Mizuho Industry Focus   Vol. 183

A Survey of U.S. Healthcare IT Industry Landscape

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〈Summary〉

○ U.S. Healthcare IT industry is booming. Over the recent years, many companies have had robust growth and the sector has attracted huge inflow of private and public investments. There are many types of HCIT companies, operating with different business models and participating in various segments of HCIT. In this report, we try to first identify the drivers behind HCIT growth and then delineate the dynamics in each HCIT segment.

○ Key drivers of HCIT are also the underlying drivers of the U.S. healthcare system, namely Obamacare, the transition to value-based reimbursement model, rising consumerism, industry consolidation, etc. Within HCIT, major drivers include the HITECH Act, advancement of technology, and the convergence of healthcare, IT, and consumer industries.

○ The booming HCIT market is in transition. Incentives for EHR created by the HITECH Act have largely run their course. In the future, the marketplace will be driven less by government subsidies and more by private spending. To earn revenues from private payers, HCIT companies increasingly need to demonstrate the clinical and financial value of their offerings. To achieve this, HCIT companies need to collaborate closely with their customers.

○ For the various HCIT segments, we see three especially promising areas – integration of remote patient monitoring either through wearables or other devices with data analytics and intervention capabilities; big data analytics by Artificial Intelligence; and telemedicine. We expect stable growth for RCM, PM, payer solution segments. For population health, although we recognize the huge potential, it is unclear to us who will be the clear winner.

○ The HCIT financing environment may also be in transition. The recent downturn in tech valuation has caused mark-down in valuation and some companies to raise the dreaded "down-rounds." In addition, public equity performance and IPO market remain challenging for HCIT companies. Meanwhile HCIT M&A activities are heating up. We believe while high-quality companies can still pursue IPOs, some private companies may prefer trade sale as the exit option. We see elevated M&A activity continuing. HCIT industry will increasingly favor large companies with broad capabilities. Reason for consolidation remains strong.

Executive Summary

- This report is a survey of the U.S. Healthcare IT (HCIT) industry landscape. First we identify the key policy, consumer behavior and economic drivers of HCIT. Second we categorize the very diverse HCIT solutions into distinct segments. Third we discuss the trend in each segment and describe the representative players. Fourth we discuss the capital market condition facing HCIT players. Lastly we provide a list of HCIT companies by category.

- Passed in 2009, the HITECH Act has provided a huge funding boost to HCIT. But the incentive from the HITECH Act is winding down. While the robust HCIT growth over the last five years was mostly driven by government's financial incentives, going forward, private sectors are likely to be the key payer for HCIT. They will increasingly demand clear benefit on clinical outcome and financial return. HCIT vendors will need to work hand-in-glove with their customers to demonstrate such benefits.

- Driven by incentives from the HITECH Act, EHR adoption has grown to saturation levels. In the future we see continued consolidation among EHR vendors, with small players losing out to big players. Certain small companies may adopt new business model or niche strategy to complete. But we believe these are isolated cases. The overwhelming trend is for a few big EHR vendors to dominate.

- For established categories such as RCM, practice management, and payer solutions, we see stable growth. For wellness and patient engagement, we believe while they offer valuable and novel solutions to consumers, they face the dual challenges of user retention and proving ROI. Many companies are participating in the very hot population health field. But it is unclear to us who will become winners.

- We see enormous potential in three specific HCIT areas:

  ➢ The integration of remote patient monitoring either through wearables or other devices with real-time data analytics and intervention could become a new way to manage diseases. Technology has advanced to a level that can make such a closed-loop monitoring/intervention system possible.

  ➢ Big data analytics, especially AI, holds great promise in healthcare. Such technology can help to predict the course of a disease and prescribe the best treatment option. In a futuristic scenario, AI may take the place of doctors and nurses to monitor, counsel and take care of patients.

  ➢ We are also excited about the future of telemedicine (which we narrowly define it as seeing doctors remotely through video or audio). We believe telemedicine will gradually establish itself as a new conduit of healthcare delivery. Rather than taking over traditional in-office physician visits, it will serve as a valuable option for patients and will become a segment in overall health delivery. The cost and convenience advantage will overcome the inertia in the current system.

- In terms of company positioning, we believe the economics will favor scale and category leaders. Scale indicators such as having the largest installed base, the largest patient clinical database, the largest claim database, the most comprehensive relation with providers or plans will have competitive advantage vs. small players. Therefore the leader has an unfair advantage. On the flip side, being the third or fourth company in a category is probably a challenging position. There is also a benefit for scope. It is much easier for a vendor with an established customer relationship to sell other HCIT products than a pure-player company.

- HCIT has attracted over $10bn funding since 2009. As a result of the funding boom, over 500 HCIT startups have been created. Last two years were the most pronounced in terms of venture investment in HCIT. In retrospect, some companies may have been funded at too lofty a valuation. Recent downturn in tech has resulted in mark-down valuation of private tech companies by prominent public investors such as Fidelity and T. Rowe Price. The same may be happening in HCIT.

- Post-market performance of recent HCIT IPOs is generally weak. Therefore IPO is not an easy option for private HCIT companies. The vast majority of HCIT ventures are in the money losing investment phase of their life cycles and therefore require continued infusion of capital. As the public market is not so welcoming for private HCIT companies and private investors become reluctant to invest, we believe trade sales may be the preferred exit option for investors. Strategic investors looking to grow in HCIT and financial investors such as PE funds will continue to boost M&A activities in HCIT.

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Glossary and Abbreviations

Abbreviations	
ACA/PPACA	Affordable Care Act; also known as Obamacare
ACO	Accountable Care Organization
AI	Artificial Intelligence
ARRA	American Recovery and Reinvestment Act of 2009, which includes the bill called HITECH (see below)
CBO	Congressional Budget Office
CDHP	Consumer directed health plans
CDW	Clinical Data Warehouse
CMS	Centers for Medicare and Medicaid Services
Digital Health	A broad term referring to the convergence of digital technology with healthcare. It is often used as synonyms of telehealth, eHealth, mHealth. Etc. But it can be considered an all-encompassing term.
EHR/EMR	Electronic Health Record / Electronic Medical Record
FFS	Fee for service
HDHP	High Deductible Health Plans
HHS	U.S. Department of Health and Human Services
HITECH Act	Health Information Technology for Economic and Clinical Health Act
HSA	Health Spending Account
HCIT	Healthcare Information Technology
HIE/HIX	Health Information Exchange
HIMMS	Healthcare Information and Management Systems Society
HIPPA	Health Insurance Portability and Accountability Act of 1996
IDN	Independent delivery network
MCO	Managed Care Organization
mHealth	Mobile Health (the use of mobile devices in healthcare)
MU	Meaningful Use (specific use of EHR technology)
NHE	National Health Expenditure
Obamacare	See ACA
ONC	Office of the National Coordinator for Health Information Technology
PHM	Population Health Management
PM	Practice management
PPACA	Patient Protection and Affordable Care Act; also known as ACA or Obamacare
RAC	Recovery Audit Contractor (recovers funds for CMS/Medicare)
RHIO	Regional Health Information Organization
RCM	Revenue cycle management
SaaS	Software as a Service
Telemedicine	Delivery of healthcare services through non-physical means (e.g., telephone, digital imaging, video). Seeing doctors remotely.

Source: Compiled by MHBK/IRD based on public company reports

I. Background of U.S. Healthcare and HCIT

A.   Introduction to U.S. Healthcare Landscape

According to the latest estimates by CMS, U.S. National Health Expenditure (NHE) was worth $3.1 trillion in 2014 and is projected to grow at 5.8% CAGR for 2014–24 (see Table 1). This 5.8% growth rate is 1.1% higher than the GDP growth rate over this period. Correspondingly, NHE as a percentage of GDP will rise from 17.4% in 2013 to 19.6% in 2024. This 1.1% increment of NHE growth over GDP growth is lower than the historical average, which is in the 2-2.5% range. This slight "bending of cost curve" is a result of Obamacare, higher economic growth, increasing cost shift to consumers, and other structural and technology changes in U.S. healthcare system.

There is substantial amount of wasteful spending in the U.S. healthcare system. It was estimated that as much as a third of the $3 trillion health spending in the U.S. is waste. Waste ranges from overtreatment, failures of care coordination, failures in execution of care processes, administrative complexity, pricing failures and fraud and abuse[1]. Healthcare IT is expected to be a key solution to address many aspects of wasteful or suboptimal healthcare delivery.

Table 1National Health Expenditure Projections 2014-2024

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2014-2024 CAGR
National Health Expenditures ($trillion)	$2.9	$3.1	$3.2	$3.4	$3.6	$3.8	$4.0	$4.3	$4.5	$4.8	$5.1	$5.4	
% growth	*3.6%*	*5.5%*	*5.3%*	*4.9%*	*5.4%*	*5.5%*	*6.2%*	*6.3%*	*6.2%*	*6.2%*	*6.1%*	*6.0%*	*5.8%*
GDP ($trillion)	$16.8	$17.4	$18.0	$18.8	$19.8	$20.9	$22.0	$23.1	$24.2	$25.3	$26.5	$27.6	
% growth	*3.7%*	*3.9%*	*3.2%*	*4.7%*	*5.3%*	*5.3%*	*5.2%*	*5.0%*	*4.9%*	*4.7%*	*4.5%*	*4.5%*	*4.7%*
NHE % GDP	17.4%	17.7%	18.0%	18.1%	18.1%	18.3%	18.5%	18.8%	19.1%	19.3%	19.6%		
Hospital Care ($bn)	$936.9	$978.3	$1,031.1	$1,087.3	$1,147.1	$1,213.6	$1,291.5	$1,374.9	$1,462.6	$1,555.9	$1,653.4	$1,755.1	
% growth	*4.3%*	*4.4%*	*5.4%*	*5.5%*	*5.5%*	*5.8%*	*6.4%*	*6.5%*	*6.4%*	*6.4%*	*6.3%*	*6.2%*	*6.0%*
Professional Services ($bn)	777.9	815.1	849.9	886	929.1	978.6	1037.5	1100.2	1165.9	1233.7	1303	1373.6	
% growth	*3.4%*	*4.8%*	*4.3%*	*4.2%*	*4.9%*	*5.3%*	*6.0%*	*6.0%*	*6.0%*	*5.8%*	*5.6%*	*5.4%*	*5.4%*
Other Health, Residential, and Personal Care ($bn)	148.2	153	159.3	167.1	175.7	184.8	194.6	204.9	215.7	227.1	238.9	251.1	
% growth	*5.8%*	*3.2%*	*4.1%*	*4.9%*	*5.1%*	*5.2%*	*5.3%*	*5.3%*	*5.3%*	*5.3%*	*5.2%*	*5.1%*	*5.1%*
Prescription drugs ($bn)	271.1	305.1	328.4	343.2	364.4	385.1	408.7	435.3	464.1	495.2	528.3	564.3	
% growth	*2.5%*	*12.5%*	*7.6%*	*4.5%*	*6.2%*	*5.7%*	*6.1%*	*6.5%*	*6.6%*	*6.7%*	*6.7%*	*6.8%*	*6.3%*
Other Medical Products ($bn)	98.9	102.7	106.3	110.8	116.1	122.6	130.1	138.3	147.3	156.6	166	175.5	
% growth	*4.1%*	*3.8%*	*3.5%*	*4.2%*	*4.8%*	*5.6%*	*6.1%*	*6.3%*	*6.5%*	*6.3%*	*6.0%*	*5.7%*	*5.5%*
Home Health Care ($bn)	79.8	81.9	86.5	91.7	97.4	103.6	110.9	118.7	127.2	136.2	145.7	156	
% growth	*3.5%*	*2.6%*	*5.6%*	*6.0%*	*6.2%*	*6.4%*	*7.0%*	*7.0%*	*7.2%*	*7.1%*	*7.0%*	*7.1%*	*6.7%*
Nursing Care Facilities and Continuing Care Retirement Communities	155.8	160.2	167.1	176.1	185.9	195.9	207	219	231.7	245.3	259.4	274.4	
% growth	*2.4%*	*2.8%*	*4.3%*	*5.4%*	*5.6%*	*5.4%*	*5.7%*	*5.8%*	*5.8%*	*5.9%*	*5.7%*	*5.8%*	*5.5%*

Source: Compiled by MHBK/IRD based on data from The Office of the Actuary of CMS, July 2015.

The rollout of Obamacare since the beginning of 2014 has had a major impact on the U.S. healthcare system. For a primer of U.S. healthcare system and a discussion of Obamacare, please refer to our 2014 report titled "Updates and Implications of Obamacare[2]."

Obamacare expands coverage to the uninsured through health exchanges and Medicaid. Enrollment in exchanges is a little below expectation. CBO projected 2015 exchange enrollment of 11mn (see Table 2) but actually ~10mn enrolled. For 2016, CBO originally projected 21 million people will enroll in the exchanges (see Table 2), which was often criticized as a high number. In January 2016, The CBO projected that 13 million Americans will be covered in the exchanges for 2016, including 11 million with subsidies and 2 million without. In March 2016, CBO further lowered the estimate by 1 million to 12 million (see Table 3). CBO's current projection of 12 million is close to the 9.4 to 11.4 million estimate put out by CMS. So far enrollment number is tracking at the high-end of CMS estimate. Eventually the two estimates are likely to converge.

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[1] "Eliminating Waste in US Health Care." Donald M. Berwick and Andrew D. Hackbarth, JAMA April 11, 2012
[2] http://www.mizuhobank.co.jp/corporate/bizinfo/industry/sangyou/pdf/mif_163.pdf

While the exchange enrollment is below initial forecast, Medicaid enrollment has surpassed expectation and CBO has raised its Medicaid enrollment projections (compare Table 2 and Table 3). CBO has increased its 2025 projection for Medicaid enrollment from 11.5 originally to 14.5 million last year and then to the current 18 million. Overall the projection for the percentage of uninsured non-elderly population has changed little.

The financial side of ACA appears to be more worrisome. Insurers have reported large losses from the health insurance exchange business. UnitedHealth projected $500mn loss from exchanges in 2015. As a result of the losses, UnitedHealth announced it would significantly cut its offerings in insurance exchanges in 2016 and will exit most of its exchange business in 2017. In response to the losses, many insurers have significantly raised premiums for the plans in exchanges. This raises concern over the financial sustainability of health exchanges. We believe although exchanges are facing some financial headwinds, driven by government subsidies and personal penalties, consumers will continue to sign on for exchanges, albeit at a level that is lower than initial projection. There are several major important events to watch for ACA. The foremost is the November presidential election. If the presumed Republican Party presidential candidate Donald Trump wins the White House, Republicans are likely to retain the majority in both the House and the Senate. In that scenario, there is a good likelihood of repeal of ACA. If the presumed Democratic Party presidential candidate Hillary Clinton wins the election, ACA will likely stay unchanged. Another important milestone is the ongoing FTC and DOJ review of the two mega managed care mergers. If the two pending mergers (Anthem-Cigna, Aetna-Humana) go through, the number of the U.S. national managed care companies will be reduced from five to three. Some observers have speculated that the reason the four managed care companies haven't followed UnitedHealth's lead to exit insurance exchanges is because they don't want to draw the wrath from the Obama Administration which could block the merger. If the merger is blocked by the Administration just like some other recent major corporate mergers, these companies may stop playing nice and drop off from exchanges. In that scenario, consumers will have even fewer options in insurance exchanges.

Table 2 CBO's *March 2015* Projection of Insurance Coverage Expansion

Effects on Insurance Coverage	Insurance scheme	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
(MN of nonelderly people)												
Change in Coverage b/c ACA	Insurance Exchanges	11	21	24	24	23	23	23	23	23	22	22
	Medicaid and CHIP	10	12	12	12	13	14	14	14	14	14	14
	Employement-Based	-1	-6	-7	-8	-8	-7	-8	-8	-8	-7	-7
	Nongroup and Other	-3	-4	-4	-4	-4	-4	-5	-5	-5	-4	-4
	Uninsured	-17	-23	-24	-24	-24	-25	-25	-25	-25	-25	-25
Uninsured Population Under the ACA												
Number of Uninsured Nonelderly People		**35**	**29**	**27**	**27**	**26**	**26**	**26**	**26**	**27**	**27**	**27**
Insured Share of the Nonelderly Population												
Including All Residents		87%	89%	90%	90%	90%	91%	91%	91%	90%	90%	90%
Excluding Unauthorized Immigrants		89%	92%	92%	93%	93%	93%	93%	93%	93%	93%	93%

Source: Compiled by MHBK/IRD based on CBO baseline report released in March 2015.

Table 3 CBO's *March 2016* Projection of Insurance Coverage Expansion

Effects on Insurance Coverage	Insurance scheme	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
(MN of nonelderly people)												
Change in Coverage b/c ACA	Insurance Exchanges	12	15	18	19	19	19	19	18	18	18	18
	Basic Health Program	1	1	1	1	1	1	1	1	1	1	1
	Medicaid and CHIP	13	14	14	14	16	17	17	18	18	18	19
	Employement-Based	-2	-4	-6	-8	-9	-9	-9	-9	-9	-9	-9
	Nongroup and Other	-2	-2	-3	-3	-3	-4	-4	-4	-4	-4	-4
	Uninsured	-22	-24	-23	-23	-23	-23	-24	-24	-24	-24	-24
Uninsured Population Under the ACA												
Number of Uninsured Nonelderly People		**27**	**26**	**26**	**27**	**27**	**27**	**27**	**27**	**28**	**28**	**28**
Insured Share of the Nonelderly Population												
Including All Residents		90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Excluding Unauthorized Immigrants		92%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%

Source: Compiled by MHBK/IRD based on CBO baseline report released in March 2016.

While Obamacare didn't fundamentally address the cost side of healthcare, as discussed in pages 12-13 of the 2014 report[3], it put in motion a number of changes that could accelerate the transition of the U.S. healthcare systems. These include:

- The rise of accountable care organization (ACOs) and bundled payment system will increase the emphasis on value of care and accountability of care. Capitation model or other value-based payment system will take the place of the traditional fee-for-service model (see Figure 1 for a gradient of configuration according to the degree of integration and accountability).

Figure 1 Transition of the U.S. Healthcare Payment Model
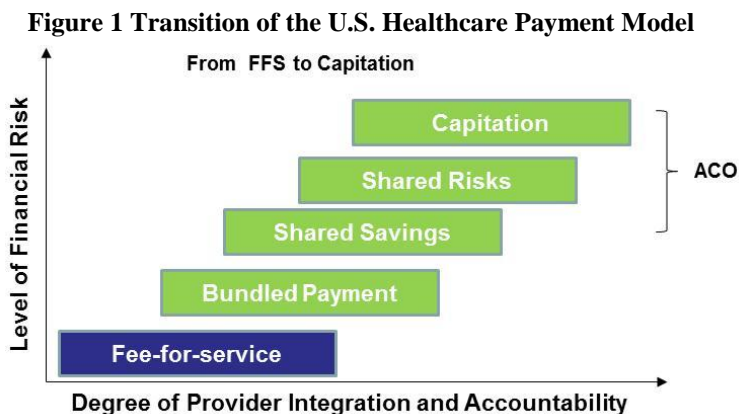
Source: HealthSouth

- Reimbursement cut to providers and generous plans (so called Cadillac plans) will force providers to be more efficient.
- Empowering consumers through the implementation of insurance market place will further push the trend of healthcare consumerism.
- The establishment of cost containment tools such as Independent Payment Advisory Board (IPAB) and Patient-Centered Outcomes Research Institute (PCORI) will emphasize value and outcome in healthcare.

The U.S. health insurer Aetna best captured the transition of U.S. healthcare system in an investor presentation slide (see   Figure 2). Basically, U.S. healthcare system is transitioning to a capitated, value-based, consumer-empowered model. Obamacare is likely to accelerate such a transition. Healthcare IT solutions are needed to facilitate such a transformation of U.S. healthcare system.

Figure 2 Changing Healthcare Landscape
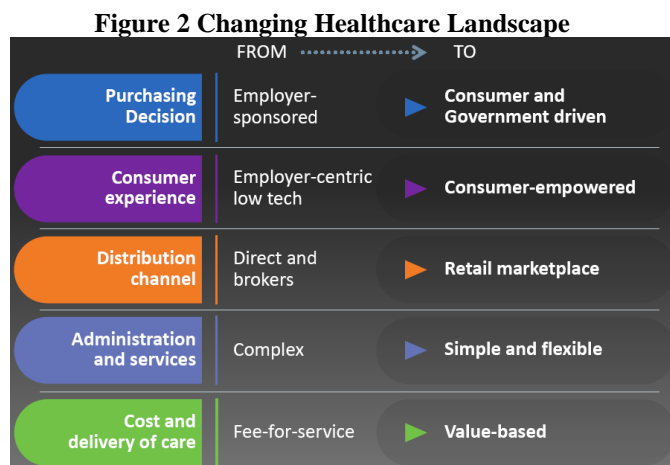
Source: Aetna Analyst Day, December 12, 2013

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[3] http://www.mizuhobank.co.jp/corporate/bizinfo/industry/sangyou/pdf/mif_163.pdf

Industry participants believe a larger scale could help them better meet the challenges brought on by Obamacare and the shifting healthcare landscape. Therefore, consolidation is occurring throughout healthcare. Providers are merging to create large healthcare systems. There have been many hospital mergers in the U.S. Not to lose bargaining power vs. the providers, managed care companies are merging. Anthem's pending acquisition of Cigna and Aetna's pending acquisition of Humana would reduce the number of U.S. national managed care companies from 5 to 3. To retain bargaining power vs. the providers and payers, medtech industry followed suit[4] . This has set the background for the consolidation of healthcare IT vendors.

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[4] http://www.mizuhobank.co.jp/corporate/bizinfo/industry/sangyou/pdf/mif_175.pdf

B. Policy and Industry Evolution of HCIT

Healthcare Information Technology (HCIT) had been growing at a moderate pace before 2009. The American Recovery and Reinvestment Act of 2009 (ARRA or the Stimulus Bill) provided a huge boost to HCIT. As a part of ARRA, The Health Information Technology for Economic and Clinical Health Act (HITECH) was enacted[5]. The HITECH Act offers large financial incentives for providers (up to $2mn per hospital and $64K per physician) to adopt electronic health records (EHRs) and levies penalties if they fail to do so. The incentives started in 2011 and as of last September government has paid $31bn incentives per the HITECH Act. However, with some residual incentives to be paid to late adopters until 2021, the majority of incentives are winding down. At the same time, penalties are taking effect this year for providers that fail to meet some of the meaningful use requirements.

CMS through the Office of the National Coordinator for Health IT (ONC) has designed a three-stage approach for adoption of HCIT. For each stage, ONC sets up specific criteria for providers to meet meaningful use (MU) standards, and thus qualifies/penalizes them for the financial incentives (see Table 4). Stage 1 requires providers to implement EHR. After six years of rapid uptake this stage is mostly complete. HCIT industry is currently in the middle of implementing Stage 2 (running 2015-2017), which emphasizes exchange of information between providers (i.e., interoperability). CMS released the final rule for Stage 3 in October 2015[6], which will be implemented on an optional basis in 2017 and a mandatory basis in 2018. If the key word for Stage 1 is EHR and the key word for Stage 2 is interoperability, the key word for Stage 3 is population health (PHM). Although there are various definitions of PHM, it basically means using EHR to improve clinical outcome for a broad patient population.

Table 4 Meaningful Use Criteria

Stage 1	Stage 2	Stage 3
Electronically capturing health information in a standardized format	More rigorous health information exchange (HIE)	Improving quality, safety, and efficiency, leading to improved health outcomes
Using that information to track key clinical conditions	Increased requirements for e-prescribing and incorporating lab results	Decision support for national high-priority conditions
Communicating that information for care coordination processes	Electronic transmission of patient care summaries across multiple settings	Patient access to self-management tools
Initiating the reporting of clinical quality measures and public health information	More patient-controlled data	Access to comprehensive patient data through patient-centered HIE
Using information to engage patients and their families in their care		Improving population health

Source: ONC. https://www.healthit.gov/providers-professionals/how-attain-meaningful-use

We believe as government incentive runs its course, HCIT market will be driven by market forces instead of government incentives. Market forces basically require HCIT to deliver good return on investment (ROI) either on the financial side or clinical side or ideally both.

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[5] https://www.healthit.gov/sites/default/files/hitech_act_excerpt_from_arra_with_index.pdf
[6] https://www.federalregister.gov/articles/2015/10/16/2015-25595/medicare-and-medicaid-programs-electronic-health-record-incentive-program-stage-3-and-modifications

C. Current Trends of HCIT

There are enormous inefficiencies and waste in the U.S. healthcare system. HCIT is considered by many as a key tool to reconfigure U.S. healthcare delivery. The underlying inefficiencies of the U.S. healthcare as well as the trends of U.S. healthcare are driving the demand for HCIT. On the supply side, most of the IT tools already exist in the technology market. HCIT companies just need to borrow and implement the existing IT solutions in healthcare.

Currently there are a number of salient trends of Healthcare IT:

- Despite waning incentives from the HITECH Act, government's incentives or penalties will continue to play an important role in guiding HCIT. For example, Obamacare established the Hospital Readmissions Reduction Program, which requires CMS to reduce payments to hospitals with excess readmissions[7]. Such penalties have driven the demand for patient engagement HCIT tools to keep patients outside of hospitals after discharge (e.g., 30 days after discharge for heart failure patients).

- Adoption of EHR has largely run its course. Going forward, EHR market is more focused on replacement. There is likely to be continued consolidation for EHR vendors. As providers consolidate, small vendors will face pressure on their business.

- Interoperability represents the most near-term need for the HCIT industry. With basic EHR installed at providers, the next challenge is to facilitate data exchanges between providers. Health Information Exchange (HIE) or other conduits of health information flow is likely to be in high demand.

- Population health / data analytics represents the largest growth potential. The next step of HCIT is to intelligently use the EHR data and other data to improve health outcome. To do so, advanced tools for data aggregation, analytics and care coordination are required. Advanced computation like IBM's Watson cognitive solutions and cutting-edge data analytics will increasingly be used in healthcare.

- While the robust HCIT growth over the last five years was mostly driven by government's financial incentives, going forward, private sectors are likely to be the main payer for HCIT. They will put more demand on ROI and other financial metrics. HCIT players will need to work hand-in-glove with providers to achieve such goals.

- Cloud-based computing will be used more prevalently in Healthcare. SaaS (software as a service) is considered a better solution for HCIT than the installed software. Therefore we see companies with SaaS technology to take market share in various HCIT segments.

- Big IT players are entering into HCIT. IBM has made four notable acquisitions in HCIT industry recently to build out its presence. Google is also featured prominently in HCIT through Google Genomics, Google Glass, apps and wearables and other ventures.

- Having faced substantial cut from Obamacare, providers continue to face tight budgets. Providers' spending on HCIT is expected to grow modestly and any HCIT solution that can produce a quick ROI will be prioritized.

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[7] https://www.cms.gov/medicare/medicare-fee-for-service-payment/acuteinpatientpps/readmissions-reduction-program.html
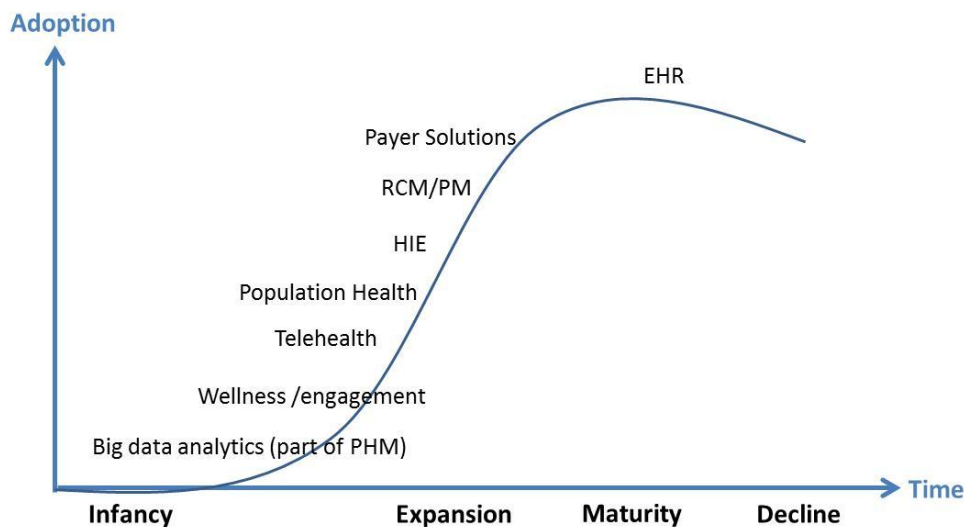
II. Major Segments of HCIT

Healthcare information technology (HCIT) is a broad term that covers a variety of products and services. From a product function perspective (see Table 5), HCIT includes electronic health/medical records (EHR or EMR), financial solutions for providers such as revenue cycle management (RCM) and practice management (PM), data integration and interchangeability solutions such as health information exchange (HIE), Population health/data analytics, telehealth, patient wellness/engagement, and solutions for payers/health plans. As illustrated in Figure 3, different segments of HCIT are at different stages of market development. At one end of the spectrum, EHR adoption is near saturation level while at the other end big data analytics is at its infancy. In-between are segments experiencing significant growth. Corresponding to the market penetration, mature segments are generating reliable profits while fast-growing and infancy segments are likely losing substantial money (see Figure 4). For example, Telehealth appears to be close to the nadir of profitability. Last year was expected to be the largest loss year for the telemedicine leader Teladoc. Its profit is projected to improve over time (see Figure 17).

Table 5 Healthcare IT Segmentation

	Payors	Provider-geared Healthcare IT				Consumer Facing Digital Health (Telehealth / Mobile Health)			
Products Category	Administration, Analytics	EHR	Health Information Exchange (HIE)	Population Health / Data analytics	RCM / Practice Management (PM)	Telemedicine (doctor visit via video or telephone)	Wearables for fitness, health monitoring	Cost/Quality Transparency	Wellness / patient engagement
Products /Services	Benefits administration, care management, analytics	EHR, EMR	HIE	Aggregate EHR data, stratify patients, data analytics, coordinate care	Help provider collect revenues, manage scheduling, etc.	Remote doctor access	Monitor health and lifestyle by wearables	Compare cost and quality across providers	Use internet to engage patients and improve health outcomes
Company Example	Cognizant, HealthEdge, MedHOK, Inovalon	Epic, Cerner, Meditech, Allscripts	Allscripts, Epic, Cerner, Orion Health, ICA, InterSystems	Cerner, Epic, Allscript, Evolent Health, Align Healthcare, MEDai	athenahealth, Meditech, Epic, McKesson, MedAssets	Doctor on Demand, Teladoc, InTouch Health	Fitbit, Jawbone, Withings, Lifewatch	Castlight, Change Healthcare (now part of Emdeon)	Omada Health, Keas, Redbrick Health, Propeller Health
Competitive advantages	Provider reach, functionality	Size, strive to the the standard	Interoperability, financial sustainability	Analytic power, comprehensive solution; deliver outcome	Ease of use, SaaS, smooth interface with other HCIT tools	Right proposition to patients, scale	Functionality, convenience, marketing	Access to clinical/cost data, scale	Ease of use, functionality, stickiness of program, outcome

Source: Compiled by MHBK/IRD based on public company reports

Figure 3 Adoption Curve of Healthcare IT

Source: compiled by MHBK/IRD.
Note for illustrative purpose only.

Figure 4 Profit/Loss of Various Segments of HCIT
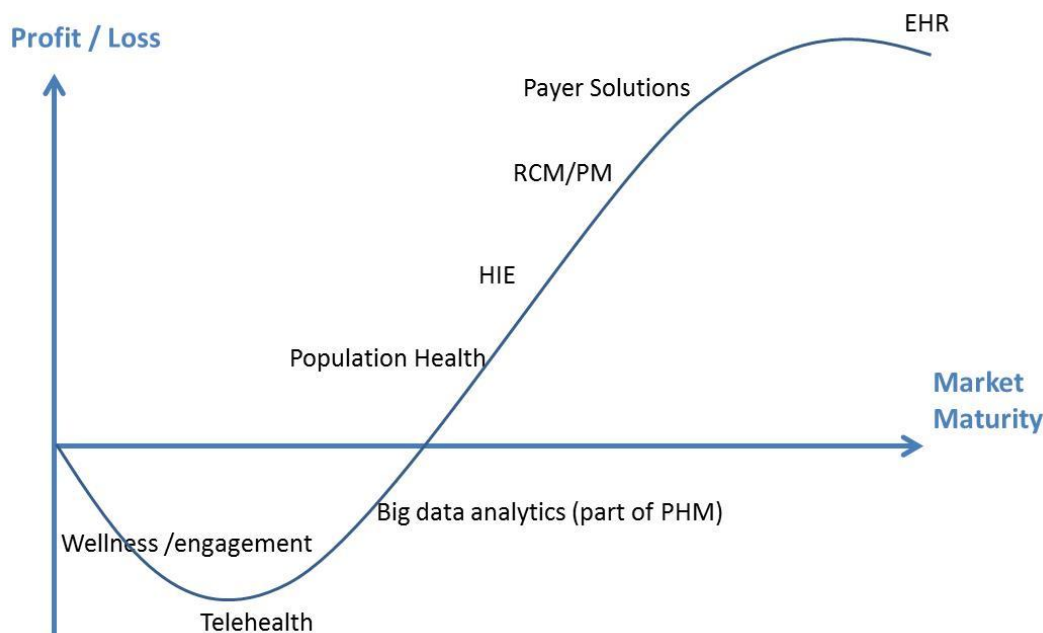
Source: compiled by MHBK/IRD.
Note for illustrative purpose only.

HCIT market can also be segregated according to who uses the service. In this segmentation, HCIT can be classified as solutions for providers, for consumers/patients, for payers, or for some hybrids. We note who uses the service is sometimes different from who pays for the service. For example, Castlight Health aggregates data from big health plans and provides medical cost comparison across providers to consumers through their online portal. Although users of such a service are consumers, big employers who self-insure their employees pay Castlight for it. Castlight's cost transparency tool can be thought of as a patient engagement tool but at the same time also a solution for payers. Similarly wellness apps/patient engagement tools are used by consumers, but oftentimes they are paid by big employers.

Telemedicine companies that allow patients to see doctors through video or telephone can be considered as solutions for patients. But even in this case, such telehealth providers need to first market to payers to incorporate this service in their health coverage. Once such a service is included in the benefit, telehealth vendors can market directly to consumers. In the case of Teladoc, firstly it charges a subscription fee based on PMPM (per member per month) from payers, and secondly it charges a $45 per episode copay from patient. Therefore it is a hybrid model.

Given the current state of U.S. healthcare system, in general we believe it is easier for HCIT business to target some health aggregators such as providers or payers rather than individual patients. Therefore a B2B model is preferable to a B2C model.

A. EHR

As the foundation of HCIT, EHR is the major recipient of government funding. As of December 2015, HITECH Act has paid $31.9bn incentives for providers to adopt EHR (see Figure 5). But this government funded EHR adoption campaign has come to the tail end. Last year we saw dramatically diminished EHR incentive fees from the government. While incentives are mostly gone, penalties for healthcare providers that haven't adopted EHRs will start this year.

Figure 5 Annual and Cumulative EHR Incentive Payments
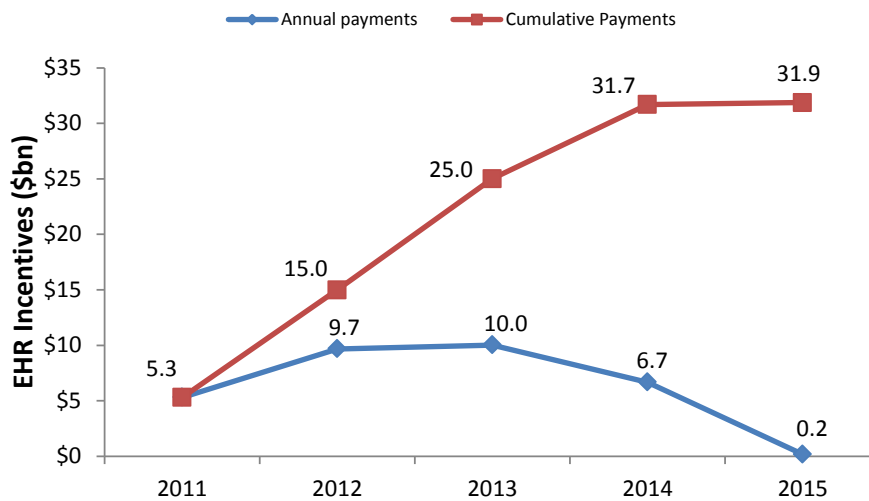
Source: CMS, https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/December2015_SummaryReport.pdf

The HITECH Act is credited with substantially boosting the adoption of EHR. EHR adoption is almost near saturation level among providers. On the ambulatory (physician clinic) side, EHR adoption has doubled from 2008 level (see Figure 6). A decade ago, most U.S. physicians kept patients' medical records in hand-written paper stored in colored folders. As of end 2014, 83% of U.S. physicians use EHR. For the 17% that don't have an EHR installed, over half plan to install in the next two years.

Figure 6 % U.S. Physicians Adopting EHR

Source: ONC. http://dashboard.healthit.gov/quickstats/pages/physician-ehr-adoption-trends.php
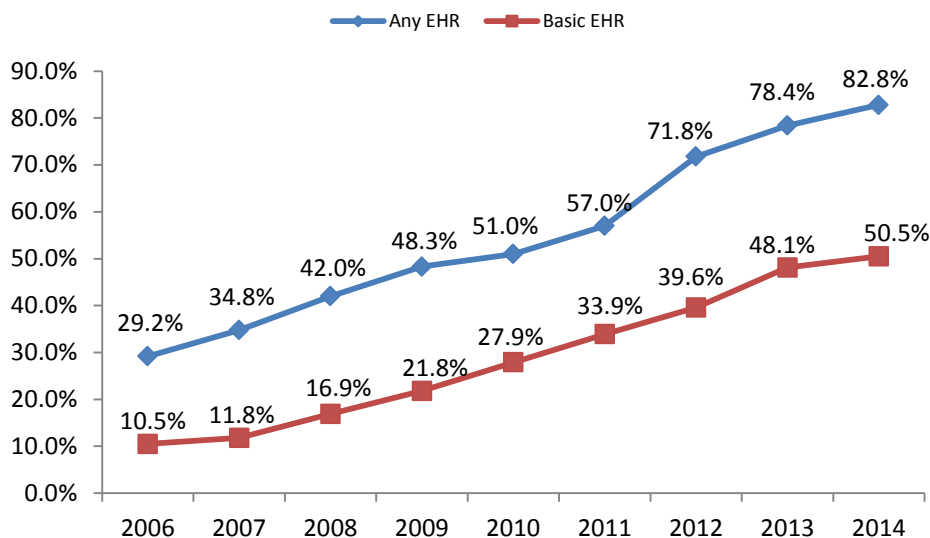
On the hospital side, EHR is almost fully penetrated with adoption rate reaching 97% as of the end of 2014 (see Figure 7).

Figure 7 % U.S. Hospitals Adopting EHR

Source: ONC. http://dashboard.healthit.gov/quickstats/pages/FIG-Hospital-EHR-Adoption.php
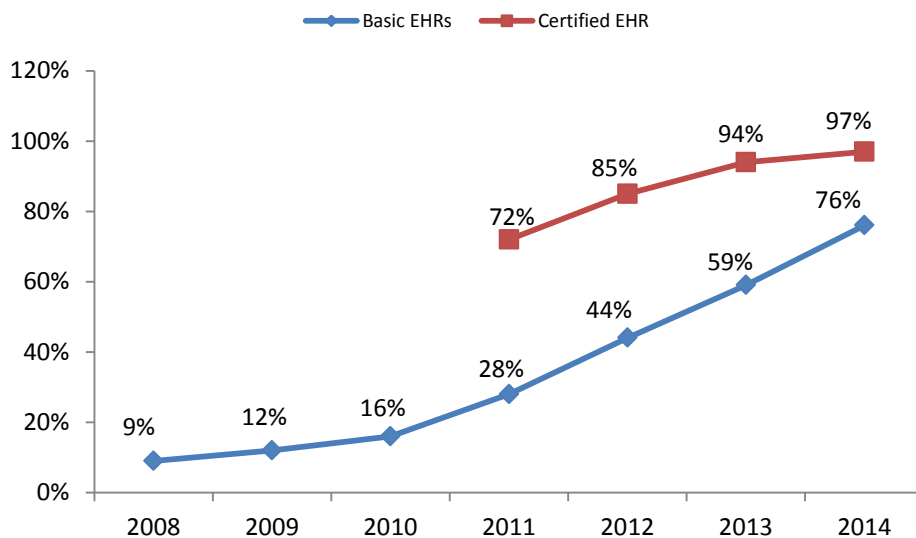
With growth slowing and market near saturation, EHR vendors are under pressure. Future revenues will come from replacing existing systems. When providers merge, they often consolidate EHR under a single vendor. In addition, there are increasing technical requirements to meet meaningful use criteria and ensure interoperability. All of these point to an environment that favors big players. The EHR market is relatively concentrated in the hospital market with the top three players having 2/3 of the market. But it is quite fragmented on the ambulatory side with the top ten companies controlling ~60% of the market (Figure 8). Epic and Cerner are the current market leaders for hospital EHRs. As an example of the benefit of large size, Cerner in partnership with Accenture and Leidos, won the huge 10-year EHR contract from Department of Defense last year. The first step of the contract, valued at $4.3 billion, is to implement Cerner's off-the-shelf EHR system across the Military Health System.

We are seeing increasingly consolidations among EHR vendors. In the hospital EHR space, the most prominent deal was Cerner's acquisition of Siemens Health Services in August 2014. The ambulatory EHR market is poised for consolidation. Last year, private equity firm Marlin Equity acquired two EHR companies (e-MDs and AdvancedMD) and merged them with its fully-owned EHR company MDeverywhere. Quality Systems acquired the cloud-based EHR company HealthFusion late last year.

As the EHR market gravitates towards large players, small players need to join a bigger platform, adopt new business models or specialize in a niche.

As an example of a new business model, Practice Fusion offers EHRs to physicians for free and at the same time gives patients free access to their personal health record. It allows patients to view lab results, communicate with their doctor, electronically fill prescriptions, and schedule appointments. The company makes money through partnerships with enterprise clients for treatment support programs and care coordination. In other words, companies use the Practice Fusion platform to encourage patients to use their services and derive more insights from patients to better market their products.

As a niche focus strategy, Flatiron Health tries to dominant a large vertical which is the oncology market. In addition to EHRs, it also offers decision support tools, analytics and integrated practice management and billing software to oncologists. Many pharma companies are likely to find Flatiron Health's data very valuable for their marketing or research use.

We believe EHR is an entry ticket for a HCIT company to establish a relationship with a customer. Once a provider adopts a particular EHR, the HCIT vendor can then offer many additional products to the customer. So although EHR in itself may not be an attractive product category, it could lead to opportunities for the vendor to market other products.

Figure 8 EHR Market Share
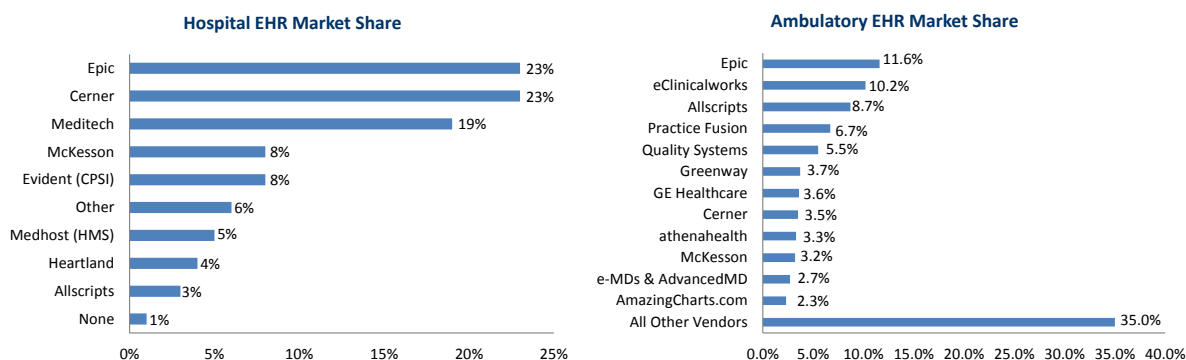
Source: KLAS 2014 and 2015 Market Share Reports

B. Revenue Cycle Management / Practice Management

Revenue cycle management / Practice management software helps providers schedule an appointment, verify insurance coverage, collect reimbursement and copay, manage patient follow-up and handle insurance denial or other collection issues. This service helps providers maintain compliance with billing and claims management standards, and at the same time improves practice management by simplifying workflows related to patient registration, scheduling, check-in, charge entry, referral management, check-out, follow-up, collections, accounting and reporting. Because of its immediate impact on revenue collection, investment in RCM often has an easy time to prove return on investment (ROI). Physician practices can see quick financial returns as RCM improves collection and efficiencies in the clinic.

There are a number of drivers for RCM/PM.

- Since October 1, 2015, CMS started the migration from ICD9 to ICD10. The ICD-10 classification system contains about five times the number of codes as ICD-9—the number of diagnosis codes expands from 14,000 to 68,000 with ICD-10, while the number of procedure codes increases from 4,000 to 87,000. The changeover to the ICD-10 coding system is a regulatory requirement expected to significantly increase operational complexity related to revenue cycle management (RCM). In 2017, it will move from ICD11, which contains 140k codes. The increased coding complexity drives the demand for advanced RCM solutions.
- As the U.S. Healthcare moves from a fee-for-service model to a value-based model, there are new requirements for RCM solutions to take account of. In the era of ACO, bundled payment, or other value-based reimbursement scheme, advanced RCM will be important to handle the complexity.
- Network effect will benefit RCM suppliers with scale and well connected to the various parties in HCIT. Big players such as athenahealth are well positioned.
- SaaS RCM providers such as athenahealth have a more attractive product than traditional software vendors.

C. HIE / Data Integration

Electronic health information exchange (HIE) is the secure transmission of electronic health data among healthcare providers, payers, government agencies and other healthcare organizations. For the data to be shared effectively between different entities, they need to be compatible or interoperable. Interoperability means two or more IT systems can exchange information and use exchanged information.

Achieving interoperability is a key objective in MU State 2. Therefore there is intense push for providers to adopt interoperability solutions such as HIE. Currently interoperability is considered a key bottleneck in HCIT. But it has made big improvement over the last four years. In 2014, around three quarters of U.S. hospitals electronically exchanged health information with outside providers[8]. The percentage of U.S. hospitals that electronically share information with other hospitals and external ambulatory providers has increased to 62%/69% in 2014 from 15%/36% in 2008 (also Figure 9).

Figure 9 Percentage of Hospitals that Electronically Exchanged Lab Results, Radiology Reports, Clinical Care Summaries, or Medication Lists with Outside Providers and Hospitals
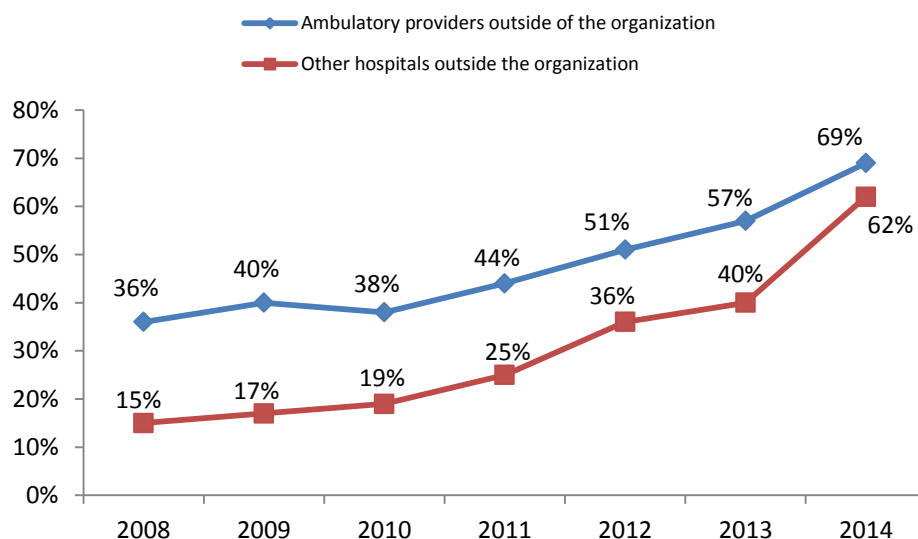
Source: Heisey-Grove, D., Patel, V., Searcy, T. (September 2015) Physician electronic exchange of patient health information, 2014. ONC Data Brief, no. 31. Office of the National Coordinator for Health Information Technology: Washington DC.

On the physician side, 57% of physicians electronically share health information with their patients in 2014, an increase from 46% in 2013[9] (see Figure 10).

- In 2014, 52% of physicians exchanged secure messages with their patients, compared to 40% in 2013.
- The percentage of physicians who gave patients access to view, download or transmit their electronic health information increased from 33% in 2013 to 47% in 2014.

In 2014, 4 in 10 physicians electronically shared patient health information with other providers, which is a slight increase from 2013 (see Figure 11). However, when looking at specific entities with which physicians share information electronically and what

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[8] https://www.healthit.gov/sites/default/files/data-brief/ONC_DataBrief24_HIE_Final.pdf
[9] http://dashboard.healthit.gov/evaluations/data-briefs/physician-electronic-exchange-patient-health-information.php

information they share, it is apparent that only 10-15% physicians share information with unaffiliated parties (see Figure 12 and). Over one-third of physicians electronically share health information with other ambulatory care providers and over one-quarter electronically shared with hospitals. The rate is much lower if we consider only unaffiliated providers (see Figure 12). Therefore physicians are much more comfortable in sharing information within their affiliated organization. There was little variability in what type of data physicians share electronically. About one-third physicians share data electronically (see Figure 12 and Figure 13).

Figure 10 Proportion of physicians who electronically shared health information with patients in 2013 and 2014
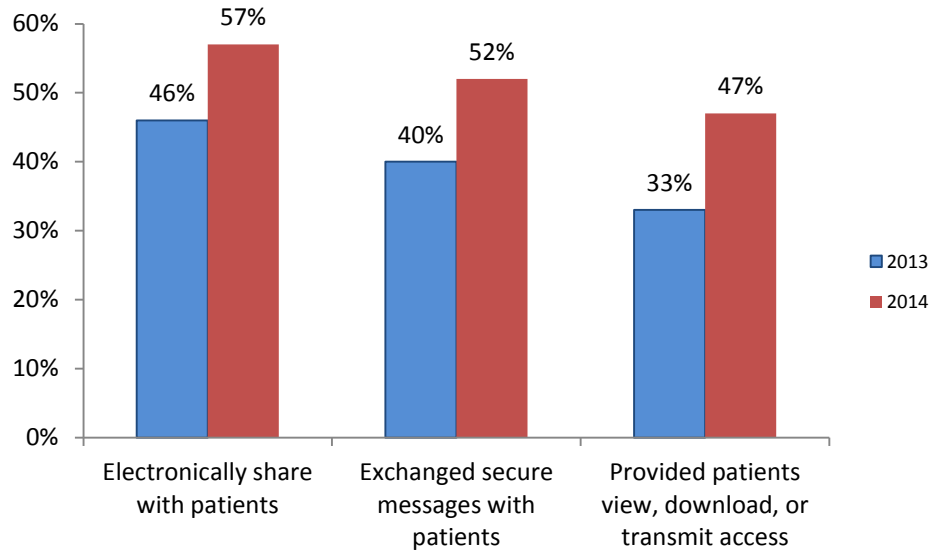
Source: Heisey-Grove, D., Patel, V., Searcy, T. (September 2015) Physician electronic exchange of patient health information, 2014. ONC Data Brief, no. 31. Office of the National Coordinator for Health Information Technology: Washington DC.

Figure 11 Proportion of physicians who reported electronic shared patient health information with other providers
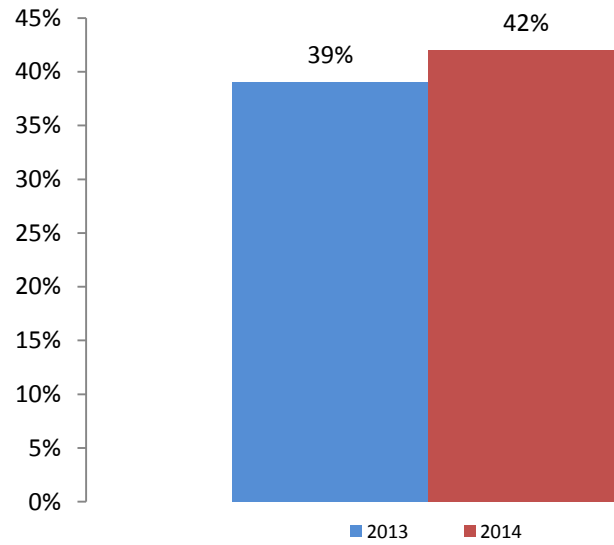
Source: Heisey-Grove, D., Patel, V., Searcy, T. (September 2015) Physician electronic exchange of patient health information, 2014. ONC Data Brief, no. 31. Office of the National Coordinator for Health Information Technology: Washington DC.

Figure 12 Proportion of physicians electronically shared patient health information with other providers, 2014
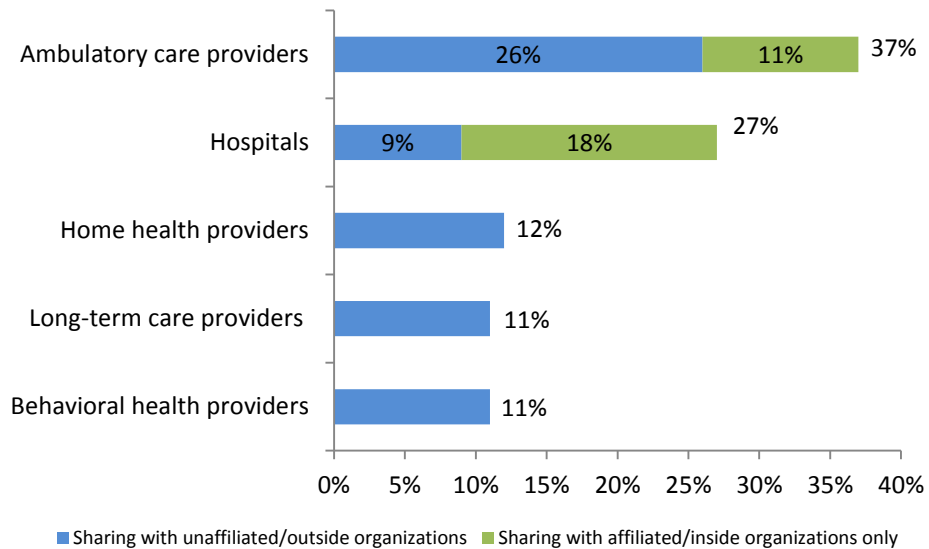
Source: Heisey-Grove, D., Patel, V., Searcy, T. (September 2015) Physician electronic exchange of patient health information, 2014. ONC Data Brief, no. 31. Office of the National Coordinator for Health Information Technology: Washington DC.

Figure 13 Proportion of physicians who electronically shared specific health information with other providers
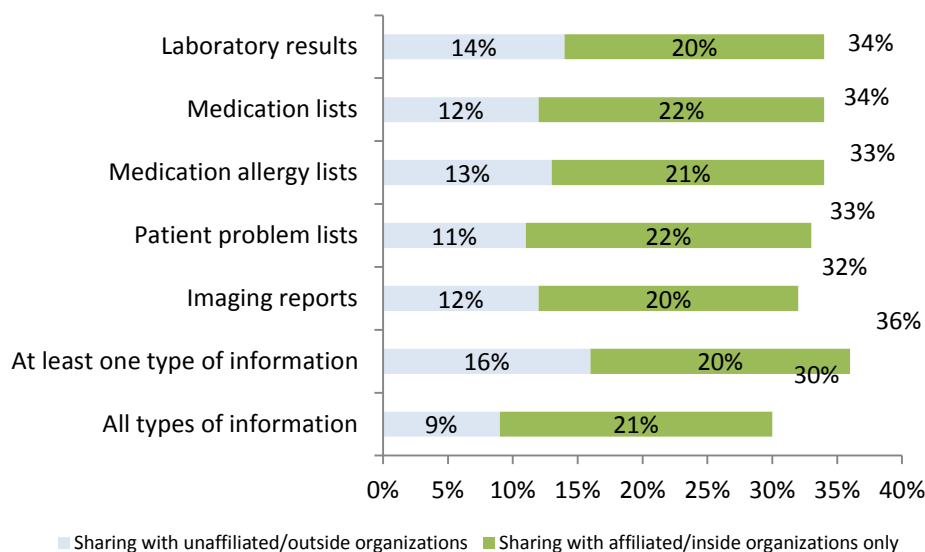
Source: Source: Heisey-Grove, D., Patel, V., Searcy, T. (September 2015) Physician electronic exchange of patient health information, 2014. ONC Data Brief, no. 31. Office of the National Coordinator for Health Information Technology: Washington DC.

In 2015 the Office of the National Coordinator for Health IT (ONC) put out a comprehensive interoperability agenda and action plan in a draft report called Shared Nationwide Interoperability Roadmap. The Roadmap identified specific goals and actions for three time frames with the final goal of achieving nation-wide interoperability by 2024. Specific goals for the three periods are[10] (also see Figure 14):

• 2015-2017: Send, receive, find and use priority data domains to improve health care quality and outcomes.
• 2018-2020: Expand data sources and users in the interoperable health IT ecosystem to improve health and lower costs.
• 2021-2024: Achieve nationwide interoperability to enable a learning health system, with the person at the center of a system that can continuously improve care, public health, and science through real-time data access.

Figure 14 Goals to Achieve Interoperability for the Three Time Frames

Source: ONC. Connecting Health and Care for the Nation: A Shared Nationwide interoperability Roadmap

A trend in interoperability is the adoption of Fast Healthcare Interoperability Resources (FHIR, pronounced "fire"). FHIR is an emerging interoperability protocol for exchanging electronic health records. The standard was created by the Health Level Seven International (HL7), a health-care standards organization. Leading provider organizations are starting to adopt FHIR. For example, recently Duke Medicine announced the adoption of FHIR with its Epic-based EHR system in conjunction with Apple's HealthKit. Many leading HCIT companies (such as athenahealth, Cerner, Epic, Meditech, McKesson, Advisory Board, Accenture, Surescripts) and a number of prominent providers have joined the Argonaut Project to push for the wide adoption of FHIR.

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[10] https://www.healthit.gov/sites/default/files/hie-interoperability/nationwide-interoperability-roadmap-final-version-1.0.pdf

The Health Information Exchange market can be segmented into public exchanges and private exchanges. Private exchanges are created and operated by a single entity such as a hospital or an integrated delivery network (IDN), while public exchanges are shared across entities. There is still a need for HIE for a single hospital or IDN because often times different departments of a hospital or different hospitals in an IDN use different HCIT vendors. Therefore they need HIEs to share data between systems. Public exchanges can further be segregated into federal/national exchanges, state exchanges, and community/local exchanges.

- Federal exchanges connect government agencies such as HHS, CMS, CDC, the Social Security Administration, and the Veteran's Administration. They are funded and governed by the government. The ONC provides funding for the development of the Nationwide Health Information Network (NwHIN), which is a set of standards, services, and policies that enable the secure exchange of health information over the Internet. eHealth Exchange (now part of Sequoia Project) has become the largest health information exchange network in the country.
- State exchanges are funded by the states but also receive start-up funding from the federal government. In 2010, the ONC granted ~$550mn to states for the development of state HIEs. State exchanges are governed by the states but also report to ONC.
- Community/Local exchanges or regional health information organizations (RHIO) connect multiple independent healthcare stakeholders in a defined geographic area and govern health information exchange among them.

There are a number of HIE vendors (see Table 6). Many large companies entered into HIE through acquisitions, such as Allscripts (dbMotion), Quality Systems (Mirth), McKesson (RelayHealth), Aetna (Medicity), and Optum (Axolotl).

Table 6 Notable HIE Providers

Notable HIE Providers	Notable HIE Providers (Continued)
Ability Network	GE
Aetna (Medicity)	HealthUnity Corporation
Allcripts (dbMotion)	ICA
Caradigm	InterSystems Corporation
CareEvolution	Quality Systems (Mirth)
Cerner Network	McKessen (RelayHealth)
Corepoint Health	OptumInsight (formerly Axolotl)
Covisint	Orion Health
eClinicalworks	Harris Corporation
Epic	IBM

Source: Compiled by MHBK/IRD based on public company reports

D. Population Health

Depending on the person asked, there could be different definitions of population health. Population health literally means the health outcome of a group of individuals, or a defined population. As the U.S. healthcare system is moving to a value-based model, it requires an IT solution that aggregates data, analyzes data and coordinates care to improve the clinical outcome and cost of a given patient population. Such IT solutions fall under the category of population health.

1. The U.S. Healthcare System is Evolving to A Value-based Model

As discussed in the beginning of this paper, the U.S. healthcare system is moving from the fee-for-service model to a valued-based system. The value-based model can take the spectrum of various formats with FFS at one end and full global capitation on the other end (see Figure 1). In the middle are intermediate types of value-based reimbursement systems such as bundled payment (already implemented this year by Medicare for total joint replacement under Medicare), Medicare Shared Savings Program (MSSP, providers share the savings but not the downside cost overrun) and others.

In an article published in a March 2015 issue of The New England Journal of Medicine, HHS secretary Sylvia Burwell outlined specific goals for linking Medicare payment to value. This was the first time for CMS to set up explicit goals for value-based payment models.

- **CMS set a goal of tying 85 percent of all traditional Medicare payments to quality or value by 2016 and 90 percent by 2018 through programs such as the Hospital Value-Based Purchasing and the Hospital Readmissions Reduction Programs.**
- **There is a goal to have 30% of Medicare payments tied to quality or value through alternative payment models by the end of 2016, and 50% of payments by 2018.** As a reference, in 2015, 20% of payments from the Medicare are paid via alternative payment models like bundled payments, patient-centered medical homes and accountable care organizations.

Commercial payers have followed CMS's lead in setting up specific goals for value-based payment model. Big health insurers such as Aetna, Anthem, Cigna, Humana, and UnitedHealth all set up similar goals as CMS.

A key player in the new value-based payment system is ACO (Accountable Care Organization). CMS defines ACOs as "Groups of doctors, hospitals, and other health care providers, who come together voluntarily to give coordinated high quality care to their Medicare patients." Medicare has experimented with different types of ACOs including Medicare Shared Savings Program (MSSP, where providers share the savings but are not penalized for cost overruns), Pioneer ACO, and Next Generation ACO. The stricter Pioneer ACO program was rolled out in 2012 as a part of Affordable Care Act (ACA). Not all Pioneer ACOs were successful and some initial participants have dropped out. Next Generation ACO is set to begin this year as an improvement over Pioneer and 21 ACOs have signed up to this program.

Beyond well-known Medicare ACO programs, commercial payers and Medicaid also offer ACO programs. According to Leavitt Partners, at the end of 2015, there were 782 public or private ACOs in the U.S., covering 23.2mn lives (see Figure 15). In a base case scenario, Leavitt Partners projects U.S. lives covered under ACO to grow to 105mn by 2020. As shown in the experience of Medicare Pioneer ACO program, not all ACOs will be financially successful. Some ACOs will fail to recoup the cost incurred to switch to an ACO model. However, if there continues to be strong public support, a strong trend will favor even wider adoption of ACOs.

Figure 15 The Growth of U.S. ACOs
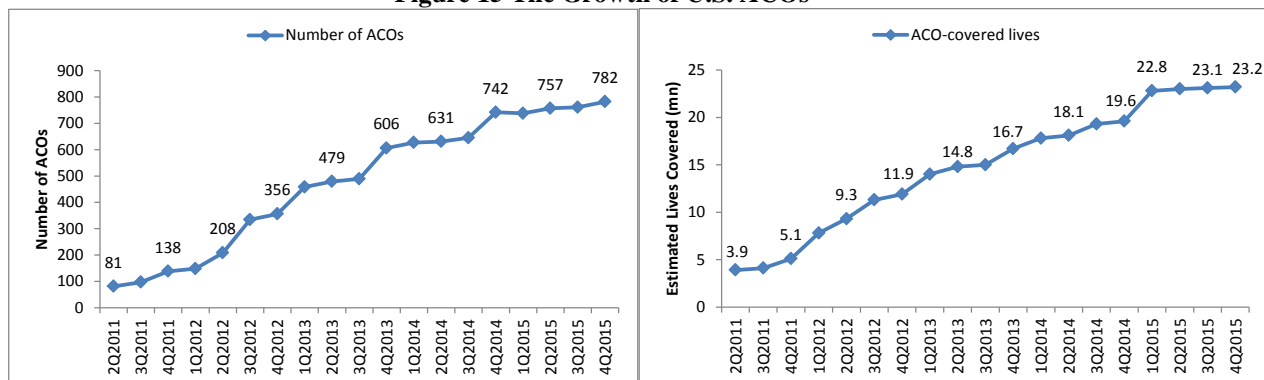
Source: Leavitt Partners. http://leavittpartners.com/wp-content/uploads/2015/12/ACO-Projections-12.22.2015.pdf

2. The Scope of Population Health and Some Key Players

To achieve this transition to the alternative model such as ACO, healthcare providers need the IT solutions to help them manage, monitor and engage patients, and to provide analytical support and care coordination. These functions are loosely referred to as population health management (PHM). EHR is merely the first step leading to population health.

According to HCIT consultancy KLAS (please refer to Allscripts Population Health Management Investor Summit, 6/5/2014), PHM is the process of proactively monitoring and caring for defined patient groups. KLAS further breaks PHM into four areas:

1. Data Aggregation: Combining patient data from disparate sources, i.e., HIE system.
2. Population health data analytics: Analyzing data to derive actionable insight to improve clinical outcome.
3. Care management and coordination: Directing care providers' efforts in a coordinated fashion to improve care.
4. Patient engagement: Engaging patients before, during and after care to improve the clinical outcome.

Others have given population health narrower definitions. Gartner defined population health as the last three of the four afore-mentioned functions, i.e., population health data analytics, care management and coordination, patient engagement. Vendors can be compared based on the capabilities they offer in PHM (see Table 7). Notably, IBM acquired three companies on the list over the last twelve months – Explorys, Phytel, and Truven.

Table 7 Key Population Health Management Capabilities Offered by PPHM Providers

PHM Vendor	Population Health Analytics	Care Management / Coordination	Patient Engagement	Enterprise Analytics Platform	Solution for Payers	Big Data Platform
Platform Segment						
Allscripts Health Solutions	√	√	√	x	x	√
Cerner	√	√	√	√	√	√
Epic	√	√	√	√	√	√
McKesson	√	√	√	√	√	√
Optum	√	√	√	√	√	√
Healthcare Enterprise Analytics Segment						
Caradigm	√	√	√	√	√	√
Deloitte	√	√	√	√	√	√
Explorys (now part of IBM)	√	√	√	√	√	√
Health Catalyst	√	√	x	√	x	√
IBM	√	√	√	√	√	√
NextGen Healthcare	√	√	√	√	√	√
Sandlot Solutions	√	√	x	√	√	√
Wellcentive	√	√	√	√	√	√
Specialty Segment						
Evolent Health	√	√	√	√	√	√
Genesia	√	√	√	√	√	√
Greenway Health	√	x	√	x	x	x
Healthagen (Aetna)	√	√	-	√	√	-
Influence Health	√	√	√	x	√	√
Enli Health Intelligence Corporation	√	√	√	x	x	x
Phytel (now part of IBM)	√	√	√	x	x	x
Practice Fusion	√	√	√	√	√	√
Streamline Health	√	x	x	x	√	x
Truven Health Analytics (now IBM)	√	√	√	x	√	√
ZeOmega	√	√	√	√	√	√

Source: "Market Guide for U.S. Provider-Based Population Health Management Solutions" from Gartner, published April 12, 2015. Note √ = Has capability; x = Does not have capability.

Many HCIT companies offer PHM solutions (for a more comprehensive list, please refer to the table in section V). Table 8 shows some examples of specific solutions offered by PHM vendors. As shown in Table 8, successful implementation of PHM often requires a comprehensive solution and a lot of handholding from the HCIT companies to their customers. The best way to implement PHM may require HCIT vendors to enter into risk-based relationship with providers. As a landmark deal, Health Catalyst entered into a 10-year, $108mn deal with Allina Health to improve clinical outcomes with Health Catalyst's PHM system.

Table 8 Technology Offerings by Selected Small-Mid Sized PHM Vendors

Company	Decription of Platform
Evolent	Evolent Health offers comprehensive solutions to help providers transition from a fee-for-service to a value-based model. Evolent's core technology solution is Identifi. Sitting above a provider's EHR system, Identifi provides data integration, clinical and business content, EMR optimization, analytics, patient risk stratification and other purpose-built applications.
Health Catalyst	Health Catalyst provides a late-binding enterprise data warehouse (EDW), which pulls in data from various data sources and integrate them into a database. On top of the EDW, Health Catalyst has been developing a variety of applications in an application layer. These applications help providers with specific tasks to improve clinical and financial outcome. For example, a heart failure management tool helps providers manage a heart failure patient. A RCM tool helps providers collect revenues from payers. In January 2015, Health Catalyst signed a landmark 10-year, $108mn deal with Provider network Allina Health. Through this collaboration, Allina will outsource HCIT to and implement PHM solutions from Health Catalyst and Health Catalyst will share risk-based compensation.
Inovalon	Inovalon provides cloud-based data analytics and data-driven intervention platforms to the healthcare industry. Its platforms enable its clients to achieve meaningful insight and improvement in clinical and quality outcomes, utilization, and financial performance. At a foundation of its technology is a massive proprietary database, on which it applied analytics to derive insights for its customers.
NantHealth	NantHealth provides a wide variety of IT applications to enable population health, with an emphasis on oncology. It offers a number of tools for population health, including Clinical Operating System (cOS™), Eviti decision support tool for oncologists, DeviceConX (a software solution that collects and transmits data from medical devices to EHR in hospitals), and big data analytics driven by super computers. Another part of NantHealth is a diagnostics division called NantOmics. NantHealth is well position to integrate personalized medicine into oncology treatment algorithms.
WellCentive	Wellcentive, Inc. provides cloud-based population health management and data analytics solutions for physicians and their organizations. It offers Wellcentive Advance, a healthcare intelligence solution suite that provides various solutions, including population management, clinical decision support, care management, accountable care, delivery system reform incentive, chronic care management, clinical integration, enterprise-wide insights, and quality-based reimbursement; and solutions for reducing avoidable hospital readmissions. The company also offers Advance Outcomes Manager, a solution that empowers physicians and their organizations to improve clinical and financial outcomes. It also offers a patient engagement portal.
Welltok (Predilytics)	Welltok, Inc. designs and develops a consumer health/wellness engagement system called CaféWell Health Optimization Platform. The CaféWell platform enables organizations to effectively target, engage and guide population health behavior at the individual level. In 2015, Welltok acquired the data analytic company Predilytics to offer another PHM product.
Covisint	Covisint Corporation provides an open, enterprise grade cloud platform in the United States and internationally. Its platform enables organizations to build solutions that identify, authenticate, and connect users, devices, applications, and information. Its customers span many industries, including healthcare.
Lumeris	Lumeris provides the people, processes and enabling technology essential for payers and health systems to deliver Population Health Services Organization capabilities. It serves health systems, payers, and providers. As an exmaple, it provides a variety of PHM solutions to health systems such as: •Creating payment models that will initiate and support care redesign. •Negotiating with multiple payers. •Covering broad enough geography to win contracts with employers / groups or create virtual IDNs. •Maintaining physician loyalty and changing behavior to manage under risk. •Integrating clinical and financial data, including information from outside systems.

Source: Compiled by MHBK/IRD based on public company reports

3. Big Data Analytics in Population Health

After data are aggregated, proprietary analytics are applied to the data to generate insight to support clinical decision making. There are many companies offering data analytics to address Population Health. The most notable analytical solutions are based on big data analytics, which incorporates a diverse set of data from clinical, social, and other sources and subjects them to machine learning by artificial intelligence (AI). AI has made huge improvements in recent years. Besides the ability of processing enormous amount of data, AI has demonstrated very advanced cognitive, analytic, learning and language skills. Advanced AIs can beat the best human in complex tasks such as competitive games. In 1997, IBM's super computer Deep Blue defeated the world chess champion Garry Kasparov in a six-game match. It was considered a stunning achievement and a significant step forward in the field of artificial intelligence. In 2011 another IBM computer called Watson that is about 100 times faster than Deep Blue beat U.S. Jeopardy champion. In March this year, in another amazing achievement of AI, Google's AlphaGo beat world number one Go player Lee Se-dol. During the match, AI appeared to be learning from the experience and became stronger with each match. As these projects demonstrated, AI has huge potential to assist humans in various decision making. A notable company in big data analytics is Silicon Valley-based Palantir. Although a private company, Palantir carries a valuation of $20bn. Its two products, Gotham and Metropolis (named after the cities of Batman and Superman respectively) bring together massive, disparate data and scrutinize them by AI to derive insights. Its customers include government, humanitarian projects, and commercial entities such as Spanish Bank Santander.

In healthcare, the representative company in big data analytics is IBM Watson Health. IBM launched the new Watson Health unit in April 2015[11]. Watson Health combines the private Watson Health Cloud with its proprietary Watson cognitive computing platform. IBM has made multiple acquisitions to gather important data to feed into the Watson cognitive engine. Such deals include Explorys, Phytel, Truven, and Merge Healthcare. The result is an integrated platform based on Watson Health Cloud (see Figure 16). At the center of this platform is the brain Watson cognitive solution. To feed this brain, Watson Health strikes many deals to bring disparate data on its Watson Health Cloud. The output is to give insights/solutions to customers regarding various aspects of medical care.

Figure 16 Watson Healthcare Cloud: A Platform for Innovation
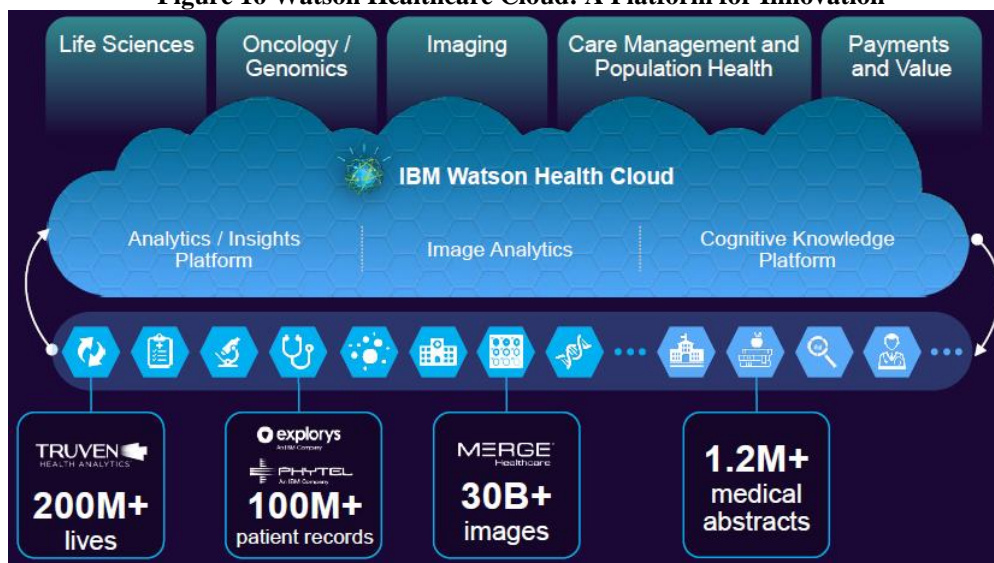
Source: IBM February 2016 Investor Presentation

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[11] https://www-03.ibm.com/press/us/en/pressrelease/46580.wss#release

Watson has partnered with multiple healthcare companies to bring many solutions to patients (see Table 9). Two partnerships illustrate the enormous potential of AI.

- Watson Health partnered with Medtronic to develop a smartphone app that can predict and alert a patient for a hypoglycemia episode three hours in advance. Medtronic is the world leader in medical devices for diabetes. It has ~65% share in the global insulin pump market and #2 share in continuous glucose monitoring (CGM). This partnership applies Watson Health's computer cognitive analytics to the data generated from Medtronic's insulin pumps and CGM as well as information from patients' activity tracker and diet to predict the risk of hypoglycemia. This new app is expected to launch this summer after receiving regulatory clearance. We believe this case illustrates the potential of combining AI with real-time patient monitoring data in disease interception. Stopping a disease episode from occurring through early intervention is the future of medical care.
- Since 1990, Watson Health has partnered with Memorial Sloan Kettering Cancer Center (MSKCC), the number one cancer center in the U.S., to develop AI for treating cancer. After 25 years of learning oncology treatment cases at MSKCC, this oncology AI has become a "learned colleague" of oncologists. It integrates all literature, cancer guideline and patient information to derive a treatment algorithm for a cancer patient. This AI has the advantage of never forgetting relevant information, never missing latest development in the fast-evolving cancer therapies and being capable of drawing connection and referring back to similar cases treated in the past at MSKCC. The benefit of having such an AI is to have access to the knowledge base and "brain" of the best cancer treatment hospital in the world. Already a couple of cancer hospitals in emerging markets have adopted Watson Health for oncology. In December 2015, Manipal Hospitals in India announced the adoption of Watson for Oncology. In October 2014, the Bumrungrad International Hospital in Bangkok, which is the largest private medical facility in South East Asia, also adopted Watson Health for oncology.

Table 9 Selected Watson Health Partnerships

Partner	Focus of Relationship
American Heart Association	Watson will work with AHA and Welltok Inc. on tools to improve cardiovascular care by combining AHA's science-based metrics and health assessments with cognitive analytics, delivered on Welltok's health optimization platform.
Boston Children's Hospital	Watson analytical capabilities are being used to help clinicians identify possible options for the diagnosis and treatment of rare pediatric diseases with the initial focus on kidney disease.
Manipal Hospitals	Watson is analyzing data to identify evidence-based treatment options to help oncologists provide cancer patients with individualized health care.
Medtronic	Working on a smartphone app for diabetes patients that will predict when a diabetic is at risk of falling into hypoglycemia up to three hours in advance of such an event.
Novo Nordisk	The companies are exploring possibilities for improved diabetes care via insights from real-time, real-world evidence of Novo Nordisk diabetes treatments and devices.
Nutrino	Watson's natural language capability and deep question-and-answer capability power Nutrino's app, which provides expectant mothers with real-time science-based, personalized and contextual nutrition advice.
Teva Pharma	Watson Health Cloud was chosen to be Teva's preferred global technology platform with the goal of building solutions to complex and chronic conditions such as asthma, pain, migraine and neurodegenerative diseases.
Under Armour	Watson will apply computing to all the data collected in Under Armour's UA Record fitness app to develop personalized coaching and training recommendations.

Source: Medtech Insight, "CES 2016: Consumer and Medical Devices Come Together in Digital Health" published in March 2016.

Another notable company in using big data in the medical field is Human Longevity, Inc. (HLI). HLI was founded by the genome sequencing pioneer J. Craig Venter. The company integrates whole genome sequencing data with phenotypic data and other data and subjects the data to machine learning to derive insights into health and diseases. HLI has built the world's leading human genome sequencing center. It cost $3bn to sequence the first human genome in the year of 2000 by the Human Genome Project. Since then, the sequencing cost has plummeted to $1000 per genome as of today. The sequencing technology has matured to a level that permits large-scale sequencing of human genome at low cost. HLI is able to offer a full exome sequencing and analysis product tailored to its clients for $250. HLI conducts deep sequencing of whole genome (30-40x coverage). It has sequenced 20,000 human genomes and plans to sequence one million genomes by 2020.

HLI's Knowledgebase is the comprehensive genome and phenotype database curated with proprietary computational tools by the leading experts in the field. The HLI Knowledgebase is the cornerstone of HLI. Machine learning is applied to HLI Knowledgebase to generate unique health insights.

There are many applications from HLI's technology platform. For example, HLI can use the genomic data to predict many human traits, such as face, voice, height, eye color, as well as specific diseases. HLI can predict the genomic age of a person by examining genome variations such as mutations (single nucleotide polymorphisms or SNPs), shortening of telomere length, loss of chromosomes, etc. This genomic age of a person could be different from a person's real age. Such analysis may contribute to the understanding of aging and lead to measures that can extend life. Supposedly, this is where the HLI's name comes from.

E.   Telehealth

According to the Center for Connected Health Policy (CCHP)[12], telehealth is "a collection of means or methods for enhancing health care, public health, and health education delivery and support using telecommunications technologies." Telehealth encompasses a broad variety of technologies and tactics to deliver virtual medical, health, and education services. CCHP further classifies telehealth into four formats[13]:

- Video conferencing. Video conferencing uses two-way, interactive audio-video technology to connect users when a live, face-to-face interaction is necessary. The current telemedicine companies such as Teledoc and Doctor on Demand are prime examples of this category.

- Store and forward. Such technology allows for the electronic transmission of clinical information (such as digital images and lab results) for medical interventions in a non-live environment.

- Remote patient monitoring. It pertains to using digital technologies to collect medical and other forms of health data from individuals in one location and electronically transmit that information securely to healthcare providers in a different location for assessment and recommendation. Remote patient monitoring, especially in conjunction with wearable technology and advanced analytics, represents a huge opportunity in our view.

- Mobile Health or mHealth is the provision of healthcare services and personal health data via mobile devices. The mHealth technology uses devices such as smart phones and portable monitoring sensors that transmit information to providers, as well as dedicated application software (apps), which are downloaded onto devices.

Although telehealth is consumer facing, direct payers and initial decision makers for bringing the telehealth solution on board are businesses such as providers, employers and payers. Therefore telehealth is a first a B2B business. To drive broad adoption, telehealth requires broad adoption by the consumers so secondarily it is a B2C business.

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[12] http://cchpca.org/what-is-telehealth
[13] http://cchpca.org/what-is-telehealth

1. Telemedicine

Telemedicine or seeing doctors remotely via a video/audio connection has been in existence for a long time. According to industry leader Teladoc, the potential market size for telehealth is as much as $18.5bn for ambulatory care and $12bn for behavior health (see Table 10). The ambulatory care, which is the core telemedicine market, has 417mn annual visits that are addressable by telemedicine. According to the American Telemedicine Association, this market is only 0.5% penetrated currently. Telemedicine leader Teladoc had around 575K virtual visits in 2015.

Table 10 Build-up of Total Addressable Market (TAM) for Telemedicine

Build up to TAM	Ambulatory Care market	Behaviroal Health market
Number of annual visits	1.25bn	168mn
% estimated treatable with telehealth	33%	78%
Number of addressable annual visits	417mn	131mn
Cost per telehealth visit	$45	$89
Total Addressable Market (TAM)	$18bn	$12bn

Source: Teladoc January 2016 Investor presentations. Note we adjusted the cost per telehealth visit from $40 to $45 per Teladoc's recent price increase.

Telemedicine has enjoyed robust annual growth since 2012. The breakout of growth can be attributed to a number of factors including improving technology offerings, robust consumer demand driven by rising healthcare consumerism, abundant venture funding for digital health, and favorable regulatory changes.

The telehealth industry so far has approached the market with the mindset of an internet company with the intention of a land grab to capture as much as possible. Therefore with increase in revenue, loss has worsened. However 2015 is expected to be the trough earnings year for the Telemedicine leader Teladoc. Earnings leverage is expected as sales grow over the next five years (see Figure 17).

Figure 17 Sales and Earnings Growth at Teladoc
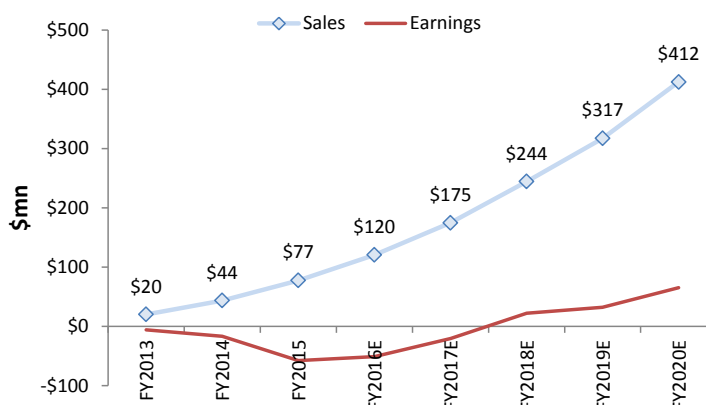
Source: Compiled by MHBK/IRD based on public data from Capital IQ. Note: from FY2016 onward, data are based on Wall Street consensus estimates.

There are quite a number of telemedicine competitors on the market. Teladoc is the leading player with around 70% market share, followed by MDLIVE, American Well, and Doctors on Demand (see Table 6). Other players include Carena, Virtuwell and the specialty doctor focused Grand Rounds and Specialists on Call. Competitors try to differentiate on a number of metrics. For example, Teladoc and MDLIVE charge a PMPM (per employee per month) subscription fee while Doctor on Demand only charges a per visit fee from patients.

Table 11 The Competitive Landscape of Telemedicine

Company	Year Founded	# of visits	Share	Mode of Visit	Fee structure	Doc Network	Client Relationships
Teladoc	2002	575k+	~70%	Choice of Viedo or Phone	PMPM access fee plus $45/visit	2,900 MD, BH, Derm professionals	Aetna, Centene, BS of California
MDLIVE	2009	125k-150k	~15%	Choice of Viedo or	PMPM access fee plus $49/visit	2,300 MD, BH professionals	Cigna, Humana, Walgreens
American Well	2005	60k-80k	~10%	Video only	PMPM access fee plus $49/visit	MD, BH and dieticians	Anthem, United Healthcare, Rite Aid
Doctor on Demand	2013	<50k	~5%	Video only	No PMPM access fee. $40/visit	1,500 MD, Psych, other	United Healthcare

Source: Teladoc January 2016 Investor presentations.

Why telemedicine? The concept for an Uber like service for doctor visit is very appealing. Table 12 shows the major advantages as well as some potential drawbacks of telemedicine. Recognizing the potential for cost saving and trying to better meet patient demand, payers have embraced telemedicine. Health plans and big employers that self-insure their employees are increasingly embedding telemedicine in their benefit designs. According to a 2014 study by Towers Watson, 22% of employers offered telemedicine to employees in 2014, 37% of employers expect to offer employees telemedicine by 2015, and another 34% are considering offering it for 2016 or 2017[14]. Of the 22% employers that offer telemedicine to employees, only 7% employees and their families use it. According to the Towers Watson study, the use of telemedicine could eliminate 15% of office visits, 15% of ER visits and 37% urgent care visits. Therefore there is tremendous growth potential of telemedicine. Health plans often form partnership with telemedicine companies to provide this service to their members either through their own brands or through the brand of telemedicine providers (see last column in   Table 11). Other payers such as Medicare and Medicaid also offer telemedicine to various extents.

Drug retailors have in-store, walk-in clinics to offer convenient and quick medical service to their customers. CVS operates almost 1,000 MinuteClinics. Walgreens has Healthcare Clinic and Rite Aid has RediClinic. Drug retailors offer telemedicine either on their own or by alliance with telemedicine vendors to augment their retail clinics (see last column in Table 11).

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[14] 2014 Towers Watson Health Care Changes Ahead Survey
https://www.towerswatson.com/DownloadMedia.aspx?media=%7B43CFC82E-3B4E-4B8E-A5D0-C2924256D2EA%7D

MIZUHO

Table 12 The Pros and Cons of Telemedicine

Advantages of Telemedicine	Downsides of Telemedicine
1. Better access. With a shortage of physicians, access to primary care physicians is challenging. Ensuring access in rural areas and after business hours will drive better health outcome and reduce the expensive emergency room visits.	A traditional roadblock for telemedicine is that physicians are not allowed to practice across state lines. Doctors need to get licenses in each state they practice. In September 2014, the Federation of State Medical Boards (FSMB) proposed Interstate Medical Licensure Compact for state boards to review. As of January 2016, 26 states have introduced Interstate Medical Licensure Compact Legislation to expedite licensure of doctors cross state lines.
2. Lower cost. The average primary care physician visit costs $145 and the average emergency room visit costs $1,957 according to the Agency for Healthcare Research and Quality and PLoS ONE, respectively. The $45 per Telemedicine visit offers substantial savings. It is only 30% of the cost for a traditional visit to physician offices. Increased access can prevent the very expensive emergency care, offering huge savings. A Teladoc commisioned study found one of its clients realized ROI of 900% by implementing its system.	Malpractice liability. The industry practice varies in terms of who provides for malpractice insurance. Teladoc covers medical malpractice insurance for the physicians on its network and claims it has never faced a malpractice claim for the 700K+ consults it has completed.
3. Convenience / ease of use. On-demand care eliminates the need for wait time in physician offices. Teladoc has a response time of less than ten minutes from the time a Member requests a telehealth visit, as compared to an average primary care appointment lead time of 19 days in the U.S.	Provider may push back at some point as this virtual venue further fragments providers' patient inflows. The Uber-type experience may "cheapen" the medical profession. However, physicians can earn good income. For a 10 minutes completed visit, a doctor can earn ~$25. So maximally, a doctor can make $150 per hour. Some doctors want to supplement their regular income.
4. More engaged consumer. Consumers are more engaged and are generally very satisfied with the telemedicine experience.	Although regulation is being relaxed,telemedicine companies still face legal risk (e.g., Teladoc is facing a long-running lawsuit in Texas for not establishing a proper professional relationship with a patient during a virtual visit).

Source: Compiled by MHBK/IRD based on public company reports

2.   Wearables for fitness and patient monitoring

According to The Center for Connected Health Policy, remote patient monitoring (RPM) is to use digital technologies to collect medical and other forms of health data from individuals in one location and electronically transmit that information securely to healthcare providers in a different location for assessment and recommendation. The benefit of RMP converges with another powerful trend in U.S. healthcare, which is the rising popularity of wearable sensor technologies. Wearable sensors have permeated many facets of people's lives. Smart watches are being adopted mainly for the fitness function. Fitness trackers from companies such as Fitbit are prevalent among consumers. In sports, various sensors are being incorporated to track athletes' movements.

We believe remote patient monitoring, especially in conjunction with wearable technology, represents huge opportunity in healthcare. RPM offers a number of benefits to healthcare stakeholders:

- Providers want to actively monitor the condition of their patients to improve clinical outcomes such as prevention of rehospitalization.
- Manufacturers such as medical device makers and pharmaceutical companies hope to improve the functionalities of their products through digital health technology, especially patients monitoring.
- Consumers want to take charge of their health by monitoring their health parameters. Rising consumerism is a key trend in health care in general.

The poster boy for wearable fitness devices is Fitbit. It has registered amazing growth since launching its fitness tracking device (see Figure 18). Since launch, it has shipped 38mn devices. In 2015 alone, it shipped 21.4mn devices. In terms of market potential, Fitbit has pointed to the 1.3bn global smart phone shipment as a benchmark. It has said fitness trackers could potentially have an attach rate of 20-40% to smart phone shipment. Therefore the market is currently only 10% penetrated.

Figure 18 Sales Growth for Fitbit
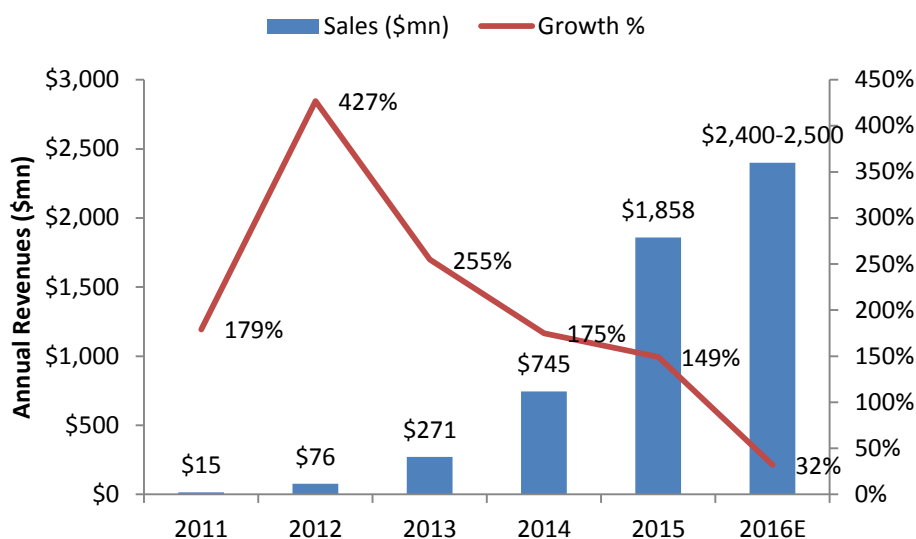
Source: Compiled by MHBK/IRD based on public data from Fitbit

Beyond the increasing healthcare consumerism, another driver of Fitbit is the U.S. corporate wellness market. To encourage healthy habits from employees so as to reduce healthcare costs, many large employers choose to offer corporate wellness programs, of which fitness tracking devices such as Fitbit are a component. According to IBISWorld Industry Report "Corporate Wellness Services in the U.S,[15]" the U.S. corporate wellness market was worth $8.1bn in 2015 and is expected to grow at 8.4% per annum for the next five years to reach $11bn in 2020. In addition to coverage by big employers and health plans, with improving functionalities by wearable devices, consumers are increasingly willing to pay out of pocket. Therefore the funding picture appears to be bright for wearable devices.

Currently there are a large number of devices being marketed for health and wellness (see Figure 19). The vast majority of devices are fitness trackers, followed by heart rate monitor and smart watches. Of the 282 devices assessed, 15% have received FDA clearance. On a percentage basis, only 5% of fitness trackers have FDA clearance, whereas 75% of ECG monitors and 100% of blood glucometers have FDA clearance[16].

Figure 19 Number of Health and Fitness Devices
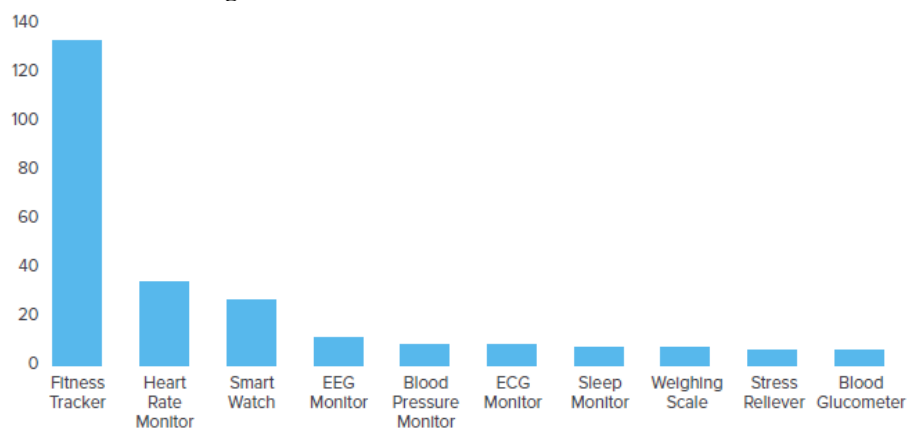
Source: Patient Adoption of mHealth. Report by IMS Institute for Health Informatics.

The wearable devices can be worn on various parts of the body. Wrist is the most common location as most fitness trackers and smart watches are worn on wrist. But there are also devices on other locations. For example, Sensoria developed smart socks with built-in sensor for runners.

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[15] http://don411.com/wp-content/uploads/2015/03/OD4621-Corporate-Wellness-Services-Industry-Report.pdf
[16] http://www.imshealth.com/en/thought-leadership/ims-institute/reports/patient-adoption-of-mhealth

Figure 20 Location of Wearable App Use
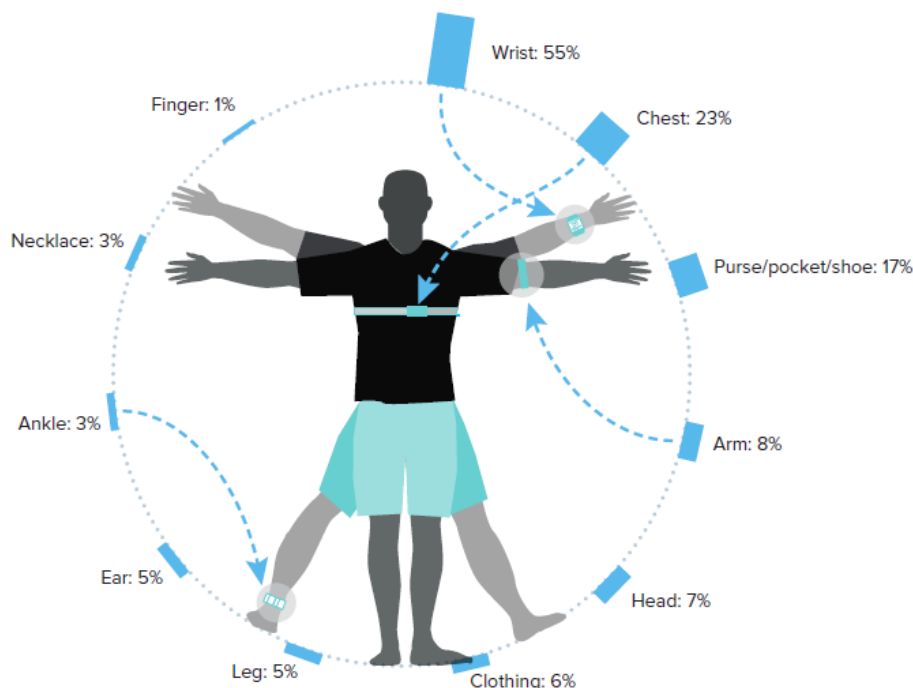
Source: Patient Adoption of mHealth. Report by IMS Institute for Health Informatics.

(1) Fitness trackers / Smart Watches

Fitbit devices not only track physical activities and heart rate, but also give time, location (GPS) and alerts/reminders. Fitness tracker is mostly a hardware business and the barrier to entry is low. There are many competitors, including healthcare pure-plays such as Fitbit, Jawbone, Withings, sports/consumer companies such as Nike, Under Armour and many technology companies such as Apple, Microsoft, Garmin and Huawei. On the low end, MOOV and Chinese technology companies Xiaomi offer fitness trackers at discount price. The perceived threat is in the long run, fitness trackers will go the way of Android phones, which is mostly a commodity business.

(2) Remote Monitoring of Cardiovascular Conditions

Big cardiovascular devices makers such as Medtronic, Boston Scientific and St. Jude offer remote patient monitoring programs. There is a general trend for medtech companies to move into disease management/ health services. For example, Medtronic acquired remote monitoring companies Cardiocom in 2013 and Coventis in 2014 to expand into health services. Medtronic and St. Jude Medical compete in the implantable cardiac monitor (ICM) market. Such devices are implanted into patients to continuously monitor patients for arrhythmias. Medtronic is the leader in this area with multiple products on the market. Besides ICM, in November 2015, Medtronic received FDA approval of the MyCareLink Smart Monitor as the first app-based remote monitoring system for patients with implantable pacemakers. The MyCareLink Smart Monitor is comprised of a handheld portable device reader, prescribed by a physician, and the MyCareLink Smart mobile app, available for free on both Android and Apple platforms. When the MyCareLink Smart Monitor is connected to cellular or Wi-Fi service, patients can initiate a transmission of pacemaker data by securely uploading the information to the Medtronic CareLink® Network, which is a leading remote monitoring service for cardiac device patients.

St. Jude entered the ICM market with the SJM Confirm product that provides continuous cardiac monitoring of arrhythmia. The next-generation device will be able to transmit the data via app on smartphone to Merlin.net, which is St. Jude's remote cardiac monitoring network.

LifeWatch AG, AlivCor, and iRhythm are emerging competitors for remote cardiac monitoring. LifeWatch AG received 510(k) approval for its electrocardiogram (ECG) LifeWatch Mobile Cardiac Telemetry (MCT) Patch system in January 2016. The MCT patch contains a one-lead ECG that monitors patient heart beat in real time and transmits the data to a service center. In February, LifeWatch also won FDA approval for its continuous Vital Signs Monitoring Service, a patch-based system worn on a patient's chest that measure a patient's vital signs (ECG, heart rate, respiration rate, surface temperature, arterial blood oxygen saturation and body position). The device remotely transmits the vital sign data to clinicians. Initial launch will be in clinics and hospitals. In the future, it will be broadened out to include ambulatory setting.

AlivCor developed the Kardia device, which can be attached to smart watches or smart phones to measure ECG. The ECG data is displayed on smart phone and can also be relayed to doctors. Kardia has been cleared by the FDA. In January 2015, AlivCor partnered with LifeWatch to tap into LifeWatch's monitoring services network.

iRhythm developed the ZIO XT patch, which is worn on the upper chest to continuously measure heart rate over a long period of time. ZIO XT patch can give a better diagnosis of atrial fibrillation than halter monitoring because it measures over ten days instead of just 24 hours for halter. iRhythm also offers to patients remote monitoring services by its in-house cardiac technicians. The service component is important to deliver on intervention, thus closing the loop from diagnosis to intervention.

(3) *Remote Monitoring of Blood Glucose*

The wide adoption of continuous glucose monitoring (CGM) and its integration with insulin pumps are making a big impact in the management of diabetes[17]. There is increasing connectivity of CGM, insulin pumps to smart phone or other smart devices. In June 2015, Medtronic received FDA clearance for the MiniMed Connect, which enables people with diabetes to view their insulin pump and CGM data on a smartphone and provides remote monitoring and text message notifications for their loved ones[18]. MiniMed Connect consists of a small device that fits on a keychain or in a pocket, a smartphone app for the person with diabetes, and a web display on desktop or mobile devices for their care partners. The MiniMed Connect device securely transmits pump and sensor glucose data from the patient's MiniMed insulin pump to the app and web display, which shows real-time sensor glucose and insulin information on the phone or any Internet-enabled device. The system also delivers preset text notifications to loved ones when the person with diabetes' glucose values go too high or too low, or when an alarm on the pump isn't cleared. In addition, MiniMed Connect provides healthcare teams with more comprehensive data so they can adjust care plans. This service is initially available on iOS platform, but Medtronic has entered into a partnership with Samsung Electronics to develop an app for Android devices. Another notable partnership as discussed earlier is Medtronic's alliance with IBM Watson Health to develop a smartphone app/analytics that can predict and alert a diabetes patient for hypoglycemic events three hours in advance

Similarly, CGM leader DexCom has received FDA approval for the Share app, which can display CGM data on Apple iPhone and also Apple Watch. Share gives patients an alternative to view their glucose level on smart devices in addition to the typical CGM receivers. DexCom's next-generation CGM device G5, which will be approved soon in the U.S., eliminates the need for the receiver and sends data directly to smart devices.

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[17] http://www.mizuhobank.co.jp/corporate/bizinfo/industry/sangyou/pdf/mif_175.pdf
[18] http://newsroom.medtronic.com/phoenix.zhtml?c=251324&p=irol-newsArticle&ID=2056803

Beyond Medtronic and DexCom, other companies with connected blood glucose monitoring products/services include Telcare, Glooko, Livongo Health, etc. Telcare is a traditional blood glucose monitoring company with glucose meters and strips. But its glucose meter is continuously wirelessly connected to caregivers and family members, who can help the patients manage diabetes. Glooko and Livongo have connecting devices for meters to connect to smart devices and share data with family members and care givers. Verily, Google's life science unit, is developing a contact lens with an embedded glucose sensor. This smart contact lens can monitor people with diabetes continuously by measuring the glucose level in their tears.

(4) Digital Tools to Monitor Medication Adherence

Drug adherence is a big problem. Poor adherence could lead to bad clinical outcome for patients and lost revenues for pharmaceutical companies. Pharma and medtech companies are converging in new wireless technologies to remotely monitor patient medication adherence and measure initial physiological response to therapies. A prime example is the partnership of Otsuka Pharma and Proteus Digital Health to develop drug device combination of Otsuka's Schizophrenia drug Abilify and Proteus Digital Health's ingestible sensor technology. The tablet is the same size as a tablet without the sensor. Within each tablet, a miniscule sensor communicates with a patch worn on the patient's torso. The sensor is activated in the stomach. The patch records the time each pill is swallowed and collects physiological metrics such as heart rate and physical activity. Data are stored and can be displayed in a user-friendly app for patients and web-based dashboard for physicians. Patients can also receive an alert on a mobile phone if they miss a medication.

The FDA accepted the New Drug Application (NDA) filing for the combined drug/sensor tablet on September 2015, but surprisingly in April 2016 issued a complete response letter (CRL). In the CRL, the FDA requested additional information regarding the performance of the product when used, and further human factors investigations. In a similar fashion, Propeller Health has developed a sensor that is attached to an inhaler and tracks daily medication use in patients with asthma and chronic obstructive pulmonary disease (COPD). The Propeller platform wirelessly syncs medication use data to an app, which analyzes patient trends and sends data to caregivers. If patients are not taking medications, the care team can send alerts to patients.

In conclusion we are very optimistic about the potential of continuous remote monitoring. In the future, technology will enable constant monitoring of a patient's vital signs and other metrics. This information will be analyzed by health professionals with the help of AI in real time. If necessary, intervention either in the form of clinical or life style changes will be delivered to the patient with the help of mobile alert. In essence, this is a closed-loop system that allows real-time monitoring and managing patients. As an example, in March this year, Pfizer entered into a collaboration with IBM to develop innovative remote monitoring solutions aimed at transforming how clinicians deliver care to patients suffering from Parkinson's disease. The experimental approach will rely on a system of sensors, mobile devices, and machine learning to provide real-time, around-the-clock disease symptom information to clinicians and researchers[19].

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[19] http://press.pfizer.com/press-release/pfizer-taps-ibm-research-collaboration-transform-parkinsons-disease-care

3.   Wellness /Patient Engagement

There are various web-based or web/brick-and-mortar hybrid programs to help consumers manage chronic diseases and improve health. On the brick-and-mortar side, Weight Watchers International has long been in existence and it is focused on the weight loss market. On the web only side, healthcare IT companies offer a large variety of smartphone apps or web-based tools to engage patients. For example, Welltok offers CaféWell, an online health optimization platform that engages consumers and offers them a personalized health itinerary to improve health.

Today, more than two-thirds of Americans own smartphones and almost 20% depend solely upon their smartphone for internet access. According to IMS Health, the number of mHealth apps available on Apple and Android platforms exceeds 165,000 in 2015. The number of apps has doubled from 2013 level. Consumer mHealth apps targeting wellness (including Fitness, Lifestyle & Stress, Diet and Nutrition) constitute two-thirds of mHealth apps. Disease and treatment management apps comprised a quarter of the mHealth apps (see Figure 21).

Figure 21 mHealth Apps by Category, 2015
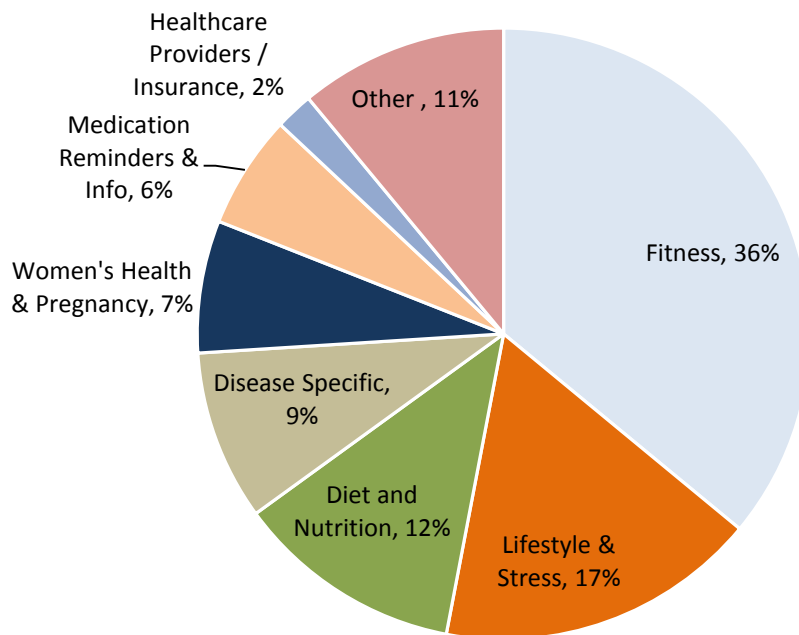
Source: Patient Adoption of mHealth. Report by IMS Institute for Health Informatics.

Although there are many apps, a small number of popular apps account for disproportionate downloads. It was reported that 36 apps account for nearly half of all downloads, while 40% of apps have fewer than 5,000 downloads. The most frequently downloaded apps, defined as more than 10 million downloads, are mostly fitness and diet apps.

Table 13 Top mHealth Apps with the Highest Number of Downloads (Android Only)

Category	App	Company
Fitness	Runtastic Running & Fitness	Runtastic
	Runkeeper - GPS Track Run Walk	FitnessKeeper, Inc.
	Endomondo Running Cycling Walk	Endomondo.com
	Nike+ Running	Nike, Inc.
	Workout Trainer	Skimble Inc.
	My Tracks	Google Inc.
	Abs Workout	Caynax
Diet	Calorie Counter - MyFitnessPal	MyFitnessPal Inc.
	Calorie Counter by FatSecret	FatSecret
	Cookpad - recipes app	Allthecooks, LLC
	Noom Coach: Weight Loss Plan	Noom, Inc
Heart	Instant Heart Rate	Azumio Inc.
	Cardiograph	MacroPinch
Women's Health	Period Tracker	GP International LLC
	Period Calendar / Tracker	ABISHKKING
Medication	Walgreens	Walgreen Co.

Source: Patient Adoption of mHealth. Report by IMS Institute for Health Informatics.

Besides just apps, some companies have integrated web-based programs with direct patient engagement into holistic chronic disease management solutions. For example, Omada Health offers Prevent, a web-based digital weight loss program for type II diabetes patients. To convince payers such as big employers and health plans to pay for such digital chronic disease management tools, companies such as Omada Health need to show tangible clinical benefits of their intervention. Another notable company is Redbrick Health, which developed a consumer health engagement platform integrating on-line, mobile and live interactions. Through multi-pronged engagement with consumers, Redbrick aims at positively modifying consumers' health behavior to improve health.

Besides demonstrating an ROI, another hurdle often cited for wellness and patient management is the high drop-out rate by people who signed up for such programs. Industry participants are trying to use social pressure and rewards to ensure the active participation by their customers.

F. Health Plans / Payer Services

Payers need healthcare IT solutions to help them administer benefits, process claims, make payments to providers, and recoup losses due to fraud. Figure 22 depicts the many solutions payers need in order to engage with other healthcare stakeholders.

Figure 22 Payer Solution Overview
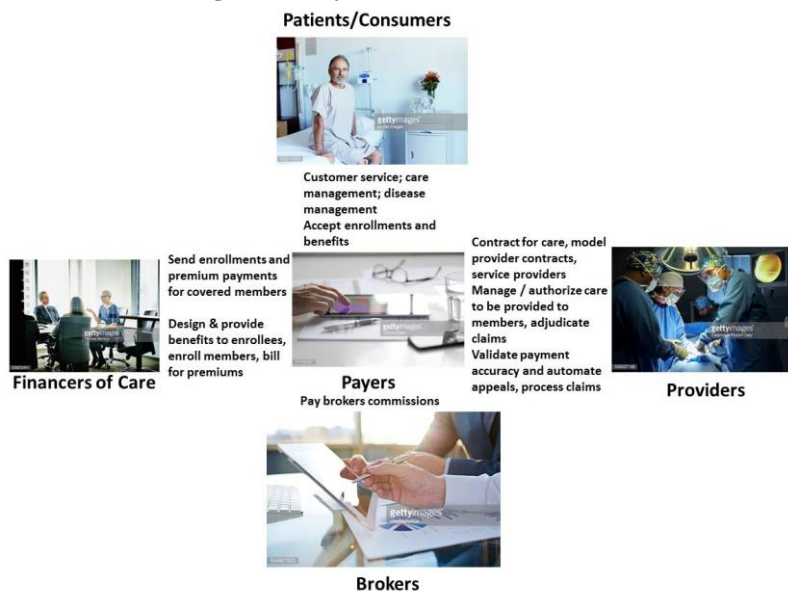
Source: Tests are adapted from Cognizant's presentation at the acquisition of TriZetto. Images are from Getty Images.

Healthcare IT solutions for payers tend to have direct and immediate impact on payers' bottom line. Therefore their impact can be more easily measured than some other areas of healthcare IT. Representative companies include Cognizant (with TriZetto), Inovalon, HMS Holdings, MedHOK, Healthedge, etc. They offer a variety of solutions to payers.

- Cognizant acquired TriZetto in 2014. Cognizant serves 16 of the top 20 U.S. health plans. TriZetto offers core administration solutions for ~350 payers with 180 million covered lives. The combined company offers a variety of software, consulting and other products to payers.
- Inovalon aggregates an enormous amount of clinical and patient data and applies big data analytics to derive insights. The insights are translated into a variety of solutions for payers, which often result in clearly-measurable return on investment.
- HMS Holdings provides revenue recovery and cost containment services to government and private healthcare payers and sponsors. It is a Recovery Audit Contractor (RAC) for Medicare. RAC identifies fraud and recovers funds for CMS/Medicare. Beyond RAC, HMS also offers Program Integrity (PI, which ensures claims are paid accurately) and Coordination of Benefits (COB, which ensures claims are paid by the responsible party) for payers.

A new emerging category of healthcare IT solution geared towards payers is transparency tool. Medical cost is often invisible to the consumers. There is substantial variability in terms of list price for common procedures. According to the Wall Street Journal, the average charge for joint replacement ranged from $5,300 in Ada, Okla., to $223,000 in Monterey Park, Calif. Even for hospitals in the same location, the listed price could vary multiple folds (see the example in greater Los Angeles area in Table 14. Hospitals typically offer significant discount on list price. Even after the discount, each hospital also offers very different prices to different payers (see Table 15).

Table 14 Hospitals' list prices for common procedures vary significantly

Hospital	Brain hemorrhage	Heart failure and shock	Chest pain	Kidney failure
Sherman Oaks Hospital	$31,668	$39,795	$13,133	$21,106
Garfield Medical Center	$178,435	$146,428	$52,580	$77,719
Cedar-Sinai Medical Center	$167,860	$125,036	$43,715	$88,191
Los Angeles Community Hospital	$60,176	$52,110	$15,356	$21,864
LAC/Harbor-UCLA Medical Center	$85,156	$57,735	$15,835	$53,128

Source: Compiled by MHBK/IRD based on Wall Street Journal report on February 24, 2014

Table 15 MRI Cost at Oakwood Healthcare System in Dearborn, Mich.

List or "chargemaster" price	$2,844
Cash price	$695
UnitedHealthcare negotiated price	$1,990
Blue Cross negotiated price	$617
Aetna negotiated price	$520
Cigna negotiated price	$341-362
Medicare rate	$335

Source: Compiled by MHBK/IRD based on Wall Street Journal report on February 24, 2014

The first step to eliminate such discrepancy in cost is to shed light on it. Health IT could bring light to the opaque pricing environment. A new Healthcare IT solution for payers is the cost transparency tool. The pioneer Castlight Health aggregates claim data from insurers (including 4 of the 5 largest health plans). It then provides the cost and quality data on providers and physicians to employees of big self-insured employers. Payers will give this price/quality transparency tool to their members to assist them in comparative shopping of medical care. We believe the service provided by vendors such as Castlight is quite useful in bringing down the medical cost. There are a number of companies offering such transparency tools (see Table 16). They have different emphasis on either the tools for provider cost/quality or access. Some are more focused on access than transparency. For example, ZocDoc is primarily an online physician appointment reservation system. Meanwhile ZocDoc also offers doctor quality ratings to assist its users in choosing a physician.

Table 16 Selected U.S. Healthcare IT Companies Offering Transparency Tools

Company	Offering	Location
Castlight	Cost/ Quality transparency	San Francisco, CA
Change Healthcare (acquired by Emdeon)	Cost/ Quality transparency	Tennessee
ClearCost Health	Cost/ Quality transparency	San Francisco, CA
Vitals	Cost/ Quality transparency	New Jersey
Healthcare Bluebook	Cost/ Quality transparency	Tennessee
Kyruus	Data analytics on physicians, physican access and matching for patients	Boston, MA
ZocDoc	Doctor Quality rating and appointment reservation	New York, NY

Source: Compiled by MHBK/IRD based on public company reports

III. Capital Market Trends of HCIT

A. Review of HCIT Venture Fund Raising and IPOs

Since 2009, backed by more than $10bn in venture capital, over 500 HCIT startups have been created. Venture investment in digital health continued to be strong in 2015. According to Rock Health, 2015 venture financing in HCIT totaled $4.5bn, which is flat from $4.3bn in 2014, but a huge increase from 2011-2013[20] (see Figure 23). Not only did the number of deals increase but also the average investment in a deal also increased over the last two years (see Figure 23). Investment in HCIT appears to have taken some investment from biotech and medtech in the healthcare sector.

Figure 23 The Increase in Venture Funding for Digital Health
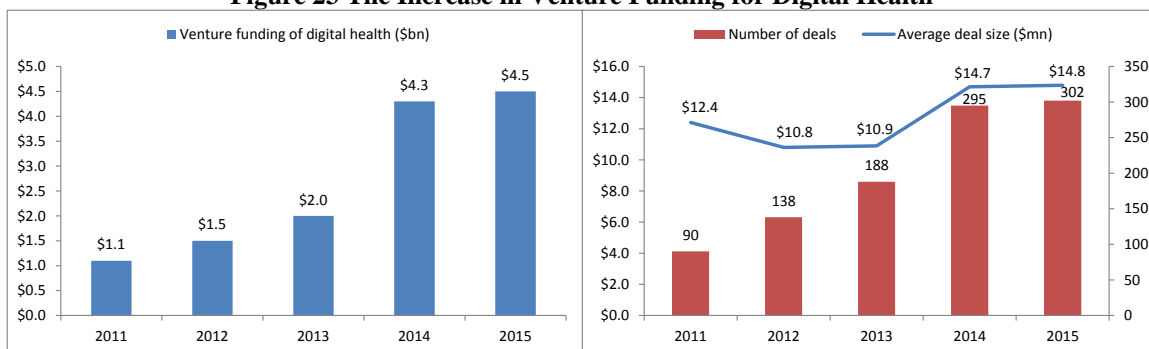
Source: Digital Health Funding: 2015 Year in Review by Rock Health

In 2015, the six largest venture funding deals raised nearly three quarters of a billion, or 16% of the total funding. The broad-based healthcare IT company Nanthealth received a $200mn equity investment from Allscripts, bringing the total raised to $680mn. ZocDoc, which runs an on-line platform to help patients book doctor appointments and review doctor ratings, raised $130mn at a valuation of $1.8bn. The direct-to-consumer genomics company 23andme raised $115mn in series E financing. Illumina, Warburg Pincus and Sutter Hill Ventures founded direct-to-consumer company Helix with $100mn investment. Consumer wellness and engagement company Virgin Pulse raised $92mn series A investment. Enterprise health insurance services platform Collective Health raised $81 million in a Series C round.

Figure 24 Largest Venture Investment in Digital Health in 2015

Source: Digital Health Funding: 2015 Year in Review by Rock Health

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[20] https://rockhealth.com/reports/digital-health-funding-2015-year-in-review/
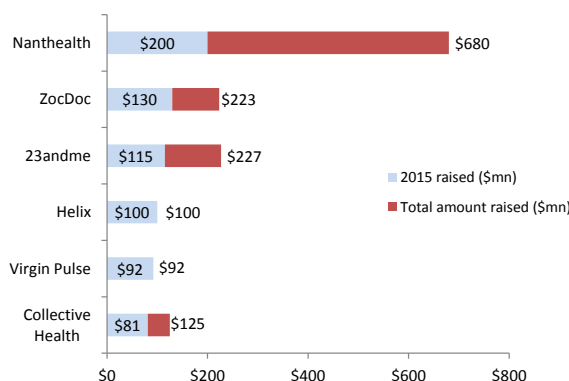
The top six categories accounted for 50% of all digital health funding in 2015 (see Table 17). As most healthcare IT start-ups are in the fast-growing but loss-making stage, they have an insatiable need to raise funding. Tech valuation appears to have cooled down substantially from a year ago. We believe late-stage investors may become hesitant to invest due to the market downswing. A recent trend in investing in tech companies is for existing investors to mark down the valuation of their private holdings. Both Fidelity and T Rowe Price have substantially marked down their private investments in tech companies. The tough IPO market further limits the options of private HCIT companies. Pressed for funding and facing an unfavorable fundraising environment, some HCIT companies may need to raise new funding in dreaded down rounds. One recent example is Jawbone. In January 2016, the wearable fitness company Jawbone raised $165mn at $1.5bn valuation, which is reportedly half of the valuation it raised in its last equity financing in 2014[21]. We believe while venture investment in healthcare IT has come at a torrid pace over the last two years, it may be hard to justify the lofty valuation paid in certain deals. Although we don't see a big fall-off in the amount of investment going into HCIT, there is a risk that the industry may enter into a period of market correction where down-round or consolidation may occur for some companies.

Table 17 Leading Healthcare IT Categories with the Most Funding in 2015

Categories	Description of the Category	Amount raised ($mn)	Example
Healthcare consumer engagement	Consumer tools for the purchasing of healthcare products and services or health insurance (B2B and B2C)	$629	ZocDoc raised $130mn in August 2015 at $1.8bn valuation.
Wearables and biosensing	Wearable or accessory devices that detect specific biometrics and are designated for consumers	$499	Jawbone raised $300mn in debt from BlackRock.
Personal health tools and tracking	Software platforms to support the delivery of medicine customized to an individual's genetics (or other 'omics profile or phenotype)	$409	23andme raised $115mn.
Payer administration	Management and administration tools for payers (e.g., fraud detection, third-party payment, portal management)	$263	Collective Health raised $81mn.
Telemedicine	Delivery of healthcare services (synchronous or asynchronous) through non-physical means (e.g., telephone, digital imaging, video)	$236	Doctor on Demand raised 63mn.
Care coordination	Coordination and management of care for a patient, across providers or other caregivers	$208	TigerText raised $50mn.

Source: Digital Health Funding: 2015 Year in Review by Rock Health

A number of Healthcare IT companies have gone public, but the average after-market stock price performance since IPO is down 11% (see Table 18). In the six 2015 IPOs, all but one company are trading below the IPO price. Even category leaders such as Teladoc and Fitbit have been caught up by the recent market weakness and experienced substantial decline in the stock price after going public. One company that epitomizes the up-and-down in investor sentiment towards healthcare IT is Castlight. Castlight went public on March 14, 2014 at the issue price of $16 a share. Due to strong investor demand at that time, it opened trading at $37.50 a share. Since then the share has undergone a protracted decline to the current stock price below $4. The change in value over the last two years equates to a decline of 90%. We are generally optimistic about the demand for healthcare.

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[21] http://bits.blogs.nytimes.com/2016/01/15/jawbone-raises-165-million-at-half-its-last-valuation/?_r=0

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While we are unsure of the fate of certain market followers, we believe category leaders should thrive over the long term.

According to a reader survey by Rock Health, a number of healthcare IT companies may be candidates for IPOs. Ranked by the frequency of mentioning, these generally well-known companies include ZocDoc, Practice Fusion, 23andme, Health Catalyst, Doctor on Demand, Welltok, Redbrick Health, Flatiron, American Well, Doximity, Proteus Digital Health, Counsyl, NantHealth and Specialists on Call[22]. In remains to be seen how many of HCIT companies can be successful in tapping the public market. If the IPO market remains tight, without strong financial backing by private investors, some private HCIT companies may increasingly pursue trade sale to provide an exit for their investors.

Table 18 Recent IPOs in Healthcare IT

Company	Business	IPO Date	IPO Price	Market Cap	EV	LTM Sales	EV/Sales	Current Price	Return	Current Valuation
Teladoc	Telemedicine	6/30/2015	$19.00	$617	$523	$88	6.0	$15.93	-16%	$617
MindBody	Wellness and fitness	6/19/2015	$14.00	$652	$577	$111	5.2	$16.43	17%	$652
Fitbit	Wearable fitness device	6/17/2015	$20.00	$2,721	$1,930	$2,027	1.0	$12.51	-37%	$2,721
Evolent Health	Population health	6/4/2015	$17.00	$1,094	$1,197	$146	8.2	$18.21	7%	$1,094
Press Ganey	Performance measure and analytics	5/20/2015	$25.00	$2,059	$2,189	$331	6.6	$38.95	56%	$2,059
Inovalon	Data analytics for payors	2/11/2015	$27.00	$2,804	$2,344	$446	5.3	$18.40	-32%	$2,804
Benefitfocus	Cloud-based benefits software	9/18/2014	$26.50	$1,084	$1,087	$197	5.5	$36.90	39%	$1,084
HealthEquity	Platform for managing Health savings account	7/31/2014	$14.00	$1,761	$1,628	$141	11.5	$30.31	117%	$1,761
Imprivata	Single sign-on access software for providers	6/25/2014	$15.00	$354	$305	$125	2.4	$13.96	-7%	$354
IMS	Prescription data tracking and analytics	4/4/2014	$20.00	$8,672	$12,845	$3,063	4.2	$26.29	31%	$8,672
Everyday Health	Health-related web site operator	3/28/2014	$14.00	$256	$339	$246	1.4	$7.72	-45%	$256
Castlight	Health cost transparency tools	3/14/2014	$16.00	$427	$306	$82	3.7	$4.01	-75%	$427
Care.com	Connecting consumers with caregivers	1/24/2014	$17.00	$364	$312	$146	2.1	$11.12	-35%	$364
Veeva Systems	Cloud-based enterprise management	10/16/2013	$20.00	$4,701	$4,243	$439	9.7	$34.88	74%	$4,701
Average EV/Sales							5.2		7%	

Source: Compiled by MHBK/IRD based on data from Capital IQ and public reports

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[22] https://rockhealth.com/reports/digital-health-funding-2015-year-in-review/

B. Review of HCIT Stock Performance

Shares of healthcare IT companies continue to be under pressure. Shares are down an average 10% since the beginning of 2015 (see Figure 25).

Figure 25 Share Performance of Healthcare IT Companies Since 2015
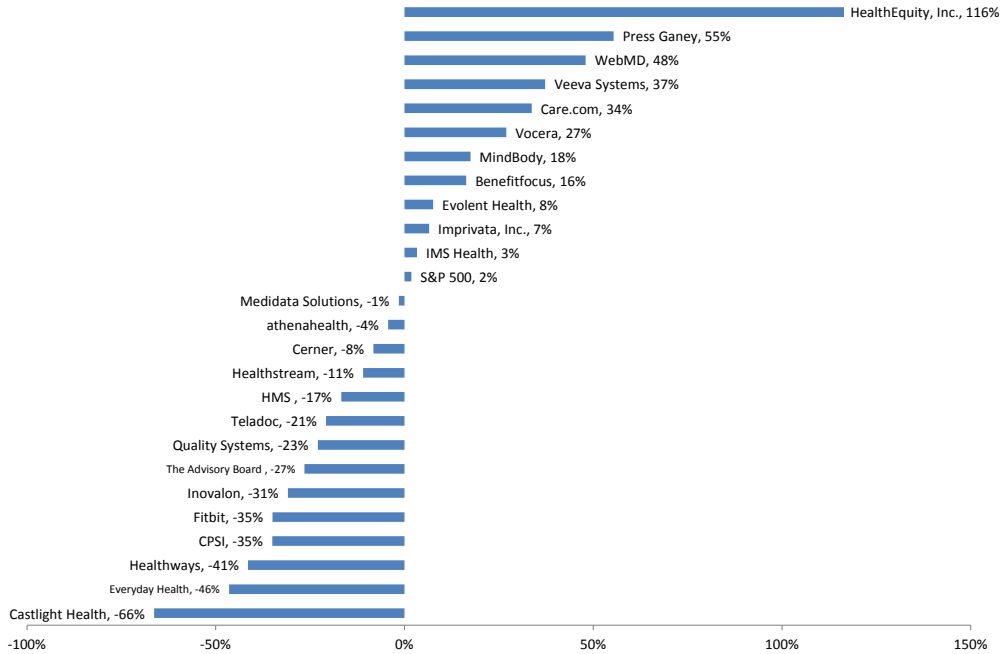
Source: Compiled by MHBK/IRD based on data from Capital IQ and public reports

Table 19 Valuation Table of Publicly Traded Healthcare IT Companies

7/7/2016 Company name	Ticker	Market Cap (USD in mn)	EV (USD in mn)	% 52-wk High	Sales 2015	Sales 2016E	Sales 2017E	2-year Sales CAGR	EV/Sales 2015	2016E	2017E	EV/EBITDA 2015	2016E	2017E
EHR and Other HCIT														
Cerner Corporation	CERN	$19,876	$19,968	79%	$4,352	$4,935	$5,460	12.0%	4.6	4.0	3.7	20.4	13.7	12.3
Allscripts Healthcare Solutions, Inc.	MDRX	$2,509	$3,020	85%	$1,386	$1,556	$1,675	9.9%	2.2	1.9	1.8	48.8	12.3	10.5
Quality Systems Inc.	QSII	$744	$813	69%	$490	$492	$514	2.3%	1.7	1.7	1.6	13.2	11.2	9.6
Computer Programs & Systems Inc.	CPSI	$537	$670	67%	$182	$297	$314	31.3%	3.7	2.3	2.1	12.6	20.3	8.3
Revenue cycle management														
athenahealth, Inc.	ATHN	$5,435	$5,632	82%	$925	$1,115	$1,332	20.0%	6.1	5.1	4.2	91.5	31.5	23.9
HMS Holdings Corp.	HMSY	$1,490	$1,544	95%	$474	$487	$523	5.0%	3.3	3.2	3.0	19.3	14.0	12.9
Accretive Health, Inc.	OTCPK:A	$205	$82	34%		$206	$301		-2.3	3.9	-2.7			
Digital Health														
IMS Health Holdings, Inc.	IMS	$8,672	$12,845	79%	$2,921	$3,231	$3,403	7.9%	4.4	4.0	3.8	19.3	14.6	13.5
Veeva Systems Inc.	VEEV	$4,701	$4,243	102%	$313	$405	$519	28.8%	13.5	10.5	8.2	103.0	48.6	36.6
Fitbit Inc.	FIT	$2,721	$1,930	25%	$1,858	$2,566	$2,992	26.9%	1.0	0.8	0.6	11.5	5.4	4.4
Inovalon Holdings, Inc.	INOV	$2,804	$2,344	67%	$437	$515	$598	16.9%	5.4	4.5	3.9	18.0	15.3	13.7
Medidata Solutions, Inc.	MDSO	$2,686	$2,616	77%	$393	$461	$551	18.4%	6.7	5.7	4.7	72.1	28.7	24.4
WebMD Health Corp.	WBMD	$2,138	$2,237	86%	$636	$703	$770	10.0%	3.5	3.2	2.9	19.8	11.6	9.8
WageWorks, Inc.	WAGE	$2,124	$1,641	96%	$334	$361	$401	9.5%	4.9	4.5	4.1	34.5	17.6	14.9
Press Ganey Holdings, Inc.	PGND	$2,059	$2,189	94%	$319	$363	$395	11.3%	6.9	6.0	5.5	24.4	18.8	15.9
The Advisory Board Company	ABCO	$1,465	$1,967	60%	$768	$819	$883	7.2%	2.6	2.4	2.2	36.5	11.6	10.3
HealthEquity, Inc.	HQY	$1,761	$1,628	85%	$88	$126	$176	41.7%	18.5	13.0	9.2			
Benefitfocus, Inc.	BNFT	$1,084	$1,087	82%	$185	$235	$291	25.3%	5.9	4.6	3.7			
Weight Watchers International, Inc.	WTW	$735	$2,732	41%	$1,164	$1,208	$1,277	4.7%	2.3	2.3	2.1	7.6	11.0	10.1
Evolent Health, Inc.	EVH	$1,094	$1,197	79%	$97	$218	$280	70.0%	12.4	5.5	4.3			
HealthStream, Inc.	HSTM	$835	$684	81%	$209	$230	$257	10.9%	3.3	3.0	2.7	28.8	20.5	18.1
MINDBODY, Inc.	MB	$652	$577	89%	$101	$137	$175	31.6%	5.7	4.2	3.3			
Teladoc, Inc.	TDOC	$617	$523	42%	$77	$123	$182	53.5%	6.8	4.2	2.9			
Imprivata, Inc.	IMPR	$354	$305	64%	$119	$139	$162	16.6%	2.6	2.2	1.9			
Castlight Health, Inc.	CSLT	$427	$306	47%	$75	$101	$129	30.6%	4.1	3.0	2.4			
Vocera Communications, Inc.	VCRA	$346	$226	82%	$104	$115	$127	10.6%	2.2	2.0	1.8			
Care.com, Inc.	CRCM	$364	$312	92%	$139	$161	$182	14.7%	2.3	1.9	1.7			
Everyday Health, Inc.	EVDY	$256	$339	61%	$232	$257	$290	11.8%	1.5	1.3	1.2	16.5	7.3	7.5
Average								**20%**	**5.1**	**4.0**	**3.3**		**16.7**	**13.4**

Source: Compiled by MHBK/IRD based on data from Capital IQ and public reports

C. Review of M&A Deals in HCIT

There are numerous M&A deals in healthcare IT. A few trends stand out.

- Consolidation has swept through healthcare industry in 2015. As their customers merge into bigger entities, healthcare IT vendors have also followed suit. This trend is especially pronouced in established categories such as EHR. According to Rock Health, a total of 34 EHR and clinical workflow companies were acquired in 2015, up from six in 2014. In 2015, the U.S. Department of Defense awarded the largest EHR contact in history to a coalition comprised of Cerner, Leidos and Accenture. The initial phase which provides "an electronic health record off-the-shelf solution, integration activities and deployment across the Military Health System," is worth $4.3bn. Three coalitions of big companies participated in the bidding - Epic Systems and IBM; Cerner, Leidos and Accenture; and Allscripts aligned with Computer Sciences Corp. and Hewlett-Packard. There is substantial economy of scale in EHR and consolidation appears inevitable.

- Big tech companies are moving into healthcare IT to capture the growth at an early stage (see Table 21). IBM made four acquisitions since the beginning of 2015. Through these deals, IBM is able to enhance its capability and secure data to feed into its Watson Health analytics engine. Beyond tech companies, consumers companies have also moved into healthcare IT via wearables and fitness/health tracking products. For example, Under Armour made two acquisitions and Fossil acquired the fitness tracker company Misfit.

- There are many deals in the high-growth areas such as population health (especially the data analytics segment).

- As valuation in established HCIT companies is not so stretched, PE firms continue to be active acquirers in HCIT. The recent example is the acquisition of MedAssets by the PE fund Pamplona Capital.

- Going forward, we continue to expect robust M&A activities in HCIT. So far, HCIT IPOs have met with lukewarm receptions in the public market. Venture backed HCIT companies may prefer a trade sale as the exit route.

Table 20 Valuation Table of Publicly Traded Healthcare IT Companies

Aquirer	Target	Announce Date	Deal Value ($mm)	Revenue Trailing ($mm)	Price/Sales Trailing	EV/EBITDA Trailing	Areas
McKesson	Change Healthcare	6/28/2016					Broad HIT
MEDNAX	Cardon Outreach	6/13/2016	$400			11.1	Hospital CRM
Quintile	IMS Health	5/3/2016	$9,046	$2,900	3.1	10.2	IT intelligence for pharma and healthcare industry
Resmed	Brightree	2/22/2016	$800	$113	7.1	18.6	Cloud-based software for home medical equipment
IBM Watson Health	Truven Health Analytics	2/18/2016	$2,600				Broad HIT.
Welltok	Silverlink	12/3/2015					Patient engagement
CPSI	Healthland	11/25/2015	$250				EHR for hospitals
Fossil	Misfit	11/12/2015	$260				Wearable activity trackers
Pamplona Capital Management	MedAssets, Inc.	11/2/2015	$2,700	$764	3.5	12.4	RCM,spend/clinical resource mgmt
Quality Systems	HealthFusion	10/30/2015	$165	$30	5.5		Cloud based EHR for ambulatory
Omnicell	Aesynt	10/29/2015	$217	$182	1.2	10.9	Pharmacy automation and IT tools
GE	IDX Systems	9/28/2015	$1,200	$591	2.0		Health IT for providers
Viverae	OneHealth	9/17/2014					Wellness
Persivia	IHM Services	9/15/2015					Data analytics
Qualcomm	Capsule Technologie	9/14/2015					Medical device data integration
Cardinal Health	naviHealth	8/25/2015	$290				Post acute care management
Inovalon	Avalere	8/24/2015	$140	$47	3.0		Pharma and life science consulting
Wolters Kluver	Learner's Digest	8/14/2015	$150				Online physician eduction
Premier	Healthcare Insights	8/12/2015	$65				Hospital financial management
Marlin Equity Partners	AdvancedMD (from ADP)	8/6/2015					Cloud based EHR for ambulatory
IBM	Merge Healthcare	8/6/2015	$1,000	$228	4.4		Medical imaging mgmt
Premier	CECity	8/4/2015	$400				Performance mgmt & improvement
Emdeon	Altegra Health	7/6/2015	$910				Data analytics
Welltok	Predilytics	5/19/2015					Data analytics, AI
Aetna	ActiveHealth Management	5/13/2015	$400				Health management / engagement
MedNax	Virtual Radiologic (vRad)	5/12/2015	$500	$185	2.7		Telemedicine for radiology
Towers Watson	Acclaris	5/11/2015	$150	$35	4.3		Consumer-driven health accounts
ABRY Partners	Sentry Data Systems	5/4/2015	$200				Pharmacy IT solutions for providers
Elekta	Clinicast	4/17/2015					Big data analytics
IBM	Explorys	4/13/2015					Data analytics
IBM	Phytel	4/13/2015					Data analytics
Marlin Equity Partners	e-MDs	3/31/2015					Cloud based EHR for ambulatory
HealthStream	HealthLine Systems	2/13/2015	$88				Credentialing medical professionals
Managed Health Care Associates	SoftWriters	2/5/2015	$450				Software for long-term care pharmacy
Under Armour	MyFitnessPal	2/4/2015	$475				Health and nutrition tracking app
Under Armour	Endomondo	2/4/2015	$85				Fitness tracking
Athenahealth	RazorInsights	1/14/2015					Hospital EHR, RCM
Emdeon	Change Healthcare	11/19/2014	$135				Transparency
Conifer Health Solutions	SPi Healthcare	9/23/2014	$235				RCM, HIM
Cognizant	TriZetto	9/15/2014	$2,700	$711	3.8		RCM, payer solution
MedAssets	Sg2	8/14/2014	$142				Market analysis for hospitals
Cerner	Siemens Health Services	8/5/2014	$1,300	$1,200	1.1		EHR
IMS Health	Cegedium RCM & IS business	6/24/2014	$520	$573	0.9		RCM
Emdeon	Capario	6/23/2014	$115				RCM
ZirMed	Intelligent Healthcare	5/21/2014					PHM
Navigant	Cymetrix	5/14/2014	$100	$48	2.1		RCM
Flatiron Health	Altos Solutions	5/9/2014	$65				OncoEHR
Symphony Technology Group	MDdatacor	4/16/2014					PHM
Intel	Basis Science	3/25/2014	$125				Wearable device
Experian PLC	Passport Health	11/6/2013	$850	$121	7.0		RCM
Quality Systems	Mirth	9/9/2013					PHM/HIE
Vista Equity Partners	Greenway Medical	9/24/2013	$644	$136	4.7		EHR, RCM, PM
Constellation Software	Quadramed	6/3/2013					RCM, EHR
Allscripts	dbMotion	3/5/2013	$235				PHM/HIE
Allscripts	Jardogs	3/5/2013					Patient engagement
UnitedHealth (Optum)	Humedica	1/25/2013					Data analytics
athenahealth	Epocrates	1/7/2013	$293	$111	2.6		Physician information
Humana	Certify Data Systems	11/5/2012					HIE
Nuance Communications	Quantim Corp. (Quadramed)	9/27/2012	$230				ICD-10 coding solution
Thoma Bravo LLC	Mediware Information Systems	9/12/2012	$195	$65	3.0		Care management
One Equity Partners	M*Modal	7/3/2012	$1,100	$458	2.4		Clinical transcription service
Vista Equity Partners	Vitera Healthcare Solutions	9/22/2012	$320	$145	2.2		EHR,
HMS Holdings	HealthDataInsights	11/7/2011	$400	$85	4.7		Medicare Recovery Audit
Blackstone	Emdeon	8/4/2011	$3,000				RCM, payer solution
Aetna	Medicity	1/24/2011	$500				HIE
Harris Corp.	Carefx	2/1/2011	$155				Interoperability
McKesson	System C Healthcare	3/3/2011	$140				EHR
Ingenix (OptumInsights)	Axoloti	8/16/2010					HIE
Ingenix (OptumInsights)	Executive Health Resources	8/4/2010	$1,500				Compliance and doc medical mgmt
Allscripts	Eclipsys	6/9/2010	$1,300	$522	2.5		EHR, RCM
Oracle	Phase Forward	4/16/2010	$685	$228	3.0		IT for clinical trial
Quality Systems	Opus Healthcare Solutions	2/11/2010	$222				EHR
TPG and others	IMS Health	11/5/2009	$5,200	$2,190	2.4		Prescription data
Average					**3.3**		

Source: Compiled by MHBK/IRD based on data from Capital IQ and public reports

Table 21 Presence in HCIT of Big Technology Companies

Company	Internal Development	Notable M&A and Partnerships
Alphabet Inc. (Google)	Google revealed the name of its in-house life science unit in December 2015 as Verily. Verily is using Google's expertise in data analytics and engineering to develop cutting-edge hardware and software for healthcare. Its goal is to manage diseases as a "continuum". One example is continuous monitoring of diseases and integration of the data in disease management. Verily assembled a multidisciplinary team, including biologists, doctors, behavioral scientist and engineers. The unit is run by a cell biologist.	In January 2016, Verily partnered with J&J's Ethicon unit to form a JV named Verb Surgical to develop robotic-assisted surgery. Alphabet will provide the software and sensor technology needed to run the robotic surgery systems. Verily is developing a continuous glucose sensor embedded in a contact lens that can measure in real time glucose level in tears. This device is partnered with Novartis.
IBM	IBM launched the new Watson Health unit in April 2015. The unit offers Watson Health Cloud as an open platform and data analytics backed by Watson cognitive computing platform.	In partnership with large companies such as Apple, Medtronic and Johnson & Johnson, Watson Health combines the private Watson Health Cloud with its proprietary Watson cognitive computing platform. IBM has made multiple acquisitions to gather important data to feed into the Watson cognitive engine. Such deals include Explorys, Phytel, Truven, and Merge Healthcare.
Apple	Apple incorporated healthcare tracking features in its iWatch. It is a leader in the wearable technologies. On the software side, Apple offers iOS Cloud for storage and sharing of health and fitness data. Apple's HealthKit is designed to help developers create health apps that can help consumers manage their health and fitness information, monitor their behavior, and stay on top of treatments. ResearchKit is an open source software framework that enables medical researchers to further medical studies. It allows consumers to volunteer their health data to assist in medical research.	Partnered with IBM for healthcare analytics in April 2015. As part of the collaboration, IBM's Health Cloud and Watson cognitive computing will harness health data that Apple customers submit to iOS apps through its ResearchKit and HealthKit platforms. The goal is to use that information to further medical research and improve customer health.
Intel	Intel has broad presence in healthcare IT, including healthcare could, data security, big data analytics, personalized medicine, clinical decision support, connected devices, etc.	In 2009, Intel formed an alliance with GE to an alliance to market and develop home-based health technologies to assist management of chronic diseases for seniors at home. Intel Capital has invested in a number of healthcare companies such as fitness tracking company Movea, diagnostic company CareDx.
Qualcomm	Qualcomm is utilizing its cellular expertise for mobile health. By leveraging key health components like biometric data, medication management, and the secure storage of health information, QUALCOMM connects patients and care providers to improve health outcome. Its subsidiary Qualcomm Life provides secure in-hospital and in-home medical device connectivity and data integration via the 2net platform. Capsule is another Qualcomm subsidiary. Capsule's core platform is called Smartlinx, which is a global leader in medical device integration and clinical data management.	In September 2015, Qualcomm Life acquired Capsure Technologie, a leading global provider of medical device integration and clinical data management solutions with more than 1,930 hospital clients in 38 countries. Qualcomm Ventures has invested in a large number of healthcare IT companies, often with a focus on wireless health. Investments include AirStrip, Doctor on Demand, Practice Fusion, Welltok, Edico Genome, Attune, ClearCare, goBalto.
Microsoft	In Healthcare IT, Microsoft offers clinical mobility, cloud computing and advanced data analytics. In clinical mobility, Microsoft offers mobile solutions to enable secure sharing of clinical and financial data. In cloud computing, Microsoft offers Microsoft cloud, cloud-based digital health apps, and Azure IoT suite. In data analytics, Microsoft offers Cortana Intelligence suite.	In 2012, Microsoft folded its Health Solutions Group into a 50-50 JV with GE named the JV company Caradigm.

Source: Compiled by MHBK/IRD based on data from public reports

IV. Future Outlook and Implications

We are excited about the potential of HCIT to transform U.S. healthcare. The first step of HCIT is to convert clinical data to electronic format. As the EHR adoption approaches saturation levels, the industry is moving beyond the initial phase. Due to the winding-down of HITECH incentives, EHR vendors could face headwinds. As the market growth decelerates and providers merge, more EHR mergers may come. It is probably hard to be a small EHR vendor in the future. The current focus of HCIT is to achieve interoperability, which is to allow sharing of electronically captured data across entities. We believe there will continue to be strong demand for data integration tools such as HIE.

The next phase is to use these data and IT tools to deliver clinical benefits for a defined patient population. This is the stage where the most benefits from HCIT on healthcare are going to be realized. While not denying the long-term trend of moving to a capitated care model, we believe the transition is not going to be easy. The ACO model is not meant for everyone. There are many HCIT companies offering population health solutions. While we don't doubt the need for PHM solutions, we wonder how many vendors can successfully prove their worth over the long term to their customers and have staying power. Therefore we have a guarded enthusiasm for PHM vendors. It is still hard for us to see what kind of PHM company will become the dominant player in the future.

We see enormous potential in three specific HCIT areas:

> ➢ The integration of remote patient monitoring either through wearables or other devices with real-time data analytics and intervention could become a new way to manage diseases. Technology has advanced to a level that can make such a closed-loop monitoring/intervention system possible.
> ➢ Big data analytics, especially AI, holds great promise in healthcare. Such technology can predict the course of a disease and prescribe the best treatment options. In a futuristic scenario, AI might take the place of doctors and nurses to monitor, counsel and take care of patients. Machines have gotten so good at doing things that probably less human intervention is required in the future.
> ➢ We are also excited about the future of telemedicine. We believe telemedicine will gradually establish itself as a new conduit of healthcare delivery. It will not take over the traditional in-office physician visits. However, it is a valuable option for treating certain ailments and thus will become a segment in overall health delivery. The cost and convenience advantage will overcome the inertia in the current system.

For established HCIT categories such as RCM, practice management, and payer solutions, we see stable growth. For wellness and patient engagement, we believe while they offer valuable and novel solutions to consumers, they face the dual challenges of user retention and proving ROI. It is hard to change consumers' ingrained behaviors. Therefore we have to wait to see if the business model can prove to work.

In terms of company positioning, we believe the economics will favor scale and category leaders. Scale is important in HCIT. Scale indicators such as having the largest installed base, the largest patient clinical database, the largest claim database, the most comprehensive relation with providers or plans will give the company competitive advantage vs. small players. Therefore the leader has an unfair advantage. On the flip side, being the third or fourth company in a category is probably a challenging position. Smaller players may need to merge or join bigger companies to compete.

There is also a benefit for scope. It is easier for a vendor with an established customer relationship to sell other HCIT products than a pure-player company. Therefore we believe some cross-sectional consolidation will be also helpful in HCIT.

HCIT has attracted over $10bn funding since 2009. As a result of the funding boom, over 500 HCIT startups have been created. The last two years have been the most pronounced in terms of venture investment in HCIT. In retrospect, some companies may have been funded at too lofty a valuation. Recent downturn in tech has resulted in mark-down valuation of private tech companies by prominent public investors such as Fidelity and T. Rowe Price. The same is happening in HCIT. Public equity return for HCIT companies has been anemic. A number of private HCIT companies have raised "down-rounds" recently.

Post-market performance of recent HCIT IPOs is generally weak. Therefore IPO is not an easy option for private HCIT companies. The vast majority of venture HCIT firms are in the money losing investment phase of their life cycles and therefore require continued infusion of capital. As the public market is not a great oasis for venture-backed HCIT companies to "graduate' into and private investors may become reluctant to invest, we believe trade sale may be the preferred exit option for investors. Strategic investors looking to grow in HCIT and financial investors such as PE funds will continue to boost M&A activities in HCIT.

V. List of U.S. HCIT Companies

Table 22 Market Participation of Notable HCIT Companies

Company	Ticker	EHR	RCM/PM	PHM/Data Analytics	HIE / Data integration Tools	Telehealth	Wellness / Patient Engagem	Payor Services	Others
3M Health Information Systems	MMM			√					√
Ability Network			√	√	√				
Accretive Health	ACHI		√						√
Advisory Board	ABCO		√	√					√
Aetna (Healthagen)	AET			√	√				
Airstrip Technologies					√				√
Aledade				√					
Alignment Health				√					
Alignment Healthcare				√					
Allscripts	MDRX	√	√	√	√		√		√
American Well						√			
athenahealth	ATHN	√	√	√			√		√
Availity			√		√				
Brightree									√
Caradigm				√					
Carecloud		√	√						
CareEvolution					√				
Castlight	CSLT							√	
Cerner	CERN	√	√	√	√		√		√
Cognizant (Trizetto)	CTSH		√	√				√	
Conifer Health			√	√			√		
Constellation (Quadramed)	TSX:CSU	√	√				√		√
Covisint	COVS			√	√				
CPSI	CPSI	√	√						
Doctor on Demand						√			
Doximity									√
eClinicalworks		√	√	√	√		√		
Emdeon/Change Healthcare			√	√				√	
e-MDs		√	√						
Epic		√	√	√	√		√		√
Evolent	EVH			√					√
Experian Health			√	√					√
GE Healthcare	GE	√	√	√					√
Greenway		√	√	√					
Health Catalyst				√					
Health Equity	HQY							√	
HealthEdge								√	
Healthedge								√	
Healthland		√	√						

Source: Compiled by MHBK/IRD based on data from Capital IQ and public reports

VI.   Appendix –Valuation Sheet and Contact Information

Table 23 Publicly Traded Healthcare IT Companies

7/7/2016 Company name	Ticker	Market Cap (USD in mn)	EV (USD in mn)	% 52-wk High	Sales 2015	Sales 2016E	Sales 2017E	2-year Sales CAGR	EV/Sales			EV/EBITDA		
									2015	2016E	2017E	2015	2016E	2017E
EHR and Other HCIT														
Cerner Corporation	CERN	$19,876	$19,968	79%	$4,352	$4,935	$5,460	12.0%	4.6	4.0	3.7	20.4	13.7	12.3
Allscripts Healthcare Solutions, Inc.	MDRX	$2,509	$3,020	85%	$1,386	$1,556	$1,675	9.9%	2.2	1.9	1.8	48.8	12.3	10.5
Quality Systems Inc.	QSII	$744	$813	69%	$490	$492	$514	2.3%	1.7	1.7	1.6	13.2	11.2	9.6
Computer Programs & Systems Inc.	CPSI	$537	$670	67%	$182	$297	$314	31.3%	3.7	2.3	2.1	12.6	20.3	8.3
Revenue cycle management														
athenahealth, Inc.	ATHN	$5,435	$5,632	82%	$925	$1,115	$1,332	20.0%	6.1	5.1	4.2	91.5	31.5	23.9
HMS Holdings Corp.	HMSY	$1,490	$1,544	95%	$474	$487	$523	5.0%	3.3	3.2	3.0	19.3	14.0	12.9
Accretive Health, Inc.	OTCPK:/	$205	$82	34%		$206	$301					-2.3	3.9	-2.7
Digital Health														
IMS Health Holdings, Inc.	IMS	$8,672	$12,845	79%	$2,921	$3,231	$3,403	7.9%	4.4	4.0	3.8	19.3	14.6	13.5
Veeva Systems Inc.	VEEV	$4,701	$4,243	102%	$313	$405	$519	28.8%	13.5	10.5	8.2	103.0	48.6	36.6
Fitbit Inc.	FIT	$2,721	$1,930	25%	$1,858	$2,566	$2,992	26.9%	1.0	0.8	0.6	11.5	5.4	4.4
Inovalon Holdings, Inc.	INOV	$2,804	$2,344	67%	$437	$515	$598	16.9%	5.4	4.5	3.9	18.0	15.3	13.7
Medidata Solutions, Inc.	MDSO	$2,686	$2,616	77%	$393	$461	$551	18.4%	6.7	5.7	4.7	72.1	28.7	24.4
WebMD Health Corp.	WBMD	$2,138	$2,237	86%	$636	$703	$770	10.0%	3.5	3.2	2.9	19.8	11.6	9.8
WageWorks, Inc.	WAGE	$2,124	$1,641	96%	$334	$361	$401	9.5%	4.9	4.5	4.1	34.5	17.6	14.9
Press Ganey Holdings, Inc.	PGND	$2,059	$2,189	94%	$319	$363	$395	11.3%	6.9	6.0	5.5	24.4	18.8	15.9
The Advisory Board Company	ABCO	$1,465	$1,967	60%	$768	$819	$883	7.2%	2.6	2.4	2.2	36.5	11.6	10.3
HealthEquity, Inc.	HQY	$1,761	$1,628	85%	$88	$126	$176	41.7%	18.5	13.0	9.2			
Benefitfocus, Inc.	BNFT	$1,084	$1,087	82%	$185	$235	$291	25.3%	5.9	4.6	3.7			
Weight Watchers International, Inc.	WTW	$735	$2,732	41%	$1,164	$1,208	$1,277	4.7%	2.3	2.3	2.1	7.6	11.0	10.1
Evolent Health, Inc.	EVH	$1,094	$1,197	79%	$97	$218	$280	70.0%	12.4	5.5	4.3			
HealthStream, Inc.	HSTM	$835	$684	81%	$209	$230	$257	10.9%	3.3	3.0	2.7	28.8	20.5	18.1
MINDBODY, Inc.	MB	$652	$577	89%	$101	$137	$175	31.6%	5.7	4.2	3.3			
Teladoc, Inc.	TDOC	$617	$523	42%	$77	$123	$182	53.5%	6.8	4.2	2.9			
Imprivata, Inc.	IMPR	$354	$305	64%	$119	$139	$162	16.6%	2.6	2.2	1.9			
Castlight Health, Inc.	CSLT	$427	$306	47%	$75	$101	$129	30.6%	4.1	3.0	2.4			
Vocera Communications, Inc.	VCRA	$346	$226	82%	$104	$115	$127	10.6%	2.2	2.0	1.8			
Care.com, Inc.	CRCM	$364	$312	92%	$139	$161	$182	14.7%	2.3	1.9	1.7			
Everyday Health, Inc.	EVDY	$256	$339	61%	$232	$257	$290	11.8%	1.5	1.3	1.2	16.5	7.3	7.5
Average								20%	5.1	4.0	3.3		16.7	13.4

Source: Compiled by MHBK/IRD based on public data from Capital IQ

Table 24 A list of Selected HCIT Companies

Company	Categories	Description	Location
Ability Network	RCM and other provider solutions	Use internet to securely connect providers to Medicare. Offer providers services such as Medicare claims and remittance, Medicare eligibility, Medicare RCM, patient referral management and transition of care or other services.	Minneapolis, MN
Accenture	Broad HIT	Broad HIT company	Ireland
Accolade, Inc.	Wellness/Patients engagement / population health	Accolade, Inc. operates a consumer healthcare engagement platform for large self-insured employers and payer organizations in the United States. The company offers analytics and decision support tools to help provide individualized help and clinical support for employees and family members. It also offers a single point of contact for various health benefits or healthcare needs; and helps drive participation in other employer-sponsored benefits.	Plymouth Meeting, PA
Accretive Health	RCM and other provider solutions	Helps providers with revenue collection and improve operating margins and clinical performance. Offer three services - revenue cycle management, physician advisory services, value-based reimbursement.	Chicago, IL
Act.MD	PHM (care coordination)	ACT.md connects all care team members and drives action through one cloud-based web application platform. Key product is ACT.md CARE COORDINATION RECORD™	Boston, MA
Adhere Tech	Telehealth (Medicine adherence)	AdhereTech's first product, the smart pill bottle, is an innovative device to track and improve adherence in real-time.	New York, NY
Adherium Ltd.	Telehealth (Medicine adherence)	Smartinhaler™ medication sensors attach to prescription inhalers to provide reminders and monitoring of inhaler usage. The SmartinhalerLive platform uses wireless technology to provide real-time data collection and reporting from Smartinhaler™ medication sensors. The company sells its Smartinhaler devices to pharmaceutical companies, organizations that conduct clinical trials, and companies that conduct disease management programs.	Melbourne, Australia
Adreima, Inc.	Payer solutions	Adreima, Inc. provides clinically integrated revenue cycle services to hospitals in the United States. It offers patient advocacy services to secure coverage and payment for hospitals and health systems; revenue review and validation; and insurance billing and follow-up services, a patient-centered extended business office, and collection services.	Phoenix, AZ
AdvancedMD Software (a part of ADP, Inc.)	EHR, RCM/PM and other services for physicians.	AdvancedMD is a leading provider of cloud solutions that support independent physicians and their staff: practice management, electronic health records, revenue cycle management, patient relationship management, business analytics reporting, and physician-performance benchmarking. AdvancedMD serves an expansive national footprint of more than 17,500 practitioners and 500 medical billing companies.	South Jordan, Utah
The Advisory Board Company	PHM/Data Analytics	A global research, technology, and consulting firm for healthcare organizations and higher education institutions. Healthcare customers are primarily hospitals, but also include some payers and other healthcare stakeholders.	Washington, DC
Aethon	Telehealth	Aethon is best known for its TUG autonomous mobile delivery robot which transports medications, meals and materials through hospitals. Aethon is also the developer of MedEx, a software system that tracks and maintains chain-of-custody control of medication delivery.	Pittsburgh, PA

Aetna (ActiveHealth, Healthagen)	Broad HIT	Broad HIT company	Hartford, CT
Agile Health	Wellness and patient engagement	Agile Health is a mobile health engagement company that leverages the power of text messaging to drive better health outcomes through lasting health behavior change.	Nashville, TN
AirStrip Technology	Telehealth (Mobile health for hospitals)	AirStrip ONE® is a mobile interoperability platform, a single-sign-on mobile platform, which enables care collaboration and timely access to patient's vital clinical data.	San Antonio, TX
Akili Interactive Labs	HCIT as treatment	Akili developed interactive video games as therapies for mental conditions. The "Project: EVO" platform is currently being tested in a variety of clinical studies in multiple patient populations around the globe, including ADHD, autism, depression, and traumatic brain injury.	
Aledade	Population Health / Data Analytics	Aledade partners with independent, primary care physicians to provide everything doctors need to create and operate an Accountable Care Organization (ACO).	Bethesda, MD
Alignment Healthcare	Population Health / Data Analytics	Alignment partners with payers and providers with varying risk-sharing models to improve clinical outcome and reduce cost.	
Allscripts	EHR and RCM	Broad HIT company	Chicago, IL
American Well	Telehealth	American Well's mobile and Web telehealth platform connects doctors with patients for live, on-demand video visits over the Internet. It serves national and regional health plans and systems, and other entities. The company was incorporated in 2006 and is based in Boston, Massachusetts.	Boston, MA
Anthelio Healthcare Solutions Inc.	Patient engagement / Population health	Anthelio Healthcare Solutions Inc. provides healthcare technology solutions to hospitals, physician practice groups, and healthcare providers in the United States. The company's products include Patient Information Exchange, Patient PULSE (a patient portal), Engage (a patient engagement solution), and others.	Dallax, TX
Apixio	Population Health / Data Analytics	Apixio's Iris platform uses proprietary data extraction tools and machine learning algorithms to feed our scalable data processing pipeline. Iris enables the analysis of unstructured healthcare data at the individual level, providing groundbreaking insights.	San Mateo, CA
Aprima Medical Software	EHR and RCM	Aprima Medical Software, Inc. provides electronic health record, practice management, and revenue cycle management solutions for medical practices. It offers Aprima, an application built on a single database that enables access to a patient's chart or insurance information without closing one database and opening another.	Carrollton, TX
Aptus Health	Patients / Physician engagement	Aptus Health, Inc. provides digital health engagement solutions to life science companies, payers, employers, and health systems. It offers integrated digital marketing campaigns, including strategy, solution design, customer segmentation, advertising, and analytics solutions. The company also provides access to the online physician and consumer health communities with collective intelligence to engage audiences in a way that helps them to work better individually and together.	Reading, MA
Arcadia Solutions	EHR	Arcadia Solutions, LLC is an electronic health record (EHR), data aggregation and analytics technology company. The company delivers services and proprietary software to large healthcare providers, payers, accountable care organizations and health information exchanges.	Burlington, MA

MIZUHO

athenahealth	EHR and RCM	athenahealth provides cloud-based services and mobile applications for medical groups and health systems. Its services include CRM/PM, EHR, patient engagement and other tools.	Watertown, MA
Augmedix	EHR and RCM	Augmendix uses wearable technologies like Google Glass for directly charting a patient's EHR.	SF, CA
Aventura, Inc.	Data integration	Aventura, Inc. develops healthcare workflow optimization software solutions. The company offers Roaming Aware Desktop, a customized clinical computing experience that combines fast access, single sign on (SSO), and protected health information security features to support mobile clinicians; Patient Aware Dashboard that synchronizes with the hospital's EHR system and display it.	Denver, CO
Aver Inc.	Population Health / Data Analytics	Aver Inc., a health information technology company, provides software for creating and managing bundles. It offers avercloud, a technology platform that coordinates payers, providers, and patients into a single value-based payment solution.	Columbus, OH
Awarepoint	Help hospitals track equipment and patient flow	Awarepoint developed a cloud-based real-time location system to help hospitals track equipment and patient flows.	San Diego, CA
Axial exchanges	Patient engagement/ telehealth	Axial Exchange Inc. develops patient engagement solutions for hospitals and health systems. It offers custom hospital and mobile health applications for patients; a dashboard for patient management; and Axial Provider, a communication and reporting software for referral networks. The company also provides chronic care management, patient activation, staff training, and IT services; and patient engagement school services.	Raleigh, North Carolina
Benefitfocus, Inc.	Health and other Benefits	Benefitfocus, Inc. provides cloud-based benefits software solutions for consumers, employers, insurance carriers, and brokers under a software-as-a-service model in the United States.	Charleston, SC
BENU, Inc.	Health and other Benefits	BENU, Inc. provides workforce management, benefits, payroll, and private healthcare exchange solutions to employers.	San Mateo, CA
Best Doctors	Telehealth	Best Doctors, Inc. provides access to the medical experts and treating physicians to have a better diagnosis and treatment plan in the United States and internationally.	Quincy, MA
BioTelemetry, Inc.	Telehealth	BioTelemetry, Inc. provides cardiac monitoring, cardiac monitoring device manufacturing, and centralized cardiac core laboratory services.	Malvern, PA
BodyMedia	Telehealth	BodyMedia, Inc. develops and manufactures wearable body monitors that collect physiological data for use in improving health, wellness, and fitness.	Pittsburgh, PA
Brighttree LLC	Healthcare IT	Brightree LLC offers cloud-based software solutions to the post-acute care industry. The company offers Brightree HME, a cloud-based business management platform for home medical equipment (HME) clients featuring billing and accounts receivable (A/R) management, inventory, and reporting and business analytics. Another product is Brightree DME.	Lawrenceville, GA
Caradigm (a JV of Microsoft and GE)	Population Health / Data Analytics	Caradigm USA LLC is a JV of Microsoft Corporation and GE Healthcare Limited. Its enterprise software portfolio encompasses all capabilities critical to delivering effective population health management, including data control; healthcare analytics; care coordination and management; and wellness and patient engagement.	Bellevue, WA
CareCloud	EHR and RCM	CareCloud Corporation provides cloud-based healthcare IT solutions for revenue cycle management, practice management, EHR, patient engagement and other IT tools for doctors.	Miami, FL

Casenet	Population Health / Data Analytics	Casenet, LLC designs and develops enterprise care management software and service solutions. The company offers TruCare, a member-centered care management system that enables improved care coordination with a solution for utilization, case, and disease management, TruCare Actions, a population health management tool and other tools.	Bedford, MA
Castlight Health, Inc.	Cost/ Quality transparency	Cloud-based IT tools that allow consumers to gain transparency on cost and clinical outcomes of various providers. It serves self-insured employers in a range of industries.	San Francisco, CA
Cerner Corporation	Broad HIT	Broad HIT company	North Kansas City, MO
ClearCare	Healthcare IT for home care market	ClearCare, Inc. develops and offers web-based home healthcare management software. The company's software enables caregiver-client matching, client assessment, and point-of-care task tracking.	San Francisco, CA
ClearCost Health	Cost/ Quality transparency	ClearCost Health owns and operates healthcare price transparency platform.	San Francisco, CA
Community Computer Services	EHR and RCM	Community Computer Service, Inc. offers an electronic medical record and practice management system that provides automation solutions.	Auburn, NY
Connance, Inc.	RCM, PHM	Connance provides predictive analytic technology solutions that enable hospitals, clinicians and outsourcing organizations to optimize financial and clinical workflows. It delivers Revenue Cycle and Population Health solutions that prioritize activity and tailor workflows to improve net income, reduce costs, and enhance the patient experience.	Waltham, MA
Connecture, Inc.	Healthcare IT for health insurance distribution	Connecture operates as a Web-based consumer shopping, enrollment, and retention platform for health insurance distribution. It serves health insurance marketplace operators, such as health plans, brokers, and exchange operators.	Brookfield, WI
COTA, Inc.	Population Health / Data Analytics	COTA, Inc. provides a cloud-based platform that collects select oncological patient level data to provide real-time functions for oncologists. It offers COTA (Cancer Outcomes Tracking and Analysis), a cloud-based platform that enables doctors and health plans to improve patient care and move from fee-for-service to value-based reimbursement models. The company's COTA is also used for cancer sorting; outcomes tracking in real-time of things that matter to oncologists and patients (e.g. OS, PFS, cost); and reporting of the data in desired format.	Hackensack, NJ
Covisint	HIE, population health	Covisint Corporation provides an open, enterprise grade cloud platform in the United States and internationally. Its platform enables organizations to build solutions that identify, authenticate, and connect users, devices, applications, and information. The company's platform offers data integration and exchange, identity management, presentation, analytics, IoT, orchestration, and device connectivity services. Its customers span many industries, including healthcare.	Southfield, MI
CPSI	EHR and RCM	Computer Programs and Systems, Inc. provides healthcare information technology solutions for rural and community hospitals in the United States. The company's integrated enterprise-wide system automates clinical and financial data management in the functional areas of a hospital. Its products and services enhance hospital performance in the areas of clinical care, revenue cycle management, cost control, and regulatory compliance.	Mobile, AL

Craneware, Inc.	Healthcare IT for provider revenue integrity solutions	Craneware provides automated revenue integrity solutions that improve financial performance for healthcare organizations. Craneware's market-driven, SaaS solutions help hospitals and other healthcare providers more effectively price, charge, code and retain earned revenue for patient care services and supplies.	Atlanta, GA
Curoverse	Population Health / Data Analytics	Curoverse, Inc. develops and operates a cloud based open source platform under the name Arvados for storing, organizing, analyzing, and sharing genomic data.	Boston, MA
Doctor on Demand	Telehealth	Seeing doctor through mobile platforms.	San Francisco, CA
Doximity	Telehealth	A LinkedIn-type of service for doctors	San Mateo, CA
DrFirst.com	Healthcare IT	Offers software solutions and services that provide real-time access to patient data, improve communication and collaboration at the point of care and across the patient's circle of caregivers, and enhance the doctor's clinical view of the patient to help drive better health outcomes.	Rockville, MD
Early Sense Ltd.	Telehealth - remote patient monitoring	EarlySense Ltd. develops patient monitoring systems to be used in hospitals. Its products include EarlySense System, which provides continuous patient monitoring for heart rate, respiratory rate, and motion; and Central Display Station that helps on-duty nurses to continuously supervise the status of the patients in the department.	Ramat Gan, Israel / Waltham, MA
eClinicalWorks LLC	EHR and RCM	eClinicalWorks, LLC provides ambulatory healthcare IT solutions. It offers eClinicalWorks V10, an electronic health record system; eClinicalWorks CCMR, a population health solution; Healow, a patient engagement solution; and eClinicalWorks RCM, a solution for revenue cycle management. The company offers its products for physicians, ACOs, out-patient departments of hospitals, health centers, departments of health, and convenient care clinics in the United States.	Westborough, MA
eHealth Technologies	Healthcare IT	eHealth Technologies is a provider of clinically informed referral services to hospitals. The company's eHealth Connect® solution streamlines referrals and intelligently aggregates patients' clinical records. eHealth Connect® Image Exchange enables the automated access to all types of medical images in the context of the aggregated patient record, in full diagnostic quality.	West Henrietta, NY
Eliza Corporation	Payer solutions	Eliza Corporation provides integrated healthcare communication services for health plans, disease management firms, pharmacy benefit managers, and pharmaceutical companies.	Danvers, MA
Emdeon (Change Healthcare)	RCM, PHM, Cost/ Quality transparency	Emdeon is a provider of revenue and payment cycle management and clinical information exchange solutions, connecting payers, providers and patients in the U.S. healthcare system.	Nashville, TN
e-MDs, Inc.	EHR and RCM	e-MDs is a provider of integrated electronic health records, practice management software, revenue cycle services, and credentialing solutions for physician practices and enterprises.	Austin, TX |
Epic Sytems Corporation	EHR and RCM	Broad HIT company	Verona, WI
Enli Health Intelligence	Population Health	Enli Health Intelligence Corporation develops population health management solutions that enable care teams to integrate healthcare data with evidenced-based guidelines in provider workflows across the population and at the point of care. It offers risk stratification solutions, care coordination programs, and care delivery solutions.	Beaverton, OR

Everyday Health	Health information and education	Operates a website for health information and education	New York, NY
eviCore National	Population Health / Data Analytics	Casenet, LLC designs and develops enterprise care management software and service solutions. The company offers TruCare, a member-centered care management system that enables improved care coordination with a solution for utilization, case, and disease management.	Bluffton, SC
Evolent Health	Population Health / Data Analytics	Evolent supports integrated health systems in migration toward value-based care and population health management. The company's services include providing customers with a robust population management platform, integrated data and analytics capabilities, pharmacy benefit management services, and comprehensive health plan administration services.	Arlington, VA
Eyefinity/Office Mate	EHR and RCM	Eyefinity offers claim filing, electronic medical records, lab ordering, practice management software, and Website development and hosting for eye care business.	Rancho Cordova, CA
Fitbit	Telehealth (Wearable fitness technology)	Wearable fitness technology	San Francisco, CA
Flatiron Health	EHR, RCM, data analytics	Flatiron Health provides EHM, RCM, and data analytics to oncology clinics. The company also offers OncologyCloud, a Web-based business and clinical intelligence data platform.	New York, NY
Gaffey Healthcare	RCM	GAFFEY Healthcare provides cloud-based revenue cycle technology and services to help health care organizations.	Plano, TX
GE Healthcare	EHR and RCM	Broad HIT company	Westborough, MA
GetWellNetwork, Inc.	Patient engagement	GetWellNetwork uses bedside TV in the hospital as a patient engagement tool. It provides tools to help nurses and clinicians manage the patient's needs, education and overall experience.	Bethesda, MD
Ginger.io	Population Health / Data Analytics	Ginger.io, Inc. provides a mobile and Web platform for Android and iPhone devices that helps providers, healthcare organizations, and other groups to stay connected to patients between office visits and understand their health.	San Francisco, CA
GNS Healthcare	Population Health / Data Analytics	GNS Healthcare, Inc. provides analytics solutions for the healthcare industry. Based on the MAX™ architecture and patented REFS™ inference engine, GNS uses machine learning and advanced simulation to create a combination of risk, efficacy, and engagement analytics to predict personalized intervention ROI.	Cambridge, MA
Grand Rounds	Telehealth	Grand Rounds, Inc. provides patient access to medical experts through the web. Its services include remote second opinions and in-person visits to local medical offices; and it handles activities ranging from medical records collection to appointment scheduling. It serves individuals and families confronting serious health issues.	San Francisco, CA
Greenway Medical Technologies	EHR and RCM	Greenway Medical Technologies, Inc. provides integrated information technology solutions and managed business services to healthcare providers in the United States. It offers electronic health record (EHR), practice management, and interoperability functionality.	Carrollton, GA

hCentive	Payer solutions	hCentive, Inc. provides cloud-based healthcare technology solutions for health plans, state agencies, dental plans, and TPAs. WebInsure solutions allows health plans and state & federal health agencies to create portals or integrate with marketplaces for consumer acquisition, and management, distribution and compliance of health insurance plans.	Reston, VA
Health Catalyst	Population Health / Data Analytics	Health Catalyst, LLC provides data warehousing, analytics, and outcomes improvement solutions to healthcare organizations in the United States. It offers Late-Binding Data Warehouse, population health, and clinical and financial risk modeling; and Catalyst Analytics Platform.	Salt Lake City, UT
Health Fidelity	Population Health / Data Analytics	Health Fidelity, Inc. engages in the development and commercialization of a clinical natural language processing (NLP) platform called Fidelity that enables medical practitioners and administrators to make use of the wealth of currently unusable medical information they collect.	San Mateo, CA
Healthcare Bluebook (CareOperative, LL)	Cost/ Quality transparency	Provides price transparency for consumers and allow consumers to comparatively shop for healthcare service. It also helps fair-price providers attract patients.	Brentwood, TN
HealthcareSource	Healthcare IT	HealthcareSource is the leading provider of talent management software for the healthcare industry. With a comprehensive suite of solutions that includes applicant tracking and onboarding, reference checking, behavioral assessments, employee performance, compensation, competency and learning management, and eLearning courseware, HealthcareSource addresses the needs that are most critical to healthcare talent management professionals.	Woburn, MA
HealthPort, Inc.	Healthcare IT	HealthPort Incorporated provides release of information (ROI) services and audit management, and tracking technology for hospitals and health systems, physician and group practices, patients, law companies, and health plans in the United States.	Alpharetta, GA
HealthCore (A subsidiary of Anthem)	Population Health / Data Analytics	With a large, integrated database and deep understanding of the complexities and nuances of big data, HealthCore helps clients achieve evidence-based competitive advantages through innovative problem solving, analytics and outcomes research expertise. HealthCore doesn't sell data. Instead, it designs custom data-driven research solutions and guides its clients in the optimal use and interpretation of the data by evaluating the impact of disease, treatment and medical care on outcomes.	Wilmington, DE
HealthEdge Software, Inc.	Payer solutions	HealthEdge Software, Inc. develops integrated financial, administrative, and clinical software platform for healthcare payers. The company offers HealthRules Payer, HealthRules CareManager, and HealthRules Answers. It also provides HealthRules Portal, and HealthRules Connector.	Burlington, MA
HealthEquity	Healthcare IT	HealthEquity, Inc. provides various solutions for managing health care accounts, health reimbursement arrangements, and flexible spending accounts for health plans, insurance companies, and third-party administrators in the United States.	Draper, UT
HealthFleet	Population Health	HealthFleet, Inc. provides weight loss and related disease prevention programs online. It offers nutrition, fitness, and lifestyle programs; live and appointment-based online coaching sessions; and programs for various diseases.	Norwalk, CT

HealthGrades Operating Company	Cost/ Quality transparency	It provides online services for comprehensive information about physicians and hospitals. Its Website is used by consumers to research, compare, and connect with physicians and other healthcare professionals based on health condition, procedure, and specialty.	Denver, CO
Healthline Networks	Health information and education	Web-based health information provider for consumers.	San Francisco, CA
HealthPrize Technologies	Telehealth (Medication adherence)	It offers HealthPrize Engagement Engine, a medication adherence platform and software solution that gathers daily compliance data from users, verifies their prescription refills, and rewards them for adherence. The company collects daily self-reporting through response to text or email messages, online via the HealthPrize dashboard, or via the HealthPrize mobile platform. Its solution combines financial incentives in loyalty points, weekly sweepstakes, and monthly competitions; and education, reminders, and fun.	Norwalk, CT
HealthSparq	Cost/ Quality transparency	Healthsparq, Inc. develops integrated healthcare transparency Software-as-a-Service solutions for health plans and employers. It offers HealthSparq Search, a provider and physician search module that enables consumers to view cost, quality and patient reviews of providers and HealthSparq Cost, a health cost estimator, as well as other comparative shopping tools.	Portland, OR
HealthStream	Healthcare IT	HealthStream, Inc. provides software-as-a-service (SaaS) based workforce development solutions and research/patient experience solutions in the United States. The company's HealthStream Workforce Development Solutions segment offers training, assessment, and talent development and management solutions; and administrative and management tools, as well as training, implementation, and account management services.	Nashville, TN
HealthTap	Telehealth	A telehealth company that delivers immediate doctor advice, answers, tips, and prescriptions	Palo Alto, CA
Healthways	Population Health	Healthways is a global provider of well-being improvement solutions. The Company uses the science of behavior change to produce and measure positive change in well-being for our customers, which include employers, integrated health systems, hospitals, physicians, health plans, communities and government entities.	Franklin, TN
HealthWyse	Healthcare IT focused on home health	HealthWyse, LLC provides integrated clinical and financial information software and services to home health, hospice, and private duty agencies in the United States.	Wilmington, MA
hellohealth	EHR and RCM	Hello Health Inc. provides a Web-based patient management platform and professional services for healthcare practitioners. The company's patient management platform includes practice management software, an electronic health record, and a suite of patient engagement tools.	New York, NY
HMS Holdings	Payer solutions	HMS provides healthcare insurance benefit cost containment services in the United States. HMS provides a broad range of cost containment solutions in healthcare to help payers improve performance.	Irving, TX
Human Arc	RCM	Human Arc Corporation provides eligibility and various reimbursement recovery solutions for hospitals and health plans in the United States.	Cleveland, OH

Human Care Systems	Population Health	The Human Care Systems Platform provides behavior modification and other interventions to patients to deliver positive ROI. Solutions include Patient Support Programs, Care Coordination and Management, Patient Engagement & Behavioral Change, Multi-channel CRM (Phone, Digital, Mail) & Data Management and other tools.	Boston, MA
Humana	Broad HIT	Broad HIT company	Louisville, KY
Humedica	Population Health / Data Analytics	Humedica, Inc., a clinical intelligence company, provides private cloud analytics solutions for healthcare providers, life sciences, and research organizations. Its solutions create a longitudinal view of individual patients and patient populations by gathering, normalizing, and analyzing data from disparate IT systems, including electronic health records, practice management systems, and claims data.	Boston, MA
Iatric Systems	Population Health	Iatric Systems, Inc. provides software applications, interfaces, and reporting solutions for healthcare information systems. Its offerings help providers with EHR integration, Analytics, Interoperability, and Patient Privacy.	Boxford, MA
IBM Watson Health	Broad HIT (esp. Big data analytics)	Broad HIT company, with special strength in big data analytics.	Armonk, NY
iHealth Technologies	Payer solutions		Atlanta, GA
ikaSystems	Payer solutions	ikaSystems Corporation develops cloud-based business automation and process solutions to help payers with commercial, Medicare, Medicaid, and ACO businesses.	Southborough, MA
Imprivata	Healthcare IT - Single sign-on platform	Imprivata, Inc. provides authentication and access management technology solutions for the healthcare industry in the United States, the United Kingdom, and internationally. The company principally offers Imprivata OneSign, an integrated enterprise single sign-on, authentication management, and workflow automation platform	Lexington, MA
IMS Health	Healthcare IT - Prescription data analytics	IMS's principal products include national information offerings that provide performance metrics related to the sales of pharmaceutical products, prescribing trends, medical treatment, and promotional activity through multiple channels.	Danbury, CT
InterSystems Corporation	HIE, EHR and other Healthcare IT	InterSystems Corporation develops data management, connectivity, and analytics technologies that help clients in healthcare, financial services, government and other industries. HealthShare is a health informatics platform that provides a technology for strategic interoperability and analytics for action within a single facility, or across a hospital network. The company also offers an EHR called TrakCare.	Cambridge, MA
Informatics Corporation of America	Health information exchange	Informatics Corporation of America, Inc. provides a health information exchange and care management solution to hospitals, IDNs, communities, and states.	Nashville, TN
Influence Health (MEDSEEK)	Wellness and patient engagement	Influence Health, Inc. develops customer relationship management (CRM) software solutions for hospitals. The company offers MEDSEEK Influence platform that integrates Web, mHealth, predictive analytics, and precision marketing technologies to help hospitals differentiate from their competitors by engaging prospects and patients before and after a physical encounter.	Birmingham, AL

inTouch Health	Telehealth	InTouch provides a line of robots which allow doctors to remotely access and assess their patients as well as communicate with them through videoconferencing. The robots use a control station interface provided by the company along with its SureConnect network infrastructure to connect doctor and patient.	Santa Barbara, CA
Jawbone (AliphCom, Inc.)	Telehealth (Wearable fitness technology)	Fitness tracker.	San Francisco, CA
Jiff, Inc.	Wellness and patient engagement	Jiff, Inc. provides HIPAA-compliant social network and digital health apps platform for the healthcare industry. Its platform allows consumers and healthcare professionals to build personalized and private communities of care in a HIPAA-compliant environment that connects people to their healthcare.	Palo Alto, CA
Keas	Wellness and patient engagement	Keas Inc. provides online care plans for individuals. Its care plans are designed to help people on health and wellness issues. The company's service offers individuals with ongoing advice and interpretation about their health data, such as lab results and current conditions and helps them to take action to achieve their health goals.	San Francisco, CA
Knome	PHM/ Big data analytics	A provider of bioinformatics systems for genomic interpretation and research.	Waltham, MA
Kyruus	Cost/ Quality transparency	Kyruus, Inc. provides physician network optimization software solutions to hospitals and health systems, life science companies, and physicians. It offers search, scheduling, and referral applications to enable patients to access the best available care.	Boston, MA
Lumeris	Population Health	Lumeris' technology-enabled solutions support health systems, payers and providers in their journey to value-based care. Through incentives, tools and information, Lumeris empowers providers and administrators to make better-informed, value-based decisions.	Saint Louis, MO
Mango Health	Wellness and patient engagement	Mango Health, Inc. develops mobile healthcare applications. It offers a patient engagement platform that provides medication information, refill time, and peer comparison to users.	San Francisco, CA
McKesson	HCIT	Broad HIT company	San Francisco, CA
MDLIVE	Telehealth	A leading telehealth provider of online and on-demand healthcare delivery services and software	Sunrise, FL
MEDai	Population Health / Data Analytics	MEDai, Inc. provides clinical and financial intelligence solutions primarily for payers and provider markets. The company provides Pinpoint Review, which predicts patient needs and provides staff alerts; Pinpoint Quality that monitors outcomes and physician performance to identify opportunities for clinical, financial, and operational improvement; and Pinpoint Compliance, which delivers regulatory reports for performance improvement.	Orlando, FL
MedAptus	Healthcare IT	MedAptus, Inc. operates as a revenue cycle and charge management company. It offers Professional Charge Capture, Provider Enrollment, and Technical Charge Capture.	Boston, MA
MedAssets	RCM and other provider solutions	MedAssets is a performance improvement company that provides technology-enabled products and services for providers and product manufacturers in the United States. It operates in two segments, Spend and Clinical Resource Management (SCM) and Revenue Cycle Management (RCM).	Alpharetta, GA

MedeAnalytics	Payer solutions	MedeAnalytics, Inc. develops cloud-based healthcare analytics solutions for providers and health plans. The company offers patient access, revenue integrity, business office, population health, and performance management solutions for healthcare providers; and provider engagement, population health, medical and Medicaid management, employer reporting, enterprise master patient index, HEDIS quality management, and performance management solutions for health plans.	Emeryville, CA
MedHOK	Payer solutions	MedHOK, Inc. provides Software-as-a-Service care, quality, and compliance software solutions for utilization management, prior authorization, predictive modeling, case management, disease management, Rx specialty management, and medication therapy management in the United States.	Tampa, FL
Medidata	Healthcare IT for pharma	Medidata Solutions, Inc. provides cloud-based clinical development solutions for life sciences in the United States and internationally. The company offers applications and data analytics for clinical development. It offers Medidata Rave, a platform for capturing, managing, and reporting clinical data; Medidata CTMS, a clinical trial management solution that streamlines operational workflows; Medidata Designer, which enhances the efficiency of clinical trial start-up; Medidata Insights, a clinical business analytics platform; and Medidata Balance, a randomization and trial supply management solution.	New York, NY
Meditech	EHR and RCM	Provider of EHRs and other IT solutions.	Westwood, MA
Medivo, Inc.	Data analytics	Medivo Inc., a health data analytics company, provides data analytics services. It maintains a lab data repository; and analyzes large de-identified data sets and shares its findings with the medical community, as well as with its life science, payer, and lab partners to ensure that appropriate available treatments are provided to patients sooner.	New York, NY
MicroMD (Henry Schein Medical Systems)	EHR/PM	Henry Schein Medical Systems, Inc. provides practice management, electronic medical records, and document management solutions for small practices, large medical groups, community health centers, and billing services in the United States. It offers MicroMD PM, a practice management system, which supports electronic claims management, accounts receivable management, patient registration and scheduling, and reporting; and MicroMD EMR, an electronic medical record system with encounter capture, multiple charting methods, e-prescribing, medical device connectivity, E&M coding, and outcomes reporting.	Boardman, OH
MindBody	Healthcare IT for the wellness industry	MINDBODY, Inc. operates a cloud-based business management software and payments platform for the small and medium-sized businesses in the wellness services industry.	San Luis Obispo, CA
Modernizing Medicine	EHR, RCM, PM	Modernizing Medicine, Inc. develops electronic medical record (EMR) systems for specialty clinicians in the United States. It offers billing, revenue cycle management, and inventory management solutions for medical specialties; Electronic Medical Assistant, a cloud-based specialty-specific electronic medical records system that is available as a native iPad application and from various Web-enabled Mac or PC devices; and implementation model, data, and ongoing support services.	Boca Raton, FL

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NantHealth	Broad HIT	NANTHEALTH provides a wide array of healthcare IT solutions. For example, it provides a cloud-based intelligent clinical operating system and eviti Advisor, a clinical decision support for oncologists. The company also provides connectivity solutions, including DeviceConX (iSirona), a software solution that collects and transmits device data; GlowCap, a medication management solution that improves medication adherence; and GlowPack that delivers reminders for patients to take medication.	Culver City, CA
Netsmart	EHR, PHM, HIE, etc.	Netsmart offers healthcare information technology for primarily health and human service market. The company offers CareRecord, an electronic health record for the health and human services community; CareManager, a care coordination software solution for the health and human services industry; CareConnect, a health information exchange software solution for integrated consumer healthcare; network and contract management software solutions for payers in the health and human services industry; and primary care integration software application for iPad and iPhone users.	Overland Park, KS
NextGen Healthcare	EHR and RCM	NextGen Healthcare Information Systems, LLC provides electronic health record (EHR), financial, and health information exchange (HIE) solutions for hospitals, health systems, physician practices, and other healthcare organizations. The company offers ambulatory product suite that integrates patient care with clinical and administrative workflow applications; financial and clinical management solutions; community connectivity solutions that include HIE and patient portals; and electronic dental records.	Horsham, PA
Nuance Communications	Healthcare IT (one of four segments)	The Healthcare segment offers transcription solutions, which enables physicians to streamline clinical documentation with medical transcription platform; Dragon Medical, a dictation software that empowers physicians to accurately capture and document patient care in real-time on various devices; clinical document improvement and coding solutions to ensure patient health information is accurately documented, coded, and evaluated; and diagnostic solutions that allows radiologists to document, collaborate, and share medical images and reports.	Burlington, MA
Omada Health	Wellness and patient engagement	Omada Health, Inc. designs and develops online digital health programs that coordinate people at risk for chronic diseases. It helps employers and health plans to identify the people within their population at risk for developing preventable chronic conditions, such as type 2 diabetes or heart diseases; and engages participants to lose weight.	San Francisco, CA
Oracle	Broad HCIT	Broad HIT company	Redwood City, CA
Orion Health	HIE / Population Health / Data Analytics	Orion Health Group Limited provides health information exchange (HIE) and healthcare integration solutions worldwide. It offers Collaborative Care, a HIE software to exchange clinical information with other organizations; Rhapsody Integration Engine that provides connectivity between legacy and next-generation health systems; and messaging and mapping tools.	Aukland, New Zealand
Passport Health Communications	RCM	Passport Health Communications Inc. provides a single revenue-cycle Software-as-a-Service platform to the healthcare industry. The company's solutions include orders and scheduling, patient access, claims and contract management, patient engagement, patient collections optimization, and population health management suites.	Franklin, TN

PatientKeeper	Healthcare IT	PatientKeeper, Inc. provides healthcare software applications for clinical and financial workflows to physicians. Its clinical solutions include Computerized Physician Order Entry (CPOE), Mobile CPOE; Medication Reconciliation, NoteWriter, and Mobile Clinical Results.	Waltham, MA
PatientPing	Population Health	PatientPing Inc. develops a national care coordination network that connects healthcare providers with real-time notifications wherever patients receive care. Its community includes emergency case managers, primary care physicians, hospital discharge planners, ACO care coordinators, nursing directors, home health administrators, bundled payment nurses, health plan care managers, and others in the United States.	Boston, MA
PatientSafe Solutions	Healthcare IT	PatientSafe Solutions, Inc. provides connected healthcare workflow and care coordination solutions to hospitals. The company offers PatientTouch system, a point-of-care mobile solution that orchestrates people, data, and processes in real-time, as well as handles barcode medication administration, specimen collection, infant care, care interventions, and clinical communications.	San Diego, CA
PatientsLikeMe	Health information and education	PatientsLikeMe Inc. operates an online health data and information sharing website for patients. It enables patients to share data with other patients, caregivers, physicians, researchers, and pharmaceutical and medical device companies. The company offers data and information on patients, treatments, symptoms, and research. Its data and information helps researchers learn how diseases act in the real world and accelerate the discovery of new treatments.	Cambridge, MA
Pebble Technology Corp.	Telehealth (Wearable fitness technology	Pebble Technology Corp. develops and markets smartwatches. The company markets its watches under Pebble Time Round, Pebble Time Steel, Pebble Time, Pebble Steel, and Pebble Classic brand names.	Redwood City, CA
Persivia	Population Health / Data Analytics	Persivia is focused on population health. It provides care management, quality measurement and outcome improvement solutions. Its two platforms are clinical decision support and big data integration/analytics.	Lowell, MA
Phreesia	Healthcare IT	Phreesia, Inc. provides a point-of-service platform for front-office operations in the healthcare industry. It provides patient registration and check in services. It offers Phreesia, a point-of-service solution that digitizes intake, automates eligibility, benefits verification, and calculates and collects patient responsibility.	NY, NY
BodyTel Scientific	Telehealth - remote patient monitoring	BodyTel Scientific provides telemedical monitoring and management systems for chronic diseases, primarily for diabetes. The company's Bluetooth enabled products are designed to simplify home monitoring by patients and to ease the communication of measured body values to healthcare professionals in real time. It develops GlucoTel system, a blood glucose monitoring system; PressureTel system for blood pressure monitoring; and WeightTel system for body weight monitoring.	Jacksonville, FL
Practice Fusion	EHR and RCM	Practice Fusion, Inc. offers cloud-based electronic health records (EHR) to doctors for free. The company offers Practice Fusion, a practice management software platform that offers charting, scheduling, billing, e-Prescribing, lab integrations, and secure messaging solutions.	San Francisco, CA
Predilytics	Population Health / Data Analytics	Predilytics, Inc., a healthcare information technology company, provides healthcare analytic solutions to health plans, providers, and other risk-bearing entities. The company applies machine-learning analytic tools to transform clients' structured and unstructured data, along with external data sources into actionable insights.	Burlington, MA

Predixion Software, Inc.	Population Health / Data Analytics	Predixion Software, Inc. develops and markets cloud-based predictive analytics (PA) solutions. The company provides Predixion Insight, a PA platform for business analysts.	Aliso Viejo, CA
Premier, Inc.	Population Health / Data Analytics	The company operates through two segments, Supply Chain Services (GPO business) and Performance Services. The Performance Services segment offers PremierConnect, an integrated data warehouse and technology platform infrastructure for continuous performance improvement; and performance improvement collaborative, advisory, and insurance services.	Charlotte, NC
Press Ganey Holdings	Healthcare IT solutions for healthcare providers	Press Ganey Holdings, Inc. provides patient experience and caregiver measurement, performance analytics, and strategic advisory solutions for healthcare organizations in the United States.	Wakefield, MA
Preventice Solutions	Telehealth (Mobile Health / remote Patient monitoring)	Preventice provides services for remote monitoring of patients with cardiovascular conditions. It offers wearable sensors called BodyGuardian, which monitors heart rhythm and transfers the data wireless to Preventice Monitoring Center.	Rochester, MN
Pricing Healthcare, Inc.	Cost/ Quality transparency	Independent, online marketplace for direct-pay healthcare	American Fork, UT
Privia Health	Wellness and patient engagement	Privia Health, LLC operates as a physician practice management and population health technology company. Its cloud-based technology platform combines with an approach to patient engagement and physician-driven wellness focusing on building a better healthcare delivery system and patient population.	Arlington, VA
Propeller Health	Wellness and patient engagement	Propeller is the leading mobile platform for respiratory health management. Through sensors, mobile apps and services, Propeller helps reduce the cost of care while delivering better quality of life for individuals with chronic respiratory disease.	Madison, WI
Proteus Digital Health	Telehealth (Medicine adherence)	Proteus Digital Health, Inc. operates as a digital medicines company. The company focuses on developing products, services, and data systems based on integrating medicines with ingestible, wearable, and mobile sensors, and cloud computing. Its digital health feedback technology provides a view into an individual's medication adherence and physiological parameters.	Redwood City, CA
QPID Health	Healthcare IT	QPID Health, Inc., a healthcare IT software company, delivers a health record intelligence platform and Web-based applications that enable healthcare institutions and clinicians to gain insights from electronic health records (EHRs). The company operates Queriable Programmable Inference Dossier (QPID), an intelligence system for the EHR that permits the creation of clinician-directed queries, analytics, and reporting abilities in real time and at the point of care. Its QPID platform aggregates EHR data, prepares information for search, and delivers meaningful information to clinicians and administrators in Web-based applications.	Boston, MA
QuadraMed (a subsidiary of Constellation Software)	Healthcare IT	QuadraMed offers healthcare software solutions and services to help providers streamline processes, and improve workflow and efficiency. Key products include enterprise scheduling, enterprise self-service, EMPI, clinical solutions, nursing and RCM.	Reston, VA

Quality Systems	EHR, PM, RCM, Population health	Quality Systems, Inc. (QSI) and its subsidiaries develop and market electronic health records (EHR), practice management, revenue cycle management, and interoperability solutions as well as clinical workflow and operations consulting services for medical and dental group practices and hospitals throughout the U.S.	Irvine, CA
Recondo Technology	Healthcare IT, RCM	Recondo Technology, Inc. provides cloud-based software and services that streamline workflow in the healthcare industry. It offers a suite of EmpoweredPatientAccess solutions for registration quality, eligibility verification, authorization, and patient estimation applications; EmpoweredBusinessOffice solutions for actionable claims status, follow-up automation, revenue forecasting analysis, and electronic claims management applications; MySurePayHealth that addresses common concerns with price estimation by enabling patients to self-generate accurate out-of-pocket expense estimates; and a suite of EmpoweredTechnology solutions that facilitates payer data resolution, payer connectivity, hospital information systems integration, and reporting and analytics features. The company offers solutions that connect providers with payers and their patients to ensure payments across the care continuum. It serves specialty providers, radiology service providers, imaging centers, ambulatory surgical centers, integrated delivery networks, and hospitals in the United States.	Greenwood Village, CO
RedBrick Health	Wellness and patient engagement	RedBrick Health Corporation provides consumer health engagement and behavior change technology solutions. The company produces and delivers a personal experience through Web, mobile, social, and live interactions. It serves primarily large, self-insured employers, but also target health plans, providers and certain partners.	Minneapolis, MN
Reflexion Health	Healthcare IT	Reflexion Health, Inc. develops and publishes a prescription software for medical professionals and their patients. It offers a rehab measurement tool to track patient adherence for the prescribed rehab plan.	San Diego, CA
RemitDATA	Healthcare IT	RemitDATA Inc., a healthcare technology company, provides comparative analytics solutions with multiple ways to access application programming interfaces, benchmarking, and peer comparison tools for payers, providers, billing companies, and other healthcare services companies.	Memphis, TN
Rise Health, Inc. (a subsidiary of Best Doctors, Inc.)	Population Health / Data Analytics	Rise Health, Inc. is a population health management company that operates a clinical data technology platform in the United States. It offers Ascend, an enterprise data integration platform, Stratus, a business intelligence tool, Cirrus, a CRM and other services to providers and other customers.	Oak Brook, IL
RxAnte (a subsidiary of Millennium Laboratories)	Population Health / Data Analytics	RxAnte Inc. provides healthcare analytics platform. The company provides an analytics platform to predict medication adherence for individual patients, target interventions to those most likely to benefit, and monitor and manage programs over time.	McLean, VA
Santa Rosa Consulting	Healthcare IT consulting	Santa Rosa Consulting is a national provider of management consulting and information technology services to the healthcare industry	Bloomfield Hills, MI
SBR Health	Healthcare IT, patient engagement	SBR Health, Inc. provides a video-based communication platform that links physicians, patients, and specialists across hospitals, clinics, homes, and geographically isolated areas. It prevents re-admissions, manages chronic diseases, improves access to care, and offers behavioral health and language interpretation services (for patients).	Cambridge, MA

Sensogram Technologies	Telehealth (Wearable, remote patient monitoring)	Sensogram Technologies designs, produces and markets innovative biosensors built into easy-to-use, wireless, wearable mobile devices that allow real-time, continuous, remote monitoring and analysis of vital signs.	Plano, TX
Sensoria, Inc.	Telehealth (Wearable fitness technology)	Sensoria Inc. designs, develops, and produces body-sensing wearable devices.	Redmond, WA
Sermo	Healthcare IT	Sermo, Inc. operates an on-line social community for doctors. The company's platform allows doctors to share their feelings about their profession and lives, help their peers by sharing and solving challenging cases, converse with their colleagues, vote with their peers, talk with their peers about real-world medicine, and get paid for their perspectives.	New York, NY
Sevocity	EHR and PM	Sevocity Inc. provides Internet-based electronic health records, FAX, cloud electronic health record, and practice management solutions to primary care centers, specialists, community health centers, billing companies, and educators in the United States.	San Antonio, TX
Shareable Ink	Healthcare IT	Shareable Ink Corporation is a cloud-based healthcare IT provider offering a natively mobile clinical documentation platform for structured and unstructured data capture and exchange at the point of care. Among several products, the company offers Shareable Documents, an enterprise mobile clinical documentation application for iOS devices to automate clinical data collection at the point of care using an iPad tablet.	Nashville, TN
ShareCare	Wellness and patient engagement	Sharecare, Inc. provides an online health and wellness engagement platform that gives consumers a personal results-oriented experience by connecting them to health resources and programs.	Atlanta, GA
SHL Telemedicine	Telehealth	SHL Telemedicine Ltd., together with its subsidiaries, develops and markets personal telemedicine systems in Israel, Europe, and U.S. It offers smartheart, a personal mobile 12-lead ECG device, CardioSen'C, a personal cellular-digital 12-lead ECG transmitter, among other devices. It is focused on CV diseases.	Tel Aviv, Israel
Silverlink Software	Healthcare IT	Silverlink Software is a UK company that supplies patient administration and electronic patient record systems. It is one of the leading patient administration systems (PAS) providers for UK's NHS.	UK
Sotera Wireless	Telehealth (Wireless vital sign monitoring)	Sotera Wireless, Inc. develops, markets, and sells a vital signs monitoring solution. The company offers ViSi Mobile System, a platform for comprehensive vital signs monitoring that is designed to keep clinicians connected to their patients. Its system monitors ECG, heart/pulse rate, SpO2, cuff-based and cuffless on a beat-to-beat basis blood pressure, respiration rate, and skin temperature.	San Diego, CA
Specialists on call Inc.	Telehealth	Specialists On Call Inc. provides emergency telemedicine consultation services in the United States. The company offers 24/7/365 specialty on-call coverage, veteran/fellowship trained specialists, care, evidence-based practice guidelines, videoconferencing equipment, and HIPAA and HITECH compliant data, as well as image management.	Reston, VA
Stanson Health	Healthcare IT	Stanson Health, Inc. develops and markets clinical decision support solutions for physicians and other healthcare providers. Its solution provides EMR-integrated real time alerts for use in the physician's clinical workflow, as well as offers analytics that guides and influences physician decisions towards the elimination of unnecessary or inappropriate care.	Los Angeles, CA

TCS Healthcare Technologies	Population Health / Data Analytics	TCS Healthcare Technologies is focused on the development and support of software solutions for Care Management operations, including utilization management, case management, disease management, population health management and quality improvement. Flagship platform is ACUITY Advanced Care™ Management Software, a highly configurable tool that supports a variety of workflows and care plan standardization.	Auburn, CA
TeleTracking Technologies	Healthcare IT	TeleTracking Technologies, Inc. provides patient flow automation/hospital capacity management solutions to hospitals and medical centers.	Pittsburgh, PA
Teladoc	Telehealth	Teledoc is a telehealth company that delivers on-demand physician access to patients via mobile devices. Teladoc provides consumers with access to its network of more than 2,900 board-certified, state-licensed physicians and behavioral health professionals who provide care for a wide range of non-emergency conditions.	Purchase, NY
TelCare	Telehealth, remote patient monitoring	TELCARE, Inc. develops cellular-enabled glucose meters for diabetes patients worldwide. The company offers Telcare blood glucose monitoring (BGM) system, a 3G cellular-enabled blood glucose meter that transmits glucose values to a care-management server and provides feedback and coaching to patients with diabetes; and Telcare test strips.	Bethesda, MD
TigerText	Telehealth (Text messaging for doctors)	TigerText, Inc. provides real-time mobile messaging solutions for healthcare.	Santa Monica, CA
Treato (a subsidiary of First Life Research Ltd)	Population Health / Data Analytics	Treato aggregates patient experiences from the Internet and organizes them into usable insights for patients, healthcare professionals, pharma companies, and other healthcare organizations. Its Treato platform collects data from healthcare social media sites and forums; analyzes the information; and provides a window into patients' thoughts and attitudes. The company also provides Treato Pharma, a brand intelligence service for pharma marketers and agencies to provide analytics and insights into patients' thoughts and attitudes.	Yehud, Israel
Triveris (a subsidiary of Health Network America)	EHR	Triveris, Inc. operates as a health technology and services provider. It offers Health Insight Now, an interactive and real time medical record solution, Personal Health Coach service, and other services.	Eatontown, NJ
TriZetto (acquired by Cognizant)	Payer solutions, population health	TriZetto Corporation develops healthcare information technology solutions and services for health plans, benefits administrators, health systems, and healthcare providers. It offers benefits administration, network and care management, consumer portals, population health management, value-based benefit design and reimbursement, provider connectivity, revenue cycle management, and analytics solutions for payers; and provider solutions in the areas of patient access, claims, collections, denial management, contract management, and customer care.	Englewood, CO
The SSI Group	RCM	The SSI Group, Inc. provides a range of provider/payer/physician services and technologies for managing the revenue cycle that include claims processing (ASP/direct/clearinghouse), document management, Electronic Data Interchange (EDI) platforms and networking services.	Mobile, AL

Company	Category	Description	Location
T-system	Healthcare IT	T-System Inc. provides clinical, financial, operational, and regulatory solutions for hospitals and urgent care clinics. The company offers documentation solutions, including EV, an emergency department information system; EV for physicians; T Sheets Digital, a documentation solution for urgent care; and T Sheets that provides patient care through medical records/documentation and optimized reimbursement. It also provides charge capture and coding solutions.	Dallas, TX
Optum Inc. (part of UnitedHealth)	Broad HIT	Broad HIT	Eden Prairie, MN
Valence Health	Population Health	Valence Health provides clinical integration, population health, and value-based care solutions to providers. It designs, builds, and manages value-based care models, including clinically integrated networks, bundled payments, risk-based contracts, accountable care organizations, and provider-sponsored health plans. Its software solutions and services include value-based consulting, vision platform, quality measurement, cost and utilization, data collection, vElect for IPAs contract administration, value-based managed services, and actuarial services.	Chicago, IL
Validic (Motivation Science Inc.)	Telehealth	Validic provides a one-to-many connection to digital health technologies. Validic is a cloud-based mobile platform that connects patient-recorded data from digital health applications, devices and wearables to key healthcare companies like hospital systems, providers, pharmaceutical companies, payers, health information technology platforms, health clubs and wellness companies. With access to this information, Validic's clients can accelerate their strategic healthcare initiatives — from patient engagement and population management to care coordination, wellness programs and more.	Durham, NC
Veeva	Healthcare IT	Veeva Systems Inc. provides cloud-based software solutions for the life sciences industry. Its solutions include Veeva CRM, a customer relationship management solution that allows pharmaceutical and biotechnology companies to market and sell compliantly to physicians and other healthcare professionals; and Veeva Vault, a cloud-based content management and collaboration solution for its customers to manage content-centric processes in various departments within a life sciences company. The company's industry cloud solutions also comprise Veeva Network, a cloud-based customer master data management solution.	Pleasanton, CA
Virgin Pulse (a subsidiary of Virgin Group)	Wellness and patient engagement	Virgin Pulse, Inc. provides employee health engagement solutions. It offers solutions that range from physical activity to nutrition to sleep; and an online platform that fosters healthy daily habits and sustainable behavior change to help employees thrive at work and across various aspects of life.	
Vital Connect	Telehealth (Wearable fitness technology)	Vital Connect, Inc., a healthcare technology company, focuses on developing a wireless biosensor technology to monitor, detect, diagnose, and aid in directing the treatment of cardiovascular disease. HealthPatch® MD, part of the innovative VitalConnect Platform, is capable of remotely capturing a broad range of clinical-grade biometric measurements in a continuous, configurable and non-obtrusive manner using a small yet powerful patch worn on the chest. - See more at: http://www.vitalconnect.com/overview#sthash.p11WA3o2.dpuf	Campbell, CA
Vitals	Cost/ Quality transparency	Vitals provide online tool to help patients search for doctors, hospital information. It offers doctor evaluation and comparison services.	Newtown, PA

Vivify Health	Population Health	Vivify Health Inc. operates a cloud-based, device-agnostic, software platform. It offers a home-based remote monitoring solution that connects health care providers with patients in their homes using consumer electronics and reduces hospital readmissions and associated healthcare costs. It also provides personal health devices including tablets, weight scales and pulse oximeters.	Plano, TX
Vocera Communications	Telehealth (Mobile Health)	Vocera Communications provides intelligent communication solutions for mobile workers in healthcare and other industry. The company offers Vocera Communication System, which includes an enterprise software platform that connects communication devices, including hands-free, wearable, voice-controlled communication badges, and third-party mobile devices that use its software applications enabling mobile workers to connect with other staff; Vocera Collaboration suite; and Vocera Alarm Management System. It also provides Vocera Care Experience solution, a hosted software suite for enhancing patient and staff experience.	San Jose, CA
VOX telehealth	Wellness and patient engagement	A patient engagement solution company, VOX delivers procedure-specific, full episode-of-care engagement solutions that provide education, coordination, and monitoring, proprietary SmartTasks™ and a customizable alert escalation and notification system. Vox telehealth engages the patient throughout their pre-op phase, as well as through transition of care and recovery.	Pennington, NJ
Voxiva	Telehealth (Mobile health)	Voxiva, Inc. provides interactive mobile health services. The company's services combine various technologies, such as SMS text messaging, interactive voice, email, mobile apps, devices, and the Web to support prevention and wellness, disease management, and adherence.	Washington, DC
WebMD	Wellness and patient engagement	WebMD Health Corp. provides health information services to consumers, physicians and other healthcare professionals, employers, and health plans through its public and private online portals, mobile platforms, and health-focused publications in the United States.	New York, NY
Weight Watchers International	Population Health	Weight Watchers International, Inc. provides weight management services worldwide.It offers a range of products and services comprising nutritional, exercise, and behavioral tools and approaches. it offers online subscription weight management products, such as Weight Watchers Online; and Weight Watchers eTools, an Internet weight management product.	New York, NY
Wellbe	Wellness and patient engagement	Wellbe Inc. provides cloud-based Patient Guidance System, which empowers patients to succeed with their treatments and gives providers a solution to reduce the cost of their care. Its solution offers patients a way to experience their acute care; enables hospitals and surgery centers to transform episodic care with the Web; and enables orthopedic centers to improve patient satisfaction scores and operational efficiency. It is targeted towards high-cost, specialty care episodes.	Madison, WI
WellCentive	Population Health / Data Analytics	Wellcentive, Inc. provides cloud-based population health management and data analytics solutions for physicians and their organizations. It offers Wellcentive Advance, a healthcare intelligence solution suite that provides various solutions, including population management, clinical decision support, care management, accountable care, delivery system reform incentive, chronic care management, clinical integration, enterprise-wide insights, and quality-based reimbursement; and solutions for reducing avoidable hospital readmissions.	Alpharetta, GA

Welldoc	Wellness and patient engagement	WellDoc, Inc. is a health care behavioral science and technology company to support chronic disease management. It provides DiabetesManager, a diabetes patient management tool, and BlueStar, a mobile prescription therapy solution that provides patients with real-time guidance to improve their diabetes self-management, as well as clinical decision support to help their doctors to optimize their diabetes treatment plans.	Baltimore, MD
Wellframe	Wellness and patient engagement	Wellframe delivers a mobile-enabled care management platform. Wellframe partners with leading health plans, providers and other healthcare stakeholders to extend the reach of care management services to support patients toward improved experience, care plan adherence and health outcomes.	El Segundo, CA
Welltok	Wellness and patient engagement	Welltok, Inc. designs and develops a technology that drives engagement through a combination of social, gaming, and personalization technologies in the healthcare industry. It offers a Health Optimization Platform called CaféWell Core that helps payers, health systems, accountable care organizations, and other population health managers to connect with their members and reward them for healthy physical, emotional, and financial behaviors via Web and mobile platforms.	Denver, CO
WiserCare	Healthcare IT	WiserCare LLC develops healthcare decision support solutions. It offers Web-based software-as-service solution that provides personalized reports that include evidence-based treatment options, personal values, and preferences regarding patients' treatment options; and details to patients about the success rates of each treatment and associated side effects. The company offers its solutions for hospitals, integrated delivery systems, ACOs, and health plans.	LA, CA
Withings	Telehealth (Wearable fitness technology)	Provider of smart, wireless connected devices to track a patient's wellbeing. Key products include smart watches, wireless scale, smart body analyzer, blood pressure monitor, smart baby monitors, etc.	Cambridge, MA
ZeOmega	Population Health / Data Analytics	ZeOmega, Inc. develops and provides population health management software solutions for payers, providers, and value-based care organizations. It offers Jiva, a Web-based population health management platform that transforms traditional episodic-based care management into proactive and collaborative population health management through electronic health record (EHR)-enabled care plans, point of care tools, decision support, and user-configurable workflows for care management. The company's platform also provides interoperability, analytics, integrated medication management, and clinical content solutions.	Plano, TX
Zephyr Health	Big data analytics for life sciences	Zephyr Health, Inc. designs and develops an enterprise solutions platform for healthcare and life sciences companies such as pharmaceutical, biotechnology, and medical devices. The company provides Insights-as-a-Service solution to organize and visualize data sources. It transforms data through research, integration, modeling, analytics, and visualization within its cloud-based platform; and provides Voyager, a mobile analytics and primary feedback solution for healthcare and life science customers.	SF, CA
Zipnosis	Telehealth	Zipnosis, Inc. operates a 24/7 online diagnosis and treatment service for common medical conditions. Its platform connects patients and clinicians online, and provides diagnosis and treatment for common health conditions.	Minneapolis, MN

ZirMed	RCM	ZirMed offers cloud-based revenue cycle management solutions for eligibility verification, patient estimation, claims management, payer payment management, patient statements, and patient payment management; a population health management solution that aggregates clinical and financial data from various disparate healthcare information systems; denial and appeal management solution; and clinical communications solutions.	Louisville, KY
ZocDoc	Cost/ Quality transparency	ZocDoc, Inc. operates an online platform to help patients to find and book medical appointments in their neighborhood. It helps patients check physician availability, acceptance to their insurance and instantly book appointments.	New York, NY
Zynx Health	Population health	Zynx Health Incorporated provides clinical improvement and mobile care solutions for hospitals and healthcare organizations in the United States. It offers ZynxAnalyzer, a solution that pinpoints opportunities essential to decreasing care variation and improving performance in clinician practices; ZynxCarebook, which connects inpatient and aftercare providers; ZynxOrder that offers clinical and quality improvement solutions; and ZynxCare, which provides actionable plans of care that enable providers to strategically coordinate patient and family focused care, reduce care disparities, and prevent avoidable and unnecessary readmissions.	Los Angeles, CA

Source: Compiled by MHBK/IRD based on data from Capital IQ and public reports

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