



THE STATE OF AMERICAN HEALTHCARE 2018: COST DISEASE AND ITS IMPLICATIONS



Healthcare delivery is time-consuming and inefficient work. The work of repairing the human body, much like the similarly essential work of child-rearing and educating, proves resistant to productivity gains and is not terribly scalable. Economists who subscribe to the theory of cost disease believe that costs, in service areas in which the reduction of labor hours is resistant to productivity gains experienced in other industries, are bound to grow at a rate greater than inflation, thereby constraining our ability to control their costs.

EXECUTIVE SUMMARY



In fall of 2017, the principals at Splash 4 Partners read *The Cost Disease: Why Computers Get Cheaper and Healthcare Doesn't* by economist William

Baumol. While its discussion of inflation, supply and demand, and labor productivity rekindled memories of a boisterous economics professor with a penchant for elbow patches and suspenders, the book also illuminated key themes underfoot and ahead in healthcare today. Our key takeaways are:

- Healthcare costs will continue to rise faster than the rate of overall inflation due, in part, to the amount of labor involved in delivering care. The rising costs are affordable for now,¹ but they present political risks that will likely grow alongside them.
- Avenues of care delivery are expanding without supplanting or cannibalizing existing platforms. Infrastructure costs for healthcare are rising, partly thanks to increasingly broader adoption of telemedicine among providers and payors.
- Thousands of companies stand poised to try to generate cost savings and productivity gains for the healthcare system. Many will fail. Many that fail to lower the cost of healthcare will instead improve the quality of care delivered and compete on this basis. A smaller group of survivors will find success, not from lowering costs or improving quality of care delivery, but by simply embedding their products and services in the infrastructure of existing healthcare organizations.
- Government involvement in healthcare will only continue to grow.
- The number of those employed in healthcare will continue to rise. Most new jobs will be for less skilled workers than the physicians and nurses they are meant to help free up.
- Recruiting (and retention) will be a competitive requirement for successful, sustainable, and profitable healthcare organizations.
- Newer healthcare market entrants will find success, not by trying to disintermediate entrenched healthcare

institutions, but by supporting those institutions in pursuit of their objectives.

- The market for personalized care is growing. Concierge practices are proliferating for patients seeking more personalized service. Meanwhile, technology-enabled healthcare services and genomic advances are offering new ways to deliver individual care to large patient populations that threaten to consume ever increasing quantities of healthcare services.
- Care coordination is a rising challenge with which payors, providers, and patients must grapple. Both healthcare IT and tech-enabled healthcare services firms are designing products and services to consolidate patient records.
- Algorithmic care will probably be used to better manage healthcare resources and to coordinate care as healthcare providers seek to maximize investments in skilled clinical labor.

The following report explores the interplay among market participants, in the context of Baumol's cost disease, as healthcare organizations seek cost reductions and productivity gains. Throughout, we underscore challenges and successes of healthcare companies in tracking and achieving cost savings and productivity gains. For those who reach the end of our report and are interested in delving deeper, we highly recommend reading *The Cost Disease: Why Computers Get Cheaper and Healthcare Doesn't* and would welcome the chance to exchange ideas with you.

Splash 4 Partners hopes you find *The State of American Healthcare 2018: Cost Disease and its Implications* valuable.

Sincerely,

Jacob Grosshandler and Richard Grosshandler

Co-Founders and Principals

Splash 4 Partners



BESPOKE GROWTH, TRANSACTION, & OPERATIONAL SOLUTIONS

Splash 4 Partners provides bespoke growth, transaction, and operational solutions for organizations focused on expansion, investment, and execution. Our team of consultants partners with executives, institutional investors, founders, and advisory firms to deliver the insights, council, and bench strength needed to:

- Develop executable growth strategies.
- Make informed investment decisions.
- Prepare a business, its data, and management team for a capital raise or transaction.
- Identify technology solutions and vendors to support growth.

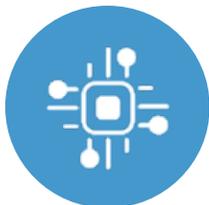
INDUSTRY EXPERTISE



Telemedicine



Healthcare Services



Tech Enabled Business Services & Software



Education, Training & Compliance

WHO WE SERVE



Middle Market Businesses



Private Equity Groups



Healthcare Organizations



Corporate Development Groups



Investment Banks



Lenders & Debt Funds

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A TAILORED APPROACH

Splash 4 Partners develops a tailored approach to your organization’s unique needs. We leverage decades of experience in private equity, investment banking, and consulting to serve our diverse clients through the various phases of value creation.

SERVICE OFFERINGS



DILIGENCE SUPPORT

- Market Studies
- Earnings & KPI Analysis
- In-depth Customer Interviews
- Financial Analysis & Valuation
- Quarterback of the Overall Diligence Process



TRANSACTION SUPPORT

- Systemizing Key Data to Convey a Compelling Story
- Identifying & Marketing to Prospective Buyers
- Overseeing the Overall Transaction Process
- Managing Diligence Streams
- Filling Interim Management Roles



GROWTH STRATEGY

- Sales & Customer Analysis
- New Market Entry & Commercialization
- Acquisition Strategy Creation
- Identify New Technology Solutions & Vendors

REPRESENTATIVE ENGAGEMENTS

Engagements	Description	Industry	Service Offerings
Project Bedrock	Stress tested the growth strategy and financial projections of a fast growing chain of outpatient medication-assisted treatment clinics for an institutional investor; created detailed forecast driven by KPI analysis.		
Project Upstart	Advised founder on competitive positioning, pricing, and go-to-market strategy for a firm attempting to supply hedge funds with aggregated data on sales volumes of privately held companies. Performed in-depth interviews with potential customers and data providers to identify early challenges to scaling.		
Project Hawk	Worked with a middle market logistics company’s CFO and board of directors to perform a strategic alternatives analysis. Identified acquisition targets and entered into pre-LOI negotiations with a target company for acquisition.		
Project Abacus	Advised on the channel strategy for a new software offering aimed at professional services firms. Helped the executive team identify, prioritize, and test an expansive list of end markets by testing receptivity of offering within each established vertical.		
Project Beats	Laid out a transaction roadmap for a top ten health system looking to sell a homegrown technology solution. Advised executive and project team on process to maximize value and certainty to close.		
Project Remote Control	Completed market study of acute care tele-neurology and tele-psychiatry services on behalf of a leading healthcare investment fund. Study results laid out hospitals buy vs. build requirements, market sizing, and competitive positioning of major providers.		
Project Graduate	Estimated market size, penetration rate, churn rate, and average annual market up for grabs in the corporate learning management system space.		

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RISING COSTS OF HEALTHCARE IN AMERICA

With American per capita healthcare spending approaching \$10,000 a year, the old question of how to make a good or service better, faster, cheaper looms ominously over the healthcare industry. Healthcare inflation since 1980, measured by the CPI, is greater than 600%.² In the same period, real median family income in the U.S. rose only 25%.³ Today, healthcare represents more than 18% of GDP, compared to 13.1% at the start of the millennium, and it continues to grow.⁴

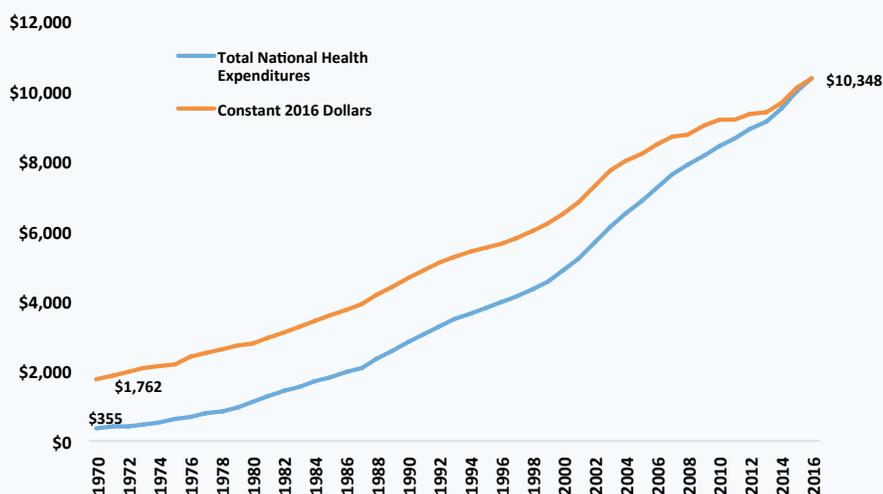
Better, faster, cheaper: three variables that influence go-to-

Emergent order, is economist speak for trade occurring without market design or government direction. In other words, the opposite of the healthcare market.

Splash 4 Partners believes that Baumol’s theory of cost disease not only explains historic phenomena but also affords predictive applications in healthcare information technology (“HCIT”) and tech-enabled healthcare service (“TEHCS”) businesses. Healthcare administrators, clinicians in managerial positions, investors, HR benefit managers, and program administrators for third-party payors all have keen interests in identifying:

- What program or company is likely to assist in reducing costs;
- What program or company is likely to scale; and

U.S. Per Capita Healthcare Expenditures 1970 – 2016⁷



market strategy. In emergent order markets making a wire thinner and wrapping it with less insulated plastic allows Amazon to sell unbranded iPhone power cords for less than 50% of the OEM price.⁵ Healthcare, however, is far from an emergent order market. Government regulation, state licensing boards, the FDA and DEA, third-party payors, the Association of Medical Colleges, and the American Medical Association compete and cooperate in a manner that leads to bills for \$600 Band-Aids after a visit to the emergency department.⁶

- What program or company is likely to hang the *no-longer-in-business* banner.

In the following pages, Splash 4 Partners examines the theory of cost disease, its strength in understanding the past, and what it might indicate about the near- and mid-term future of America’s healthcare system. The report then examines how a select number of HCIT and TEHCS firms are finding success among the entrenched institutions that dominate the healthcare industry today.



Cost Disease and Growing Government Healthcare Dollars

According to Baumol’s theory, healthcare’s cost continues to rise at a rate higher than the overall rate of inflation because it is a personal service where the amount of labor is difficult to reduce despite productive gains elsewhere in the economy. More productive segments of the economy can reduce their labor needs per unit of output due to gains from technology, ideas, and process engineering. In contrast, *repair industries* are plagued by the cost disease, and the industry charged with repairing the human body and mind is not exempt.

There are multiple contributors to rising healthcare costs, such as an aging population, advancement in life-saving medical techniques, poorly designed policies, poor patient lifestyle decisions, and the threat of malpractice lawsuits. Furthermore, most attempts to curtail healthcare costs have done little to reduce the amount of labor needed to treat patients.⁸

Healthcare providers that employ medical scribes add labor to record the necessary patient data into costly electronic medical record (“EMR”) systems. Advancements in dialysis since the 1960’s have increased the amount of both specialized equipment and skilled clinical labor (“SCL”) needed to perform what has become the standard of dialysis care—hemodialysis.⁹

An all-too-real concern about the sustainability of healthcare costs abounds. Projections place healthcare costs at 62% of GDP by the year 2105, compared to today’s roughly 18%.”

Similarly, handwashing protocols and the now pervasive central line checklist actually slow down SCL to improve the quality of care. These improvements thankfully reduce errors but also create additional labor demand and extend life expectancies of patients.

Baumol and several of his contributing colleagues argue that America can afford these price increases into the twenty-second century thanks to economic growth driven by productivity gains that dwarf healthcare cost increases. Increases in the average worker’s wages and purchasing power parity enable payment of higher prices for personal services.

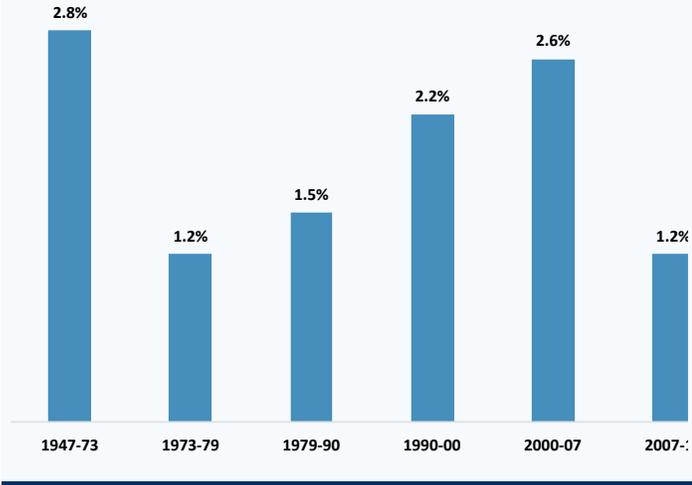
However, this rosy picture is far more tenuous than the authors acknowledge.¹⁰

The annual rate at which output per worker increased between 479 A.D. and the American Revolution barely topped zero. Nearly 13 centuries of anemic productivity gains might indicate that the Industrial and Digital Revolutions that followed were aberrations

lasting, so far, three centuries.¹¹ No matter if you believe, in terms of economic growth, we are heading to a regression to historic means or not, an all-too-real concern about the sustainability of healthcare costs abounds. Projections place healthcare costs at 62% of GDP by the year 2105,¹² compared to today’s roughly 18%.



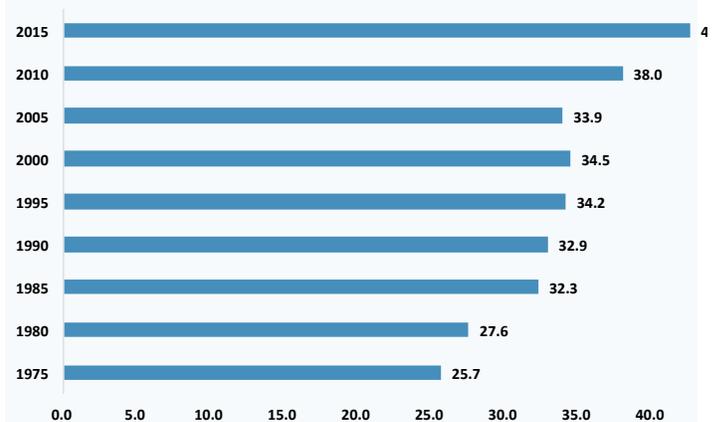
Average Annual Percent Change in Productivity of Non-Farm Business Sector 1947 - 2016¹³



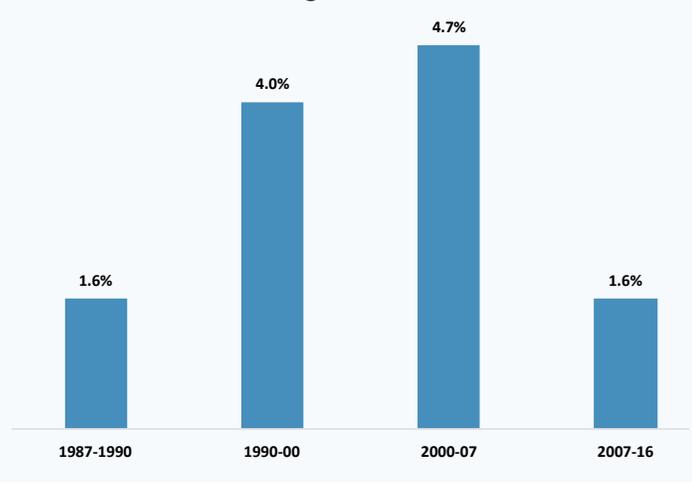
A decade after the Great Recession, questions as to the strength of the recovery and the strength of the American consumer persist. Health insurance premiums rise year after year, as do out-of-pocket expenses. In 2016, one in four Americans reported having problems keeping up with their medical bills in the last year, according to The Kaiser Family Foundation.¹⁵ From 2000 to 2016, real median household income increased by only \$495. In the majority of years

between those bookend years, household income declined relative to the millennium's 2000 peak of \$58,544.¹⁶ Healthcare costs are not the only expense putting pressure on Americans. During the same period from 2000 to 2016, rents increased by 76%—a percentage high not experienced since 1965—for the 37% of Americans who rent.^{17 18} At the individual and family level, rising costs and stagnate wages continues to undermine the financial stability of American households.

of Renter Occupied Housing Units in the U.S. from 1975 – 2015 (# in millions)¹⁹

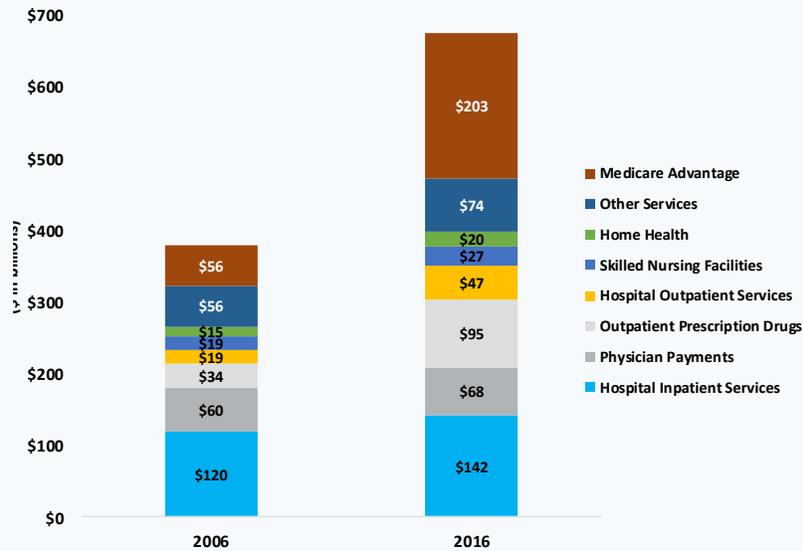


Average Annual Percent Change in Productivity of the Manufacturing Sector 1947 - 2016¹⁴



Even if the economists are correct about America's ability to afford persistently higher healthcare bills, politics may render such increases unsustainable. When monarchs ruled, and liberalism was nascent, agrarian peasants felt great resentment toward the king for putting his hand in their pockets, especially in lean crop years. Prolonged resentment and a few lean years catalyzed changes in regime or new royal decrees. Large healthcare bills coupled with wage stagnation leave the healthcare sector vulnerable to royal comparisons. The analogy becomes more apt as healthcare coverage is legislatively mandated, subsidies for policies purchased through the exchanges are vanishing, and both premiums and deductibles continue to rise. To attenuate the pressures on the populace, the government has grown and continues to grow its participation in the healthcare industry. Various subsidies under the Affordable Care Act have extended expenditure by the government on healthcare.

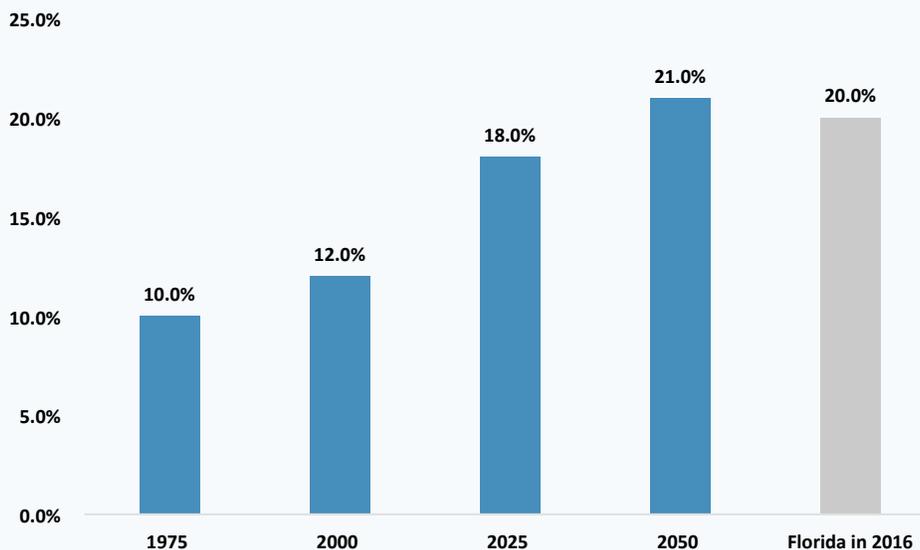
Medicare Benefit Payments by Type of Service: 2006 vs. 2016²⁰



Government dollars will continue to flow into this sector, if for no other reason than that the percentage of the population eligible for Medicare coverage continues to increase. Like any insurer, more covered lives mean more negotiating power over providers. One might rejoice in this change in power

dynamics among healthcare market participants, except that salary caps and limits on procedures have failed to curtail cost increases to a rate lower than overall inflation in countries that adopted these policies. Baumol and his associates' research indicates the cost disease has spread globally.²¹

People Age 65 and Older (% of Total Population)²²



COST DISEASE AND HEALTHCARE LABOR

Two clear predictions emerge from the theory of cost disease as it relates to labor. First, due to minimal productivity gains, costs for specialists and select types of skilled clinical labor will remain high in the absence of government intervention. Second, the amount of labor employed within healthcare will continue to grow. To free up physicians in an attempt to capture net gains, healthcare has opted to:

- expand the supply of nurse practitioners and the duties they carry out;
- employ scribes to free up physicians from the burden of documentation; and
- digitize—and in some cases machine automate—patient scheduling, appointment reminders, and prescription ordering.

Physician wages have remained relatively sticky despite increases in healthcare labor costs. Demand does not decrease in the face of rising prices. Telemedicine companies seek to improve the system’s utilization of SCL by better utilizing the hours of specialists, such as:

- Psychologists;
- Dermatologists;
- Intensivists; and
- Hospitalists.

As supply-side demand for healthcare services rises and healthcare companies proliferate, short- and mid-term wage increases for hot specialties are likely. Splash 4 has heard reports of relatively green dermatologists receiving six-figure signing bonuses to join well-capitalized dermatology practice groups with mandates to grow. With a disproportionate number of psychologists approaching retirement age in the next five years and the rise of anxiety disorders in our society, the premium on hiring psychologists is rising rapidly as well.

As more hospitals adopt telemedicine strategies, they will face internal decisions regarding which specialists they can recruit with a competitive advantage. Administrators at one large academic hospital located west of the Rockies stated that tele-stroke is a commodity service for them; whereas, they believe their hospital has figured out more complex areas of remote care such as tele-ICU. Thus, they outsource the former and specialize in the latter. For this hospital to maintain that specialty, the organization must recruit intensivists. Administrators are looking simply to load balance



their ICU needs, using their own tele-ICU capabilities; they aren’t looking to sell or lease out acquired labor. However, the hospital might seek to generate excess labor capacity for sale in the future to offset the all-in costs of employing its own intensivists.

Despite rapid increases in the adoption of tele-ICU and other telemedicine services, the cost disease threatens the long-term viability of telemedicine programs should the cost of labor raise too rapidly within discrete specialties. Splash 4 Partners has encountered multiple cases where the capital investments of a tele-ICU program were lost when the program was shuttered in less than five years of adopting another hospital’s tele-ICU services. One element driving the abandonment by providers of these up-front investments is the costs of recruiting and hiring intensivists relative to the cost of the service for night and weekend support. In these instances, the cost savings from outsourcing were negligible or non-existent.

In the next section, you will see the rate of dollars flowing into digital health companies that aim at lowering hours of the highest skilled SCL. Some of these solutions come in rather bland packaging; others are slightly repackaged technologies from consumer-facing industries. Both often use lower-skilled labor to deliver care. Call centers that handle patient scheduling, on-boarding, follow-up, prescription refill requests, and more are growing rapidly. Teladoc, for example, employs more than 400 people—a number that continues to grow—at its call center to facilitate care coordination. Many other companies outsource this function. On the technology side, home health on-demand services are proliferating, as companies attempt to become the Lyft or Uber of non-skilled home-based care. No matter the care setting or service, what is clear is that the channels of care delivery continue to expand but garner only nominal (if any) net benefits in cost savings.

While Splash 4 Partners is unsure just how much care the overall system can afford, investors pump billions of dollars into the healthcare sector each year to tackle the upward expanding costs in care delivery.



COST DISEASE & HEALTHCARE INNOVATION

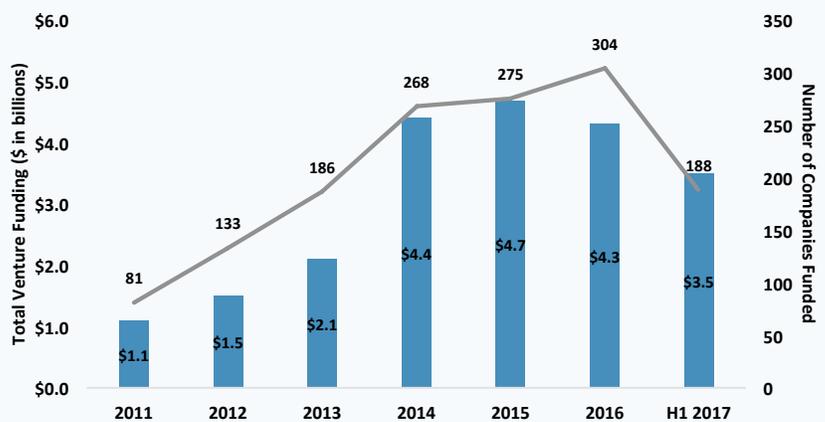
A rapidly and seemingly endlessly growing end market shines like a beacon to investors. In 2014 and every subsequent year, investment in early stage digital health companies has been four times the amount invested in 2011. In just the first half of 2017, investment in digital health companies reached \$3.5 billion or 81% of the entire year's investment in 2016. On the buyout end of the deal spectrum, looking at pure healthcare labor plays, TeamHealth, an aggregator of skilled clinical labor, went private for \$6.1 billion in 2017.²³ As of November 2017, publicly traded leading direct-to-patient telemedicine provider, Teladoc was trading at 15 times revenue. We cannot provide an intelligible price-to-earnings ratio because the company is not profitable yet. Cost disease invites investments in technology from institutional investors and from consumers of new software and services.

For the past five years, emerging HCIT and TEHCS firms have wildly promoted Silicon Valley speak within healthcare, championing disruption rather than mere change. Many Silicon Valley co-founders and legions of their programmers and managerial talent are migrating into healthcare from technology giants such as Google, Facebook, and Apple. These technology giants operate in more emergent order markets where supply chains are more prone to being disintermediated

than healthcare. Looking toward current and future influxes of dollars, HCIT and TEHCS executives and investors saw where the money was and had a playbook to deploy.

Many companies consulting that playbook are enjoying improved results. However, the *move-fast-and-break-things* hacker speak championed in headlines and press releases is not holding up to the reality of the regulated and institutionalized American healthcare system.

Total Healthcare Venture Funding 2011 – First Half of 2017²⁴



Pillar of Go-To-Market Strategy	Traditional Silicon Valley Startup Playbook	The Healthcare Playbook
Avoidance of Regulation		X
Engage Directly With Consumers Around Purchasing Decision		X
Leverage Consumers to Market Product or Service		X
Buy Market Share By Underpricing Product/ Service		X
Automate Processes		X

In the Spring of 2017, before an audience of a few thousand at the American Telemedicine Association’s annual conference, representatives from the investment arms of McKesson, Providence Health, and a Blue Cross Blue Shield plan, highlighted that successful HCIT and TEHCS startups sought not to compete with the old guard of healthcare providers, but rather to support their efforts in maintaining and growing their market positions. One panel participant even remarked that the investments, partnerships, and vendor agreements with technology-driven healthcare firms were helping overcome the technical debt of healthcare’s Old Guard. “We,” he said of the healthcare organizations on stage, “are the technical debt.”

American Well, MDLive, and Teladoc are all great examples of TEHCS firms that have found market footing by supporting existing mega-institutions.²⁵ American Well has focused on bringing its technology platform to hospitals, empowering them to create white-label direct-to-consumer telemedicine services. Teladoc has gained its greatest market traction in the employer space, providing remote primary and urgent care services to employers and, subsequently, third-party payors.

MDLive has found success with payors and providers as well.

Conspicuously absent from this bunch is Doctor on Demand. Fourth in a field of four, Doctor on Demand bit down—hook, line, and sinker—on the consumerization-of-healthcare business model. While the company is still in operation, its strategy of building its own brand that is recognized by patients has caused it to lag behind its direct competition in all three primary healthcare markets, even by trying to compete heavily on price. In contrast, American Well is frequently championed by customers like the Cleveland Clinic as having created an *effective* direct-to-patient telemedicine program.

Clearly, the new HCIT and TEHCS playbook calls for collaboration, rather than competition, with payors and providers. Yet, when more than early stage 1,000 digital health companies have received funding since 2011, how do investors, healthcare administrators, healthcare plan administrators, HR benefits managers, and SCL know which firms will survive and deliver on the promises of their platforms?

SEARCHING FOR COST SAVINGS IN HEALTHCARE

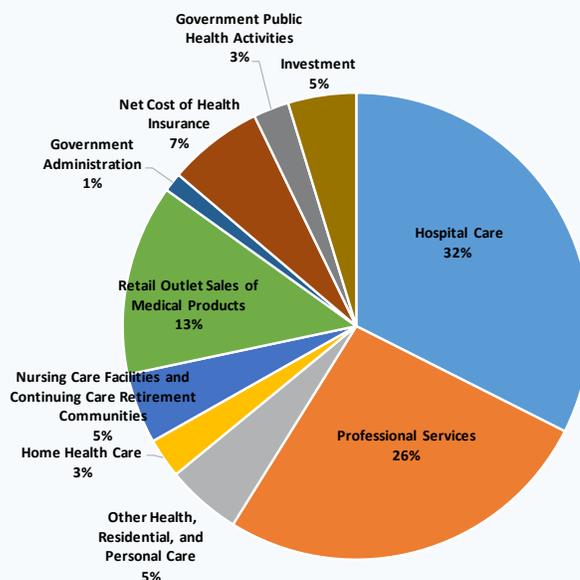
“If it was up to the NIH to cure polio through a centrally directed program... You’d have the best iron lung in the world but not a polio vaccine.” -- Samuel Broder, Former Director, National Cancer Institute.

Despite the growth in healthcare investing, cost disease continues to pipe more of our healthcare spending through the public sector directly and indirectly. Governments are more prone to reach for salary caps and producer limits than to look to innovate its way toward growth. To cure cost disease, one must search beyond salary caps and rationing. Fertile hunting grounds for cost savings²⁶ can be found in five areas:

- Reducing medical errors;
- Implementing communication applications and services;
- Inventory and asset tracking;
- Improving idea sharing and process; and
- Changing social norms.

These five areas span across the services and the continuum of care.

2016 National Healthcare Expenditures by Service





Medical Errors

Medical errors are costly. In 2016, \$3.8 billion went to payouts for medical malpractice claims.²⁷ The FDA estimates, that over 20 years, more than a half billion

medication errors will occur in hospitals, accounting for \$93 billion in added costs to the system.²⁸ Nearly one in five patients seeks a second opinion. According to some studies, as many as 60% of those patients receive different diagnoses. Telemedicine and clinical algorithms offer applications to reduce the rate of such errors.²⁹

Second opinion services have been available for more than three decades. Best Doctors, recently acquired by Teladoc, helped build an international platform for patients seeking second opinions. There is no CPT code for a second opinion. Employers offering second opinions as an employee benefit comprise the largest group of customers of second opinion services. Most second opinions never call for communication between the reviewing specialists and the primary clinician or patient, remote

review and care instructions are provided through the second opinion intermediary. Previously, second opinions were primarily a coordination service with limited technology to aid the process. Today, companies like Grand Rounds white label their custom-built technology for use by individual healthcare systems looking to enter the second opinion market. Given the rate of misdiagnosis, in the studies we have reviewed, second opinions have the ability to root out inaccurate care that keeps patients in treatment longer, not to mention the added cost of other deleterious effects of misdiagnoses.

In addition to second opinion services, clinical algorithms offer the ability to assess and triage large patient populations. The backbone of the majority of tele-ICUs today is Philips VISICU. VISICU helps one intensivist to remotely monitor as many as 100 or 200 patients at a time. A regular ICU, without any remote support, manages closer to one intensivist per ten patients. Clinical algorithms are critical in controlling the traffic of more than 10 times the patients of traditional in-person care.³⁰ Tele-ICU's are expensive to adopt, but hospitals that use them effectively have experienced average decreases of

23% in length of stay and 27% in patient mortality. The cost savings per patient shakes out to roughly \$2,000 - \$5,000. Such savings show the benefit of adoption. It was sustainability that was in question for much of the first decade of the tele-ICUs existence.³¹

The first VISICU system was installed in Sentra Norfolk General in 2001. Some earlier adopters of tele-ICU bunkers that followed Sentra closed just a few years after opening. These closures helped spawn a debate that took more than a decade to gather sufficient longitudinal data to conclude the clinical and financial value of tele-ICU programs. The outcomes data mentioned in the prior paragraph settled the broad debate over the efficacy of tele-ICUs. Splash 4 Partners believes it

is fair to say that had Advanced ICU Care—the leading private provider of outsourced tele-ICU services—not been such a stalwart champion of the VISICU platform, optimizing best practices in tele-ICU and proving the cost savings with its client hospitals, the tele-ICU program would not likely have proliferated or survived as it has.

Clinical algorithms are still in the early innings

“Clinical algorithms are still in the early innings of development and deployment. An aging and increasingly overall ill population means more patients, regardless of payor. Increasing the number of patients without correspondingly increasing SCL levels—a process that takes years due to the training required to become a nurse, NP, or MD—mandates a change to the way we deliver care.”

of development and deployment. An aging and increasingly overall ill population means more patients, regardless of payor. Increasing the number of patients without correspondingly increasing SCL levels—a process that takes years due to the training required to become a nurse, NP, or MD—mandates a change to the way we deliver care. Tap Health and Zipnosis have questionnaires built into patient interactions to help triage patients. The Cleveland Clinic's eHospital applies algorithmic monitoring and remote bunker oversight seen in a tele-ICU setting to med-surg beds and other parts along the continuum of care. PeraHealth converts nurses' notes into numeric scores to help SCL know which patients need what level of care when. Imaging Advantage (now part of Envision Healthcare), Google, and Intermountain have R&D programs aimed at automating the reading of common scans and X-rays. IBM's AI program, Watson has long been used to help facilitate diagnosis and treatment of cancers.

The proliferation of EMRs, coupled with the rise of wearables—we are not talking Fitbits—and remote patient monitoring tools will give rise to mountains of data on patient

populations that would have previously taken researchers considerable efforts to identify, organize, and collect before they could analyze. Thanks to machine learning packages, the flood of data will help improve algorithmic care applications.

Banner Health, in partnership with Philips, has developed a remote patient monitoring program that reduces readmission rates for chronically ill patient populations. The algorithms are effective because of streamlined coordination between patients, social workers, and clinical staff. In concert, patients are monitored and connected with the appropriate level of care, freeing up the more skilled SCL to address patients who are truly in need of further assessment and treatment.

Programs like this rely on skilled and unskilled labor to facilitate patient coordination support. This mix is consistent with an underlying belief held by economists who study cost disease: more jobs—likely, lower-paying jobs—will be added to industries afflicted by cost disease, since human labor is so hard to reduce in the delivery of healthcare.³²

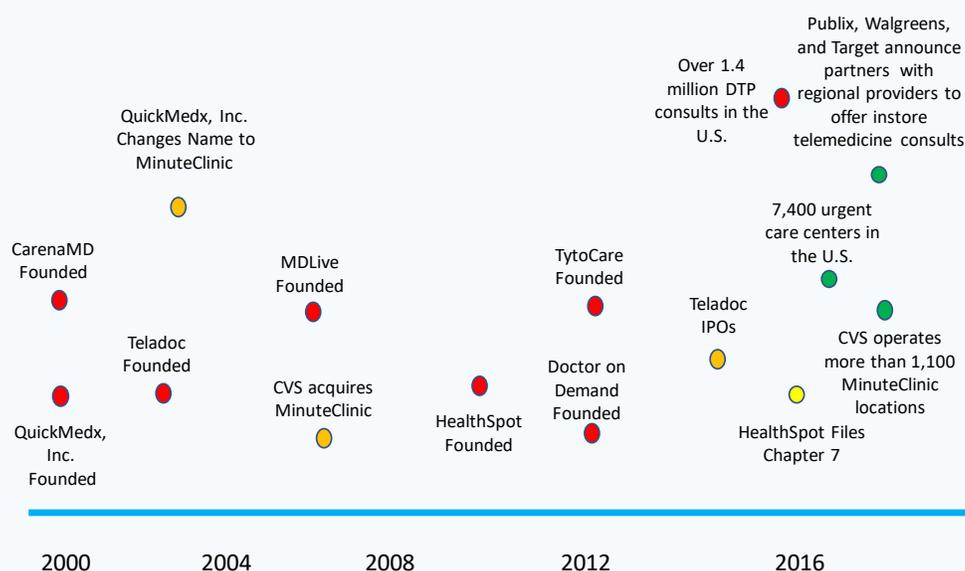
Healthcare at scale—*Cheesecake-Factory* healthcare, as Atul Gawande described it—is creating a new market for more personalized medicine.³³ Concierge medical practices, for a fee, allow greater ease of access to SCL, typically to primary care physicians. Some practices, like PALM Health, offer an integrated practice for those willing to pay an annual

subscription fee of a few grand a year for access to primary care, mental health professionals, onsite lab draws, chiropractic care, nutrition counseling, and more. Another example is Chicago based Shift that uses an integrated concierge offering as well and streamlines patient communication with online scheduling, text based communication, and detailed customized health and wellness plans for each patient. In theory, the personalized care market helps limit chances of medical error by increasing care coordination and increasing the time the primary care physician or concierge doctor spends with each patient.

Care coordination remains a hot topic, in part due to the rate of specialization in healthcare. CareSync is one company filling the care coordination void that exists for patients who see multiple providers. Doing so fractures the patient’s EMR, providing an incomplete view of the patient’s care. CareSync aggregates the patient’s records, has one treating practitioner take point, and provides access to a call center of nurses and nurse practitioners. Similarly, the Veterans Administration is building its own health information exchange to provide comprehensive electronic medical records for its patients.³⁴

EMR firms like Epic and Cerner realize that care coordination and unified electronic records become vital as points of care continue to proliferate.

Growth in Points of Patient Care 2000 - 2017





Implementing Communication Applications and Services

Most American adults remember when communicating with a physician at night or on the weekend entailed either a game of phone tag through a call service, a trip to the emergency department, or marrying a physician. Nearly 7,400 urgent care centers³⁵ have helped open a new avenue of patient care, with many open well after 6:00 PM and on weekends. Direct-to-patient (“DTP”)—not

and cross-sell more profitable services. To date, it has been a land grab of covered lives. Yet, competition is rising from EHR firms and straight technology plays such as Avizia, SnapMD, and Zipnosis performing research and development on how to bring automation to healthcare and reduce SCL hours. All seek to be the killer application and standard software infrastructure, much like Microsoft did with Internet Explorer in the 1990’s.

For now, though, DTP utilization remains low. Among more than 60 million Americans covered by the four largest DTP

Select Healthcare Communication Applications and Services

Company	Founded	Acquired	Acquirer	Estimated # of Employees
2nd.MD	2011			35
CarenaMD	2000	X	Avizia	122
Chiron Health	2013			28
Connexall	1992			60
DocBookMD	2008			4
Extension Healthcare	2009	X	Vocera Communications	--
Medigram	2011			10
Mend	2014			8
Spruce Health	2013			18
TigerText	2010			135

Sources: Company Web Sites, LinkedIn, CrunchBase, Company Press Releases, and Splash 4 Partners Analysis.

to be confused with direct-to-provider telemedicine, which will be discussed later—primary and urgent care telemedicine connects doctors to patients in real time, regardless of geography and time of day. Companies like Teladoc, American Well, MDLive, Doctors on Demand, and MeMD, offer real potential for productivity gains in the healthcare sector. DTP telemedicine has the ability to soak up excess SCL hours captured by a single hospital, practice group, or medical office.

Venture capital and growth equity firms have made considerable bets on the companies listed above and others. Many investors believe that MDLive, American Well, or Teladoc could be healthcare’s equivalent to Microsoft Internet Explorer in a post-Meaningful-Use world. EMRs gave providers an operating system but did not address how to reach the internet—patients in any hospital, at home, or on vacation.

All DTP providers want to serve as the telemedicine gateway for health systems and hospitals. To be competitive and move toward profitability faster, the companies are buying up clinical labor and offering behavioral health, dermatology, and second opinion services. The millions each has lost so far on DTP primary and urgent care is the beachhead to set up shop

telemedicine companies, less than one in twenty percent seeks treatment through DTP services.³⁶ Therefore, the question of net benefit remains unanswered alongside the secondary question of extending an organization’s sustainability.

Teladoc enjoys the highest rate of utilization in the industry among its most immediate peers, thanks to the company’s strength with employers and its heavy investment in marketing to the lives it covers. Marketing has not traditionally been a core strength of providers and payors, but investment in patient engagement will continue to grow to increase patient use of DTP services over emergency departments and urgent and primary care. Many prominent, successful corporate wellness companies have developed domain expertise that could be valuable to hospitals with DTP primary and urgent care offerings that are looking to extend awareness and drive utilization within their communities.

Hospitals with sufficient brand strength, like the Cleveland Clinic, garner free advertising when they launch their DTP programs. For the Cleveland Clinic, this free advertising comes in the form of webinars and marketing by American

Well to highlight the hospital's success with American Well as its DTP partner.³⁷ Smaller regional hospitals have launched DTP telemedicine programs in partnership with pharmacy and grocery store retailers, such as Publix. Using lessons learned from the HealthSpot bankruptcy, expansion of in-store care is being given a second shot. The jury is still out on the profitability and success of these programs, as to date, most

care centers are adopting DTP technology to compete against hospitals with DTP offerings.

By the time the numbers come in, telemedicine systems are likely to be embedded within provider networks as a standard of care, especially as more state medical licensing boards offer reciprocal licensing agreements and as reimbursement parity for telemedicine services continues to slowly make inroads.

Select Patient/Employee Engagement and Wellness Companies

Company	Founded	Acquired	Acquirer	Estimated # of Employees
Accolade	2007			9
Continuwell	2016			3
Eliza	1989	X	HMS Holding Company	222
Evive Health	2007			109
GenerationOne	2010			12
ID Avatars	2013			17
Limeade	2006			196
MedHOK	2009	X	Hearst Communications	181
Redbrick Health	2006			371
Sharecare	2010			505
Spoke	2015			3
Touchcare Health	2013			16
Viverae	2003			306
Wellness Corp Solutions	2004			101
Welltok	2009			420
Tea Leaves (j2Global)	2011	X	Welltok	49

Sources: Company Web Sites, LinkedIn, CrunchBase, Company Press Releases, and Splash 4 Partners Analysis.

partnerships have not borne sufficient fruit, adding rather than answering questions about sustainability for DTP primary care.

As with tele-ICU, it may take ten years or longer to finally ascertain if DTP programs reduce the cost of delivering care by keeping patients out of the emergency departments and urgent care centers. Yet, even now, some of the largest urgent

No matter the ultimate outcome in DTP telemedicine, let us not rest the future of telemedicine on DTP programs. Arguably, DTP is the one of the less interesting applications of telemedicine, as well as existing in a segment of healthcare where the relative dollars and profit margins are low.

Largest Insurance Providers by Covered Lives & DTP Providers

Category	American Well	MDLive	Teladoc	Doctor On Demand
Anthem	X			
United Health Group	X		X	X
Aetna		X	X	
Healthcare Services Corporation		X		
Cigna	X	X		
Humana		X		X
Kaiser Permanente				

Source: Teladoc Annual Report, Industry Publications & Sources, Company Web Sites, and Splash 4 Partners Analysis.



Inventory and Asset Tracking

Radio Frequency Identification (“RFID”) has been around for more than 50 years. Logistics firms, retailers, and pet owners use it to track property that might otherwise be

lost to coordination issues, theft, or carelessness. Hospitals, giant healthcare factories that they are, lose track of beds, IV pumps, and even—from time to time—patients, all costly losses. Seeing the adoption of RFID in healthcare, Cardinal Health acquired an RFID company in 2013, called WaveMark RFID for an undisclosed amount.³⁸

In the early days of Splash 4, the principals ran across an RFID startup that landed early academic hospital wins in setting up digital inventory management systems. Their small client base reported rapid payback periods due to fewer lost oxygen tanks and greater ease in identifying where hospital beds, crash carts, IV Pumps, and wheel chairs were. Like many healthcare vendors, the company found itself navigating the cashflow challenges of a sales cycle and implementation phase that can stretch well beyond a year.

Attaching barcodes and RFID—the same technology Wal-Mart uses to protect Mach III razors from theft—to controlled substances and expensive surgical equipment makes for sound financial investments. Companies like KitCheck and Censis Technologies have taken to supporting hospitals’ inventory and asset control by focusing on hospital pharmacies and surgical equipment, respectively. Both companies help provide a record of chain of custody in their respective domains.

KitCheck allows hospital pharmacists to package pharmaceuticals for distribution in a streamlined fashion while creating a chain of custody log. The log increases the likelihood of the right patient receiving the correct dose of the prescribed medication through the use of barcodes, RFID, and workflow processes.

While the combination of workflow processes roots out common dispensing errors, distracted floor nurses and physicians who administer drugs still introduce the possibility for error in final delivery. One ICU nurse practitioner, who spoke with Splash 4 Partners, described an event in which a junior floor nurse made just such a dosing error, even using KitCheck’s flagship product. Inattention in the final steps of delivery can still cause significant medical errors, but the KitCheck system gave the hospital a clean, accurate, and quick audit of the chain of events that led up to the medication error. The hospital was then able to identify procedural gaps and provide the appropriate remedial training to prevent future error.

Inventory tracking in the provider setting improves inventory control, asset protection, and return on assets, while also empowering providers to reduce medical errors. However, software built for complex and non-uniform systems is often expensive because of the customization it requires. Many restaurant chains standardize their kitchen and dining room floor plans to provide for greater uniformity in work flow processes, but every pharmacy is set up differently, according to each hospital’s physical and clinical workflows. Every radiology department has different patient traffic patterns and policies. Lack of uniformity demands additional expense that erodes both the sustainability for the vendor—if that expense is not priced in—and the attractiveness of the return on investment for the hospital if that expense pushes the price too high. Competing budget priorities, in an industry with pre-negotiated bulk rates, make for additional challenges in driving sustainable adoption of most tech-enabled workflow process solutions in care settings. Demonstrable ROIs are increasingly needed to sell successfully to healthcare providers and payors.



Idea Sharing and Process Improvements

Direct-to-provider telemedicine services, through which a provider cues up a remote consult and patient assessment from another (often specialized) provider, such as Specialists On Call and Advanced ICU Care, are specialty clinical staffing businesses wrapped around technology. That they specialize in discrete practice areas, each serving dozens of hospitals across the country, allows for new standards of care to be quickly disseminated and has a direct positive impact on the quality of care given to patient populations under each company’s care. Through in-depth interviews, Splash 4 Partners collected firsthand accounts from heads of ICU and emergency departments of how new standards of care and best practices reach hospitals faster, thanks to the specialization of care and network effects such services provide.

Idea sharing, and process improvements are the organizational equivalents of eating one’s leafy green vegetables, the unsung heroes of quality and productivity advances. The lack of knowledge around germ theory and handwashing contributed to thousands of deaths in the middle part of the 1800’s. Thanks to the pig-headedness of one doctor, Dr. Ignaz Semmelweis, who noticed a connection between washing one’s hands with chlorine and the lower rates of infection in mothers after giving birth, adopting the process of routine handwashing has saved lives.³⁹ Yet, as Atul Gawande noted in his essay on the subject, *Slow Ideas*, handwashing remained perfunctory until relatively recently, and so the rate

of infection remained higher than it needed to be.⁴⁰ Process and procedure were required to improve the practice of SCL handwashing. SCL had to slow down to help reduce future demand for its services.

Some departments in top academic hospitals employ people to regulate and monitor handwashing. These floor captains are part hall monitors, part project managers, and part handwashing culture cheerleaders. Studies have shown that taking this program from one department to the next requires some time for behaviors to take root and for its agents to cultivate and monitor behavior of new participants.

Things get cheaper when labor is moved off someone’s books and more effectively coordinated through specialization.⁴¹ This explains why idea sharing about such quotidian matters as handwashing and basic checklists for central line incision do not always easily get their due.⁴² Splash 4’s work outside of healthcare, in the learning management systems industry, shows that the most successful firms at adopting learning management systems are those with strong partners to help with not only technological implementation but also content creation and marketing plans to drive user engagement.

The true value of many direct-to-provider telemedicine services resides, then, not only in the technology they help deploy, the staffing they provide, and the analytics and KPI tracking they offer, but also in the ideas they help socialize. Hospitals and other providers would be wise to examine more than just the turn of beds and impact on mortality statistics before shutting down any of these services they have integrated into their practices. Even if they move to an inhouse solution, powered by telemedicine platforms Avizia, SnapMD, or even EHR-provider Epic, the rate of new ideas and best practices will likely be altered in a flatline or downward direction.

Changing Social Norms

 Nearly 30% of Medicare spending is tied to care given in the final six months of a patient’s life. Medical and public health researchers believe that the social norms of planning for and openly talking about—or not—how we want to die are directly tied to elevated end-of-life spending. Nurses and physicians are more likely to limit the scope of heroic care they are willing to receive at the end of life than the average non-clinician. Former healthcare advisor to President Obama, Ezekiel Emmanuel, famously pronounced that he would not even accept antibiotics after the age of 75, based on his knowledge of the decrease in quality of life associated with escalating efforts to prolong it.

Fewer than one in three Americans formally plans for his or

“The true value of many direct-to-provider telemedicine services resides, then, not only in the technology they help deploy, the staffing they provide, and the analytics and KPI tracking they offer, but also in the ideas they help socialize. Hospitals and other providers would be wise to examine more than just the turn of beds and impact on mortality statistics before shutting down any of these services they have integrated into their practices.”

her death in the form of an advanced medical directive—something everyone can do. The result is a hospital bill in the final two years of life that averages nearly \$26,000. Yet, at the local hospital in La Crosse, Wisconsin, where nearly 96% of residents possess an advanced medical directive, that bill is nearly \$8,000 less.⁴³ La Crosse residents save on end-of-life care thanks largely to the work of Dr. Bud Hammes. Hammes tirelessly encouraged patients for two decades to socialize and institutionalize the idea of writing out advanced directives. Building on the success in his hometown, Hammes’s Respected Choices program has partnered with The Coalition to Transform Advanced Care to take the program to the national level.

This shows that changes in norms are possible but take long lead times and determined teams of individuals to sow and foster them within a community.

With the advent of technology platforms, companies like Omada and Bridge Health seek to change norms and behavior pathways by engaging patients before they consume healthcare services. Omada reports broad success in its diabetes management plan. Within one year of onboarding, it claims, a patient’s 5-year risk factors for type-two diabetes, stroke, and heart disease decrease by 30%, 16%, and 13%, respectively⁴⁴. Bridge Health helps consumers navigate the waters of price transparency by paying patients a portion of cost savings when they choose less expensive surgical providers with equal-quality outcomes. In each instance, a combination of human intervention and technology is changing the norms of healthcare consumption. Given the already high labor costs in healthcare and a slew of failed

behavior modification programs, challenges for broad-based adoption of behavioral change are omnipresent and, at times, even compounded by the architecture of the healthcare system itself.

As previously noted, the equivalent of 18% of GDP is spent on healthcare in America. Most healthcare is still regionalized and fractured, and vast systems of people and software are dedicated to current care delivery and payment pathways. As money flows into the healthcare system, it is likely to follow the well-worn tracks created and managed by the primary players. The narrowing hive mind of ideas is likely to persist, as further consolidation occurs as dominant healthcare players consume other large or rapidly growing healthcare companies.

Allscripts bought eviCore Healthcare in 2017. At the time of writing this report, CVS is attempting to close on its acquisition of Aetna and providers Providence St. Joseph Health and Ascension Health have announced intentions to merge. Meanwhile, entire sections of states are left relying on a single payor on an exchange or underwriting individual policies. The reduced competition among payors, providers, and healthcare vendors further enforces the competitive moat and oligopoly status that much of the healthcare industry currently enjoys.

In fact, a case could be made that many segments of the healthcare industry are already de facto subsidiaries of the U.S. government. The Veterans Administration sees more than 8.3 million patients a year.⁴⁵ The Department of Defense's Tricare covers another 9.4 million lives.⁴⁶ Federal and state prisons and jails provided healthcare for more than 2.2 million prisoners as of 2013. Another 44 million people—15% of the U.S. population—are enrolled in Medicare.⁴⁷ Medicaid and CHIP programs cover another 74.3 million individuals.⁴⁸ Assuming no overlap, that tallies to more than 40% of the U.S. population. In 2013, approximately 64% of U.S.

healthcare spending was tied to public funds. Other more conservative cuts of the data places public spending at 50% of total U.S. health expenditures. Either way, the percentage of public dollars is greater than the percentage of the population governments cover, indicating a higher utilization from patients on government plans.⁴⁹

While large healthcare institutions continue to expand in size and clout, one is left to wonder about the fate of the patient. In emergent order markets, consumers maintain market clout by migrating to competitors, yet regulations place considerable constraints on many patients' choices. The net effect is one where no chair is left for the healthcare consumer at the preverbal negotiating table. This runs contrary to the popular consumerization of healthcare narrative. In our view, the growing dominance from a shrinking number of healthcare players leads to a decrease in competition and continued opaqueness wall papered over by the fact that patients can now schedule appointments online and see a sanitized version of their health record from their physician.

The dominance of large payors, PBMs, and providers brings to mind the explanation a political economy professor shared as to why the Soviet Union failed to survive in the long run. The professor, who grew up in Soviet controlled Belarus, proclaimed that Soviet officials after Stalin sought to capture large rents in short succession, setting the table for a decline in stability by the mid-1980s. In contrast, he argued, dynastic organization with plans to last long periods of time, capture more moderate and at times meager rents decades, tend to enjoy long term stability. While we see no immediate erosion in the short and mid-term time horizon for the large healthcare players, one might begin to think about telecom and big oil's dominance thirty-six and one hundred and seven years ago should the trend of consolidation continue. Or the emergence of a new healthcare order due to the government flexing its growing position as a top spender in healthcare.

OVER 40% OF THE U.S. POPULATION IS COVERED UNDER DE FACTO SUBSIDIARIES OF THE U.S. GOVERNMENT.

8.3 million
Patients seen by the Veterans Administration

9.4 million
Patients covered by the Department of Defense's Tricare.

2.2 million
Prisoners receive healthcare while incarcerated

44 million
People enrolled in Medicare

74.3 million
People covered by Medicaid and CHIP programs

HEALTHCARE'S

ENTRENCHED PLAYERS

To pronounce any HCIT or TEHCS to be viable and durable, one must first ensure that its revenue model aligns with the dollars, needs, and interests of at least one of the primary end markets in healthcare addressed below. The following list

is not exhaustive, as we are choosing to temporarily ignore pharmaceutical firms and medical device companies from the discussion since the entirety of this whitepaper has focused on HCIT and TEHCS firms.



Payors & PBMs:

BCBS, Kaiser Permanente, Aetna, CignaCVS, Express Scripts, etc.



Providers:

Cleveland Clinic, HCA, CHS, Mayo Clinic, physician practice groups, urgent care centers, etc.



Employers:

Lowes, Nike, etc.



Government Institutions:

Schools, universities, prisons, Veterans Affairs, Department of Defense, etc.

End Market	General Motivations
Payors 	Cost savings motivate payors. ⁵⁰ Cost savings can come from delivering care that reduces future expenditures through increased patient compliance with treatment protocols or expanded access to care for emergent issues within patient populations, such as those affected by the opioid epidemic.
Providers 	Providers look for cost savings, improvement in patient outcomes, patient capture, improved patient revenue capture, and regulatory compliance. The tip of the spear in care delivery, healthcare provider organizations have a wider array of motivations for adopting pilot programs, technology, and tech-enabled services.
Employers 	Minimizing healthcare costs is critical for employers, as they are often footing the majority of the cost. Approximately 49% of people in the U.S. receive healthcare coverage through their or their family members' employer ⁵¹ . Employers secondary motivation is keeping employees at work, doing the jobs they were hired to do.
Government Institutions 	Meeting the standard of care at a minimum cost is top priority. The primary tools of the government in controlling cost are limiting procedures, wage caps, and bulk pricing achieved through a volume of lives covered.

Next, one must understand how HCIT or TEHCS companies compete. From our perspective, viable HCIT and TEHCS provide at least one of six major value propositions:⁵²

- Improved Patient Outcomes
- Increase Patient Volumes / Patient Capture
- Access to Scarce Skilled Clinical Labor
- Payment Capture and Outsourced Administration
- Technology⁵³
- Enhanced Workflow Processes

Individually, one of these propositions will be useful. In combination, they will be valuable within one or across the four addressable end markets. The following tables highlight a few noteworthy and emerging companies targeting each end market.⁵⁴ For most organizations listed, profitability is either a target for the future or a relatively recent development.



Payors

The standard narrative surrounding health insurers is that they are in the business of risk taking. In reality, they are in the business of mitigating risk, which explains why so many are pulling back from the healthcare exchanges and individual markets. Payors are in the business of managing the spread, and in an era of kingdom building where size matters, it is arguably easier to push the pricing lever up than truly attempt to reign in and manage costs down. Payors have found multiple ways to manage risk, while maximizing exposure to the pantheon of solutions being offered up by thousands of HCIT and TEHCS firms. One of the more recent forms of risk mitigation payors have found is entering the corporate venture capital business.

Echo Health Ventures is a corporate VC partnership between two Blue Cross Blue Shield plans—Cambia Health Solutions (part of the BCBS plans in the Pacific Northwest) and BCBS of North Carolina.⁵⁵ Echo's past portfolio companies include CarenaMD (now part of Avizia), RiseHealth (acquired by Best Doctors), and Best Doctors (now part of Teladoc). In the fourth quarter of 2017, UnitedHealth's Optum business announced it was launching an inaugural \$250 million venture fund⁵⁶. UnitedHealth and Echo, among others, compete for deal flow with traditional venture capital, growth equity, and buyout funds, other corporate venture funds run by providers (e.g., Ascension Ventures, Catholic Health Initiatives, Cleveland Clinic Innovations / Ventures, Dignity Health, Geisenger Ventures, Mayo Clinic Ventures, HCA, Providence Ventures, and University of Pittsburgh Medical Center ("UPMC") and other similar funds run by Kaiser Permanente and Aetna.

By investing in everything from HCIT firms to new providers, payors are able to outsource their R&D costs, help select winners that support the current healthcare system architecture they seek to maintain, and participate in possible equity upside in those investments that are successful.⁵⁷ Even if an HCIT or TEHCS firm gets equity backing from a corporate venture firm, it does not mean the company will find rapid growth and market dominance. CarenaMD—backed by both payor and provider corporate venture arms—competes against Teladoc and American Well but is currently only a fraction of the size of its competitors. Limits to scale in the face of payor backing also stems from high organization coordination costs, organizational status quo bias, and competing priorities.

Current competing priorities include trying to develop enough resources to meet growing opioid treatment needs around the country. This year it is opioids; next it might be diabetes. Twenty-five years ago, it was the AIDS crisis. American bodies appear to be in perennial need of drastic repair. The tyranny of the urgent can be lucrative for many companies if they align advantageously with payors' heat maps for a few years. However, change and adoption in healthcare is anything but swift. Many pilots get locked into some sort of *pilot purgatory* and never scale.

According to the Healthcare Cost Institute, there is little correlation between price and quality in healthcare.⁵⁸ Pilot programs that are not fully scaled, despite delivering lower costs without degrading patient outcomes, demonstrates that cost containment is not always the top priority of payors. Payors after all live off the spread between utilization and premiums collected. Price increases, higher deductibles, and other price increases get passed through to the patient routinely. The proliferation of narrow networks also help set the table for greater status quo basis.

To be fair, providers need to maintain a margin to stay in business and are bombarded with pressures from nearly every direction, so the payor is likely to negotiate shrewdly on some points and give on others. Payors also experience consistent churn among their customers, or covered lives. One healthcare investor estimates that a health insurer will have a covered life for roughly three years before lost to another payor. A cynic likely sees this data point as incentive to underinvest in its patient population. A rationalist likely argues that payors do not want to simply trade sick patients back and forth due to underinvestment in their health plans and cost containment strategies. While we have no direct confirmation that payors broadly adopt a less than rational investment time horizon for covered patient populations, we are reminded that healthcare as an industry is riddle with irrational puzzles and misaligned incentives between patients, payors, regulators, clinicians, investors, et. al.

The point here is not to generalize and malign an entire segment of the healthcare industry. Rather it is to underscore the complex nature that goes in to determining who gets what, when, and where for what amount in healthcare. From a business perspective, firms wishing to grow by servicing payors have a high bar to clear and a fair amount of work to gain sufficient payor market share. The table below highlights a few companies that have found meaningful market traction among the payors despite the odds.

Example Companies Gaining Some Degree of Traction with Payors

Specialty Area	Company	Improved Patient Outcomes	Patient Capture	Access to SCL	Payments	Technology	Workflow Processes
Primary / Urgent Care	MDLive	X	X	X	X	X	X
Primary / Urgent Care	Teladoc	X	X	X	X	X	X
Surgery	Bridge Health	X	X	X	X	X	X
Remote Patient Monitoring	Critical Signal Technology	X	X	X	X	X	X
Remote Patient Monitoring	GlucoMe	X	X	X	X	X	X
Engagement Platforms	MedHok	X	X		X	X	X
Population Health	ZeOmega	X	X	X	X	X	X
Population Health	Omada	X	X	X	X	X	X



Providers

Providers reliant on third party reimbursement thirst after patient volumes as a way to capture both revenue and greater bargaining power with payors. The result is health systems increasingly leveraging telemedicine platforms to allow them to:

- Capture new patients;
- Service existing patients;
- Improve utilization of specialists; and
- Capture higher acuity (and higher paying) patients via remote care.

Health systems and providers of all types are still figuring out the best practices and means to leverage these tools and weave them into their current care delivery models, workflow processes, and overall organizations. The playbook is not yet set; it is being created in real time. Harkening back to why the Silicon Valley mindset of disruption often fails to transform healthcare is that it fails to appropriately account for the *baggage* providers, payors, and other incumbents must address. Borrowing from another market, a number of Silicon Valley-backed upstart fintech applications have been successful because they have been able to avoid or maneuver around much of the *baggage*, such as the regulatory albatross weighing on incumbents. For example, on-line peer-to-peer or small business lending platforms have largely avoided having to seek bank charters and the regulations such institutions must comply with. Getting back to the healthcare example at hand, existing telemedicine models have largely not solved for or maneuvered around the *baggage* providers and patients must comply with, such as restricting care based on state licensure and credentialing requirements, third party reimbursement dynamics and true payor parity (to say nothing

of true consumerism and direct pay models), perceived and actual risks around malpractice and other liability with remote treatment—just to name a few. Telemedicine, however, holds the promise for significant incremental improvement in the areas bulleted above. It is worth mentioning some provider adoption cases below.

The Cleveland Clinic has partnered with American Well to sell primary and urgent care virtual visits throughout Ohio and Florida. The Clinic through its American Well partnership has turned competitor with every urgent care center—whether attached to another health system or freestanding—in those two states. Avera expands access to care for rural communities that are unable to recruit intensivists, psychiatrists, or other specialists in their geographies, bringing access to care in otherwise desolate zones of clinical care. Grand Rounds allows top oncologists, endocrinologists, and other specialists to extend their reach and provide second opinion services outside their hospitals’ traditional patient flow. Massachusetts General Hospital’s telemedicine program allows them to support hospitals across New England via a hub and spoke model, allowing for the highest acuity patients to be routed to their campuses and lower acuity services to be treated locally.

Not all hospitals are or can be the Cleveland Clinic, Avera Health or, Massachusetts General, creating the opportunity for non-health system based, outsourced providers like Advanced ICU Care, MDLive, and Specialists On Call to combine technology, processes, and SCL to serve those that cannot develop and scale their own homegrown telemedicine offerings. Other hospitals choose to keep care within their network of hospitals and outpatient facilities. Banner Health’s tele-ICU and remote patient monitoring programs are well regarded within the industry but currently are not offered to other providers outside of the Banner system.

Other health systems possess aspirations of turning their homegrown telemedicine practices into viable commercial enterprises and possible incremental revenue sources in a time of increasing financial pressures. However, Splash 4 Partners views these successes to be few and far between to date. Again, not all health systems can be Avera Health. This has more to do with the organizational structures, operating mentality, lack of sales and marketing engines, and competing priorities of these large health systems (discussed more below). This is unfortunate, as some of these systems have developed and continue to develop systems, protocols, technologies, algorithms, clinical teams that would benefit many other providers and patients and could be thriving business operations under the right management and circumstances.

Historically, health systems have not been on the bleeding edge of HCIT innovation, as demonstrated by the relatively small list of names in the prior paragraph. While the list of health systems that are true IT innovators is limited, the list gets even smaller when looking for those that also have a

strong sales and marketing capability for the HCIT and TEHCS offerings.

Splash 4 Partners' primary research has uncovered several hospital systems with telemedicine commercialization initiatives that lack market traction due to an absence of a true sales ethos and process. The most egregious of scenarios being a system that has invested heavily in telemedicine infrastructure that reportedly had roughly half a dozen contracts sitting for departmental approval for months, as this health system's process was to approve these contracts at each quarterly board meeting, leaving their would-be customers to find alternative solutions. This is tied to the fact that large healthcare systems tend to have a complicated approval processes where any one of ten people across multiple departments can say *no*, but only a committee can say *yes*. If MDLive, Advanced ICU Care, and Specialists On Call, had similar corporate structures and time horizons for approval, then the hospitals looking to commercialize their own telemedicine offerings would be on equal footing, but they are not.

Sample Telemedicine & Related Companies Segmented by Specialty Area

	Specialty Area	Company	Improved Patient Outcomes	Patient Capture	Access to SCL	Payments	Technology	Workflow Processes
Direct-to-Patient Telemedicine	Primary / Urgent Care	American Well	X	X	X	X	X	X
	Primary / Urgent Care	CarenaMD	X	X	X	X	X	X
Direct-to-Provider Telemedicine	ICU	Advanced ICU Care	X	X	X		X	X
	ICU	Avera	X	X	X		X	X
	ICU	Mercy Virtual	X	X	X		X	X
	Neurology	Specialists On Call	X	X	X		X	X
	Neurology	Blue Sky	X	X	X		X	X
	Neurology	Avera	X	X	X		X	X
	Neurology	Massachusetts General Hospital	X	X	X		X	X
	Psychology	Specialists On Call	X	X	X		X	X
	Second Opinion Services	Grand Rounds	X	X	X	X	X	X
	Second Opinion Services	2nd.MD	X	X	X	X	X	X
	Second Opinion Services	Best Doctors	X	X	X	X	X	X
	Clinical Triage	Pera Health	X	X	X		X	X
	Clinical Triage	Mercy Virtual	X	X	X		X	X
	Translation Services	United Language Group	X		X			
	Telemetry	Mobile Heartbeat	X				X	
	Telemetry	Philips	X				X	
	Remote Patient Monitoring	Banner Health	X	X	X	X	X	X
	General Telemedicine Platforms	Avizia	X		X*		X	X
General Telemedicine Platforms	SnapMD	X	X			X	X	
General Telemedicine Platforms	Zipnosis	X	X			X	X	



Employers

Henry Ford paid middle-class wages to his workers so that they could afford to buy the Model T's they were manufacturing. Large employers began offering health insurance as an employee benefit to compete, while keeping wages low. But now, cost disease has made employment costs skyrocket. In response, employers have adopted a



Government

Governments have been resource allocators since their earliest forms—Mancur Olson's roaming bandit who settled down to profit share with a group of farmers he protected was nothing more than a resource allocator.⁵⁹ In this role, governments look to limit more than they look to grow. The nature of government is to look for

Example Companies Serving the Employer Market

Specialty Area	Company	Improved Patient Outcomes	Patient Capture	Access to SCL	Payments	Technology	Workflow Processes
Primary / Urgent Care	MDLive	X	X	X	X	X	X
Primary / Urgent Care	Teladoc	X	X	X	X	X	X
Surgery	Bridge Health	X	X	X	X	X	X
Weight Loss	Kurbo	X	X	X		X	X
Engagement Platforms	Accolade	X	X	X		X	X
Engagement Platforms	Welltok	X	X			X	X

variant of Henry Ford's way of thinking. Instead of straight wage increases, they invest in corporate wellness plans and HR benefits managers who then adopt services sold by Accolade, Omada, and MDLive. Products and services with a demonstrable ROI for employers is likely to scale more quickly here than in other healthcare end markets due to the profit incentive of mid- and large-size employers.

blanket solutions, rather than elegant designs. As such, they constantly strive to strip out costs. One result was that prisons and jails were among the earliest adopters of telemedicine. Schools and universities—comprising another segment of the economy suffering from cost disease—are also adopting technology and services that strip out costs in delivering care. Cost containment and single points of payment are well loved by governments. The \$258 million contract that the VA awarded to IronBow to serve its telemedicine program proves just that.⁶⁰

Example Companies Serving the Government Market

Government Institution	Company	Improved Patient Outcomes	Patient Capture	Access to SCL	Payments	Technology	Workflow Processes
Veteran Affairs	IronBow				X	X	X
Veteran Affairs	Vivify	X	X			X	X
Veteran Affairs	Veterans Affairs	X		X			X
Department of Defense	Department of Defense	X		X			X
Department of Defense	Teladoc	X	X	X	X	X	X
Prisons	GlobalMed	X		X	X	X	X
Prisons	Virginia Commonwealth University	X		X	X	X	X
Schools	Tyto	X				X	

NEW MARKET OPENINGS

Cost-saving and profit-seeking policies of payors, providers, and employers create market openings. Some urgent care centers and direct primary care practices around the U.S. have begun to offer subscription pricing, which gives subscribing patients access to lower prices for routine lab tests, x-rays, and other common screenings. It should be noted that direct primary care—in which primary care is delivered via monthly or annual membership—has faced sustainability questions in light of highly publicized closures. Direct primary care providers Iora Health, Turntable Health, and Qliance Medical Management all shut their doors in the first half of 2017, though some hybrids, like OneMedical, that collect both memberships and fees for services from payors continue to expand.

The willingness of patients to come out-of-pocket for subscriptions to primary and urgent care reflects the tenuous nature of individuals and families being able to afford the rising costs of care. The average employer family health plan costs roughly \$17,700 in 2016, of which the employee paid \$5,000⁶¹. On top of the \$5,000 premium, the family must allocate another 1.3% to 2.6% of pre-tax income to cover the deductible (which has also been increasing with the prevalence of high deductible plans).⁶² Subscription primary and urgent care is attractive for the very reason that the price of care is so high and so are the deductibles.

The high cost of healthcare has spilled over into the personal insurance market. Buddy is an insurance startup that has partnered with Lloyds of London to offer one-time and event-specific insurance plans. For example, their policies cover cyclists, who—if they were to get injured while riding—would receive payment of a few thousand dollars, money that could go to cover the out of pocket gap needed to fund in primary and urgent care coverage. Time will tell how attractive this special activity coverage will be, but the cost of being anything other than healthy is increasingly prohibitive, even to solid middle-income earners. After all, there are limits on consumers' ability to spend, even with the decreasing costs of goods and services outside of healthcare. Student debt and rising apartment rental costs only exacerbate healthcare consumption's rising coverage gap.

Concierge medicine, too, is an offshoot of policies and business plans designed to support volume-based care. More than 50% of family practice physicians report being burned out.⁶³ The average primary care physician sees more than 20 patients a day, and the average wait time to see a primary care physician is 4 weeks. One primary care physician told Splash 4

“It’s fitting. MDs tend to look down on DOs. Us bone crushers have never had the reimbursement love primary care did. We have always had to be creative. For me, that has meant being easy to get into and always learning new, innovative treatment protocols and technologies. My out-of-pocket price for patients is only 20 to 30 dollars above a lot of people’s co-pays. I guess what I am saying is that I try to also make my service affordable. Other DOs do nutrition counseling, hire massage therapists, or have various sales packages and membership rates. It is just funny to me that the primary care guys are falling into the same boat as us just chiropractors.”

Partners that, prior to starting his own concierge practice, the hospital he worked for scheduled appointments so tightly that the physician regularly skipped lunch, was dehydrated, and only had time for one-bathroom break during each workday. Anyone who has taken a basic first aid course knows that the first assessment medical responders perform is on themselves to make sure that they are able to give adequate care. The pressure to see more patients in less time, a standard recipe for dilution of quality and increase in errors, has facilitated thousands of physicians' exit from traditional healthcare practices to start or join concierge practices.

Sometimes scientific innovation opens the door to new markets and services, but unless such innovations receive the blessing of one of the primary end market participants, traditional avenues for growth will restrict their market size and growth in the U.S. That leaves these new technologies to dwell parallel to the traditional healthcare system with early adopters likely to come from the same waters as those who can afford white glove personal healthcare today. Given that

Splash 4 Partners focuses more on healthcare services and HCIT than more classical parts of the life sciences sector, our ability to forecast the true impact and corresponding timing of adoption is handicapped when discussing:

- Gene Mapping;
- Gene Therapy; and
- Gene Editing (i.e., CRISPER).

Based on reporting and interviews with respected medical futurists, all three demonstrate early promise in creating tailored and cost-reducing services. The answer to the question as to whether those cost savings will ever come to fruition resides in:

- Regulatory frameworks adopted to foster, manage, and oversee scientific application;
- Acceptance of the new technologies by the general public; and
- The business model and pricing mechanism employed in delivering the good or service.

While it is too early and beyond the scope of this report to address the first two bullets, we will provide a brief comment on the third.

Tailored medicine that can freeze, reverse, or altogether eliminate chronic and costly disease is clearly worth significant sums to payors, pharmaceutical companies, society, and afflicted individuals. One could imagine a well-capitalized company offering gene therapies or gene editing, with pricing based on a small payment today and a percentage of income for the rest of a patient's extended and healthy life. Or perhaps provider networks would invest in the technology to initially help bring down costs and then find themselves with too much specialized staff and too many buildings filled with equipment, which would incentivize price escalation of the technology to offset declining and costly business lines. The business model will matter deeply for these technologies to truly have a net benefit and be sustainable.

Endnotes

- 1 Affordable is a relative, imprecise term much like "tall" or "short." It is worth noting that, in 2016, one in four Americans reported having problems keeping up with their medical bills over the past year (per Kaiser Family Foundation).
- 2 <http://slatestarcodex.com/2017/02/09/considerations-on-cost-disease/>.
- 3 <https://fred.stlouisfed.org/series/MEFAINUSA672N>.
- 4 OECD Health Data.
- 5 S4P analysis of select Amazon and Apple accessory offerings.
- 6 <https://www.vox.com/the-impact/2017/10/16/16387298/band-aid-er-bill-truth-american-health-care>.
- 7 https://www.healthsystemtracker.org/chart-collection/u-s-spending-healthcare-changed-time/#item-total-health-expenditures-increased-substantially-past-several-decades_2017.
- 8 Baumol, William; *The Cost Disease: Why Computers Get Cheaper and Healthcare Doesn't*.
- 9 Ibid.
- 10 Ibid.
- 11 Ibid.
- 12 Ibid.
- 13 <https://www.bls.gov/lpc/prodybar.htm>.
- 14 Ibid.
- 15 <https://www.kff.org/health-costs/report/the-burden-of-medical-debt-results-from-the-kaiser-family-foundation-new-york-times-medical-bills-survey/>.
- 16 <https://fred.stlouisfed.org/series/MEHOINUSA672N>.
- 17 <https://www.statista.com/statistics/200223/median-apartment-rent-in-the-us-since-1980/>.
- 18 <https://www.cnbc.com/2017/07/20/there-are-more-renters-than-any-time-since-1965.html>.

- 19 <https://www.statista.com/statistics/187577/housing-units-occupied-by-renter-in-the-us-since-1975/>.
- 20 <https://www.kff.org/medicare/issue-brief/the-facts-on-medicare-spending-and-financing/>.
- 21 While America spends more per capita on healthcare than any other OECD country, cost controls by other wealthy nations have been insufficient to cure cost disease.
- 22 https://www.pgpf.org/chart-archive/0050_aging-US-population.
- 23 <https://www.beckershospitalreview.com/hospital-transactions-and-valuation/blackstone-closes-6-1b-deal-to-acquire-team-health.html>.
- 24 RockHealth.
- 25 Note that all three serve payors, employers, and hospitals/health systems, but have taken different approaches in tackling the direct to patient (“DTP”) telemedicine market.
- 26 Baumol, William; *The Cost Disease: Why Computers Get Cheaper and Healthcare Doesn’t*.
- 27 <http://www.diederichhealthcare.com/the-standard/2017-medical-malpractice-payout-analysis/>.
- 28 Baumol, William; *The Cost Disease: Why Computers Get Cheaper and Healthcare Doesn’t*.
- 29 <http://www.latimes.com/business/la-fi-healthcare-watch-20150525-story.html>.
- 30 S4P primary research.
- 31 http://www.telehealthtechnology.org/sites/default/files/documents/user_reviewed_products/elCUProgram_Datasheet.pdf and <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4206175>.
- 32 Baumol, William; *The Cost Disease: Why Computers Get Cheaper and Healthcare Doesn’t*.
- 33 <https://www.newyorker.com/magazine/2012/08/13/big-med>.
- 34 *Telemedicine and e-Health*, Volume 23, Number 4, page 265.
- 35 <http://www.ucaoa.org/?page=IndustryFAQs>.
- 36 S4P industry analysis.
- 37 The Cleveland Clinic’s free advertising and marketing has been augmented by their 2017 Super Bowl commercial highlighting their DTP program, Express Care Online, as well as their recurring radio and television spots in certain markets promoting the same.
- 38 <http://www.cardinalhealth.com/en/essential-insights/can-rfid-technology-transform-hospitals.html>.
- 39 <http://www.npr.org/sections/health-shots/2015/01/12/375663920/the-doctor-who-championed-hand-washing-and-saved-women-s-lives>.
- 40 <https://www.newyorker.com/magazine/2013/07/29/slow-ideas>.
- 41 It is worth noting that when things get too specialized and coordination, idea sharing, and communication is insufficient, specialization can lead to poor outcomes, which can lead to more expense rather than less.
- 42 Many valuable and cost-saving ideas remained increasingly localized or poorly socialized and institutionalized. In fact, the impact new ideas are having on our economy is slow, as measured through total factor productivity. For several years, total factor productivity has averaged less than 1%, compared to the greater-than-1% average annual contribution in the second half of the 20th century.
- 43 <https://www.forbes.com/sites/offwhitepapers/2014/09/23/how-to-die-in-america-welcome-to-la-crosse/#710bcdb1e8c6>.
- 44 Omada’s Website as of October 2017.
- 45 *Telemedicine and e-Health*, Volume 23, Number 7, page 577.
- 46 <https://tricare.mil/About/Facts/BeneNumbers>.
- 47 https://assets.aarp.org/rgcenter/health/fs149_medicare.pdf.
- 48 <https://www.kff.org/health-reform/state-indicator/total-monthly-medicaid-and-chip-enrollment/?currentTime-frame=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>.
- 49 <http://www.pnhp.org/news/2016/january/government-funds-nearly-two-thirds-of-us-health-care-costs-american-journal-of-pub>.

50 It is important to note that Payors and PBMs are not large risk takers, as it is popularly believed. After all, Payors have moved out of many geographies due to the patient profiles signing up on the government exchanges. The limited concern of cost savings comes from the nature of the health insurer model, which is to live off the spread between the reimbursement rates paid and the premiums charged to patients. Sizeable revenue stakes for PBMs come from rebates they negotiate. The volume of filled prescriptions is tied to the amount made off the rebates. In return, money is being made off of utilization, which runs counter to a cost savings thesis.

51 <https://www.kff.org/other/state-indicator/total-population/?dataView=1¤tTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>.

52 Given that the majority of these have been sufficiently highlighted throughout the report, we will refrain from providing additional commentary or examples here.

53 Most strategy minded business executives would not include technology as a value proposition or differentiator unto itself. However, healthcare is still relatively new to the digital revolution. Broad based EMR adoption is less than a decade old, and during that same time is when HCIT firms began to produce friendlier user interfaces. Many organizations in healthcare market themselves as being forward thinking by adopting/leveraging technologies, giving HCIT and TEHCS firms the ability to market themselves on the technology they provide and relative ease of use. For this reason, Splash 4 Partners included technology in the list of value propositions.

54 Not a comprehensive list, merely example companies.

55 A number of other BCBS plans have venture arms, e.g., Sandbox Industries and Cobalt Ventures to name two.

56 <http://www.modernhealthcare.com/article/20171128/NEWS/171129932>.

57 Depending on the product or service and its relevance to the payor's core business, the payor may become a marquee anchor customer, thus helping the portfolio company investment succeed. The same dynamic goes for providers with corporate investment arms. As noted herein, however, this is not a guarantee or foregone conclusion. In many "hot" spaces such as telehealth, patient engagement platforms, remote patient monitoring, clinical algorithm platforms, among others the different competing corporate venture arms across payors and providers will back competing platforms, each vying for market footing and scale—often times with few if any of the platforms ever reaching sufficient scale relative to the dollars invested and deployed into them.

58 <http://www.healthcostinstitute.org/files/Data%20Brief%203%20-%20April%202016.pdf>.

59 <http://www.svt.ntnu.no/iss/Indra.de.Soyas/POL3503H05/olson.pdf>.

60 <http://hitconsultant.net/2017/02/15/iron-bow-technologies-vivify-health-partnership/>.

61 <https://www.kff.org/other/state-indicator/family-coverage/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>.

62 <https://fred.stlouisfed.org/series/MEFAINUSA646N>.

63 <https://wire.ama-assn.org/life-career/report-reveals-severity-burnout-specialty>.

LIST OF COMPANIES REFERENCED

Cost Disease and Healthcare Labor

- Teladoc

Cost Disease & Healthcare Innovation

- Teladoc
- TeamHealth
- McKesson
- Providence Health
- American Well
- MDLive
- Doctor on Demand

Searching for Cost Savings in Healthcare

Medical Errors

- Best Doctors
- Teladoc
- Grand Rounds
- Phillips
- Advanced ICU Care
- PeraHealth
- Imaging Advantage
- Envision Healthcare
- Google
- Intermountain
- IBM
- Banner Health
- PALM Health
- CareSync
- Epic
- Cerner

Implementing Communication Applications & Services

- Teladoc
- American Well
- MDLive
- Doctor on Demand
- MeMD
- Connexall
- DocBookMD
- Extension Healthcare
- Medigram
- Mend
- Spruce Health
- TigerText
- Chiron Health
- 2nd.MD
- CarenaMD
- Avizia
- SnapMD
- Zipnosis
- Cleveland Clinic
- Publix
- Accolade
- Continuwell
- Eliza
- Evive Health
- GenerationOne
- ID Avatars
- Limeade
- MedHOK
- Redbrick Health
- Sharecare
- Spoke
- Touchcare Health
- Viverae
- Wellness Corp Solutions
- Welltok
- Tea Leaves (j2Global)
- Anthem
- UnitedHealth Group
- Aetna
- HCSC
- Cigna
- Humana
- Kaiser Permanente

Inventory and Asset Tracking

- Cardinal Health
- WaveMark RFID
- KitCheck
- Censis Technologies

Idea Sharing and Process Improvements

- Specialists On Call
- Advanced ICU Care
- Avizia
- SnapMD
- Epic

Changing Social Norms

- The Coalition to Transform Advanced Care
- Omada
- Bridge Health
- Allscripts
- eviCore Healthcare
- CVS
- Aetna
- Providence St. Josephy Health
- Ascension Health

LIST OF COMPANIES REFERENCED *cont.*

Healthcare's Entrenched Players

- Blue Cross Blue Sheild
- Kaiser Permanate
- Aetna
- Cigna
- CVS
- Express Scripts
- Cleveland Clinic
- HCA
- CHS
- Mayo Clinic
- Lowes
- Nike

Payors

- Echo Health Ventures
- CarenaMD
- Avizia
- RiseHealth
- Best Doctors
- Teladoc
- Optum
- Cleveland Clinic
- Kaiser Permanente
- Aetna
- MDLive
- Teladoc
- Bridge Health
- Critical Signal Technology
- GlucoMe
- MedHok
- ZeOmega
- Omada

Providers

- Cleveland Clinic
- American Well
- Avera Health
- Grand Rounds
- Massachusetts General Hospital
- Advanced ICU Care
- MDLive
- Specialists On Call
- Banner Health
- CarenaMD
- Mercy Virtual
- Specialists On-Call
- Blue Sky
- Avera
- 2nd.MD
- Best Doctors
- Pera Health
- Mercy Virtual
- United Language Group
- Mobile Heartbeat
- Philips
- Avizia
- SnapMD
- Zipnoisis

Employers

- Accolade
- Omada
- MDLive
- Teladoc
- Bridge Health
- Kurbo
- Accolade
- Welltok

Government

- IronBow
- Vivify
- Veterans Affairs
- Department of Defense
- Teladoc
- GlobalMed
- Virginia Commonwealth University
- Tyto

New Market Openings

- Iora Health
- Turntable Health
- Qilance Medical Management
- OneMedical



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