

Industry Insights

May 9, 2019

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Artificial Intelligence in Healthcare Banker Commentary by Sean Trail

From improvements in national security to the optimization of transportation routes and manufacturing processes, artificial intelligence (AI) and machine learning have already begun revolutionizing many major industries

worldwide – and healthcare is no exception. Healthcare has often been on the forefront of innovation and advancement, and many subsectors have already introduced artificial intelligence capabilities. AI technology is typically differentiated by its intentionality, intelligence and adaptability and, thus, drives significant opportunity in care coordination, improved outcomes and cost reduction – each a key aspect in the evolving healthcare landscape...*Continued on p.2*



Weekly Commentary Market Commentary by Matt O'Grady

Headline News

It's hard not to mention the trade war between the United States and China. Last week the markets were feeling good as more positive news came out of continued discussions. This week was supposed to represent a legitimate chance to end the nearly yearlong trade war. Then, like many had feared, there was a Tweet from President Trump over the weekend about increasing tariffs by the end of the week, because he thinks the pace of these discussions has been too slow. Besides the market impact, this Tweet has everyone scratching their heads. Are we over playing our hand, or is there something else lingering that we don't know about? Only time will tell...*Continued on p.3*

Commentaries *Banker Commentary by Sean Trail Continued from p. 1*

While this technology is still in its relative infancy, there have been a number of areas where this technology has successfully demonstrated its capabilities and potential.

1. **Streamlining of Administrative Tasks.** As one of the most immediate and obvious uses of AI in healthcare, the automation of administrative work could generate annual savings in excess of \$18 billion to the healthcare industry.¹ Use of simple tools such as voice-to-text applications, scheduling applications and other tools supporting maintenance of medical records, hospitals and physician practices not only generate significant cost savings, but also free up significant time for physicians and nurses to focus on patient care.
2. **Robotic assisted procedures.** Recent years have seen increased investment and interest in robotic technologies, especially as they relate to surgical procedures. In 2018, it is estimated that approximately one million procedures were completed by more than 5,000 surgical robots worldwide.² While these technologies are still relatively young, as more practices begin to utilize them, they will continue gathering critical data, and such data with help to refine surgical technique and uncover key insights to minimize variations in procedures and improve patient outcomes. Historically, the robotic surgery market has been led by Intuitive Surgical's da

Vinci System, however, recent years has seen an influx of major medical device companies and new, differentiated approaches incorporating machine learning from upstart companies such as Verb Surgical.

3. **Data Mining and Clinical Decision Making.** Every day, significant amounts of data are generated throughout the healthcare industry creating challenges around data management and analysis. Manually extracting data can be time consuming and unreliable, but with advancements in technology, these processes can be streamlined and organized with tools trained to turn data into relevant solutions supporting physician treatment decisions.
4. **Medical Imaging Analysis.** Artificial Intelligence offers an opportunity to enhance the review and interpretation of medical images to streamline diagnosis and improve patient treatment. According to RSNA, imaging research laboratories are developing systems focused on improving medical image reconstruction, quality assurance, triage, computer-aided detection and computer-aided classification. These computer vision systems can perform clinical interpretation at the level of an expert physician, leading to a reduction in diagnostic errors, improved patient outcomes and reduced costs.

¹ According to HBR estimates

² According to Robotic Business Review

Commentaries *Banker Commentary by Sean Trail Continued from p. 2*

5. **Precision Medicine.** Precision medicine is an approach for disease treatment and prevention that factors individual variability in genetics and lifestyle. With AI technologies, doctors are able to gain insights from massive available data sets, leading to a better understanding of patients at an individual level. These insights help to develop precision treatments for complex diseases, guide the development of new drugs, suggest personalized combinations of old drugs, and predict disease risk.

There are numerous other applications of AI in the healthcare industry, and each is consistent in that it applies opportunities to streamline processes, reduce costs and enhance patient outcomes. It is expected that more sectors will continue to explore opportunities to incorporate AI and machine learning technologies.

Key Challenges Remain

While the benefits of artificial intelligence are well-demonstrated throughout the industry, there are still several challenges that may slow the adoption in some areas.

New Regulatory Burdens and Hurdles. Healthcare regulation in the U.S. has historically been among the more rigorous systems worldwide but has demonstrated an ability to be receptive to new

advancements and technologies. AI technologies, however, raise a few challenges not previously contemplated: autonomy of technology; continuous learning, resulting in evolving output and solutions; and the ability to demonstrate and articulate the process for developing output.

Data Collection and Interoperability. Many of the benefits stemming from machine learning stem from its ability to gather as much data as possible to analyze and interpret commonalities. However, artificial intelligence struggles to digest data from multiple disparate formats. With the number of unique EMR platforms currently being used by health systems and practices, the ability to collect and seamlessly synthesize data remains a major challenge in the growth of AI technology.

Like in many industries, the implementation of AI has been steady, but the benefits are clear, especially in the changing landscape of healthcare. It is clear that, regardless of the challenges and hurdles ahead, artificial intelligence and machine learning is gaining acceptance and beginning to evolve the healthcare industry. Ultimately, this technology's ability to demonstrate improved patient outcomes with reduced costs will be key in its ability to drive sustained change throughout the industry.

Commentaries *Market Commentary by Matt O'Grady Continued from p. 1*

Simultaneously, the U.S. Navy was busy over the weekend as several destroyers moved past some disputed islands in the South China Sea, and an aircraft carrier was dispatched to the Middle East to remind Iran that the United States is serious. While these actions aren't necessarily concerning, they are adding to the variables the markets are already contending with, and they highlight some of the multiple flash points that are currently heating up.

Turning to Venezuela we can see another tense situation that appears to be overheating. The more concerning aspect is that Russia and Cuba are supporting the dictator (Nicolas Maduro), and the United States is supporting Juan Guaido. This could boil over into something bigger, which won't be good news for anyone, including the markets.

Last week the markets also focused on the FOMC meeting, and, while no one expected any changes in rates, everyone was glued to the press conference after the meeting. The distilled version of events looks like this: the Fed is still in a wait and see approach, unemployment remains very low, inflation remains below the 2% target, and the Fed will be very patient.

There were also some discussions about the balance sheet, and the Fed has decided to continue those discussion, when they meet over the next few months. In their words, they can continue to exercise patience there, as well.

I would be remiss if I didn't mention the new low achieved on Capitol Hill last week as the Mueller report and Attorney General Barr's testimony took our political discord to a place rarely seen in the history of our democracy. The market did a good job shaking it off, but, as we've seen in the past, everything has its limits.

Not wanting to be overlooked, the market was also fixated on Berkshire Hathaway's annual investor meeting over the

weekend. While recent returns have been subpar by Warren Buffet's standards, investors always check in for any information that they think can help their portfolio. The two biggest takeaways I read were simple: Buffet has started buying Amazon (AMZN) and he thinks stocks look cheap, if you believe in the economy.

Economic Releases

Last week's reports helped fueled some market moves as the jobs numbers came in better than expected, while inflation was lower than expected.

This week investors will be focused on the following reports: PPI, CPI, Consumer Confidence, Wholesale Inventories, and Trade Balance.

Market News and Numbers

The stock market finished yet again basically flat as the DJIA closed at 26,504. Technology stocks had a relatively good week, fueled by Amazon and Apple. Amazon's growth projections remain above average, while Apple caught some tailwinds by announcing their plans to increase their stock repurchase plans. Equity investors also became enamored with an IPO for Beyond Meat, which was issued at \$25 a share and traded as high as \$67 on the break. This clearly brings Mom's instructions to eat your peas to a new meaning as plant-based protein could become more mainstream.

The Treasury market largely treaded water for the week with the 10-year bond closing at a 2.526%, which was one basis point higher. With the Fed meeting last week investors felt best to sit tight. With that in mind, I would expect Treasury rates to remain rangebound until something substantial develops.

Commentaries Market Commentary by Matt O'Grady Continued from p. 4

The municipal bond market remained topical as multiple reports circulated discussing the recent influx of cash and the continued limited new issue supply. These conditions are expected to continue through the summer, which will make a seasonally slow period even worse than it normally is.

Looking at rates, MMD saw yields close three basis points lower on the longer end of the scale. This move was like what we saw the RBI do as it closed at a 4.21%, which was down six basis points for the week. SIFMA also rebounded from a couple of tough weeks, and the index closed at a 2.12%, which was eighteen basis points lowering than the previous week.

From a funds flow perspective, cash remained strong as mutual funds enjoyed their seventeenth straight week of positive cash flow. Lipper reported \$1.6 billion, and ICI reported \$2 billion of inflows. With more cash than bonds available for sale, credit spreads continue to tighten as the yield curve continues to flatten. It remains a very borrower friendly environment.

This week's negotiated new issue calendar won't do anything to normalize this imbalance as we expect a piddly \$2.4 billion in supply. New issue supply would need to eclipse \$15 billion for several straight weeks to even put a dent in filling this supply void.

Oil finished the week lower. WTI futures closed on Friday at \$61.94.

What Deals Got Placed

Last week's calendar didn't contain any healthcare or senior living transactions.

What's on Deck

MASSACHUSETTS DEVELOPMENT FINANCE AGENCY REVENUE BONDS, ATRIUS HEALTH ISSUE SERIES A (2019) TERM: 2039, 2049, 2049	05/07	138,820 / BBB /
CLEVELAND CLINIC VARIABLE RATE DEMAND REVENUE BONDS SERIAL: 2052	05/08	131,315

Market Indices

Equity Indices Information as of May 3, 2019

Index	Close	Returns			Returns	
		52 Week	Weekly		52 Week	Weekly
DJIA	26,505	8.8%	(0.1%)	Acute Care	9.4%	(3.3%)
S&P 500	2,946	10.2%	0.2%	Alternate Site Services	(7.4%)	0.6%
NASDAQ	8,164	12.4%	0.2%	Diagnostics	7.8%	4.5%
Russell 2000	1,614	2.2%	1.4%	Distribution	(14.3%)	3.8%
NYSE Healthcare	15,783	11.6%	1.0%	Healthcare IT	23.4%	2.0%
				Healthcare REITs	20.4%	2.6%
				Managed Care	4.6%	(1.9%)
				Medical Technology	8.6%	1.2%
				Outsourced Services	(12.2%)	(0.9%)
				Pharma Services	8.2%	1.0%
				Pharmacy Services	(19.6%)	3.6%
				Post-Acute Care	20.5%	(0.6%)

Source: Cain Brothers, Bloomberg and Capital IQ.

Tax-Exempt Debt Information as of May 3, 2019

Borrower	Par (\$MM)	State	Rating	Maturity	Coupon	Yield to Call	Yield to Mat.	AAA
None								
Total	\$	-						

Source: Cain Brothers. Note: SIFMA, RBI & 30-Yr. Treasury are as of prior Thursday close

Tax-Exempt Healthcare Issuance Information as of May 3, 2019

	Current (%)	One Week Ago (%)	One Year Ago (%)
A-rated Tax-Exempt Hospital Bonds (30-Yr)	3.48%	3.28%	3.65%
AA Tax-Exempt Hospital Bonds (30-Yr)	3.38%	3.13%	3.40%
SIFMA (Variable Rate Demand Notes)	2.12%	2.30%	1.75%
Revenue Bond Index	4.21%	4.27%	4.46%
SIFMA/1 Month LIBOR	85.83%	92.74%	88.83%
RBI/30 Yr Treasury (%)	143.69%	146.23%	142.74%
30-Year Floating to Fixed Swap (81% LIBOR)	2.16%	2.16%	2.47%

Source: Cain Brothers, Bloomberg and Capital IQ.

Transaction Activity, Week of May 7, 2019

M&A Activity

Announced	Target	Acquirer	Ent. Value	Enterprise Value/		Description
				LTM Rev.	LTM EBITDA	
5/3/2019	Krueger-Gilbert Health Physics (Anacapa)	Blue Sea Capital	NA	NA	NA	Diagnostic medical physics provider
5/3/2019	OrthoFi	Accel-KKR	NA	NA	NA	Software and technology-enabled service platform in the orthodontic specialty industry
5/2/2019	Acelity (Apax, CPPIB and 3M (NYSE: MMM) and PSP Investments)		\$6,700.0	4.5x	11.0x	Global medical technology company focused on advanced wound care and specialty surgical applications
5/2/2019	McBee Associates	Netsmart (GI Partners)	NA	NA	NA	Provider of managerial and financial consulting services to the health care industry
4/30/2019	Advanced Medical Personnel Services (Clearview Capital)	AMN Healthcare Services (NYSE: AMN)	\$200.0	1.4x	10.0x	Staffing company that specializes in placing outstanding therapists and nurses in contract and permanent positions
4/29/2019	ClearSky Health	Blue Wolf Capital Partners and Peloton Equity	NA	NA	NA	Developer and acquirer inpatient rehabilitation facilities and related post-acute services companies

Source: Capital IQ, Mergermarket, PE HUB and press releases.

Public Offering Activity

Date	Issuer (Ticker)	Underwriter(s)	Offer Price	Amt Offered	Current / Offer	Market Cap.	Description
5/2/2019	TransMedics (TMDX)	Morgan Stanley, JPM, Cowen, Canaccord	\$16.00	\$91.2	55.0%	\$477.3	Medical technology organ transplant therapy for patients with end-stage lung, heart and liver failure

Source: IPO Monitor, Capital IQ, Mergermarket, PE HUB and press releases.

Private Placement Activity - Equity

Date	Company	Investor(s)	Type	Amount	Description
5/2/2019	CirrusMD	Drive Capital and Colorado Impact Fund	Series B	\$15.0	Software that connects physicians with patients via secure chat, mobile, video and image transfer
4/30/2019	Ablacon	Ajax Health	Series A	\$21.5	Advanced mapping system to guide the treatment of atrial fibrillation
4/29/2019	BostonGene	NEC Corporation	Series A	\$50.0	Biomedical software for advanced patient analysis

Source: Capital IQ, Mergermarket, PE HUB and press releases.

Healthcare News

As Retiree Health-Care Bills Mount, Some States Have a Solution: Stop Paying

States across the U.S. are testing how far they can reduce health benefits for current and future retirees as a way of coping with mounting liabilities and balancing budgets. The cuts are a response to dramatic increases in medical costs, budget shortfalls and the introduction of new accounting rules forcing governments to be more public about how much they owe. Officials also face fewer legal hurdles to cutting retiree health benefits than they face with public pensions, which enjoy ironclad legal protections in many states. (The Wall Street Journal, 5/1)

<https://www.wsj.com/articles/as-retiree-health-care-bills-mount-some-states-have-a-solution-stop-paying-11556703001>

Why Men Won't Go to the Doctor, and How to Change That

Men are notoriously bad patients. Compared with women, they avoid going to the doctor, skip more recommended screenings and practice riskier behavior. They also die about five years sooner, live with more years of bad health and have higher suicide rates. Now, with growing recognition that treating preventable causes of death and disability could close the medical gender gap, the health-care industry is mounting a new push to get men the care they need. (The Wall Street Journal, 4/29)

<https://www.wsj.com/articles/why-men-wont-go-to-the-doctor-and-how-to-change-that-11556590080>

Healthcare News *Continued from p.8*

Kaiser to Launch Social Care Network

Kaiser Permanente will soon launch a new care network that connects the system's more than 12 million members to community services that address their social needs. The Thrive Local initiative will be integrated into Kaiser's electronic health record, and will be rolled out regionally this summer, though the first location hasn't been announced yet. Over the next three years, the health system will make it available throughout the entire system. The program will allow healthcare providers and caregivers to connect patients with community resources that can help them address needs such as food insecurity or housing instability from an array of not-for-profit, public and private social services. (Modern Healthcare, 5/6)

<https://www.modernhealthcare.com/care-delivery/kaiser-launch-social-care-network>

Trump Administration Files Formal Request to Strike Down All of Obamacare

The Trump administration formally declared its opposition to the entire Affordable Care Act on Wednesday, arguing in a federal appeals court filing that the signature Obama-era legislation was unconstitutional and should be struck down. Such a decision could end health insurance for some 21 million Americans and affect many millions more who benefit from the law's protections for people with pre-existing medical conditions and required coverage for pregnancy, prescription drugs and mental health. (The New York Times, 5/1)

<https://www.nytimes.com/2019/05/01/health/unconstitutional-trump-aca.html>

Healthcare News *Continued from p.9*

External Reference Drug Pricing Could Save Medicare Tens of Billions

A new study by researchers at the Johns Hopkins Bloomberg School of Public Health found that prices for brand-name prescription drugs averaged 3.2 to 4.1 times higher in the U.S. when compared with prices in the United Kingdom, Japan and the Canadian province of Ontario. The study also found that the longer the brand-name prescription drug was on the market, the greater the price differential. U.S. prescription drug prices for brand-name drugs are the highest in the world. One approach to lower U.S. prescription drug prices is to benchmark drug prices to those paid in other countries using a pricing model known as external reference pricing. If the Medicare program used the same prices as these other countries, the estimated savings to Medicare Part D would have been almost \$73 billion in 2018 alone, the study found. (Science Daily, 5/6)

<https://www.sciencedaily.com/releases/2019/05/190506160719.htm>

3M Buying Acelity, Maker of Wound-Care Products, in its Biggest Deal in Years

3M Co. said Thursday it has agreed to acquire Acelity Inc., a maker of wound dressings and other products to stop bleeding. The deal values San Antonio, Texas-based Acelity at \$6.7 billion, including the assumption of debt. Maplewood, MN based 3M (NYSE: MMM) said Acelity, which had 2018 revenue of \$1.5 billion, would complement its own wound-care offerings. "Acelity is a recognized leading provider of advanced wound care technologies and solutions and an excellent complement to our Health Care business," said 3M CEO Mike Roman. (The Business Journals, 5/2)

<https://www.bizjournals.com/twincities/news/2019/05/02/3m-buying-acelity-maker-of-wound-care-products-in.html?>

Cain Brothers' Transactions



ARSENAL
CAPITAL PARTNERS

Has acquired



hopebridge

BUYSIDE M&A ADVISORY
May 2019

SW Holdings
SussexWire **MAROX**

A portfolio company of



ARGOSY PRIVATE EQUITY

Has been acquired by



A portfolio company of



AMERICAN SECURITIES
SELLSIDE M&A ADVISORY
April 2019



Primary Health
Medical Group

Has received an investment from



Blue Cross of Idaho

FINANCIAL ADVISORY
April 2019



alacare
HOME HEALTH & HOSPICE

Has agreed to be acquired by



Encompass Health

SELLSIDE M&A ADVISORY
Pending



Centerbridge

Has acquired



CIVITAS SOLUTIONS

BUYSIDE M&A ADVISORY
March 2019



Centerbridge

Has acquired



CIVITAS SOLUTIONS

\$1,180,000,000
Senior Secured
Credit Facilities

JOINT LEAD ARRANGER &
JOINT BOOKRUNNER
March 2019



Onlife
HEALTH

A subsidiary of



of Tennessee



CAMBIA
HEALTH SOLUTIONS

Has been acquired by



GUIDEWELL

SELLSIDE M&A ADVISORY
February 2019



DR. DENTAL
Adult and Kids Dentistry For Every

Has been recapitalized by



abry partners

SELLSIDE M&A ADVISORY
January 2019



MISSION HEALTH

Has been acquired by



HCA

SELLSIDE M&A ADVISORY
January 2019

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