

VALUE FOCUS

Medical Device Industry



First Quarter 2018

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Executive Summary

This edition of the medical device quarterly update includes **a broad outlook** that enumerates long and short-term industry trends. In particular, we are interested observers of how technological changes could spur innovation within the industry along three dimensions: i) traditional products (hardware), ii) data and communications (software), and iii) business model changes. As in other years, the combination of structural trends and shorter-term developments could potentially result in a very active 2018 for mergers, acquisitions, and divestitures.

The **transactions section** reviews a few notable deals from 2017. Observed themes undergirding these transactions will also be useful in framing and thinking about likely activity in 2018 and beyond. Also included in the section is a summary of purchase price allocations for a selection of transactions as reported by acquirers.

As usual, this update also includes a review of public company returns by subsector, trends in implied valuation multiples, venture capital activity, and select operating metrics.

Mercer Capital has broad experience in providing valuation services to medical device start-ups, larger public and private companies, and private equity and venture capital funds involved in the sector. Please contact us to discuss how we can be of help.

Stock Market Performance

The medical device sector outpaced broader markets over the twelve months ended 4Q17. In aggregate, total shareholder returns (price appreciation and dividends) for medical device companies were 29.1% compared to 21.3% for the S&P 500 during the period.

The cardiovascular subsector gained the most over the year ended 4Q17, with total returns north of 40%. IVD and large diversified companies (included in Mercer Capital groups) gained 28.0% and 26.5%, respectively, over the same period. Orthopedic-focused medical device companies returned 16.2% over the twelve months, the only subsector that trailed the S&P 500 index in 2017.

IVD companies returned nearly 10% in 4Q17 alone. Orasure Technologies realized the largest gains among group constituents over 2017 (113.3%) despite falling nearly 20% in 4Q17. Bruker (61.7%), Haemonetics (45.3%), and Bio Rad Labs (30.3%) each also realized large gains. GenMark Diagnostics fell nearly 70% over the year, with the biggest decline occurring after a **sizable revenue miss in 3Q17**. Select subsector notes include:

- » **Bruker acquired MERLIN Diagnostika GmbH** in 3Q17, expanding Bruker's microbiology business. The company also introduced **two new CE Mark** registered diagnostic products in 4Q17.
- » Hologic received **510(k) clearance in 4Q17 from the FDA for its Quantra 2.2 Breast Density Assessment Software**, which enables clinicians to provide women with breast density assessments during breast cancer screenings. **The FDA also granted 510(k) clearance for the company's Panther Fusion AdV/hMPV/RV assay**, a multiplex test that detects adenovirus, human metapneumovirus, and rhinovirus.

Cardiovascular companies returned a collective 42.1% from 4Q16 to 4Q17, the largest among the analyzed sub-sectors. Abiomed (65.0%), Integer (51.0%), Teleflex (55.0%), and ICU Medical (48.9%) all had large returns in 2017. Select subsector notes include:

- » **Becton Dickinson completed the acquisition of C.R. Bard** in late 4Q17. (This deal is discussed in more detail **in a subsequent section**.)

Stock Market Performance

- » Cryolife returned a negative 1.0% over 2017 following a near 16% decline in 4Q17. The stock fell over 14% **after the company's 3Q17 performance announcement**, which coincided with the **company's announced takeover of JOTEC GmbH**, a developer of surgical devices and endovascular implants.
- » **Abiomed announced in 3Q17 that it had received FDA premarket approval (PMA) for the Impella RP heart pump** that provides temporary right ventricular support, the only FDA-approved device of its kind on the market according to the company.

The orthopedics segment lagged the broader markets on a total return basis over 2017. Exactech (81.5%) realized the largest total returns, driven by an impressive 4Q17 (50.1%) gain following news the **company would be taken private** by TPG Capital. (This deal is discussed in more detail **in a subsequent section**.) Globus Medical (65.5%) and Orthofix (52.6%) also realized large 2017 returns. Other sub-sectors notes include:

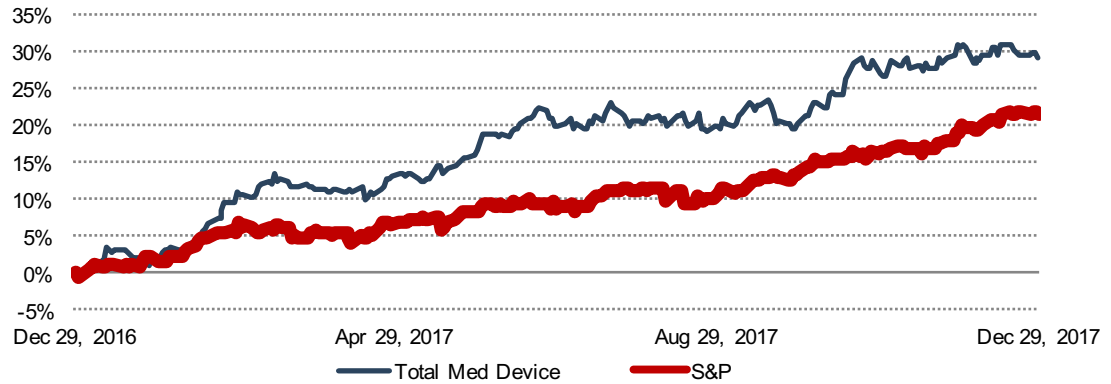
- » Zimmer Biomet Holdings appointed **Bryan Hanson** as CEO in 4Q17. Zimmer's stock rose 6% on the announcement. The company returned 17.5% over the year despite a tumultuous 2Q/3Q17.
- » According to a **Globus Medical press release**, results from a 380-subject IDE study demonstrated the superiority of the company's SECURE-C Cervical Artificial Disk over the current standard of care for the treatment of cervical disc disease, anterior cervical discectomy, and fusion (ACDF).
- » **Wright Medical acquired Imascap** in 4Q17, which develops software solutions used for preoperative planning of shoulder replacement surgery. Imascap's Glenosys technology is the preoperative software behind Wright's current preoperative planning offering.
- » **Smith & Nephew acquired privately held Rotation Medical** in 4Q17, which specializes in rotator cuff disease treatment. Smith & Nephew also **launched MolecuLight i:X** during 4Q17, a handheld imaging device that instantly measures wound surface area and visualizes the presence and distribution of harmful bacteria in wounds.

Stock Market Performance

The group of large, diversified companies returned 26.5% over 2017 and 7.6% in 4Q17, outpacing broader markets on both an annual and quarterly basis. Total returns for group constituents ranged from 14.2% to 52.4%. Subsector notes include:

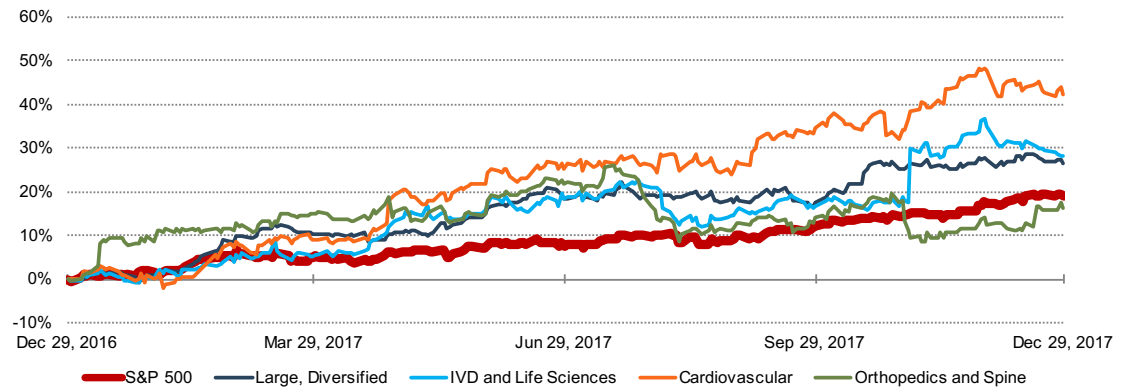
- » Stock prices of heart stents sellers – Abbott, Boston Scientific, and Medtronic – ticked slightly lower upon the publication of findings from **a study that questioned whether the devices alleviate chest pain.**
- » **Stryker agreed to acquire Entellus Medical**, which developed products for ear, nose, and throat (ENT) procedures. (This deal is discussed in more detail **in a subsequent section.**)

Industry Stock Prices



Represents market capitalization weighted index of all Med Device companies followed by Mercer Capital.
Source: Bloomberg, Mercer Capital analysis

Sector Stock Prices



Individual sub-sectors performance represented by market capitalization weighted indexes for each group. IVD group presented exclusive of ILMN
Source: Bloomberg, Mercer Capital analysis

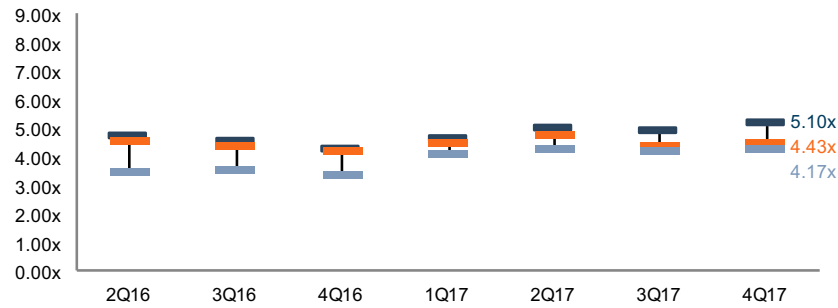
Revenue Multiples

■ 75% Quartile ■ Median ■ 25% Quartile

Median Revenue multiples from each MCM group. Data source: Bloomberg

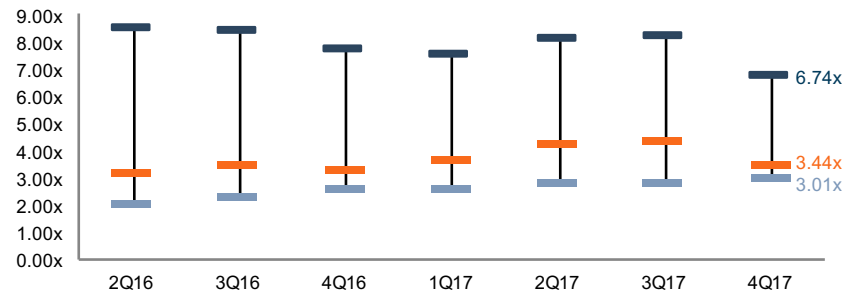
Large Diversified

EV / Trailing LTM Revenue



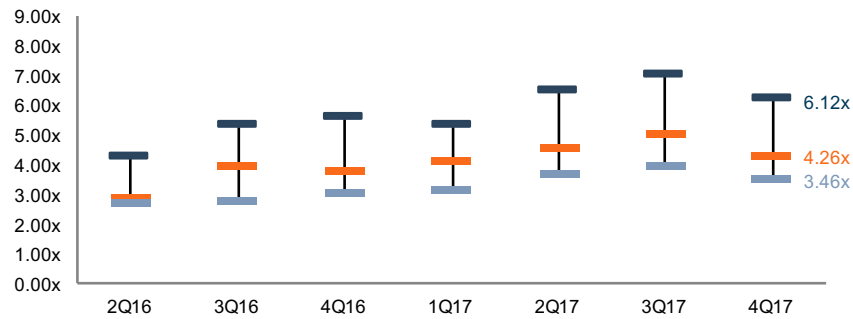
IVD and Life Sciences

EV / Trailing LTM Revenue



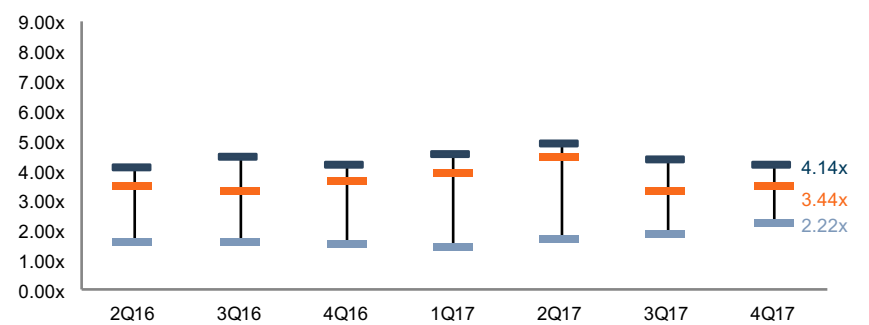
Cardiovascular

EV / Trailing LTM Revenue



Orthopedics

EV / Trailing LTM Revenue



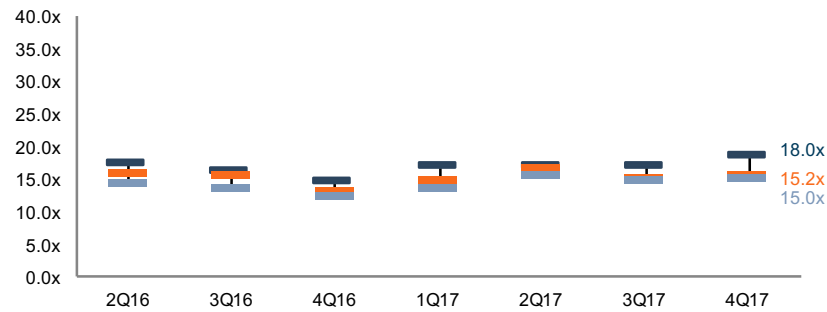
EBITDA Multiples

■ 75% Quartile ■ Median ■ 25% Quartile

Median EBITDA multiples from each MCM group. Data source: Bloomberg

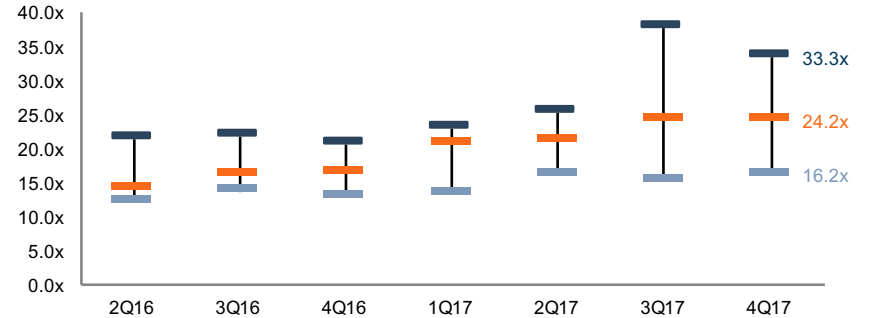
Large Diversified

EV / Trailing LTM EBITDA



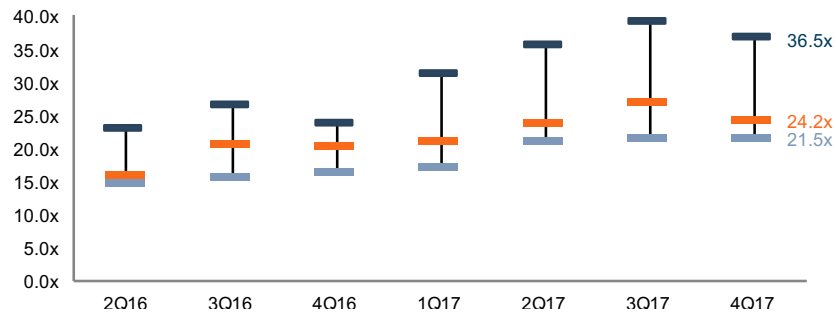
IVD and Life Sciences

EV / Trailing LTM EBITDA



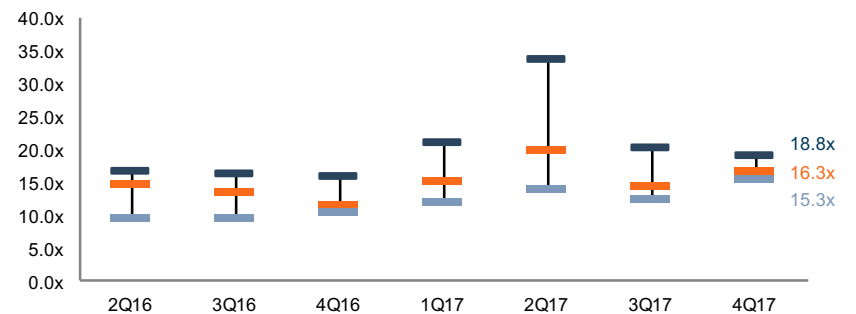
Cardiovascular

EV / Trailing LTM EBITDA



Orthopedics

EV / Trailing LTM EBITDA

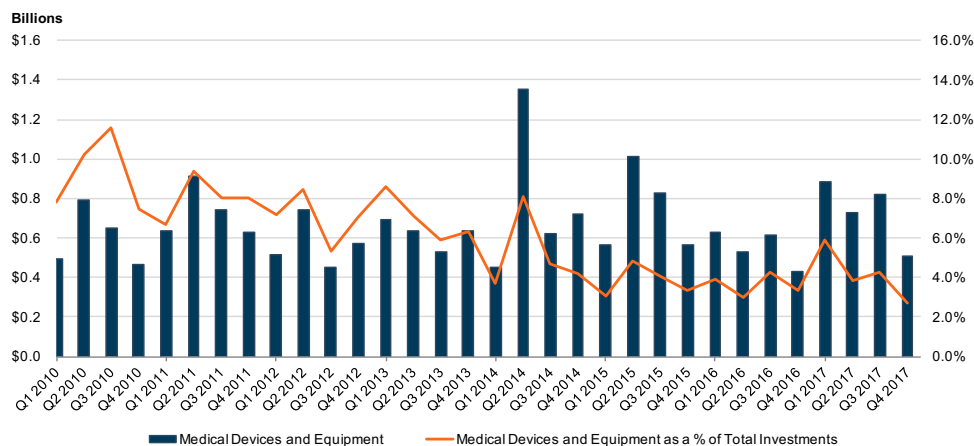


Venture Capital Funding & Exit Activity

While venture capital funding for healthcare rose over 20% from 3Q17 to 4Q17, funding for medical devices fell to their lowest level in 2017. VC funding for medical device and equipment companies fell nearly 40% to \$505 million in 4Q17. Device deal volume was relatively constant at 56 in 4Q17 (compared to 55 in 3Q17), but the average deal value fell to \$9.0 million (the lowest level observed since 1Q14). Medical device companies' share of VC funding accounted for 2.7% of all VC investments during 4Q17, the **lowest level observed since 2002**.

A total of \$1.3 billion was invested into Biotechnology related industries in 4Q17, an increase of 11.7% from the prior quarter, and total healthcare VC funding rose to nearly \$4.0 billion. Overall, 2017 represented a record high level of funding directed towards healthcare at \$14.4 billion, a 25.2% increase over 2016. Average deal value increased to \$21.8 million, also a record high, in 4Q17. The seven largest healthcare deals in the quarter were in biotechnology, drug development, or disease diagnosis, with Ginkgo Bioworks, Precision Medicine, and GRAIL all raising **more than \$200 million each**.

Venture Capital Investments in Medical Devices

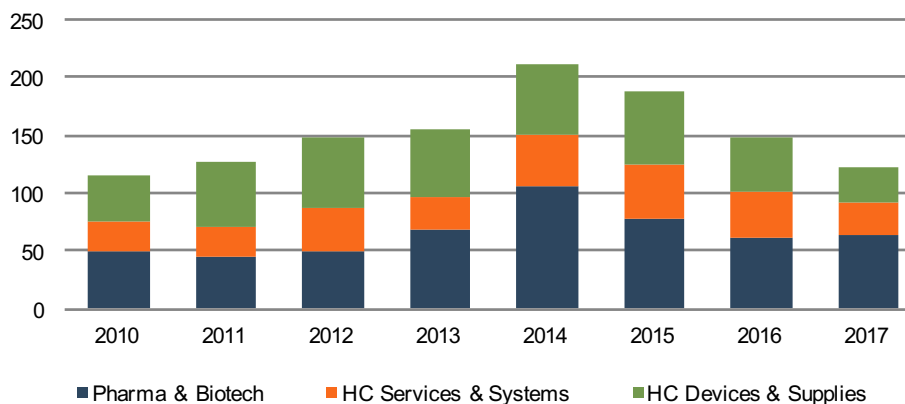


Data Source: MoneyTree Report; PwC/NVCA, Thomson Reuters, Mercer Capital analysis

Venture Capital Funding & Exit Activity

VC exit activity, which includes acquisitions, secondary buyouts, and IPOs continues to gradually decline from heightened levels seen over the last few years. Total VC exit value was \$51.0 billion across 769 exits over 2017. Average exit values have increased, resulting in only marginally lower total exit value compared to 2016 (\$52.9 billion) despite a 10% drop in exit volume. Total exits of 769 were the lowest annual level since 2011. Healthcare, including medical devices, has not been immune to these trends, seeing exit volume decline over the last several periods. 2017 represented the **lowest exit volume for healthcare since 2010**.

U.S. Venture-Backed Exits (#) by Sector

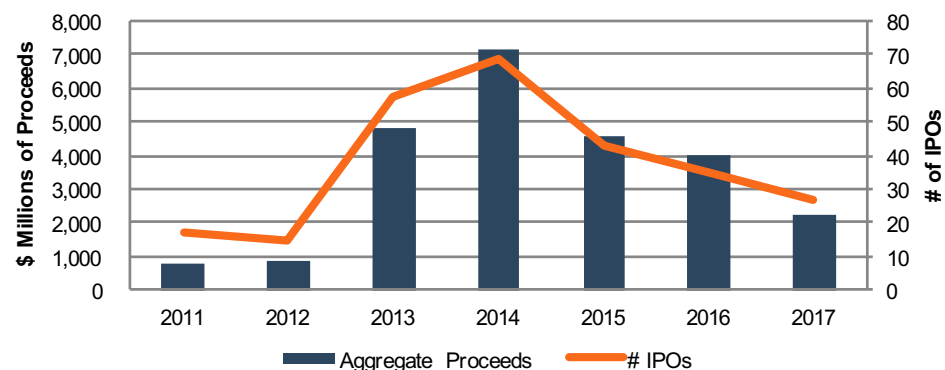


Source: NVCA Venture Monitor: 4Q 2017, Mercer Capital Analysis

Medical Device IPOs

Medical device IPOs slowed since their recent peak in 2014, with 27 recorded medical device companies filing IPOs over 2017. Estimated aggregate IPO proceeds of \$2.2 billion in 2017 were well below figures observed over the last several years.

Medical Device IPOs



Source: Capital IQ, Mercer Capital Analysis

2017 IPO Summary Statistics

Metrics	Observations
Return Since IPO (through Feb. 1, 2018)	Median returns for companies going public in 4Q17 = 22.3% Median returns for companies that IPOed in 2017 = 32.7% Range = -55% to 188%
LTM Performance	16 of 27 companies in sample had no trailing 12-month revenue 1 company had positive EBITDA
Projected Revenue Growth	Median projected revenue growth from 2017 to 2018 = 58% Median projected revenue growth from 2018 to 2019 = 45% 12 companies project no revenue in 2018, 7 project no revenue in 2019 Forward-looking information not available for 5 companies

Summary revenue growth statistics based only on companies for which forward-looking estimates were available.
Returns represent changes in price between IPO date and February 1, 2018 (i.e., are not annualized).
Source: Capital IQ, Mercer Capital Analysis

Medical Devices IPOs

2017

Issuer	Offer Date	Offer Price	2/1/18 Stock Price	% Return Since IPO	LTM Revenue	LTM EBITDA	Implied 17-18 Revenue Growth %	Implied 18-19 Revenue Growth %
Cue Biopharma, Inc.	12/27/17	7.50	14.95	99.3%	\$0.0	(\$15.3)	nm	nm
Denali Therapeutics Inc.	12/7/17	18.00	21.18	17.7%	\$0.0	(\$83.4)	nm	-13%
Quanterix Corporation	12/6/17	15.00	19.90	32.7%	\$23.0	(\$25.3)	50%	51%
Arsanis, Inc.	11/15/17	10.00	12.70	27.0%	\$0.0	(\$30.0)	nm	nm
Apellis Pharmaceuticals, Inc.	11/8/17	14.00	16.42	17.3%	\$0.0	\$0.0	nm	nm
TissueGene, Inc.	11/5/17	24.19	51.07	111.1%	\$0.0	\$0.0	nm	nm
Spero Therapeutics, Inc.	11/1/17	14.00	12.55	-10.4%	\$1.3	(\$36.2)	235%	30%
Allena Pharmaceuticals, Inc.	11/1/17	14.00	8.23	-41.2%	\$0.0	(\$20.3)	nm	nm
Restoration Robotics, Inc.	10/11/17	7.00	5.07	-27.6%	\$20.6	(\$16.3)	33%	45%
Rhythm Pharmaceuticals, Inc.	10/4/17	17.00	31.05	82.6%	\$0.0	(\$29.6)	nm	nm
Deciphera Pharmaceuticals, Inc.	9/27/17	17.00	26.83	57.8%	\$0.0	(\$39.0)	nm	nm
Celcuity Inc.	9/20/17	9.50	16.58	74.5%	\$0.0	(\$4.9)	nm	nm
Krystal Biotech, Inc.	9/19/17	10.00	9.69	-3.1%	\$0.0	(\$3.9)	nm	nm

Source: Capital IQ, Mercer Capital Analysis

Medical Devices IPOs

2017

Issuer	Offer Date	Offer Price	2/1/18 Stock Price	% Return Since IPO	LTM Revenue	LTM EBITDA	Implied 17-18 Revenue Growth %	Implied 18-19 Revenue Growth %
Calyxt, Inc.	7/19/17	8.00	23.01	187.6%	\$0.4	(\$22.9)	1585%	946%
Co-Diagnostics, Inc.	7/12/17	6.00	2.71	-54.8%	\$0.0	(\$3.5)	nm	nm
Aileron Therapeutics, Inc.	6/28/17	15.00	9.25	-38.3%	\$0.0	(\$20.3)	nm	nm
Mersana Therapeutics, Inc.	6/27/17	15.00	14.37	-4.2%	\$26.3	(\$23.2)	26%	28%
Imagion Biosystems, Inc.	6/21/17	0.15	0.07	-52.2%	\$0.0	(\$3.7)	nm	nm
Athenex, Inc.	6/14/17	11.00	14.68	33.5%	\$28.3	(\$115.8)	58%	19%
G1 Therapeutics, Inc.	5/16/17	15.00	23.31	55.4%	\$0	(\$60.9)	nm	nm
ENDRA Life Sciences Inc.	5/8/17	5.00	3.48	-30.4%	\$0.9	(\$2.6)	nm	nm
Ovid Therapeutics Inc.	5/4/17	15.00	8.83	-41.1%	\$0	(\$61.5)	nm	nm
Biohaven Pharmaceutical Holding Company Ltd.	5/3/17	17.00	32.70	92.4%	\$0	(\$102.1)	nm	2411%
Tocagen Inc.	4/12/17	10.00	13.39	33.9%	\$0	(\$34.7)	5%	122227%
Visioneering Technologies, Inc.	3/27/17	0.32	0.44	37.7%	\$0	(\$8.9)	670%	253%
BeyondSpring Inc.	3/8/17	20.00	26.64	33.2%	\$0.0	(\$84.9)	nm	nm
Jounce Therapeutics, Inc.	1/26/17	16.00	23.98	49.9%	\$78.9	\$1.4	60%	-38%

Source: Capital IQ, Mercer Capital Analysis

Select Operating Metrics

Segment	Gross Margin		EBITDA Margin		Operating Margin		R&D / Revenue	
	Q4 2017	Q3 2017	Q4 2017	Q3 2017	Q4 2017	Q3 2017	Q4 2017	Q3 2017
Large, Diversified	65.7%	66.1%	27.3%	27.4%	14.2%	12.5%	7.4%	7.3%
IVD & Life Sciences	52.7%	53.0%	18.5%	17.3%	7.0%	7.6%	9.2%	9.4%
Cardiovascular	69.0%	69.0%	19.2%	19.7%	8.4%	9.6%	8.3%	8.1%
Ortho, Implants & Prosthetics	72.7%	72.2%	17.1%	17.4%	7.1%	7.3%	5.8%	5.8%
Other	52.1%	52.0%	5.3%	6.7%	-0.7%	-0.9%	8.2%	8.2%
All Companies	55.3%	55.0%	18.8%	17.6%	7.1%	7.8%	7.5%	7.6%

Segment	Historical Rev Growth		LT Fwd Op Earn Grwth		Debt / EV		Debt / EBITDA	
	Quarterly	Annual	Q4 2017	Q3 2017	Q4 2017	Q3 2017	Q4 2017	Q3 2017
Large, Diversified	2.5%	1.4%	9.5%	10.2%	14.2%	12.8%	2.5	2.5
IVD & Life Sciences	1.9%	1.9%	13.2%	14.2%	7.2%	7.1%	1.5	1.6
Cardiovascular	2.5%	2.5%	15.0%	15.0%	7.0%	3.3%	1.6	0.8
Ortho, Implants & Prosthetics	0.8%	1.3%	12.9%	10.9%	17.5%	19.4%	2.8	3.2
Other	2.3%	1.6%	12.5%	11.3%	4.5%	3.6%	0.4	0.0
All Companies	1.9%	1.5%	13.0%	12.1%	8.8%	7.9%	1.6	1.5

Median measures for each group. | Data Source: Bloomberg, Mercer Capital Analysis

Medical Devices Select Transactions Summary

(\$Millions)

Acquirer	Target	Announce Date	Closed Date	Implied EV	Implied Enterprise Value			Sector
					EBIT	EBITDA	Revenue	
Roche Holdings, Inc.	Ignyta, Inc.	12/21/17	2/7/18	1,823.8	NM	NM	NA	Biotechnology
TPG Capital, L.P.	Exactech, Inc.	10/22/17	2/14/18	709.6	31.0x	16.5x	2.68x	Healthcare Equipment
Stryker Corporation	Entellus Medical, Inc.	12/7/17	NA	663.9	NM	NM	7.70x	Healthcare Equipment
JSR Corporation	Crown Bioscience International	12/11/17	NA	345.5	61.7x	34.9x	4.79x	Life Sciences Tools and Services
Boston Scientific Corporation	Apama Medical, Inc.	10/2/17	10/10/17	300.0	NA	NA	NA	Healthcare Equipment
Ambu A/S	invendo medical GmbH	10/25/17	10/25/17	265.7	NA	NA	NA	Healthcare Equipment
CryoLife, Inc.	JOTEC GmbH	10/10/17	12/1/17	253.6	NA	NA	4.97x	Healthcare Supplies
Edwards Lifesciences Corporation	Harpoon Medical, Inc.	12/1/17	12/1/17	250.0	NA	NA	NA	Healthcare Equipment
Guangzhou Kunlun Investment Co., Ltd.	Guangzhou Xiehe Precision Medical Co., Ltd.	12/8/17	1/3/18	244.7	NA	NA	NA	Biotechnology
Smith & Nephew plc	Rotation Medical Inc.	10/23/17	12/6/17	210.0	NA	NA	NA	Healthcare Equipment
Zhongyuan Union Cell & Gene Engineering Corp., Ltd	Shanghai Aoyuan Medical Supplies Co., Ltd.	11/8/17	NA	180.8	109.8x	NA	2.62x	Biotechnology
Shanghai Runda Medical Technology Co., Ltd.; et al	ReLIA Biotechnologies (Shenzhen), Inc.	10/13/17	NA	179.2	NA	NA	9.46x	Healthcare Equipment
Lupin Inc.	Sybiomix Therapeutics, LLC	10/11/17	10/11/17	150.0	NA	NA	NA	Biotechnology
Mitsubishi Tanabe Pharma Corporation	Stelic Institute & Co., Inc.	11/1/17	NA	104.4	NA	NA	NA	Biotechnology

Over \$10mm Transaction | Data Source: Bloomberg and Capital IQ

Medical Devices Select Transactions Summary

(\$Millions)

Acquirer	Target	Announce Date	Closed Date	Implied EV	Implied Enterprise Value			Sector
					EBIT	EBITDA	Revenue	
Livzon Biotechnology (Hong Kong) Co., Ltd.	Livzon Mabpharm, Inc.	12/21/17	NA	91.1	NA	NA	NA	Biotechnology
BTG plc	Roxwood Medical, Inc.	10/5/17	10/5/17	80.0	NA	NA	NA	Healthcare Equipment
CooperVision, Inc.	Paragon Vision Sciences, Inc.	12/1/17	12/1/17	80.0	NA	NA	5.33x	Healthcare Supplies
Wuhu Jiujiu Equity Investment Partnership Enterprise (LP)	Bioland Technology (Shenzhen) Ltd.	12/11/17	NA	45.3	NA	NA	2.44x	Healthcare Equipment
Altus Capital Partners; Altus Capital Partners II, L.P.	MGC Diagnostics Corporation	11/25/17	12/27/17	43.8	39.2x	24.4x	1.08x	Healthcare Equipment
Ligand Pharmaceuticals Incorporated	Crystal Bioscience Inc.	10/4/17	10/6/17	35.5	NA	NA	NA	Biotechnology
OneLife Technologies Corp.	Yinuo Technologies LTD	12/22/17	NA	35.0	NA	NA	NA	Healthcare Equipment
Neovia S.A.S.	Epicore BioNetworks Inc.	10/13/17	12/18/17	24.2	8.9x	8.3x	2.04x	Biotechnology
Summit Therapeutics plc	Discuva Limited	12/23/17	12/23/17	13.2	NA	NA	NA	Life Sciences Tools and Services
ImmunoPrecise Antibodies Ltd.	Crossbeta Biosciences B.V.	12/22/17	NA	10.1	NA	NA	NA	Biotechnology

Over \$10mm Transaction | Data Source: Bloomberg and Capital IQ

Transactions Summary

A number of large transactions involving medical device companies in 2017 were generally motivated by the desire to pursue higher growth, either through product portfolio acquisitions or divestments. For more mature operations, post-acquisition cash flow growth may be predicated primarily on expected revenue trajectory. However, incremental opportunities for margin expansion may also be available from transactions of size. Select examples of acquisitions expected to fill out or expand product portfolios and/or global footprint:

- » Abbott acquired St. Jude Medical (announced **April 2016**, closed **January 2017**) in a cash and stock deal for a total consideration of approximately \$23.6 billion, and assumption of \$5.9 in debt. The transaction is expected to make Abbott a leader in high-growth cardiovascular, including atrial fibrillation, structural heart and heart failure, and neuromodulation markets. Following the transaction, combined annual revenue for the cardiovascular business is expected to be approximately \$8.7 billion (with an aggregate market opportunity of \$30 billion). As part of the transaction, the combined company announced sale of a part of their vascular business to Terumo for \$1.1 billion in October 2016.
- » Hologic **acquired Cynosure** in March 2017 for a total consideration of approximately \$1.7 billion. The transaction is expected to facilitate the acquirer's **expansion into the medical aesthetics market** with non-invasive and minimally invasive treatment systems that could be marketed to plastic surgeons, dermatologists and other medical practitioners.
- » Stryker **acquired Novadaq Technologies** in September 2017 for a total consideration of approximately \$716 million. Novadaq is developing fluorescence imaging technology that provides surgeons with visualization of blood flow in vessels and related tissue perfusion in cardiac, cardiovascular, gastrointestinal, plastic, microsurgical and reconstructive procedures.
- » Abbott acquired Alere (first announced in February 2016, the deal faced **some interim difficulties** before final agreement **in April 2017**, and closed in October 2017) for a purchase price of \$4.5 billion for common shares, \$0.7 billion for preferred shares, and assumption of \$3.0 billion in debt. The acquisition is expected to enhance Abbott's market share in point of care testing and diagnostics by providing access to new products, channels and geographies.

Transactions Summary

- » Becton, Dickinson and Company **acquired C.R. Bard** in a cash and stock transaction in December 2017 for a total consideration of approximately \$25.0 billion. The transaction is expected to expand the acquirer's existing product offering and shore up the innovation **pipeline for opportunities in fast-growing clinical areas**. Revenue and cost synergies are also expected.
- » Stryker announced the **acquisition of Entellus Medical** in December 2017 for a total consideration of approximately \$662 million. Entellus is a high-growth global medical technology company with products designed for the minimally invasive treatment of various ear, nose and throat (ENT) diseases. The acquired products are **complementary to Stryker's existing** portfolio.

Companies also looked to divest certain lines of businesses with the intent to prop up faster growth rates for the retained product portfolio. Presumably, acquirers of these businesses or segments foresee benefits in the form of cost synergies or other strategic elements (diversification, geographic expansion, and others). Select examples:

- » Abbott sold its vision care business, Abbott Medical Optics (AMO), to **Johnson and Johnson** for \$4.3 billion in cash in February 2017. The acquirer expects to achieve unspecified synergies as a result of the transaction.
- » Johnson and Johnson **divested its Codman Neurosurgery business** to Integra Lifesciences Holdings Corp in October 2017 for **an aggregate purchase price of \$1.0 billion**. The acquirer expects the acquisition will **expand its portfolio of neurosurgery products** and increase international footprint.

A somewhat different type of transaction – a vertical integration – represented a strategic move to make changes in the business model. In August 2017, Fresenius Medical Care announced the acquisition of NxStage Medical for approximately \$2.0 billion. Fresenius primarily is a service provider that operates a network of 3,690 dialysis clinics. NxStage develops and markets products for the treatment of end-stage renal disease and acute kidney failure. The acquisition is expected to allow Fresenius to leverage its expertise in providing dialysis services to offer care and services in home-care settings, as well, with its own products. Cost synergies are expected to be **on the order of \$80 million to \$100 million annually**. It remains to be seen if a portion of the cost savings will be passed on to customers in order to support the company's competitive position.

Transactions Summary

Finally, a transaction that did not fit the more common acquisition/divestment theme involved the take-private of Exactech by TPG Capital. The transaction, first announced in October 2017, was completed in February 2018 for a total consideration of \$737 million. The final purchase price represented an almost 18% premium to the initial offer after an alleged **unsolicited interest from another financial buyer**. The deal is expected to afford Exactech management space to **invest in long-term growth**.

The next page presents a summary of purchase price allocations for select transactions reported by the acquirers. While a healthy allocation to goodwill for young companies is generally not surprising (in part, owing to a relative dearth of identifiable intangible assets), goodwill balances resulting from the acquisitions of some of the more mature companies or businesses is perhaps suggestive of the attractive pricing available in the industry during 2017.

	Abbott STJ	Hologic Cynosure	Stryker Novadaq	Abbott Alere	BDX C.R. Bard	JNJ AMO	Integra Codman
Purchase Price Allocations (\$millions)							
Tangible assets, net	\$15,500	\$309	\$92	\$900	\$2,614	\$300	\$145
Customer relationships	na	\$35	\$18	na	\$1,122	na	\$0
Trade name	na	74	1	na	0	na	163
Developed technology	na	736	133	na	11,738	na	380
IPR&D	na	107	0	na	0	na	0
Other	na	42		na	0	na	0
Identifiable intangible assets	3,000	994	152	3,500	12,860	2,300	543
Goodwill	13,100	684	521	4,100	15,054	1,700	346
Other	0	12	9	0	490	0	0
Assets	\$31,600	\$1,999	\$774	\$8,500	\$31,018	\$4,300	\$1,034
Net debt	(\$5,300)	\$0	\$0	(\$2,600)	(\$1,692)	na	\$0
Non-interest bearing liabilities and other	(2,700)	(341)	(58)	(700)	(4,309)	na	(20)
Preferred stock	na	na	na	(700)	na	na	0
Liabilities acquired	(\$8,000)	(\$341)	(\$58)	(\$4,000)	(\$6,001)	\$0	(\$20)
Total consideration	\$23,600	\$1,658	\$716	\$4,500	\$25,017	\$4,300	\$1,014
Relative Allocation – % of Total Intangible Assets							
Customer relationships	nm	2%	3%	nm	4%	nm	0%
Trade name	nm	4%	0%	nm	0%	nm	18%
Developed technology	nm	44%	20%	nm	42%	nm	43%
IPR&D	nm	6%	0%	nm	0%	nm	0%
Other	nm	3%	0%	nm	0%	nm	0%
Identifiable intangible assets	19%	59%	23%	46%	46%	58%	61%
Goodwill	81%	41%	77%	54%	54%	43%	39%
Total intangible assets	100%	100%	100%	100%	100%	100%	100%

Sources: 2017 10-K filed by ABT. Final allocation for St. Jude, and preliminary allocation for Alere shown. 10-Q for period ended December 2017 filed by HOLX. Preliminary allocation for Cynosure shown. 2017 10-K filed by SYK. Preliminary allocation for Novadaq shown. 10-Q for period ended December 2017 filed by BDX. Preliminary allocation for C.R. Bard shown. 2017 10-K filed by JNJ. Final allocation for AMO shown. 2017 10-K filed by IART. Preliminary allocation for Codman Neuro shown.

Five Trends to Watch in the Medical Device Industry

The medical device manufacturing industry produces equipment designed to diagnose and treat patients within global healthcare systems. Medical devices range from simple tongue depressors and bandages, to complex programmable pacemakers and sophisticated imaging systems. Major product categories include surgical implants and instruments, medical supplies, electro-medical equipment, in-vitro diagnostic equipment and reagents, irradiation apparatuses, and dental goods.

The following outlines five structural factors and trends that influence demand and supply of medical devices and related procedures.

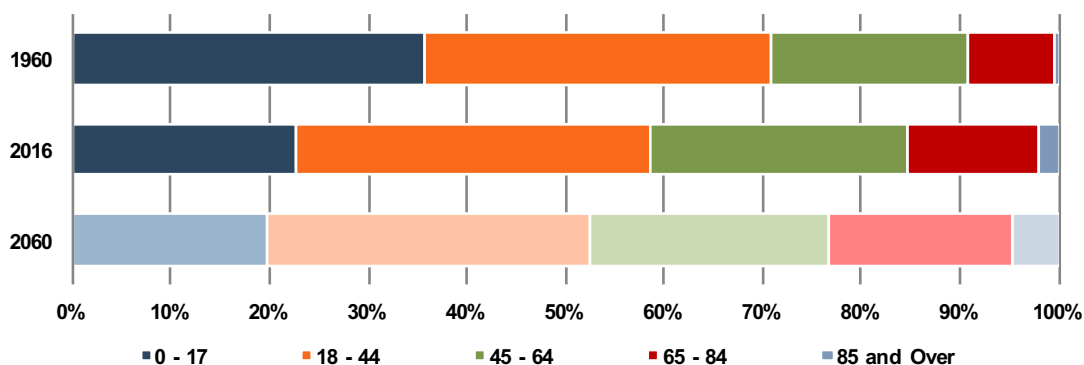
1 Demographics

The aging population, driven by declining fertility rates and increasing life expectancy, represents a major demand driver for medical devices. The U.S. elderly population (persons aged 65 and above) totaled 49 million in 2016 (15% of the population). The **U.S. Census Bureau** estimates that the elderly will roughly double by 2060 to 95 million, representing 23% of the total population.

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U.S. Population Distribution by Age Group

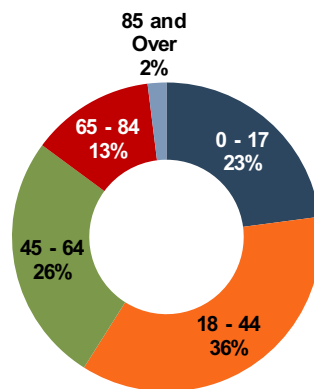


Source: U.S. Census Bureau

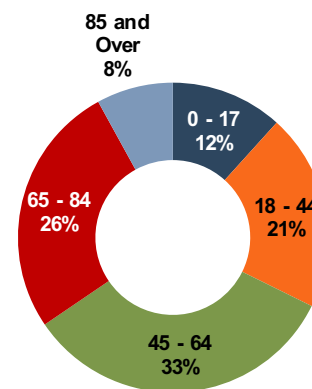
The elderly account for nearly one third of total healthcare consumption. Personal healthcare spending for the population segment was **\$19,000 per person in 2012**, five times the spending per child (\$3,600) and almost triple the spending per working-age person (\$6,600).

According to United Nations projections, the **global elderly population** will rise from approximately 610 million (8.3% of world population) in 2015 to 1.8 billion (17.8% of world population) in 2060. Europe's elderly are projected to reach nearly 29% of the population by 2060, making it the world's oldest region. While Latin America and Asia are currently relatively young, these regions are expected to undergo drastic transformations over the next several decades, with the elderly population expected to expand from approximately 8% in 2015 to more than 21% of the total population by 2060.

**U.S. Population
Distribution by Age**

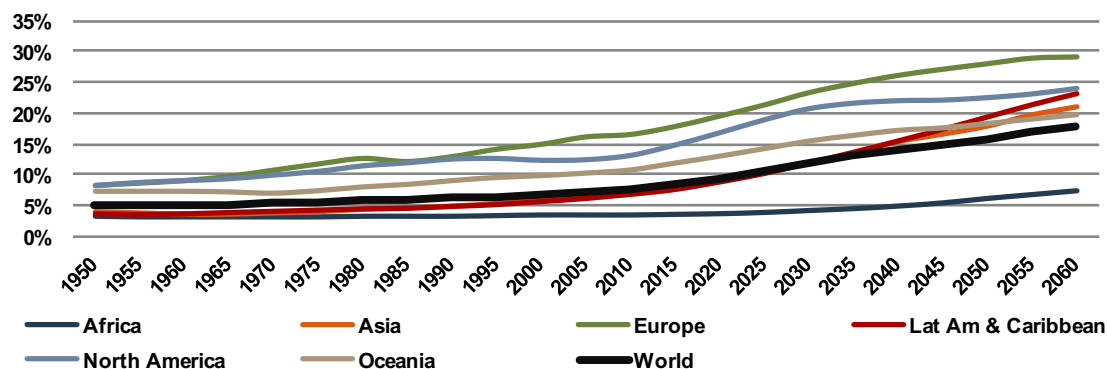


**U.S. Healthcare Cost
Distribution by Age**



Source: U.S. Census Bureau, Centers for Medicare and Medicaid Services, Office of the Actuary, National Health Statistics Group

World Population 65 and Over (% of Total)



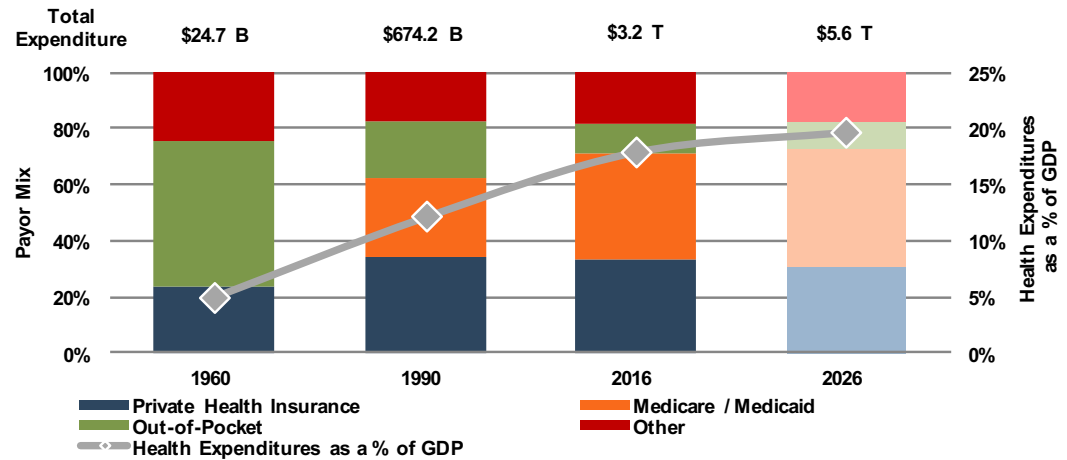
Source: United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, custom data acquired via website.

2 Healthcare Spending and the Legislative Landscape in the U.S.

Demographic shifts underlie the expected growth in total **U.S. healthcare expenditure** from \$3.3 trillion in 2016 to \$5.7 trillion in 2026, an average annual growth rate of 5.5%. This compares to the 7.3% rate observed from 1990 through 2007 and 4.2% between 2008 and 2016. **Projected growth in annual spending for Medicare (7.4%) and Medicaid (5.8%)** is expected to contribute substantially to the increase in national health expenditure over the coming decade. **Healthcare spending as a percentage of GDP** is expected to expand from 18% in 2016 to nearly 20% by 2026.

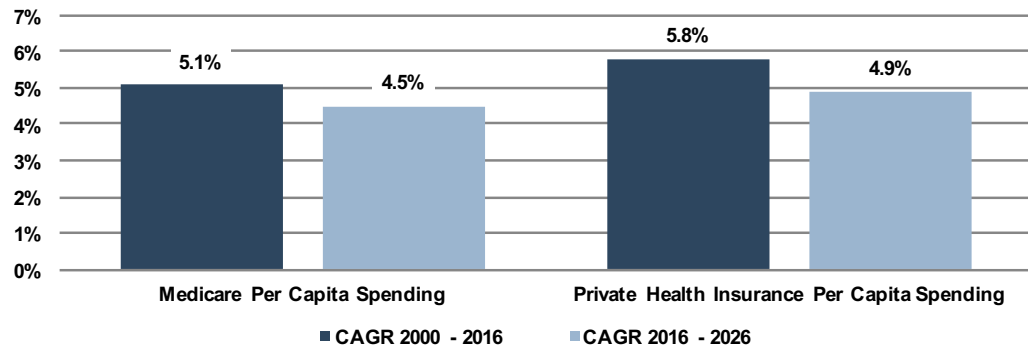
Since inception, **Medicare** has accounted for an increasing proportion of total U.S. healthcare expenditures. Medicare currently provides healthcare benefits for an estimated 57 million elderly and disabled people, constituting approximately 15% of the federal budget in 2016. Medicare represents the largest portion of total healthcare costs, constituting 20% of total health spending in 2015. Medicare also accounts for 26% of hospital spending, 29% of retail prescription drugs sales, and 23% of physician services.

U.S. Healthcare Consumption Payor Mix and as % of GDP



Source: Centers for Medicare & Medicaid Services, Office of the Actuary

Average Spending Growth Rates, Medicare and Private Health Insurance



Source: Kaiser Family Foundation

Owing to the growing influence of Medicare in aggregate healthcare consumption, legislative developments can have a potentially outsized effect on the demand and pricing for medical products and services. **Net mandatory benefit outlays** (gross outlays less offsetting receipts) to Medicare totaled \$588 billion in 2016, and are expected to reach \$1.1 trillion by 2026.

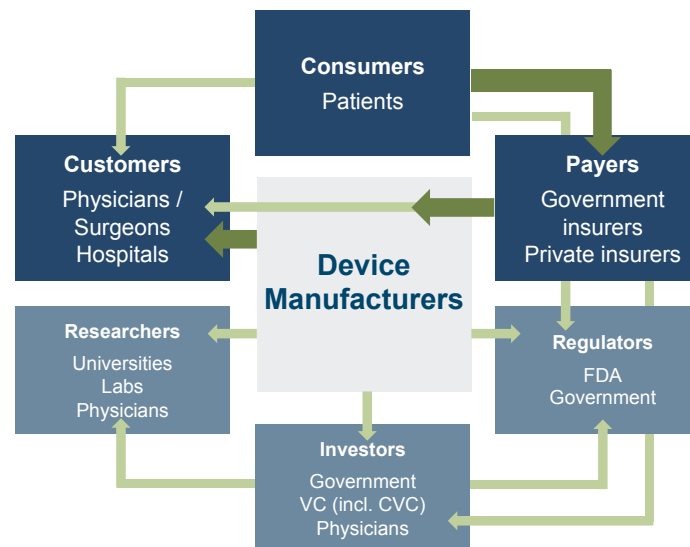
The Patient Protection and Affordable Care Act ("ACA") of 2010 incorporated changes that are expected to constrain annual growth in Medicare spending over the next several decades, including reductions in Medicare payments to plans and providers, increased revenues, and new delivery system reforms that aim to improve efficiency and quality of patient care and reduce costs. On a per person basis, **Medicare spending** is projected to grow at 4.5% annually between 2016 and 2026, compared to 5.1% average annualized growth realized between 2000 and 2016.

As part of ACA legislation, a 2.3% excise tax was imposed on certain medical devices for sales by manufacturers, producers, or importers. The tax became effective on December 31, 2012 but met resistance from industry participants and policy makers. **In late 2015**, Congress passed legislation promulgating a two-year moratorium on the tax beginning January 2016. **In January 2018**, the moratorium suspending the medical device excise tax was extended through 2019.

3 Third-Party Coverage and Reimbursement

The primary customers of medical device companies are physicians (and/or product approval committees at their hospitals), who select the appropriate equipment for consumers (patients). In most developed economies, the consumers themselves are one (or more) step removed from interactions with manufacturers, and therefore pricing of medical devices. Device manufacturers ultimately receive payments from insurers, who usually reimburse healthcare providers for routine procedures (rather than for specific components like the devices used). Accordingly, medical device purchasing decisions tend to be largely disconnected from price.

Third-party payors (both private and government programs) are keen to reevaluate their payment policies to constrain rising healthcare costs. Several elements of the ACA are expected to limit reimbursement growth for hospitals, which form the largest market for medical devices. Lower reimbursement growth will likely persuade hospitals to scrutinize medical purchases by adopting i) higher standards to evaluate the benefits of new procedures and devices, and ii) a more disciplined price bargaining stance.



The transition of the healthcare delivery paradigm from fee-for-service (FFS) to value models is expected to lead to fewer hospital admissions and procedures, given the focus on cost-cutting and efficiency. In 2015, the Department of Health and Human Services (HHS) announced goals to have 85% and 90% of all Medicare payments tied to quality or value by 2016 and 2018, respectively, and 30% and 50% of total Medicare payments tied to alternative payment models (APM) by the end of 2016 and 2018, respectively. A report issued by the Health Care Payment Learning & Action Network (LAN), a public-private partnership launched in March 2015 by HHS, found that **29% of payments were tied to APMs**, a 6% increase from 2015 to 2016.

While the shift toward value-based care is continuing, the pace could slow under the **new administration**. In November 2017, the **CMS partially canceled** bundled payment programs for certain joint replacement and cardiac rehabilitation procedures. However, indications are that the CMS supports value-based care and wants pilot programs to **accelerate**. Ultimately, lower reimbursement rates and reduced procedure volume will likely limit pricing gains for medical devices and equipment.

The medical device industry faces **similar reimbursement issues globally**, as the EU and other jurisdictions face increasing healthcare costs, as well. A number of countries have instituted price ceilings on certain medical procedures, which could deflate the reimbursement rates of third-party payors, forcing down product prices. Industry participants are required to report manufacturing costs and medical device reimbursement rates are set potentially below those figures in certain major markets like Germany, France, Japan, Taiwan, Korea, China and Brazil. Whether third-party payors consider certain devices medically reasonable or necessary for operations presents a hurdle that device makers and manufacturers must overcome in bringing their devices to market.

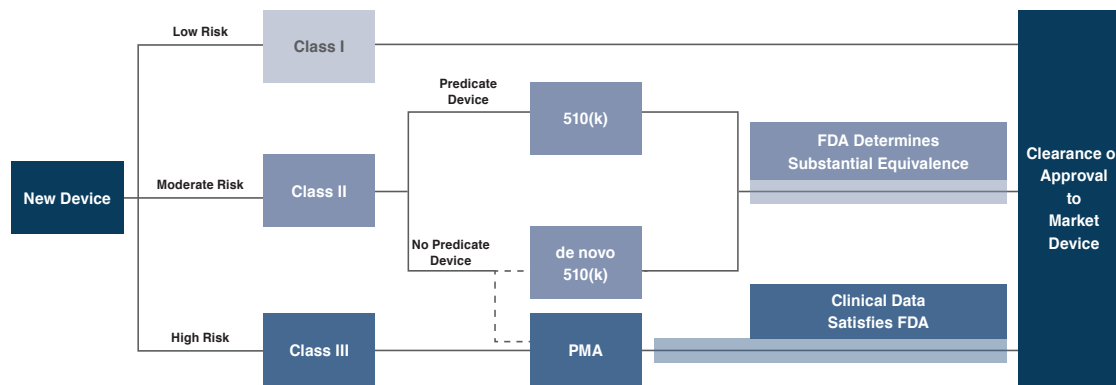
4 Competitive Factors and Regulatory Regime

Historically, much of the growth for medical technology companies has been predicated on continual product innovations that make devices easier for doctors to use and improve health outcomes for the patients. Successful product development usually requires significant R&D outlays and a measure of luck. However, viable new devices can elevate average selling prices, market penetration, and market share.

Government regulations curb competition in two ways to foster an environment where firms may realize an acceptable level of returns on their R&D investments. First, firms that are first to the market with a new product can benefit from patents and intellectual property protection giving them a competitive advantage for a finite period. Second, regulations govern medical device design and development, preclinical and clinical testing, premarket clearance or approval, registration and listing, manufacturing, labeling, storage, advertising and promotions, sales and distribution, export and import, and post market surveillance.

Regulatory Regime in the U.S.

In the U.S., the FDA generally oversees the implementation of the second set of regulations. Some relatively simple devices deemed to pose low risk are exempt from the FDA's clearance requirement and can be marketed in the U.S. without prior authorization. For the remaining devices, commercial distribution requires marketing authorization from the FDA, which comes in primarily two flavors.



- » The premarket notification (“**510(k) clearance**”) process requires the manufacturer to demonstrate that a device is “substantially equivalent” to an existing device that is legally marketed in the U.S. The 510(k) clearance process may occasionally require clinical data, and generally takes between 90 days and one year for completion.
- » The premarket approval (“**PMA**”) process is more stringent, time-consuming, and expensive. A PMA application must be supported by valid scientific evidence, which typically entails collection of extensive technical, preclinical, clinical, and manufacturing data. Once the PMA is submitted and found to be complete, the FDA begins an in-depth review, which is required by statute to take no longer than 180 days. However, the process typically takes significantly longer, and may require several years to complete.

Pursuant to the **Medical Device User Fee Modernization Act (MDUFA)**, the FDA collects user fees for the review of devices for marketing clearance or approval. The current iteration of the Medical Device User Fee Act (MDUFA IV) came into effect in October 2017. Under MDUFA IV, the FDA is authorized to collect **almost \$1 billion** in user fees, an increase of more than \$320 million over MDUFA III, between 2017 and 2022.

Regulatory Overview Outside the U.S.

The European Union (EU), along with countries such as Japan, Canada, and Australia all operate strict regulatory regimes similar to that of the FDA, and international consensus is moving towards more stringent regulations. Stricter regulations for new devices may slow release dates and may negatively affect companies within the industry.

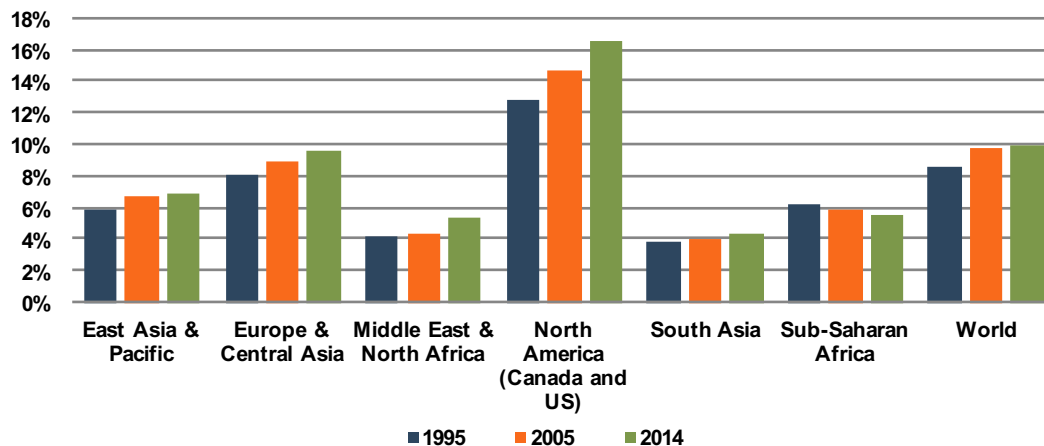
Medical device manufacturers face **a single regulatory body across the EU**. In order for a medical device to be allowed on the market, it must meet the requirements set by the EU Medical Devices Directive. Devices must receive a Conformité Européenne (CE) Mark certificate before they are allowed to be sold in that market. This CE marking verifies that a device meets all regulatory requirements, including EU safety standards. A set of different directives apply to different types of devices, potentially increasing the complexity and cost of compliance.

5 Emerging Global Markets

Emerging economies are claiming a growing share of global healthcare consumption, including medical devices and related procedures, owing to relative economic prosperity, growing medical awareness, and increasing (and increasingly aging) populations. As global health expenditure continues to increase, sales to countries outside the U.S. represent a potential avenue for growth for domestic medical device companies. According to the World Bank, all regions (except Sub-Saharan Africa) have seen an increase in healthcare spending as a percentage of total output over the last two decades.

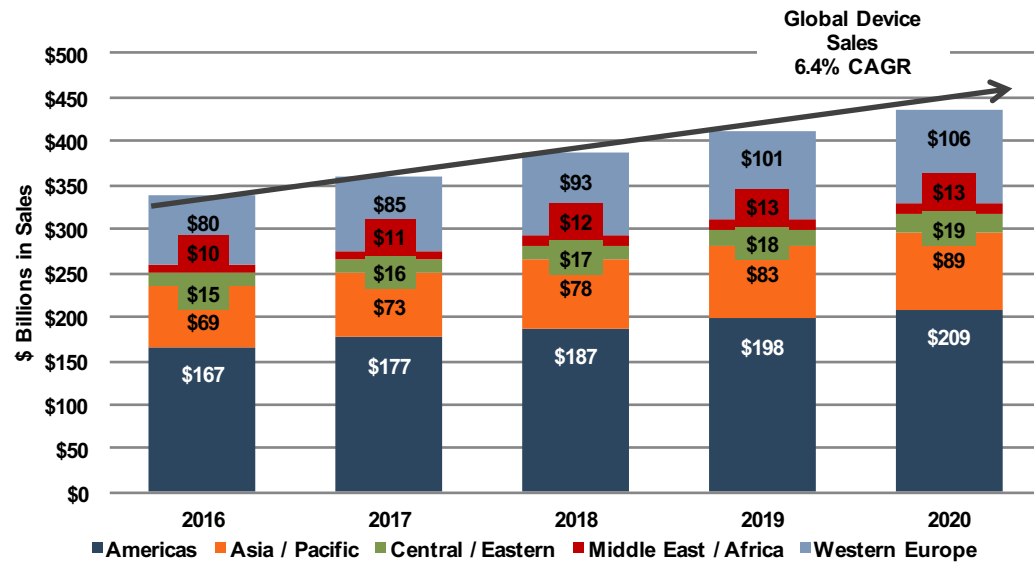
Global medical devices sales are estimated to increase 6.4% annually from 2016 to 2020, reaching nearly \$440 billion according to the International Trade Administration. While the Americas are projected to remain the world's largest medical device market, the Asia/Pacific and Western Europe markets are expected to expand at a quicker pace over the next several years.

World Health Expenditure as a % of GDP



Source: The World Bank

Global Medical Device Market



Source: Worldwide Medical Devices Forecast to 2020, 2016 ITA Medical Devices Top Markets Report

Bonus Items for 2018

The following is a (non-ordered) list of items likely relevant for the medical device and medtech industry over the shorter-term.

Tax Reform

Passage of tax reform legislation in late 2017 appears to have invigorated market participants across many sectors of the economy. While the full effect of the new legislation will likely play out over the course of the rest of the year and beyond, the implications for valuation (multiples) are generally **expected to be positive**. The effective tax rates for many multinational medical device companies were already below the new corporate rate. Accordingly, reductions in overall tax burdens for device companies are likely modest. A more immediate effect materialized in the form of a transition tax on corporate cash parked outside the U.S. (for example, Johnson and Johnson reported a **one-time \$13.6 billion charge** related to the new tax law). With a lower tax rate available on deemed repatriation, many corporations will likely have a more direct access to hitherto-unused overseas funds.

Innovation

Given the structural underpinnings (discussed in earlier sections), continued innovation is probably a low-risk bet vis-à-vis the medical device industry and is likely to materialize along three dimensions. First, the traditional product pipeline nursed by the industry over the years is likely to continue turning out iterative and transformative changes to improve or create new devices (hardware). Second, cost pressures as well as technological developments outside the industry will likely fuel new data analysis and tele-communication products and services (software) that **augment or complement the traditionally product-only offerings** of device and medtech companies. Finally, business model innovations in response to the changing pricing and competitive landscape will become increasingly relevant, especially for the more mature devices.

M&A

The level of deal activity in the industry observed in 2017 will likely continue in 2018 as consolidation within certain sub-sectors could provide (a degree of) inoculation against the ravages of competitive forces. Some potential acquirers will also be buoyed by the unlocking of the cash resources previously trapped overseas. As in 2017, transaction motivations will likely mirror the three dimensions of innovation as firms pursue i) acquisition of complementary products, ii) **access to newer higher-growth markets or segments**, and iii) ability to address changes in the modes of care delivery that increasingly favor lower acuity settings over lengthy hospital stays.

Summary

Demographic shifts underlie the long-term market opportunity for medical device manufacturers. While efforts to control costs on the part of the government insurer in the U.S. may limit future pricing growth for incumbent products, a growing global market provides domestic device manufacturers with an opportunity to broaden and diversify their geographic revenue base. Developing new products and procedures is risky and usually more resource intensive compared to some other growth sectors of the economy. However, barriers to entry in the form of existing regulations provide a measure of relief from competition, especially for newly developed products.

Public Medical Device Companies

	Price			Δ Stock Price		EV	TTM Rev	TTM EBITDA	FWD EBITDA		EV / Sales	EV / EBITDA	EV / FWD EBITDA	
	Q4 2017	Q3 2017	Q4 2016	Qtrly	Annual	Q4 2017	Q4 2017	Q4 2017	FY 2018	FY 2019	Q4 2017	Q4 2017	FY 2018	FY 2019
Large, Diversified														
Abbott Laboratories	\$56.80	\$52.85	\$37.36	7.5%	52.0%	\$113,026.9	\$27,390.0	\$7,497.0	\$7,710.5	\$8,567.4	4.13	15.1	14.7	13.2
Baxter International Inc	\$64.64	\$62.60	\$43.88	3.3%	47.3%	\$35,333.6	\$10,561.0	\$2,318.0	\$2,618.3	\$2,914.1	3.35	15.2	13.5	12.1
Becton Dickinson and Co	\$214.06	\$195.28	\$163.10	9.6%	31.2%	\$81,065.9	\$12,093.0	\$3,277.0	\$4,986.1	\$5,888.6	6.70	24.7	16.3	13.8
Boston Scientific Corp	\$24.79	\$29.17	\$21.63	-15.0%	14.6%	\$40,062.8	\$9,048.0	\$2,265.0	\$2,837.1	\$3,121.2	4.43	17.7	14.1	12.8
Medtronic PLC	\$80.75	\$77.33	\$69.67	4.4%	15.9%	\$124,950.0	\$29,710.0	\$9,155.0	\$9,386.1	\$10,098.1	4.21	13.6	13.3	12.4
Johnson & Johnson	\$139.72	\$129.22	\$112.29	8.1%	24.4%	\$396,552.3	\$76,450.0	\$26,616.0	\$28,604.4	\$30,939.0	5.19	14.9	13.9	12.8
Stryker Corp	\$154.84	\$141.59	\$118.35	9.4%	30.8%	\$62,390.0	\$12,444.0	\$3,394.3	\$3,787.5	\$4,100.6	5.01	18.4	16.5	15.2
IVD & Life Sciences														
Bio-Rad Laboratories Inc	\$238.67	\$222.22	\$182.28	7.4%	30.9%	\$6,820.1	\$2,068.2	\$264.4	\$289.7	\$368.0	3.30	25.8	23.5	18.5
Bruker Corp	\$34.32	\$29.72	\$21.06	15.5%	63.0%	\$5,315.3	\$1,765.9	\$309.4	\$354.2	\$383.6	3.01	17.2	15.0	13.9
Enzo Biochem Inc	\$8.15	\$10.47	\$6.94	-22.2%	17.4%	\$315.6	\$107.8	\$1.0	\$1.9	\$5.1	2.93	324.0	166.1	61.9
GenMark Diagnostics Inc	\$4.17	\$9.63	\$12.24	-56.7%	-65.9%	\$171.0	\$49.3	(\$52.6)	(\$52.6)	(\$42.1)	3.47	nm	nm	nm
Haemonetics Corp	\$58.08	\$44.87	\$40.20	29.4%	44.5%	\$3,086.3	\$886.1	\$194.4	\$212.0	\$234.7	3.48	15.9	14.6	13.2
Hologic Inc	\$42.75	\$36.69	\$40.12	16.5%	6.6%	\$14,474.8	\$3,058.8	\$999.6	\$1,056.5	\$1,135.6	4.73	14.5	13.7	12.7
Illumina Inc	\$218.49	\$199.20	\$128.04	9.7%	70.6%	\$31,166.5	\$2,752.0	\$358.0	\$962.4	\$1,130.6	11.33	87.1	32.4	27.6
Luminex Corp	\$19.70	\$20.27	\$19.98	-2.8%	-1.4%	\$740.8	\$306.6	\$62.3	\$59.1	\$57.8	2.42	11.9	12.5	12.8
OraSure Technologies Inc	\$18.86	\$22.50	\$8.78	-16.2%	114.8%	\$987.9	\$167.1	\$34.1	\$32.5	\$47.4	5.91	28.9	30.4	20.9
Quidel Corp	\$43.35	\$43.86	\$21.42	-1.2%	102.4%	\$1,453.2	\$191.6	\$41.8	\$64.7	\$153.4	7.58	34.7	22.5	9.5
Bio-Techne Corp	\$129.26	\$120.31	\$101.45	7.4%	27.4%	\$5,053.3	\$563.0	\$224.5	\$238.1	\$269.0	8.98	22.5	21.2	18.8
Trinity Biotech PLC	\$5.10	\$5.61	\$6.92	-9.1%	-26.3%	\$155.4	\$99.6	nm	\$12.0	\$14.0	1.56	nm	12.9	11.1
Vermillion Inc	\$1.93	\$1.80	\$0.95	7.2%	103.2%	\$109.8	\$2.6	(\$9.5)	NA	NA	41.55	nm	nm	nm

(\$Millions, except per share figures)

Data Source: Bloomberg

Public Medical Device Companies (continued)

	Price			Δ Stock Price		EV	TTM Rev	TTM EBITDA	FWD EBITDA		EV / Sales	EV / EBITDA	EV / FWD EBITDA	
	Q4 2017	Q3 2017	Q4 2016	Qtrly	Annual	Q4 2017	Q4 2017	Q4 2017	FY 2018	FY 2019	Q4 2017	Q4 2017	FY 2018	FY 2019
Cardiovascular														
ABIOMED Inc	\$187.41	\$168.60	\$112.68	11.2%	66.3%	\$7,935.8	\$445.3	\$148.4	\$169.8	\$219.8	17.82	53.5	46.7	36.1
BioTelemetry Inc	\$29.90	\$33.00	\$22.35	-9.4%	33.8%	\$1,154.8	\$208.3	\$49.2	\$64.5	\$94.1	5.54	23.5	17.9	12.3
Cardiovascular Systems Inc	\$23.69	\$28.15	\$24.21	-15.8%	-2.1%	\$700.4	\$204.9	\$3.7	\$15.0	\$21.8	3.42	191.4	46.6	32.1
CryoLife Inc	\$19.15	\$22.70	\$19.15	-15.6%	0.0%	\$705.9	\$180.4	\$28.2	\$28.1	\$39.7	3.91	25.0	25.1	17.8
Edwards Lifesciences Corp	\$112.71	\$109.31	\$93.70	3.1%	20.3%	\$23,550.6	\$3,435.3	\$1,068.6	\$1,256.0	\$1,396.9	6.86	22.0	18.8	16.9
Integer Holdings Corp	\$45.30	\$51.15	\$29.45	-11.4%	53.8%	\$3,021.0	\$1,386.8	\$276.4	\$281.0	\$306.0	2.18	10.9	10.8	9.9
LeMaitre Vascular Inc	\$31.84	\$37.36	\$25.15	-14.8%	26.6%	\$575.9	\$89.2	\$18.7	\$24.7	\$31.8	6.46	30.9	23.3	18.1
Merit Medical Systems Inc	\$43.20	\$42.35	\$26.50	2.0%	63.0%	\$2,423.2	\$603.8	\$120.8	\$124.0	\$147.8	4.01	20.1	19.5	16.4

(\$Millions, except per share figures)

Data Source: Bloomberg

Public Medical Device Companies (continued)

	Price			Δ Stock Price		EV	TTM Rev	TTM EBITDA	FWD EBITDA		EV / Sales	EV / EBITDA	EV / FWD EBITDA	
	Q4 2017	Q3 2017	Q4 2016	Qtrly	Annual				Q4 2017	Q4 2017			FY 2018	FY 2019
Ortho, Implants and Prosthetics														
Alphatec Holdings Inc	\$2.66	\$2.26	\$3.21	17.7%	-17.1%	\$92.9	\$120.2	(\$3.4)	\$3.7	\$2.7	0.77	nm	25.1	34.4
Exactech Inc	\$49.45	\$32.95	\$27.30	50.1%	81.1%	\$712.7	\$257.6	\$45.1	\$49.6	\$52.8	2.77	15.8	14.4	13.5
Globus Medical Inc	\$41.10	\$29.72	\$24.81	38.3%	65.7%	\$3,564.1	\$564.0	\$211.2	\$221.4	\$240.2	6.32	16.9	16.1	14.8
Integra LifeSciences Holdings Corp	\$47.86	\$50.48	\$42.90	-5.2%	11.6%	\$4,445.4	\$992.1	\$247.8	\$263.4	\$349.1	4.48	17.9	16.9	12.7
NuVasive Inc	\$58.49	\$55.46	\$67.36	5.5%	-13.2%	\$3,541.4	\$962.1	\$240.8	\$265.8	\$295.8	3.68	14.7	13.3	12.0
Orthofix International NV	\$54.70	\$47.25	\$36.18	15.8%	51.2%	\$943.3	\$409.8	\$61.1	\$75.0	\$84.3	2.30	15.4	12.6	11.2
RTI Surgical Inc	\$4.10	\$4.55	\$3.25	-9.9%	26.2%	\$345.0	\$272.9	\$16.1	\$37.5	\$41.5	1.26	21.4	9.2	8.3
Wright Medical Group NV	\$22.20	\$25.87	\$22.98	-14.2%	-3.4%	\$2,982.8	\$690.4	\$48.0	\$85.0	\$119.1	4.32	62.2	35.1	25.0
Zimmer Biomet Holdings Inc	\$120.67	\$116.86	\$102.38	3.3%	17.9%	\$34,050.5	\$7,824.1	\$2,822.0	\$2,847.6	\$2,990.1	4.35	12.1	12.0	11.4

(\$Millions, except per share figures)

Data Source: Bloomberg

Public Medical Device Companies (continued)

	Price			Δ Stock Price		EV	TTM Rev	TTM EBITDA	FWD EBITDA		EV / Sales	EV / EBITDA	EV / FWD EBITDA	
	Q4 2017	Q3 2017	Q4 2016	Qtrly	Annual				Q4 2017	Q4 2017			FY 2018	FY 2019
Cosmetics														
Cutera Inc	\$45.35	\$41.35	\$17.35	9.7%	161.4%	\$592.4	\$151.5	\$8.1	\$17.1	\$21.8	3.91	73.2	34.7	27.2
Dental														
Align Technology Inc	\$222.19	\$186.27	\$96.13	19.3%	131.1%	\$17,053.2	\$1,473.4	\$346.3	\$488.4	\$628.9	11.57	49.2	34.9	27.1
DENTSPLY SIRONA Inc	\$65.83	\$59.73	\$57.41	10.2%	14.7%	\$16,384.1	\$3,745.3	\$960.1	\$919.0	\$982.0	4.37	17.1	17.8	16.7
Pediatric Medical Devices														
Natus Medical Inc	\$38.20	\$37.50	\$34.80	1.9%	9.8%	\$1,255.4	\$501.0	\$68.5	\$69.8	\$77.8	2.51	18.3	18.0	16.1
Surgery and Life Support Devices														
AtriCure Inc	\$18.24	\$22.37	\$19.57	-18.5%	-6.8%	\$633.1	\$155.1	(\$19.8)	(\$5.2)	\$2.4	4.08	nm	nm	260.8
Intuitive Surgical Inc	\$364.94	\$348.63	\$211.39	4.7%	72.6%	\$38,931.7	\$3,128.9	\$1,179.0	\$1,330.7	\$1,528.2	12.44	33.0	29.3	25.5
Misonix Inc	\$9.45	\$10.15	\$10.45	-6.9%	-9.6%	\$76.4	\$27.3	(\$5.5)	NA	NA	2.80	nm	nm	nm
NxStage Medical Inc	\$24.23	\$27.60	\$26.21	-12.2%	-7.6%	\$1,561.0	\$366.4	\$19.8	\$25.7	\$32.5	4.26	78.8	60.9	48.1
Stereotaxis Inc	\$0.80	\$0.82	\$0.65	-2.4%	23.1%	\$19.7	\$32.2	(\$2.4)	NA	NA	0.61	nm	nm	nm
Surmodics Inc	\$28.00	\$31.00	\$25.40	-9.7%	10.2%	\$320.4	\$73.1	\$10.0	\$3.1	\$9.3	4.38	32.1	102.4	34.6
Teleflex Inc	\$248.82	\$241.65	\$160.10	3.0%	55.4%	\$12,441.6	\$1,868.0	\$575.1	\$616.3	\$716.5	6.66	21.6	20.2	17.4

(\$Millions, except per share figures)

Data Source: Bloomberg

Public Medical Device Companies (continued)

	Price			Δ Stock Price		EV	TTM Rev	TTM EBITDA	FWD EBITDA		EV / Sales	EV / EBITDA	EV / FWD EBITDA	
	Q4 2017	Q3 2017	Q4 2016	Qtrly	Annual				Q4 2017	Q4 2017			FY 2018	FY 2019
General Hospital Devices and Supplies														
CONMED Corp	\$50.97	\$52.26	\$43.44	-2.5%	17.3%	\$1,901.8	\$796.4	\$123.8	\$147.0	\$153.8	2.39	15.4	12.9	12.4
Digirad Corp	\$2.51	\$3.30	\$4.61	-23.7%	-45.4%	\$69.0	\$125.5	\$11.0	\$10.9	\$15.3	0.55	6.3	6.3	4.5
Dynatronix Corp	\$2.88	\$2.26	\$2.35	27.5%	22.7%	\$32.7	\$35.8	\$0.2	NA	NA	0.91	203.7	nm	nm
FONAR Corp	\$24.35	\$30.50	\$19.15	-20.2%	27.2%	\$153.3	\$78.0	\$24.9	NA	NA	1.96	6.2	nm	nm
Intuitive Surgical Inc	\$364.94	\$348.63	\$211.39	4.7%	72.6%	\$38,931.7	\$3,128.9	\$1,179.0	\$1,330.7	\$1,528.2	12.44	33.0	29.3	25.5
Masimo Corp	\$84.80	\$86.56	\$67.40	-2.0%	25.8%	\$4,091.8	\$694.6	\$197.9	\$206.0	\$227.3	5.89	20.7	19.9	18.0
OPKO Health Inc	\$4.90	\$6.86	\$9.30	-28.6%	-47.3%	\$2,788.3	\$1,221.7	(\$69.3)	(\$66.8)	\$5.2	2.28	nm	nm	536.2
STERIS PLC	\$87.47	\$88.09	\$66.40	-0.7%	31.7%	\$8,586.9	\$2,612.8	\$615.5	\$642.8	\$677.3	3.29	14.0	13.4	12.7
Varian Medical Systems Inc	\$111.15	\$100.06	\$79.50	11.1%	39.8%	\$9,686.8	\$2,668.2	\$547.1	\$582.4	\$619.3	3.63	17.7	16.6	15.6
Home Health and Consumer Devices														
Invacare Corp	\$16.84	\$15.73	\$13.00	7.1%	29.5%	\$620.2	\$966.5	(\$14.4)	\$11.0	\$44.5	0.64	nm	56.6	13.9
MSA Safety Inc	\$77.15	\$78.78	\$67.70	-2.1%	14.0%	\$3,316.5	\$1,149.5	\$216.0	\$227.5	\$269.8	2.89	15.4	14.6	12.3
ResMed Inc	\$84.38	\$76.35	\$60.68	10.5%	39.1%	\$12,178.1	\$2,066.7	\$616.9	\$683.2	\$755.5	5.89	19.7	17.8	16.1

(\$Millions, except per share figures)

Data Source: Bloomberg

Public Medical Device Companies (continued)

	Price			Δ Stock Price		EV	TTM Rev	TTM EBITDA	FWD EBITDA		EV / Sales	EV / EBITDA	EV / FWD EBITDA	
	Q4 2017	Q3 2017	Q4 2016	Qtrly	Annual				Q4 2017	Q4 2017			Q4 2017	FY 2018
Other Medical Device														
Accuray Inc	\$4.30	\$4.00	\$4.60	7.5%	-6.5%	\$426.7	\$383.4	\$15.5	\$26.9	\$34.4	1.11	27.6	15.9	12.4
Allied Healthcare Products Inc	\$2.09	\$2.11	\$2.00	-0.9%	4.4%	\$8.4	\$33.5	(\$0.9)	NA	NA	0.25	nm	nm	nm
Cesca Therapeutics Inc	\$3.00	\$3.56	\$3.45	-15.7%	-13.0%	\$34.9	\$14.5	(\$8.2)	NA	NA	2.40	nm	nm	nm
Cogentix Medical Inc	\$3.15	\$2.56	\$2.01	23.0%	56.7%	\$166.3	\$51.9	\$2.6	\$2.7	\$5.0	3.21	65.2	61.6	33.3
ReShape Lifesciences Inc	\$1.48	\$1.77	\$2.00	-16.1%	-26.0%	\$8.7	\$0.8	(\$23.4)	NA	NA	11.08	nm	nm	nm
Escalon Medical Corp	\$0.21	\$0.15	\$0.11	39.9%	99.9%	\$1.6	\$11.2	(\$0.3)	NA	NA	0.15	nm	nm	nm
IRIDEX Corp	\$7.62	\$9.37	\$14.06	-18.7%	-45.8%	\$65.5	\$46.2	(\$8.0)	NA	NA	1.42	nm	nm	nm
Micron Solutions Inc	\$3.50	\$3.80	\$3.80	-7.9%	-7.9%	\$15.5	\$19.6	\$0.6	NA	NA	0.79	27.4	nm	nm
Navidea Biopharmaceuticals Inc	\$0.36	\$0.42	\$0.64	-13.6%	-43.8%	\$54.2	\$22.0	(\$10.4)	NA	NA	2.47	nm	nm	nm
Other Diversified Cos with Med-Tech Components														
Agilent Technologies Inc	\$66.97	\$63.93	\$45.15	4.8%	48.3%	\$20,894.5	\$4,472.0	\$1,114.0	\$1,205.1	\$1,322.8	4.67	18.8	17.3	15.8
Danaher Corp	\$92.82	\$85.65	\$77.34	8.4%	20.0%	\$74,467.5	\$18,329.7	\$4,166.5	\$4,635.4	\$5,001.0	4.06	17.9	16.1	14.9
General Electric Co	\$17.45	\$24.01	\$30.57	-27.3%	-42.9%	\$231,927.9	\$120,468.0	\$16,043.0	\$16,907.3	\$19,555.7	1.93	14.5	13.7	11.9
PerkinElmer Inc	\$73.06	\$68.84	\$51.87	6.1%	40.8%	\$9,863.6	\$2,257.0	\$467.5	\$573.4	\$633.1	4.37	21.1	17.2	15.6
Thermo Fisher Scientific Inc	\$189.88	\$189.05	\$140.63	0.4%	35.0%	\$95,814.0	\$20,918.0	\$5,268.3	\$6,028.8	\$6,493.9	4.58	18.2	15.9	14.8

(\$Millions, except per share figures)

Data Source: Bloomberg

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