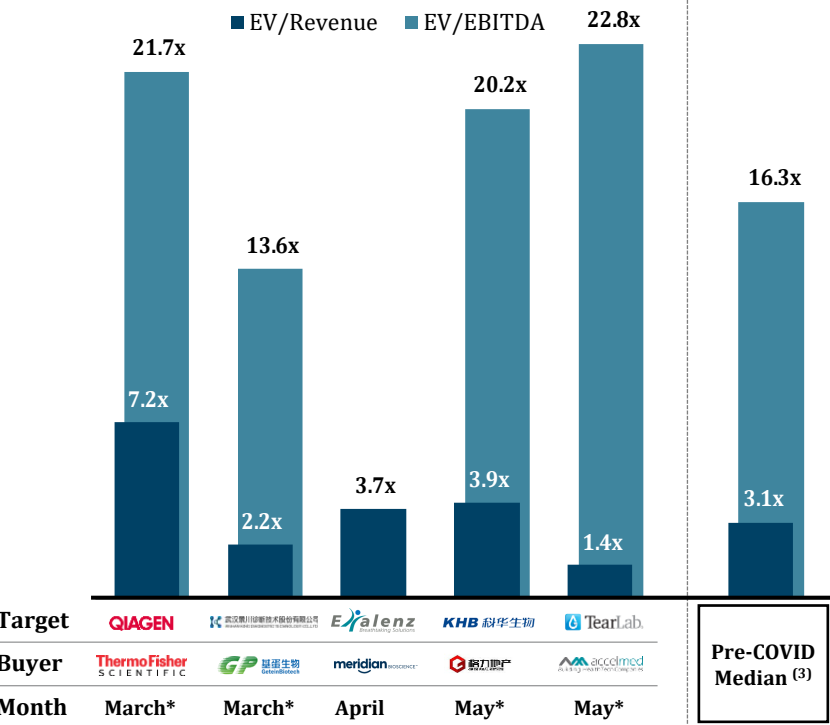
EV/EBITDA expansion since the pandemic began ⁽¹⁾

Median EV/EBITDA multiple of select companies since November 2019



Selected diagnostics M&A transactions announced in 2020 ⁽²⁾

Implied enterprise value multiple at announcement



We have started to see multiples in recent diagnostics M&A deals reach the height of the trading comparables. For example, **FountainVest's recently announced sale of their stake in KHB and Accelmed's acquisition of IVD tear testing platform TearLab** have each topped **20x EBITDA**.

We expect to see more **diagnostics M&A in Asia near-term** as smaller players look to take advantage of the valuation rise and established diagnostics businesses eye further consolidation.

(1) As of 31 May 2020, see page 6 for full comparables universe; (2) See page 7 for selected M&A transactions; (3) Median multiples for selected M&A transactions, exclusive of deals announced in 2020, see page 7 for more detail; * Denotes deal announced, not yet closed. Dates provided refer to the date of announcement.

Spotlight on recent diagnostics M&A

Selected transactions announced thus far in 2020



Sale of Stratos Genomics to Roche

Implied EV (US\$m)	Proprietary
EV / Revenue	Proprietary
EV / EBITDA	Proprietary
COVID-19 Test	None

- DNA sequencing technology firm, Stratos Genomics has agreed to sell a stake to Roche
- Roche now hold 100% equity ownership after making a venture investment in Stratos in 2015
- Part of the trend of diagnostic majors consolidating their earlier venture investments



Sale of Exalenz to Meridian Bio science

Implied EV (US\$m)	Proprietary
EV / Revenue	~3.0x
EV / EBITDA	Proprietary
COVID-19 Test	None

- Exalenz develops the BreathID® system, a breath testing platform to diagnose GI and liver conditions
- The acquisition strengthens Meridian's H. pylori testing position
- Illustrative of the industry transitioning away from stool testing and towards breath testing



Sale of FountainVest's stake in KHB to Gree RE ⁽¹⁾

Implied EV (US\$m)	1,355
EV / Revenue	3.9x
EV / EBITDA	20.2x
COVID-19 Test	KHB SARS-CoV-2 Reagent

- Shanghai Kehua Bio-Engineering ("KHB") is a developer of IVD and biochemical tests in China
- FountainVest has sold their ~20% stake in the business to China's Gree Real Estate
- An example of the trend of Chinese property players seeking new long-term growth platforms



Wuhan King raises capital from Getein Bio ⁽¹⁾

Implied EV (US\$m)	20
EV / Revenue	2.2x
EV / EBITDA	13.6x
COVID-19 Test	None

- Wuhan King Diagnostic is a manufacturer of IVD reagents serving customers in China and globally
- Getein has agreed to a capital raise to gain a majority stake in the business
- Demonstrates that the pandemic has not held back investor interest – deal closed before lockdown was lifted in Wuhan

■ Denotes BDA/William Blair transaction.

(1) Deal announced, not yet closed. Dates provided refer to the date of announcement.

Key industry trends

How COVID-19 is shaping the diagnostics sector

The race to increase diagnostic test supply

The COVID-19 pandemic has turned a global spotlight on the IVD market as the world's economies have sought to rapidly scale testing capabilities. **Understandably, the largest, and most urgent, area of focus has been on molecular assays for detection.**

As of May 2020, **more than 200 SARS-CoV-2 tests have been approved** by the US FDA and regulatory authorities in Europe, China, Korea, Singapore, India, and elsewhere. The proliferation of tests has been explosive as **governments worldwide have issued Emergency Use Authorizations (EUAs) and relaxed review processes to meet the shortfall.**

Among the first companies to develop commercial PCR tests were **BGI Group** in China, **Seegene** in Korea, and **Roche** in the US and Europe.

Given the expansion of testing worldwide and the backlogs created by supply and capacity constraints, many companies have focused their development efforts on point-of-care solutions, such as **Abbott's ID NOW** platform, which can deliver results in as little as five minutes.

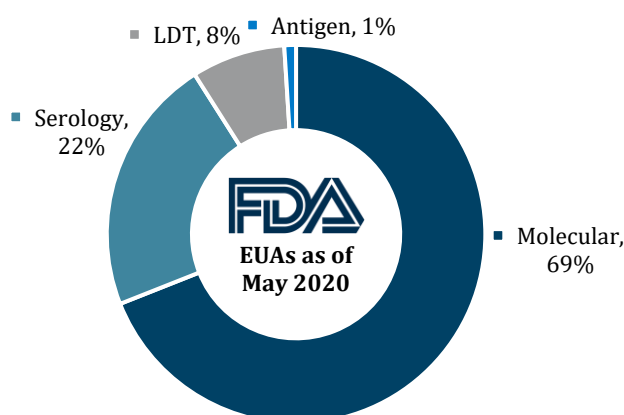
Antibody testing – the best hope for a broad reopening?

While the need for increased diagnostic testing remains acute in many regions the industry's focus has started to shift towards immunoassays and an epidemiological accounting of what percentage of the population has been infected. **Antibody testing, otherwise known as serology testing, can determine whether a person has ever been infected with COVID-19.**

Together with Antigen tests – which can detect the virus far faster than molecular tests and are better suited for point-of-care applications – these tests **allow researchers to get a better sense of the scale of the pandemic** and gives comfort to regulators and governments that a certain level of herd immunity has been achieved. The latter is especially important in determining whether areas still under restrictions can safely begin reopening before a vaccine can be developed. Here again, **companies in Asia are playing a leading role** in the development of serology and antigen tests, including **AmonMed** and **AssureTech** in China.

COVID-19 tests authorized by the US FDA, by type ⁽¹⁾

Percentage of testing platforms



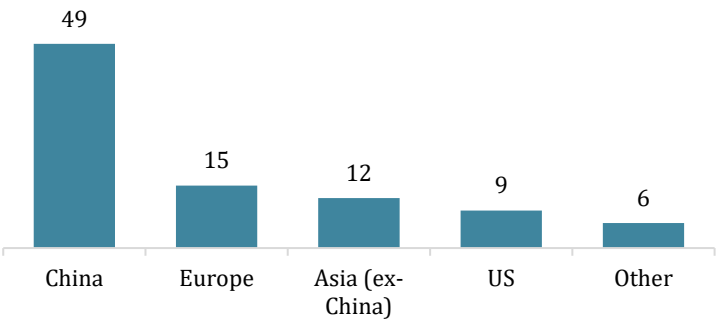
(1) Source: US FDA, Kalorama Information.

Key industry trends

How COVID-19 is shaping the diagnostics sector

Serology tests on the market by developer geography ⁽¹⁾

Nº of approved tests



In fact, **Asia, and China in particular, has been at the forefront of the push for more serology testing.** Of all the serology tests currently on the market, **over 50% have been developed by Chinese companies,** and a further 13% have been developed by firms in Korea, India, and Singapore.

Looking beyond COVID-19

Asia also leads the world in another key aspect – **loosening lockdown restrictions and reopening their economies.**

As the economies of China, Korea, Vietnam and Singapore take tentative steps towards a return to normalcy, they also **provide a window into what long-term trends will develop in the diagnostics industry.**

While the demand for SARS-CoV-2 tests have soared, **pathology labs have seen a significant drop off in demand** as patients forego routine doctor’s visits and elective procedures amid the pandemic, and the diagnostic services / pathology lab sector has not seen as pronounced a valuation uptick as diagnostic tests and tools. However, as mentioned earlier, we believe this to be temporary and expect to see non-COVID-19 testing volumes rebound in the mid-term. While COVID-19 molecular and antibody testing will continue to be focus areas in the near-term, the more long-lasting impact of the coronavirus pandemic will be the **rapid mobilization of resources in the sector and the favorable changes made to government policies to enable getting tests to market faster.**

Lessons learned during the latest pandemic will **inform new research and lead to new developments in other tests.** Even today, amidst the industry-wide focus on COVID-19, new IVD tests for the treatment of blood cancers and allergies have been announced by **Qiagen** and other firms.

We expect **M&A in the diagnostics space to pick up in the near future, especially in Asia.** Increasing valuations will precipitate more sale processes with both strategics looking to consolidate their share or expand into rapidly growing adjacencies. The pandemic also presents an opportunity for healthcare private equity looking to deploy capital in Asia, further **accelerating the consolidation of a fragmented industry.**










(1) Source: Kalorama Information.

Appendix



Public diagnostic products & tools comparables universe

US\$m, except for per share data

Company Name	Country	Share Price	Market Cap	Enterprise Value	Last Twelve Months			Enterprise Value /	
					Revenue	EBITDA	Margin	LTM Revenue	LTM EBITDA
Western Companies									
Abbott		94.92	167,899	182,712	32,095	8,026	25.0%	5.7x	22.8x
Agilent		88.14	27,147	28,311	5,236	1,294	24.7%	5.4x	21.9x
BD		246.93	73,045	92,304	17,414	5,174	29.7%	5.3x	17.8x
Biomérieux		143.52	16,979	17,388	3,002	618	20.6%	5.8x	28.1x
Bruker		43.28	6,675	6,895	2,035	349	17.1%	3.4x	19.8x
DiaSorin		209.56	11,482	11,243	780	293	37.5%	14.4x	38.4x
Hologic		53.00	13,685	16,580	3,325	1,037	31.2%	5.0x	16.0x
Invitae		16.82	2,103	2,131	241	(238)	NM	8.9x	NM
Mettler-Toledo		795.00	19,006	20,257	2,978	782	26.2%	6.8x	25.9x
PerkinElmer		100.47	11,191	13,196	2,887	611	21.2%	4.6x	21.6x
Quidel		175.00	7,350	7,352	562	177	31.5%	13.1x	41.6x
Roche		346.05	295,228	302,338	65,825	25,200	38.3%	4.6x	12.0x
ThermoFisher		349.19	137,913	154,931	25,647	6,561	25.6%	6.0x	23.6x
Waters		199.85	12,372	13,966	2,358	792	33.6%	5.9x	17.6x
Western Median							26.2%	5.7x	21.9x
Western Average							27.9%	6.8x	23.6x
Asian Companies									
Bohui Biotech		0.70	570	645	89	16	17.6%	7.2x	40.9x
DAAN Gene		3.04	2,425	2,543	203	22	10.8%	12.6x	115.9x
Easy Diagnosis Biomed		6.69	445	393	26	8	29.6%	15.3x	51.6x
Fuji Pharma		11.53	359	379	322	51	15.9%	1.2x	7.4x
Getein Bio		4.16	1,084	955	128	46	35.8%	7.4x	20.8x
Handok		19.00	262	418	393	41	10.3%	1.1x	10.3x
Horiba		52.65	2,221	1,942	1,858	275	14.8%	1.0x	7.1x
Kehua Bio-Engineering		2.15	1,108	1,158	345	67	19.5%	3.4x	17.2x
Leadman Bio		0.73	306	292	64	9	13.9%	4.5x	32.7x
Maccura Biotech		7.24	4,040	4,215	426	120	28.2%	9.9x	35.1x
Medicalsystem		2.08	719	871	407	54	13.4%	2.1x	16.0x
NanoEnTek		6.69	179	168	23	5	22.7%	7.3x	32.0x
SeeGene		94.52	2,457	2,420	145	55	38.3%	16.7x	43.6x
Sysmex		79.94	16,694	16,385	2,806	736	26.2%	5.8x	22.2x
Wondfo		12.34	4,230	4,108	307	91	29.5%	13.4x	45.3x
Asian Median							19.5%	7.2x	32.0x
Asian Average							21.8%	7.3x	33.2x
Consolidated Median							25.3%	5.8x	22.5x
Consolidated Average							24.6%	7.0x	28.8x

Recent diagnostic products and tools M&A transactions

US\$m

Date Closed	Target Name	Country	Business Description	Buyer / Investor Name	Country	Enterprise Value	LTM Revenue	Enterprise Value / LTM EBITDA
May 2020	Stratos Genomics		Genomic sequencing and targeted oncology panels	Roche		Proprietary		
May 2020*	TearLab		Develops proprietary IVD tear testing platform for dry eye disease	Accelmed		31	1.4x	22.8x
May 2020*	KHB		In-vitro diagnostic test kits and biochemical analysis systems	Gree RE		1,355	3.9x	20.2x
Apr 2020	Exalenz Bioscience		Breath-testing technology platform	Meridian Bioscience		Proprietary		
Mar 2020*	Wuhan King Diagnostics		In-vitro diagnostic reagents	Getein Bio		19	2.2x	13.6x
Mar 2020*	Qiagen		Primary sample diagnostic consumables and purification kits	Thermo Fisher Scientific		11,055	7.2x	21.7x
Nov 2019	Genomic Health		Genetic-based lab services for oncology	Exact Sciences		2,259	5.1x	29.9x
Sep 2019	RAL Diagnostics		Reagents in hematology, pathology, cytology and microbiology	CellaVision		28	3.1x	20.6x
Aug 2019	BioTek Instruments		Microplate instrumentation and software	Agilent		1,170	7.2x	NA
Aug 2019	SuperSonic Imagine		Oncology and renal ultrasonic diagnostics platform	Hologic		67	2.4x	NM
Jun 2019	Suzhou Hybiome		Immunological analysis and blood testing instruments and reagents	bioMérieux		174	NA	NA
May 2019	DIESSE Diagnostica		In-vitro diagnostics for hematology, sero-immunology and bacteriology	ArchiMED		52	2.2x	8.0x
Apr 2019	Cisbio Bioassays		Life sciences and diagnostics kits and reagents	PerkinElmer		215	4.2x	16.1x
Feb 2019	Invisible Sentinel		Microbacterial detection and diagnostic platform	bioMérieux		75	8.3x	NA
Dec 2018	Beijing Leadman Bio		In-vitro diagnostic and biochemical products	Guangzhou Kaide		479	4.6x	18.8x
Dec 2018	Genoptix		Hematology oncology detection platform	NeoGenomics		139	1.4x	16.5x
Apr 2018	Orion Diagnostica		POC diagnostic equipment and tests	Axcel Management		274	4.1x	NA
Dec 2017	C. R. Bard		Diagnostic and surgical devices	BD		24,894	6.6x	21.4x
Dec 2017	EUROIMMUN		Test systems and automation solutions for diagnostics	PerkinElmer		1,344	2.8x	12.7x
Oct 2017	Alere (Select Assets)		Cardiovascular and toxicology POC and BNP assays	Quidel		680	2.8x	11.0x
Oct 2017	Alere		Leader in POC diagnostics	Abbott		7,634	3.2x	20.7x
Jul 2017	ELITech Group		In-vitro diagnostic equipment and reagents	PAI Partners		421	2.8x	12.7x
Median							3.4x	18.8x
Average							4.0x	17.8x

As of 31 May 2020

Sources: S&P Capital IQ, MergerMarket, Company Reports

* Denotes deal announced, not yet closed. Dates provided refer to the date of announcement.

Diagnostic services sector















Public comparables universe

US\$m, except for per share data

Company Name	Country	Share Price	Market Cap	Enterprise Value	Last Twelve Months			Enterprise Value /	
					Revenue	EBITDA	Margin	LTM Revenue	LTM EBITDA
BML		28.18	1,145	741	1,122	138	12.3%	0.7x	5.4x
Dian Diagnostics Group		3.50	2,174	2,656	1,151	160	13.9%	2.3x	16.6x
Dr. Lal PathLabs		20.25	1,668	1,569	177	46	25.8%	8.9x	34.4x
Falco		15.46	159	124	401	16	4.1%	0.3x	7.5x
Healius		1.61	1,005	2,411	1,318	125	9.5%	1.8x	19.3x
Kingmed Diagnostics		9.83	4,499	4,488	745	97	13.0%	6.0x	46.4x
LabCorp		175.32	17,041	23,841	11,587	1,881	16.2%	2.1x	12.7x
Metropolis Healthcare		18.32	927	907	114	31	27.2%	8.0x	29.3x
Miraca		23.27	1,326	1,652	1,754	198	11.3%	0.9x	8.4x
Prodia Widyahusada		0.21	200	133	126	21	16.8%	1.1x	6.3x
Quest Diagnostics		118.28	15,818	20,188	7,657	1,478	19.3%	2.6x	13.7x
Sonic Healthcare		18.70	8,887	11,301	4,618	741	16.1%	2.4x	15.2x
Thyrocare Technologies		6.89	364	355	58	23	39.8%	6.2x	15.5x
Services Median							16.1%	2.3x	15.2x
Services Average							17.3%	3.3x	17.7x

Selected M&A transactions

US\$m











Date Closed	Target Name	Country	Business Description	Buyer / Investor Name	Country	Enterprise Value	Enterprise Value /	
							LTM Revenue	LTM EBITDA
Apr 2020	Metropolis Healthcare		Provides pathology and lab services in India	Multiple Parties		747	6.8x	25.5x
Jan 2020*	Shraddha Diagnostic Centre		Pathology laboratory in Ahmedabad, India	Metropolis Healthcare		3	7.5x	NA
Jan 2017	Staber Laboratory Group		Operates a number of clinical laboratories in Germany	Sonic Healthcare		133	1.5x	NA
Sep 2016	Sequenom		Develops highly-sensitive laboratory genetic tests	LabCorp		365	3.2x	NM
Oct 2015	Fleury		Laboratory and diagnostic medicine group in Latin America	Advent International		922	2.0x	10.2x
Jul 2015	Medisupport		Provides medical laboratory services in Switzerland	Sonic Healthcare		351	2.1x	NA
Sep 2019	Covance		Drug and product development services to the pharma industry	LabCorp		28	3.1x	20.6x
Median							3.1x	20.6x
Average							3.7x	18.8x

As of 31 May 2020

Sources: S&P Capital IQ, MergerMarket, Company Reports

* Denotes deal announced, not yet closed. Dates provided refer to the date of announcement.

BDA diagnostics and life science tools transactions

 <p>has been acquired by</p> <p>Roche</p> <p>DNA sequencing and targeted oncology panels</p>	 <p>has been acquired by</p> <p>Meridian Bioscience</p> <p>Non-invasive diagnostic tools for GI and liver conditions</p>	 <p>has agreed to divest its stake in</p> <p>KHB 科华生物</p> <p>to</p> <p>Gree Real Estate</p> <p>Developer of in-vitro diagnostic products</p>	 <p>follow-on offering</p> <p>Multiplex molecular diagnostic solutions</p>
 <p>has been acquired by</p> <p>H.I.G. Capital</p> <p>Mission critical drug discovery reagents</p>	 <p>has been acquired by</p> <p>NeoGenomics</p> <p>Hematology oncology detection platform</p>	<p>CDx[®] Diagnostics</p> <p>majority recapitalization by</p> <p>Galen Partners</p> <p>Esophageal and oral cancer detection and prevention</p>	 <p>has been acquired by</p> <p>Parcom Capital BV</p> <p>Diagnostic services for drug discovery</p>
 <p>diagnostic media company, sold to</p> <p>Japanese chemical company</p> <p>Diagnostic chromogenic culture media solutions</p>	 <p>has been acquired by</p> <p>GHO Capital</p> <p>Mass spectrometry solutions for drug discovery</p>	<p>intellicyt</p> <p>has been acquired by</p> <p>Sartorius</p> <p>High throughput flow cytometry</p>	 <p>has acquired</p> <p>LabIndia distribution business</p> <p>Diagnostic instruments and reagents distribution</p>

Note: Includes transactions by BDA’s strategic partner William Blair

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BDA's global coverage

