

# Healthcare IT Insights

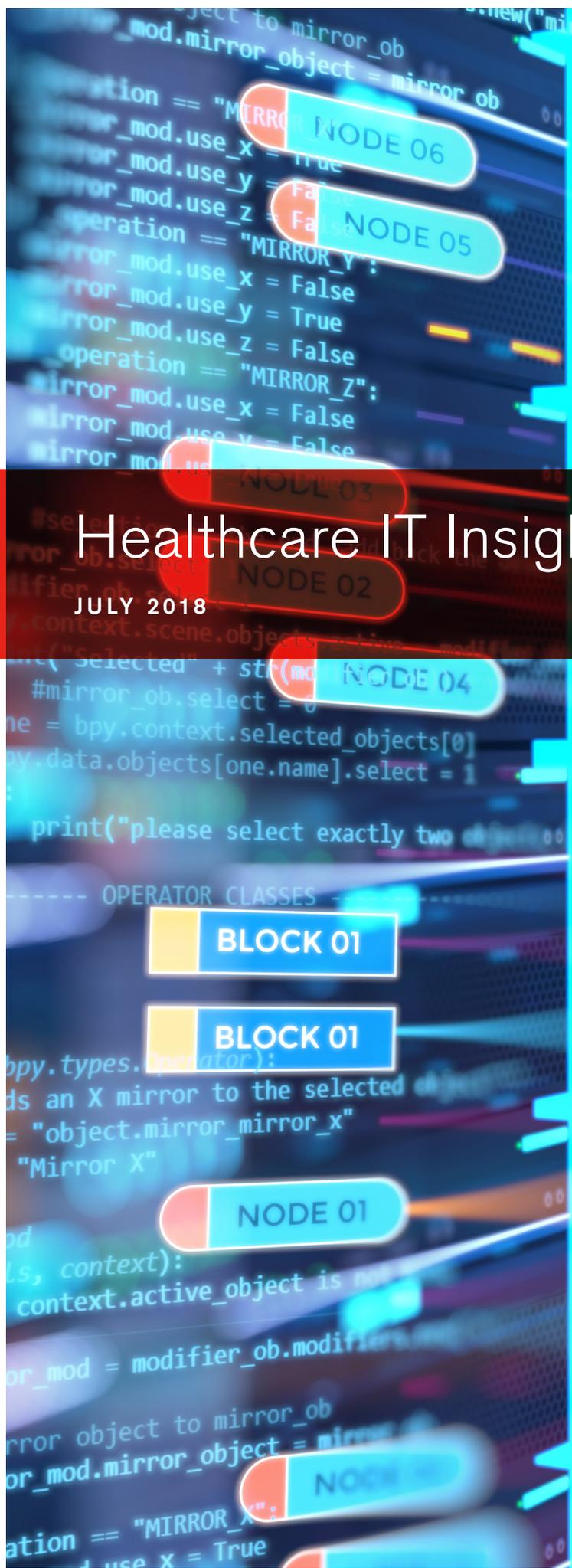
JULY 2018

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# Is Blockchain Hope or Hype for Improving Revenue Cycle Management and Healthcare?

When most think of blockchain, they think of Bitcoin, the cryptocurrency that has been in the spotlight for more than 10 years. Initially, Bitcoin was thought to be destined to augment, if not replace, “fiat” currency—a vehicle to securely and anonymously store value and effect transactions without the need for a central clearinghouse or source of truth. Then Bitcoin became a speculative asset traded by hedge funds and discussed at cocktail parties. Most recently, the bubble in Bitcoin, which peaked at \$17,555 in December 2017 and crashed to just over \$6,000 today, has garnered media attention. As all of this occurred, the focus on cryptocurrency shifted attention to blockchain, the underlying technology that enables Bitcoin and its application in healthcare.

According to a May 2018 *Wall Street Journal* article blockchain was first theorized by a Bell Labs physicist at a Friendly’s Restaurant in New Jersey in 1990.<sup>1</sup> Fast forward 27 years to the 2017 HIMSS conference in Orlando, which in many ways was the coming-out party for blockchain in healthcare. Blockchain was validated by IBM CEO Ginni Rometty, whose hour-long keynote speech and Q&A session made several references to blockchain, and who said it would have “a profound impact on healthcare.” We observed at least one panel discussion, and there may have been more, with respect to blockchain’s applications in healthcare at the 2017 conference.

In the ensuing year, more than 30 healthcare blockchain technology companies raised hundreds of millions of dollars<sup>2</sup> (yes, fiat currency) in initial coin offerings (a fundraising method very different than a traditional IPO) largely outside the purview of the SEC. As mentioned above, Bitcoin went on to become a household name in 2017. By the 2018 HIMSS conference, Bitcoin had traded down to below \$10,000, but blockchain was top of mind for many attendees. We counted at least five separate blockchain-related events at HIMSS 2018.

Wikipedia defines blockchain as “...a continuously growing list of records, called blocks, which are linked and secured using cryptography. Each block typically contains a cryptographic hash of the previous block, a timestamp and transaction data. By design, a blockchain is resistant to modification of the data.” It is “an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way.”

Because blockchain enables both data security and data transparency, it has been presented as a solution to many of healthcare’s most vexing problems - data-interoperability, medication adherence, physician satisfaction, healthcare consumerism and elimination of waste and fraud, to

1. Source: A. Whitaker, “The Eureka Moment That Made Bitcoin Possible,” *Wall Street Journal*, May 25, 2018.

2. Source: ICO Alert

name a few. It has already been adopted with some success in industries such as fintech, insurance underwriting and supply chain management. Technology companies such as Alphabet and IBM have major initiatives in the area. In April, Humana, Multiplan, Quest Diagnostics and UnitedHealthcare announced a pilot program applying blockchain technology to improve data quality and reduce administrative costs associated with changes to healthcare provider demographic data. The FDA has launched a pilot program with four major hospitals to test blockchain's ability to share data. While the sector is ever slow to adopt the latest technologies, the promise of blockchain suggests the inevitable adoption, in some form, within healthcare.

A quick survey of the current state of health records demonstrates a problem for which blockchain might provide a solution. An American adult is unlikely to have one complete medical record. Records generally reside with the healthcare provider, so any number of providers—pediatricians, hospitals, primary care providers, dentists, dermatologists and other specialists—can have a portion of an individual's medical history, most likely siloed in their own EHR platform. Even if a provider is inclined to share data, securely sharing Personal Health Information (PHI) is complicated. As a result, an individual's records are inevitably incomplete, data is scattered and no one has a single, longitudinal health record accessible at every point on the continuum of care.

Blockchain to the rescue! Imagine the possibilities if, via blockchain, all of an individual's medical records could be readily accessed by permissioned clinicians, researchers and patients in a HIPAA compliant, cybersecure fashion. Physicians could make clinical decisions with complete knowledge of a patient's medical history. Patients could manage their own medical record. Clinical research could be expedited by accelerating patient recruitment and enrollment, trials could be easily replicated and results verified and easier to reproduce. Physician and patient satisfaction improves, quality goes up, cost goes down, and eureka—blockchain has achieved the Quadruple Aim!

Not so fast. Cryptoskeptics argue that blockchain will not become as pervasive as its advocates insist. The cost to store data on a blockchain is high, so it may not be practical for storage of EHRs, imaging records and other PHI. There is no interoperability between separate blockchains, limiting data transfer opportunities. Security claims may be overstated and future computing power could render blockchains hackable.

We don't know which camp has the better argument, but we are intrigued by how the technology could impact revenue cycle management in the future. Here are four examples:

**Credentialing:** Duff & Phelps' [September 2016 Healthcare IT Report](#) discussed the importance of credentialing, privileging and enrollment on the revenue cycle. Credentialing is the process that verifies a physician's qualifications to practice and be reimbursed for performing specified services in a specified setting. It involves gathering education, employment and other professional information of a physician. It is a complicated, expensive and time-consuming process—the industry averages 90 to 120 days to enroll a physician with providers and payors, and until enrolled and on-boarded, the physician cannot bill for services. The entire credentialing and enrollment

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process must be repeated when a physician moves to a new hospital or enrolls with a new payor or when the hospital with which the physician is affiliated is sold. A lengthy enrollment period can cost hospitals thousands of dollars per physician per day in foregone revenue. Blockchain could be used to confirm credentialing information the first time it is requested and to confirm, when subsequently requested, the continued validity of the information. In the case of a hospital acquiring another hospital with a 500-physician group averaging \$2,000 in facilities fee charges per day, accelerating the credentialing process could accelerate revenue by \$1 million per day.

**Provider Data Management:** Provider directories are used by health plan members to find in-network physicians. Physicians are in-network with multiple plans, and each plan administers its own provider directory, resulting in duplicative efforts to maintain directories. Unfortunately, the provider records in directories are often error prone and out of date. A recent report by Humana laid out a blockchain-based approach using smart contracts (a transactional protocol written in code that can self-execute when contract terms are met and verified) that would improve the quality of data and efficiently distribute data among users. The report estimated that an approach like this could save the U.S. healthcare industry more than \$1 billion per year.

**Instantaneous Claims Adjudication:** Blockchain could be used to provide the instantaneous verification of a claim. Using smart contracts claims could be instantaneously adjudicated and paid upon submission to the payor, reducing denials, and secure payments could be triggered, eliminating the need for a clearinghouse. According to CMS, 26% of all claims processed are rejected and 40% of those denials are never rebilled. CMS asserts that providers can increase total collections by as much as 7% by managing claims more efficiently.

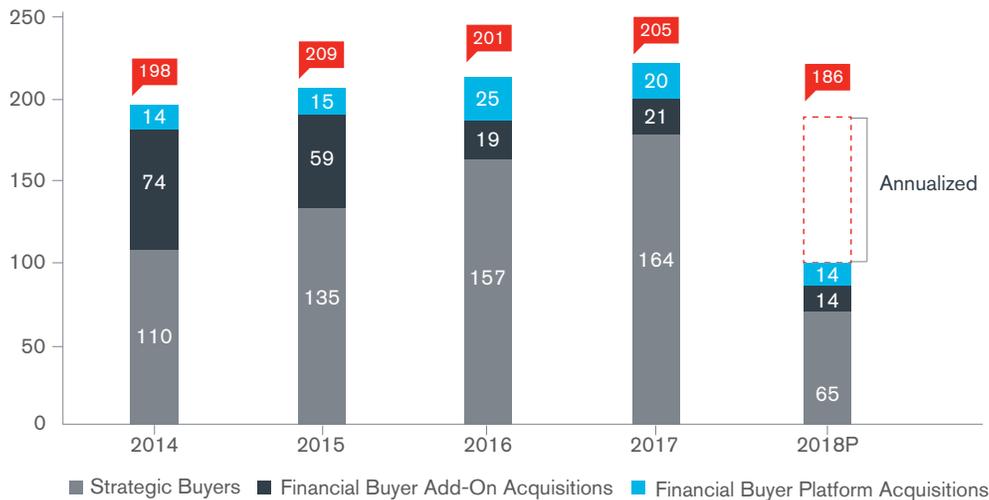
**Patient Matching:** Patient matching is the first step in attaining a truly interoperable medical record. The problem is threefold: The amount of data being collected in EHRs is growing exponentially, data is being collected in multiple EHRs in disparate formats and standards and demographic data is constantly changing. During the ordinary course of life people change their names (marriage, legal name changes), use their middle initials, adopt hyphenated last names and change their addresses. A single source of truth could eliminate the problems that arise from inaccurate patient matching: duplicate tests, unnecessary procedures, medical error and increased denials, to name a few.

When discussing the hope for blockchain in healthcare, a friend who is a chief medical officer and transplant surgeon reminded us that blockchain won't cure cancer or create world peace. He is, of course, right. But while this technology may be overhyped, it could make a difference—perhaps initially at the edges and then at the core of revenue cycle management and healthcare IT. IBM, Alphabet, Google, UnitedHealthcare, the FDA and many others are invested in this technology. Blockchain could become part of every EHR and RCM company's strategy for addressing the needs of the U.S. healthcare system over the next decade.

# 2018 Healthcare IT M&A Overview\*

In the first two quarters of 2018, 93 Healthcare IT (HCIT) transactions were announced, which on an annualized basis is slightly behind the pace set in 2017 of 205 transactions for the year. Strategic buyers (including private equity portfolio companies) represented approximately 85% of activity, with new platform acquisitions by financial buyers representing the remaining 15% of announced transactions. Deal volume in the sector was largely driven by a continued buyer interest in companies that improve patient care and regulatory compliance, while creating operating efficiencies. Additionally, innovation in areas such as data storage and cloud technology, analytics and population health management, EHR interoperability, cybersecurity, HIPAA compliance, blockchain and artificial intelligence continues to be an important investment theme as acquirers seek to remain ahead of HCIT trends.

## 2014–Q2 2018 Healthcare IT M&A Activity

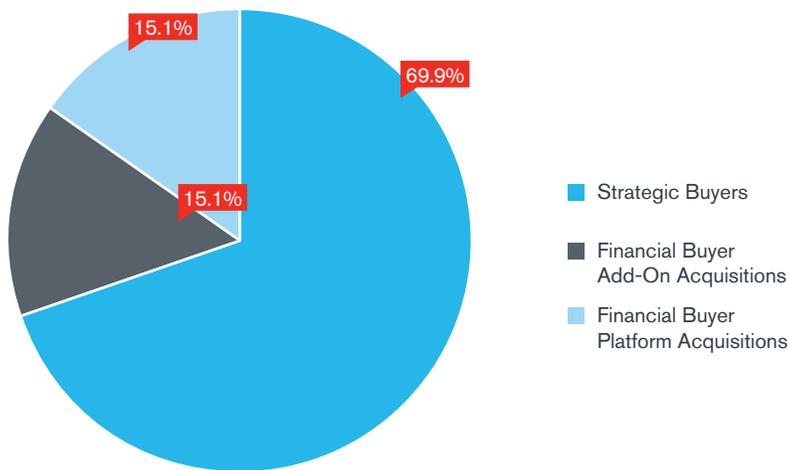


Sources: S&P Capital IQ, Healthcare IT News, S&P Global Market Intelligence, MergerMarket, company press releases and other news sources

Large healthcare corporations are increasingly interested in specialized HCIT solutions as a means to provide complementary services to their existing offerings. One area of specialized HCIT solutions gaining investor attention is clinical decision support. In the coming years, regulatory changes in the United States, such as legislation enforcing stricter medical record and clinical data monitoring, will likely drive demand for HCIT services and software.

The largest HCIT transaction announced in the first half of 2018 was Elliott Management's bid for athenahealth, Inc. (NASDAQ: ATHN) for \$7 billion in cash. Other notable transactions in the first half of 2018 include: the acquisition of Flatiron Health by Roche (SIX: RO); the acquisition of ABILITY Network by Inovalon (NASDAQ: INOV); the acquisition of the revenue cycle, ambulatory care and workforce management software unit of GE Healthcare (NYSE: GE) by Veritas Capital; the acquisition of Bolder Healthcare by Cognizant Technology Solutions Corporation (NASDAQ: CTSH); and the acquisition of Intermedix Corporation by R1 RCM Inc. (NASDAQ: RCM).

YTD 2018 Transactions by Acquirer Type



Sources: S&P Capital IQ, Healthcare IT News, S&P Global Market Intelligence, MergerMarket, company press releases and other news sources

## M&A Activity – HCIT Trends

On May 7, 2018, Elliott Management proposed to acquire athenahealth, Inc. for \$160 per share in cash, representing a premium of 27% to the stock price on the date of the announcement. athenahealth provides network-based medical record, revenue cycle, patient engagement, care coordination and population health services for medical groups and health systems. Following Elliott Management's bid, athenahealth's CEO resigned and the company announced that it will initiate a sale process. According to Mergermarket, a handful of financial sponsors and strategic buyers are expected to look at the company, including healthcare IT giant Cerner Corporation (NASDAQ: CERN), IBM Corporation (NYSE: IBM) and Microsoft Corporation (NASDAQ: MSFT). On the financial sponsor side, athenahealth is expected to primarily attract interest from growth-oriented investors. Expected improvements in margin and steady growth should allow the company to be successfully acquired through a leveraged buyout.

On April 6, 2018, Roche (SIX: RO) announced that it completed the acquisition of Flatiron Health, a privately held healthcare technology and services company. Flatiron Health is a market leader in oncology-specific EHR software. With its large network of community oncology practices and academic medical centers across the United States, Flatiron Health created a platform that incorporates patient experience into its technology. In a statement announcing the purchase, Roche said that the acquisition will bring the firms together to “improve the lives of cancer patients through the evolving field of healthcare data and analytics.” Under the terms of the agreement, the transaction value was approximately \$1.9 billion. Flatiron Health will retain its current business model, network of partnerships and overall objectives, including its patient protected health information, dedicated sales and marketing efforts and its provider-facing and life science business activities.

On April 2, 2018, Inovalon (NASDAQ: INOV), a leading technology company providing advanced, cloud-based platforms empowering a data-driven transformation from volume-based to value-based healthcare models, announced it closed the acquisition of ABILITY Network, formerly owned by Summit Partners, for an aggregate consideration of \$1.2 billion. The transaction will create a vertically integrated leader in cloud-based enablement of data-driven, value-based care. ABILITY is a leading cloud-based Software-as-a-Service (SaaS) technology company that focuses on simplifying the administrative and clinical complexities of healthcare. Through the myABILITY® software platform, ABILITY provides core connectivity, administrative, clinical and quality analysis, and management and performance improvement capabilities to more than 44,000 acute, post-acute and ambulatory point-of-care providers. “As the healthcare landscape continues to adopt models of value-based care, the sophistication of the technologies needed to achieve meaningful and differentiated results has never been more integral to success,” Inovalon's president, Robert Wychulis, said in a statement.

# Public Market Valuation Multiples

**The HCIT Index outperformed the S&P 500, while the Consumer Driven Health and Wellness (CDHW) Index underperformed the S&P 500 over the last 12 months.** The HCIT Index outperformed the S&P 500 by 22.2%, while the CDHW index underperformed the S&P 500 by 2.7% for the 12 months ending June 30, 2018. In the HCIT Index, Tabula Rasa HealthCare, Inc. was the top performer, gaining 324.1%, followed by R1 RCM Inc. with a gain of 131.5% and Craneware plc with a gain of 67.9%. In the CDHW Index, HealthEquity, Inc. was up 50.7% for the year, followed by Fitbit, Inc. at 23.0%. Medica Group PLC was the poorest performer in the HCIT Index, declining by 41.9%, while WageWorks, Inc. was the poorest performer in the CDHW Index, declining by 25.6%. Nonetheless, the last two quarters of 2017 and the first two quarters of 2018 proved to be a strong year in the HCIT equity market, with a majority of companies showing positive share performance.

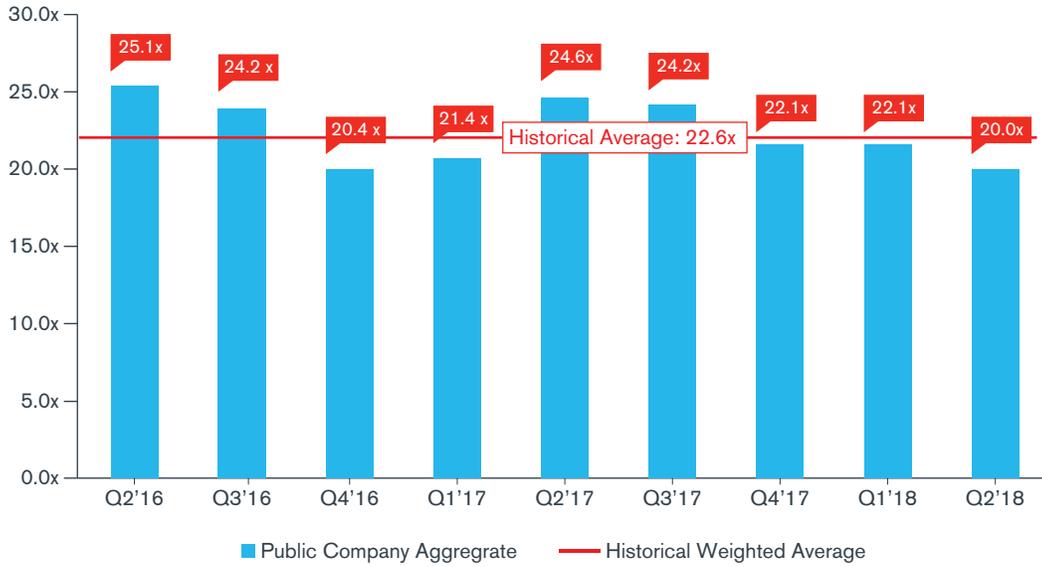
**HCIT company valuation multiples declined in the same period, while CDHW valuation multiples rose sharply.<sup>1</sup>** The average LTM EV/EBITDA multiple for HCIT companies declined from 24.6 times to 20.0 times in the last 12 months. The average LTM EV/EBITDA multiple for CDHW companies rose by 25.1 times to 27.9 times during the same period.<sup>2</sup>

Stock Price Index<sup>3</sup>  
(July 1, 2017–June 30, 2018)

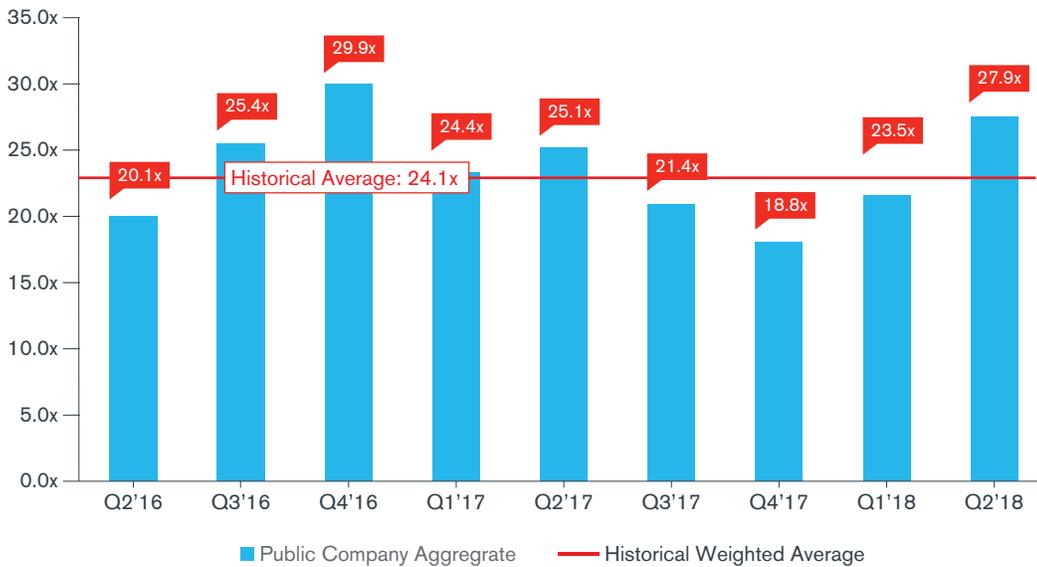


1. See historic multiple charts on page 10.
2. CDHW's LTM EV/EBITDA growth was primarily driven by Health Equity, Inc., which was the only company in the sector that exhibited multiple expansion over the period.
3. Indices based on companies included on page 12.

HCIT Index Quarterly LTM EBITDA Multiples: Q2 2016–Q2 2018



Consumer Driven Health and Wellness Index Quarterly LTM EBITDA Multiples: Q2 2016–Q2 2018

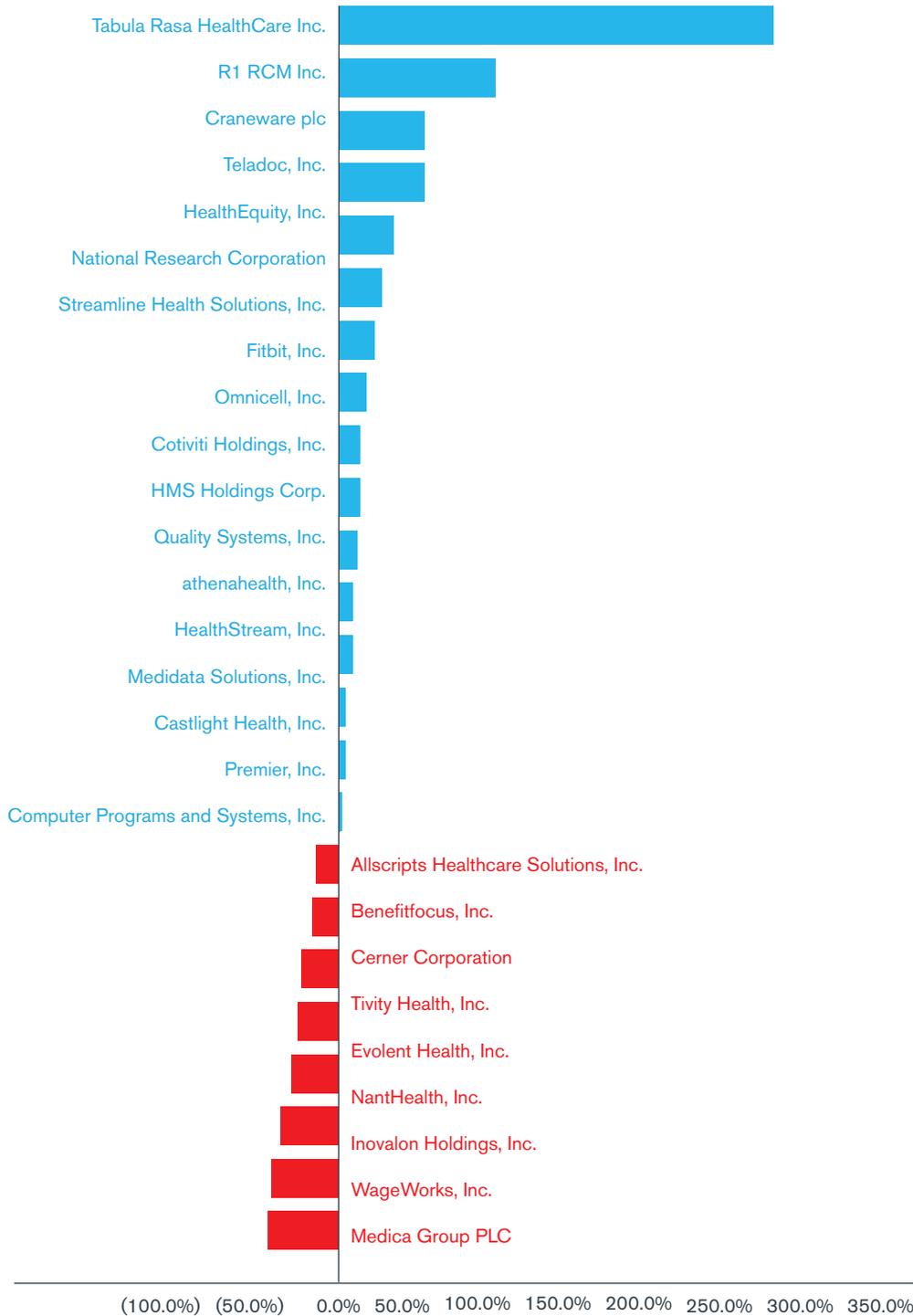


Source for both charts: S&P Global Market Intelligence

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# Selected Publicly Traded Companies

Stock Price Change - (July 1, 2017–June 30, 2018)



Source: S&P Capital IQ

Company Name	Ticker	Price	% Change	LTM Multiples					
				(as of 7/1/2017)		(as of 6/30/2018)		Change in Multiples	
				Rev	EBITDA	Rev	EBITDA	Rev	EBITDA
HCIT									
Allscripts Healthcare Solutions, Inc.	MDRX	\$12.00	(6.0%)	2.5x	26.7x	2.2x	29.0x	(10.2%)	8.3%
athenahealth, Inc.	ATHN	159.14	13.2%	5.2x	51.5x	5.2x	30.9x	(0.3%)	(39.9%)
Cerner Corporation	CERN	59.79	(10.0%)	4.6x	16.3x	3.8x	14.6x	(16.2%)	(10.3%)
Computer Programs and Systems, Inc.	CPSI	32.90	0.3%	2.2x	20.7x	2.1x	15.7x	(7.7%)	(24.2%)
Cotiviti Holdings, Inc.	COTV	44.13	18.8%	6.3x	18.5x	6.4x	16.3x	0.6%	(11.9%)
Craneware plc	CRW	27.97	67.9%	7.1x	23.2x	11.5x	37.9x	60.5%	63.5%
Evolent Health, Inc.	EVH	21.05	(17.0%)	5.8x	NM	3.3x	NM	(42.5%)	NA
HealthStream, Inc.	HSTM	27.31	3.8%	3.1x	33.3x	2.7x	25.0x	(12.2%)	(25.0%)
HMS Holdings Corp.	HMSY	21.62	16.9%	3.3x	17.4x	3.6x	18.1x	8.9%	3.8%
Inovalon Holdings, Inc.	INOV	9.93	(24.5%)	3.8x	20.2x	3.0x	23.4x	(20.9%)	15.7%
Medica Group PLC	LSE:MGP	1.72	(41.9%)	9.7x	31.9x	4.4x	15.2x	(54.0%)	(52.2%)
Medidata Solutions, Inc.	MDSO	80.56	3.0%	9.2x	61.6x	8.2x	52.8x	(11.1%)	(14.4%)
NantHealth, Inc.	NH	3.31	(21.7%)	5.6x	NM	5.7x	NM	0.9%	NA
National Research Corporation	NRC	37.40	39.0%	6.3x	18.6x	7.5x	23.3x	19.5%	25.0%
Omicell, Inc.	OMCL	52.45	21.7%	2.6x	40.3x	2.9x	34.5x	11.5%	(14.4%)
Premier, Inc.	PINC	36.38	1.1%	3.2x	10.6x	3.0x	7.3x	(6.3%)	(31.1%)
Quality Systems, Inc.	QSII	19.50	13.3%	2.1x	18.0x	2.4x	28.2x	13.7%	56.8%
R1 RCM Inc.	RCM	8.68	131.5%	1.3x	14.8x	1.9x	NM	43.8%	NA
Streamline Health Solutions, Inc.	STRM	1.41	31.8%	1.2x	NM	1.5x	52.2x	25.4%	NA
Tabula Rasa HealthCare, Inc.	TRHC	63.83	324.1%	2.5x	57.5x	8.5x	NM	233.5%	NA
Teladoc, Inc.	TDOC	58.05	67.3%	12.7x	NM	13.5x	NM	6.6%	NA
Mean			30.1%	4.8x	28.3x	4.9x	26.5x	2.9%	(6.3%)
Median			13.2%	3.8x	20.7x	3.6x	24.2x	(6.2%)	16.8%
Market Capitalization Weighted			4.1%	5.2x	24.6x	5.2x	20.0x	0.3%	(18.5%)
Consumer Driven Health and Wellness									
Benefitfocus, Inc.	BNFT	\$33.60	(7.6%)	4.9x	NM	4.3x	NM	(10.7%)	NA
Castlight Health, Inc.	CSLT	4.25	2.4%	4.1x	NM	3.6x	NM	(11.6%)	NA
Fitbit, Inc.	FIT	6.53	23.0%	0.2x	NM	0.6x	NM	136.2%	NA
HealthEquity, Inc.	HQY	75.10	50.7%	14.7x	48.5x	NM	57.7x	NA	19.1%
Tivity Health, Inc.	TVTY	35.20	(11.7%)	3.4x	16.2x	2.7x	11.7x	(22.0%)	(27.9%)
WageWorks, Inc.	WAGE	50.00	(25.6%)	5.7x	31.2x	2.9x	14.6x	(49.3%)	(53.3%)
Mean			5.2%	5.5x	31.9x	2.8x	28.0x	(48.7%)	(12.4%)
Median			(2.6%)	4.5x	31.2x	2.9x	14.6x	(35.5%)	(53.3%)
Market Capitalization Weighted			8.5%	7.2x	25.1x	1.5x	27.9x	(78.8%)	11.3%

Source: S&P Global Market Intelligence

Note: Revenue multiples greater than 15.0x and EBITDA multiples greater than 100.0x are deemed not meaningful (NM)

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