

Disruptive entrepreneurship is transforming U.S. health care

By Jonathan Rauch

I. INTRODUCTION: HEALTH CARE'S 'MAMMALS' EMERGE



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Health care accounts for more than a sixth of the U.S. economy; yet of all U.S. economic sectors, with the possible exception of education, it has been the most impervious to disruptive innovation, especially of the sort that improves productivity and value. Jonathan Bush's witticism cuts close to the bone: "The industries we care about least innovate at the highest speeds, while those we hold dearest to our heart innovate hardly at all."¹ To be sure, the sector has shown impressive medical innovation, but its cost-no-object, value-no-concern approach to pharmaceuticals, procedures, and devices has been part of the sector's debilitating cost-spiral problem, not part of the solution. Innovation to improve efficiency and deliver more bang for the buck has been scarce, and more often has been punished than rewarded when it did occur.

No wonder the sector is full of providers, insurers, and other institutions which, like the saurians of an ancient epoch, are bloated, slow-moving, voracious, and probably doomed, at least in their current forms. But newer, more agile creatures are scampering underfoot. A growing culture of disruptive entrepreneurship is gaining a foothold in U.S. health care. Its ultimate impact remains to be seen, but its growth and potential significance are not in doubt. Health care's mammals, as it were, have arrived.

Economists and other experts debate why, in the past few years, health care inflation has abruptly and significantly moderated.² The soft economy has no doubt been a factor. This paper, however, adds weight to a significant body of evidence suggesting that longer-lasting structural changes are also at work: in particular, changes in economic incentives, which put a premium on maximizing value and health rather than cost and treatment, have given rise to an entrepreneurial, value-maximizing ecosystem. Supporting this ecosystem are four developments: first, changes in public and private payment structures that reward value; second, rapid improvements in information technology and

¹ *Where Does It Hurt? An Entrepreneur's Guide to Fixing Health Care* (Portfolio/Penguin, 2014), p. 61.

² See, for example, Chapter 4 of the 2014 *Economic Report of the President*.

data availability; third, an influx of creative value-seeking entrepreneurship, often led by insurgents from outside the traditional health care sector; fourth, an investor infrastructure that is eager to bankroll value-seeking startups. In short, health care is beginning to taste the disruptive culture of Silicon Valley, retailing, and many other American sectors.

Who are the disruptors, how do they see the world, what are they doing, and what are the implications of what they are doing? By interviewing entrepreneurs, investors, and health care executives, I tried to understand change as seen by the change agents. My sample includes newcomers to health care and small, independent companies, as well as people within some of the sector's most prominent providers and insurers. Although—cautionary note—my sample is neither large nor scientifically selected, the consensus I find is strong to the point of unanimity:

- On the *demand side* of the market for value-oriented business models, pressure on providers and insurers to reduce cost growth by increasing value is biting much more today than in even the recent past. Health-care actors have internalized the message that prior rates of health-cost inflation are unsustainable and that fee-for-service payment, which rewards overutilization and inefficiency, is on the wane. Federal policy changes, including (but not limited to) new payment structures introduced in the Medicare Advantage program and the Affordable Care Act, have accelerated the market's emphasis on value. As a result, executives in corporate C-suites are more interested in value-seeking revenue models than in the past, and incumbent companies are fearful, in a way they had not been, of being left behind if they ignore value-seeking innovation. They are focused as never before—as one executive put it—on not becoming Kodak.
- On the *supply side* of the value-seeking market, the quantity and quality of health-care data and the power and availability of analytical tools are growing exponentially, while information-technology costs are declining swiftly. Meanwhile, investments in health IT and in companies that target waste offer comparatively rapid potential returns and low development costs. Those factors, plus the growing demand for value-based business models, have markedly reduced what once seemed nearly insurmountable barriers to efficiency-seeking startups and products.
- With the market for value-driven business models growing, profitable niches are emerging for efficiency-improving products and services that could not have been commercially viable as recently as five to seven years ago. As a result, business and entrepreneurial talent is flowing into health care from outside the sector, and traditional players are feeling pressure to raise their game by hiring, investing in, partnering with, or otherwise incorporating talent and business models which until recently they would have ignored.
- These factors combine to make the health care sector more open to business-model innovation than at any time in memory. That is certainly how people in the field see it. A partner in one venture-investment company says: "This feels like, at least in the U.S. market, a very significant industry transformation that's taking place." The managing director of another health-care venture investment fund: "The world just wasn't ready yet" five or ten years ago. A chief financial officer: "Health care is definitely at a crossroads." Other investors, entrepreneurs, and executives use phrases like "a very big change," "transformational," "incredibly exciting," "explosion of ideas," "explosion of positive innovation," and more in that vein.

How the health sector's new and growing openness to business-model innovation and value-seeking entrepreneurship will play out is, of course, an open question. I predict, however, that in two decades or so people will look back on the current time as a turning point. Barring some unforeseen reversal, the mammalian ecology is established securely enough to be a durable presence in health care, and it has the potential to bring about a step-change in

the sector's heretofore dismal productivity. The dinosaurs still roam, and indeed still dominate, but their monopoly is broken.

This paper begins with an overview of the forces creating mammals' niche. It then presents case studies of value-oriented entrepreneurs and startups and explores the financial infrastructure backing them. Finally, it looks ahead and offers what may be a surprising comparison.

II. A NEW ENVIRONMENT: DRIVERS OF CHANGE

Dr. Brad Stuart is a white-haired, avuncular physician in his 60s. He looks like an old-fashioned doctor from central casting, but he has a maverick entrepreneurial streak (as evidenced by one of his email handles, *tenacious.doc*). He spent decades at Sutter Health, a large provider in northern California, where he pioneered a system that treats chronically ill patients at home when possible, keeping them healthier and out of the hospital.³

In late 2013, Stuart struck out on his own. He founded a startup called Advanced Care Innovation Strategies, a consulting and care-management group that helps health systems move the focus of care for older, chronically ill patients “out of the hospital and into the home and community.” Like many others interviewed for this report, he believes the health care system has reached a turning point. “I’m seeing more spirit of creativity and change for the better out there in health care than I’ve seen in my almost 40 years of doing this,” he told me. He describes the current moment as a “time of wrenching change” for old-style hospital-based providers—and a time of unprecedented opportunity for change agents like himself.

What’s happening? First, and probably most important, fee-for-service payment, although still prevalent, is losing market share to what’s called population management, which Stuart characterizes as “a very new and startling trend.” Under the fee-for-service system, health care providers manage “the patient in front of you,” as one doctor put it, and they order treatments at will, leaving payers (patients, private insurers, and the government) to foot the (soaring) bill. By contrast, in a managed-population system, providers receive a fee to manage the health care of a large number of members. Under population management, providers earn more if they keep their members healthy, and in many cases they, rather than payers, are at risk of suffering losses if they overtreat: a calculus which reverses fee-for-service’s incentive to treat everyone for everything as expensively as possible. Executives emphasize that population management is

Under population management, providers earn more if they keep their members healthy, and in many cases they, rather than payers, are at risk of suffering losses if they overtreat: a calculus which reverses fee-for-service’s incentive to treat everyone for everything as expensively as possible. Executives emphasize that population management is not merely an incremental adjustment. Rather, it is a fundamental change of business models: “a whole different mindset,” and “a completely different business,” as two executives said.

³ See Jonathan Rauch, “The Home Remedy for Old Age” (*The Atlantic*, December 2013).

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Meanwhile, consumers increasingly are taking the lead in selecting health coverage, and they are paying higher health-plan deductibles and other out-of-pocket costs, making them more sensitive to price.⁴ True, the dominant model remains the one in which employers choose health plans for most non-elderly workers, fee-for-service Medicare covers the elderly, and Medicaid covers the poor. But what has been called the retailization, or consumerization, of health care is making inroads. As consumers exercise more choice, health insurers and providers need more agility in marketing and product development than they have had to show in the past. They need to get better and faster at improving and personalizing the customer experience. They also need to take growing account of consumers’ sensitivity to value. Consumerization and the faster tempo open providers’ and insurers’ minds and doors to previously spurned ideas and innovators.

Neither of those developments is likely to be fleeting. To the contrary, the forces impelling them appear to be gathering momentum.

First, pretty much the entire industry now understands that previous rates of health-care cost growth are economically unsustainable, and that organizations which do not seek and establish value-maximizing business models, rather than treatment-maximizing models, will not have a bright future. For example, Bert Zimmerli, the chief financial officer of Intermountain Healthcare, a large integrated health provider based in Salt Lake City, says the company has made a strategic decision to go “all in” on moving toward population management, and hopes in five years or so to be treating 70 to 80 percent of its members on that basis (from fewer than half today). “We’re saying we do not want to do one procedure that doesn’t need to be done,” Zimmerli said. Much the same is true of insurers. “Up until recently they didn’t have to worry about innovating too much,” one health-insurance executive said, but today they are fearful of being “commoditized.” Further demand for value comes from the fact that a growing number of employers—especially large ones—are self-insuring, giving them a particularly direct stake in health-care efficiency (and in workforce health).⁵

Second, information technology is beginning to deliver on its promise, opening doors to business models which would not have been viable as recently as five years ago. Wearable sensors, in-home monitoring, cellphones, health apps, and other technologies that trail “digital exhaust” (valuable consumer information) grow cheaper and more sophisticated by the week; data bases maintained by insurers, providers, and governments become more accessible and comprehensive; and powerful analytics can mine all this data for previously illegible patterns and predictive insights. Innovations from other digital realms, such as video games, cellphone apps, and online video conferencing, give health insurers and providers entirely new ways to interact with customers and patients. Not least, digital technologies have been around long enough to build what one executive calls “a proven playbook”: established roadmaps for change and a base of executives and consultants who know the route.

Third, federal policy has swung significantly toward value. One important element is the establishment of Medicare Advantage in 2003; another is the creation of accountable care organizations (ACOs) under the Affordable Care Act in 2010. Though different, both have in common their rising market penetration and their risk-sharing, population-based

⁴ See, e.g., Stephanie Armour, “More Cost of Health Care Shifts to Consumers,” *Wall Street Journal*, December 3, 2014.

⁵ According to the Employee Benefits Research Institute, “In 2011, 58.5 percent of workers with health coverage were in self-insured plans, up from 40.9 percent in 1998.” Paul Fronstin, “Self-Insured Health Plans: State Variation and Recent Trends by Firm Size,” *EBRI Notes*, November 2012.

payment structures.⁶ Both, therefore, create market opportunities for products, services, and companies that reduce wasted motion and improve value. The Affordable Care Act also contains a host of other value-oriented changes in payment incentives.⁷ Further emphasizing the point, the Health and Human Services Department recently announced it would move half of all Medicare payments off of fee-for-service payment and onto value- and quality-based payment by 2018.⁸ Together, these policy changes have had an important signaling effect: C-suite executives in the health sector have gotten the message that the government is serious about taking away the fee-for-service punch bowl. In interviews, entrepreneurs and investors spoke again and again of the ACA, Medicare Advantage, and other federal incentive changes as an “accelerator” of macroeconomic forces driving toward value, as “what tipped,” as “wind in the sails,” and so on.

For decades, the U.S. health sector was a dinosaur ecology. The one-size-fits-all, hospital-centered medical culture, the fee-for-service payment structure, the insularity of health-care business executives, the third-party-payment system’s marginalization of consumers, and the federal government’s disincentives to improve efficiency: all worked together to support large, slow-moving, wasteful institutions that got fat at the expense of the rest of the economy. The health care sector changes slowly, but it is changing. Nimble, value-seeking business models and enterprises now have a place in the sun, and they are building a different ecology under the feet of the dinosaurs. These, as it were, are the mammals.

Who are these creatures and what are they doing? In search of insight, I sought a closer look.

III. THE DISRUPTORS: PORTRAITS OF INNOVATION

Clayton Christensen, a Harvard Business School professor who is arguably the leading theorist of disruptive innovation, likes to warn that a disruptive innovation is not necessarily a breakthrough improvement. Often, indeed, it is just the opposite: a less advanced or elaborate product which meets consumers’ needs at a lower price point. In other words, it figures out how to make money by giving over-served consumers a form of value which incumbents cannot profitably supply. In yet other words, a disruptor will often be a business-model innovator, not a technology innovator.

For the most part, the businesses and entrepreneurs profiled here accord with Christensen’s notion. To be sure, they rely on new(ish) digital technologies and tools, but few of them offer dramatically new technologies or solve previously unknown problems. Rather, their innovations combine state-of-the-art technologies with new business models to attack existing problems in more efficient ways.

They have no shortage of targets. American health care does acute care pretty well. If you have a head trauma or a heart attack, a hospital is a good place to be. But it does many other things suboptimally or downright poorly, and at very high cost. For example:

⁶ Medicare Advantage, which accounts for more than 30 percent of Medicare spending, pays private providers based on a per-enrollee fee, a disincentive to overtreat. Accountable care organizations, which cover about 14 percent of the U.S. population, offer providers payment incentives to form integrated networks and keep patient populations healthy. For useful summaries, see Henry J. Kaiser Family Foundation, *Medicare Advantage Fact Sheet*, May 1, 2014 (<http://kff.org/medicare/fact-sheet/medicare-advantage-fact-sheet/>), and Jenny Gold, “FAQ on ACOs: Accountable Care Organizations, Explained,” *Kaiser Health News*, April 16, 2014 (<http://kaiserhealthnews.org/news/aco-accountable-care-organization-faq/>).

⁷ See the American Public Health Association’s eight-page list, “Major Affordable Care Act Delivery and Payment Reforms: Summary Table” (October 2013), at <http://goo.gl/qjT5FA>.

⁸ HHS press release, “Better, Smarter, Healthier: In historic announcement, HHS sets clear goals and timeline for shifting Medicare reimbursements from volume to value,” January 26, 2015.

- **Inappropriate late-life care:** Near the end of life, many people receive unnecessary, unhelpful, or unwanted treatment because they lack information, haven't clearly expressed their wishes, or have their wishes ignored;
- **Medication noncompliance:** Millions of people take their medications inconsistently, incorrectly, or not at all;
- **Post-acute care:** After leaving the hospital, many people land in inappropriate settings, such as in nursing homes they don't need or at home without needed medical oversight;
- **Preventable crises:** Many people wind up in the hospital for conditions or problems that monitoring and timely intervention could have anticipated or headed off.

Given the size of the health sector and the scale of those problems, making even modest headway against any of them would produce large savings in cost, as well as welcome improvements in quality and customer experience.

Then there are endemic business-process inefficiencies that plague providers, insurers, employers, and increasingly even consumers:

- **Managing employee wellness programs:** Employers are confronted with countless employee-health programs and incentives. How are they to navigate the options efficiently, and know which ones actually improve health and thus cut costs, and get employees to use them?
- **Engaging consumers:** As they become more accountable for costs, insurers and self-insured employers need to encourage consumers to shop for care with value in mind. How?
- **Implementing population management:** Moving from fee-for-service to population management is like entering a whole new business. How can a health system whose experience is almost entirely with fee-for-service navigate the transition?

Seven company profiles follow, each addressing one of problems just mentioned, and each intended to give a flavor of the ways in which realigned incentives, data analytics, and entrepreneurial ingenuity are combining to commercialize value.⁹

VITAL DECISIONS: LATE-LIFE COUNSELING TO PREVENT UNWANTED TREATMENT

"This is my third build," says Mitchell Daitz, the CEO and founder of Vital Decisions, a startup based in New Jersey. Now in his late 40s, Daitz trained in engineering as an undergraduate and took a business degree from Wharton. He spent half a decade as a health care management consultant before realizing in 1999 that he prefers "architecting" new businesses to managing old ones. It was at his second startup, a company that built chemotherapy software and collected data on dosing, that he noticed wild variations in treatment of patients near the end of their lives. "The inconsistency was huge," Daitz says. "There was no rhyme or reason in the last year or two years of life. When there's a lot of process variation, that's an indication of process inefficiency."

⁹ No specific endorsement of any company is implied by its inclusion here—though, in my judgment, all have plausible business models.

Process inefficiency—and worse. Far too often with late-life patients (though not only with them), the medical system fails to communicate options in ways they understand and fails to elicit and understand their goals of care. Most people prefer to live as normally as possible in the last months and die at home. Instead they often wind up dying in hospitals, where they get treatments that are invasive, sometimes incapacitating and painful, and frequently useless or worse. Medicine’s tendency to throw every treatment at patients, even when there is little hope of recovery, is not only expensive but inhumane.¹⁰ Daitz, with others, set to work in 2008 building a commercial model to take on this problem. After several years of piloting and testing, the fledgling company was introduced to MTS Health Investors, a private-equity firm which saw late-life care as “a completely broken process,” as Oliver Moses, the firm’s senior managing director, puts it. Daitz’s pitch “was an ‘aha!’ moment for us: this was a big opportunity that no one was addressing.”

Vital Decisions acquires patient caseloads from Medicare Advantage and other health plans. It then uses data analysis to identify and target the small subgroup of the population that appears likely to be facing serious chronic illness without much time remaining—something which, until recently, was difficult to do. Thus identified, patients receive offers by email and phone of free counseling by licensed social workers and other professional counsellors.¹¹ The point of the counseling is not to discuss medical options or treatment advice—that is physicians’ job—but to help patients identify, express, and codify goals of care. In most cases, family members are also brought into the discussion. Whether to engage in counseling is up to patients; 40 to 45 percent choose the service. Patients pay nothing; instead, Vital Decisions bills health plans a fee for up to nine months of telephonic counseling per engaged patient. Counseling is not cheap, but the revenue model works, according to the company, because many patients turn out to prefer less treatment, and less-expensive treatment, than the system, absent clear guidance, would throw at them.

As of January 2015, Vital Decisions had 14 clients, employed 90 people, and covered patient populations totaling 1.8 million lives. Executives believe the potential market extends to hundreds of health plans.

RXANTE: FORECASTING AND PREVENTING MEDICATION NONCOMPLIANCE

Josh Benner, today in his early 40s, trained as a pharmacist, took a doctorate in health-policy and management at Harvard, did consulting, and for a time was a policy analyst at Brookings. Along the way, he learned that, as he puts it, “For a variety of reasons, we just fail to use medicines correctly in this country.” The annual cost is reckoned in the hundreds of billions of dollars, to say nothing of the health detriment. In 2011, he and a colleague founded RxAnte. “The insight behind RxAnte was this is a big problem and we know how to make it better,” Benner says. “I’ve always been passionate about it, and suddenly it’s a moment when the biggest stakeholders in health care are accountable for it.”

RxAnte sells its services to health plans on a dollars-per-member basis. Its product is prediction: “We can predict the future very accurately,” Benner says. “We take people’s health insurance data at an individual level and we use it to tell the future of how they will—or won’t—use their medicines, and how costly that may or may not be to the health plan.” Armed with this information, “Now plans could deploy more intensive services, like sending someone to your house or paying your doctor to manage your medications more effectively, which no one had tried before.” As with

¹⁰ See the author’s “How Not to Die,” *The Atlantic*, May 2013.

¹¹ Counselors are required to have master’s degrees or above, to be licensed social workers or the equivalent, and to have had at least three years of experience in face-to-face counseling.

Vital Decisions, prediction and targeting are the business model's secret sauce: nagging everyone in a health plan would be prohibitively expensive, to say nothing of annoying, but checking up on members who are at highest risk makes sense both medically and fiscally. If it succeeds in forecasting and preventing costly medication failures, the service saves money for insurers and can also improve their Medicare quality ratings.

Physicians and other health professionals, says Benner, are the most trusted and effective interveners, but proactive intervention is new territory for them. To ease the way, RxAnte provides a web-based portal that helps doctors track high-risk patients; it provides monetary rewards for medical practices that get their high-risk patients to take their meds; and it trains physicians' offices to engage with patients about medication use.

As of late 2014, the company had about 2,000 physician practices using its platform and was managing medication use for more than 9 million health-plan members, and it had 65 employees. In 2013, it was acquired by Millennium Health, of which Benner is an executive vice president.

NAVIHEALTH: GUIDING AND MANAGING POST-ACUTE CARE

Medicare Advantage likewise brings viability to NaviHealth, a company founded in 2012 and headed by Clay Richards. U.S. health care is notoriously poor at so-called handoffs, the transition from hospital care to skilled nursing, rehabilitation, in-home treatment, and other post-acute settings. Patients often receive little guidance or input, coordination between institutions is weak to nonexistent, and placements can have as much to do with what is convenient for providers, or what insurance or Medicare will pay for, as with what makes the most sense therapeutically. "Researchers have discovered huge discrepancies in how much is spent on these [post-acute] services in different areas around the country," *Kaiser Health News* reported in 2013, and providers commonly "earn double-digit profits from Medicare through a hodgepodge of payment methods that health experts say encourages unnecessary and disjointed care, wastes taxpayer money and makes fraud easier."¹² The dollars involved are significant: post-acute care accounts for about a fifth of Medicare's spending. "The incentives really are not aligned around a patient-centric model to drive better outcomes," Richards says. "If you eliminated the silos, and you gave one company the ability to manage the care with standardized care protocols across the continuum and put the patient at the center, you could get better outcomes and manage more efficiently."

NaviHealth contracts with insurers and health systems to manage populations of post-acute patients, "guaranteeing significant savings below a health plan's current [post-acute care] spend," according to the company's website. Patients receive what Richards calls a "concierge-like" service; health plans receive relief from financial risk and exorbitant bills. The company's secret sauce is a proprietary algorithm that crunches data on patients' health and demographics to determine the settings in which other, similarly situated patients have had the best outcomes. Did they go to a skilled nursing facility or did they go home or somewhere else? And what kind of therapy and support did they receive? Data in hand, the company works with patients and health professionals to determine placements and coordinate care.

¹² Jordan Rau, "Medicare Seeks to Curb Spending on Post-Hospital Care," *Kaiser Health News*, December 1, 2013 (<http://kaiserhealthnews.org/news/post-acute-care-medicare-cost-quality/>). The author encountered this problem firsthand when his father, after a brief hospital stay, was placed in a skilled-nursing facility and explicitly encouraged to remain there because Medicare would pay for it.

Richards says the company is producing double-digit reductions in utilization with improved quality. It has about 400 employees and covers about 1.8 million individuals, most of them insured through Medicare Advantage. The company's investors include health providers and insurers, who are customers as well as funders.

MYNEXUS: MONITORING AND MANAGING HEALTH AT HOME

McArthur VanOsdale, still in his early 30s, grew up in Nashville and worked as a managed-care consultant after college. Often he found himself sitting in meetings where he tried to convince people twice his age that they were using inefficient and outdated methods. "I became this kind of person who was always trying to challenge the system," he says. "I can tell you from firsthand knowledge that a lot of health-care [organizations] make decisions all the time that may not be in the best interests of their patients." His grandmother and mother, he believes, both suffered unnecessarily because easily discoverable trouble signs were missed. He has seen any number of industry practices that "make me sick to my stomach."

A serial entrepreneur, in January of 2014 he and a partner launched their third startup, myNEXUS, which monitors and manages health at home.¹³ The home is an area in which today's system is woefully lacking: far too many people go untreated and overlooked until they reach the doctor's office or emergency room.¹⁴ Often, VanOsdale says, heading off problems can be as easy as having someone step on a scale every day. MyNEXUS attempts to fill this gap. An insurance plan might contract with myNEXUS to manage its members' home-based benefits. MyNEXUS crunches data and uses proprietary analytics to identify high-risk individuals in the insurer's member population; it outfits their homes with daily monitoring equipment (if they consent, as most do); and, when trouble signs appear, it coordinates responses with patients, families, physicians, and other care providers. In exchange, the insurer pays myNEXUS a fee based on the number of covered individuals. As a further way to incentivize value, myNEXUS's revenue model incorporates "gainsharing": the company can share in savings if it prevents hospital readmissions or unnecessary trips to skilled nursing facilities, emergency rooms, and other high-cost settings. Initially capitalized by its founders, the company last year took on board its first external investor, MTS Health Investors (which also funds Vital Decisions, profiled above). Still new, the company expects to have 500,000 or more individuals under management by mid-2015, according to VanOsdale.

In health care, the ultimate efficiency improvement is not the one that provides treatment more cheaply but the one that prevents treatment altogether. MyNEXUS seeks to commercialize this most desirable—and, in the fee-for-service world, least profitable—kind of efficiency. Asked if the business model might have been viable, say, five years ago, VanOsdale says that the answer is yes in theory, but that in practice the model is an order of magnitude cheaper and more efficient today. Declining equipment costs and improving algorithms allow the company's staff to monitor more people in more locations than was possible even very recently.

However the company fares, VanOsdale is representative of the young, driven, passionate, and (by his own description) disruptive entrepreneurs who characterize the mammalian ecology. He works and travels incessantly, taking care of his own health in hotel fitness centers. He wants to own all the companies he works for, and his latest startup seems unlikely to be his last. And he sees no shortage of problems to fix in health care. "I want to be viewed as

¹³ VanOsdale's co-founder is John Dant III. Their first startup is a consulting business, and the second was sold to a publicly traded company.

¹⁴ On the need for, and potential of, home-based health care, see Jonathan Rauch, *Opportunity Knocks at Home: How Home-Based Primary Care Offers a Win-Win for U.S. Health Care* (Brookings, December 2013).

somebody that really changed health care and disrupted the old-guard behavior,” he says, “somebody that helped people live better lives.”

JIFF: NETWORKING EMPLOYER HEALTH PROGRAMS

Whether because they are self-insured or because they worry about premium increases, employers have a bottom-line interest in their workforce’s health; nearly all large employers and many small ones offer health services and wellness programs. These run the gamut from telemedicine, diabetes treatments, and second-opinion services to smoking cessation and weight loss; they include biometric screening, flu shots, personal fitness monitors, meditation apps, seated massage, and much more.¹⁵ With about 150 million Americans now covered by employer health plans, the potential of workplace interventions is large. For corporate human-resource departments, however, navigating the choices is challenging, and figuring out which ones deliver bottom-line health improvements for a given workforce is even harder. Because businesses’ health-care expenses run to more than \$600 billion a year, or more than a fifth of the country’s health-care bill (according to the Centers for Medicare and Medicaid Services), potential efficiency gains are fiscally consequential.

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James Currier, in his late 40s, is a serial entrepreneur with a deep background in data analytics and social platforms. He also has experience in video games and “gamification,” the art of getting consumers to engage in and stick with tasks. In 2011 he co-founded Jiff, an online platform that helps self-insured employers make data-guided choices between available health programs and interventions. Instead of contracting with multiple vendors, says Currier, employers who sign with Jiff can make selections on Jiff’s online platform in about 90 minutes by ticking boxes. The employers pay Jiff, and Jiff pays vendors, who wake up the next morning with new customers. “We say to employers: here’s the marketplace. Here are the six tele-health vendors. Here are the cost-transparency apps. You just click-click-click.”

By using challenges, prizes, and other incentives, Jiff encourages workers to participate in activities like exercise, weight management, drug adherence, tele-health, and biometrics reporting. Employers can track and evaluate workforce participation in real time. Perhaps most intriguingly, user-generated data from health apps and services—what Currier calls “digital exhaust”—flows back to Jiff, which analyzes the data to understand what

people are doing and to learn which interventions are most effective. In effect, employers, workers, and Jiff are linked in a network that learns continuously from everyone’s choices and behavior. “Three or four years out, this company

¹⁵ See Henry J. Kaiser Foundation, *2014 Employer Health Benefits Survey*, September 10, 2014 (<http://kff.org/report-section/ehbs-2014-summary-of-findings/>).

becomes a giant data company,” Carrier said. In Jiff’s case, new consumer technologies (cellphones, apps, and games), intensifying business imperatives (employers’ need to control health-care costs), and big data (granular real-time analysis of many daily interactions and decisions) combine to create a value-driven business that could not have existed a few years ago.

CHANGE HEALTHCARE: TURNING CONSUMERS INTO SHOPPERS

Making health care consumers cost-conscious has been the holy grail of reformers for years, but the smart-shopping health consumer remained elusive, because consumers didn’t pay the bill. Today’s market, however, is increasingly characterized by high-deductible health plans that let consumers share in savings if they shop around. A consequence is that the price-transparency and consumer-engagement space has become crowded with companies and insurers introducing platforms and apps that encourage consumers to compare prices and service ratings. If consumers become more value-conscious, competition is likely to reduce both prices and pricing variability, potentially reducing health-care inflation.

Change Healthcare is a rapidly growing occupant of this space. Its web and mobile platforms offer consumers personalized information on how much they will pay for health care and where to find better value, but with a twist: instead of waiting for consumers to shop, the service analyzes insurance-claims data, such as prescription drugs and health appointments, to find patterns in health purchases, develop individualized recommendations, and email or text them to consumers.

“You’ve got to take the information to the consumer,” says Doug Ghertner, the company’s president (who is also an executive vice president of Emdeon Inc., which bought Change Healthcare in November of 2014). Most health plans now have transparency tools, he says, but only a small fraction of members use them, “so we’re creating a more proactive consumer.” Scanning members’ health data, the company’s software shops on their behalf and, if it finds better deals, sends monthly alerts that might say, “You can save \$270 on your health-care services; click here to find out how.” If consumers click through and log in to the web portal (as 60 percent do, according to Ghertner), they see personalized information, based on their health plan and location, listing opportunities to pay less for provider services, prescription medications, and other health items. It might tell them, for example (in Ghertner’s paraphrase): “I know you go to this dermatologist five times a year; did you know there are five others within five miles of your home who would cost you less?” Members who receive such “ways to save” emails are 600 percent more likely to shop for their care, Ghertner says.

Dating back to 2007, Change Healthcare is not a new entrant, but it spent its early years trying to sell its shopping service directly to consumers, a heavy lift. It subsequently shifted to a business-to-business-to-consumer model, selling its service to health plans and self-insured employers, and through them providing shopping tools to employees. Its clients pay a monthly per-head fee to cover their members. The service was under contract to cover more than 10 million people at the end of 2014, up from 5.5 million a year earlier. Change Healthcare has taken in multiple rounds of financing, tapping independent venture investors as well as strategic investors such health insurers.

EVOLVENT HEALTH: MANAGING THE BUSINESS-MODEL TRANSITION

If population management is in so many respects a different business than fee-for-service—requiring providers to unlearn the “heads in beds” strategies they have long relied on—incumbent organizations need new business

processes, new technologies, and people with a new mindset. In business, few challenges are as difficult as changing horses in midstream. Though many incumbents have put a toe in the population-management waters, they have reason to fear floundering as they try to take the new model to scale.

In 2010, a handful of senior executives at the Advisory Board, a health-care consultancy, saw an opening for a company that provides soup-to-nuts assistance with the move away from fee-for-service. “We wrote a business plan as to how to do we accelerate the adoption of integrated and value-based care,” says Seth Blackley, the president and co-founder of Evolent Health. “We believed the world had to head this way.” Capitalized in August of 2011, when Blackley says many providers weren’t ready to make the shift, the company now faces steady demand, has 700 employees, and is active in 20 or more markets, aiming to reach 50 over the next five years. “There’s tons of innovation going on from hundreds of companies that are supporting that transition,” Blackley said. “We are one of those companies. We are differentiated around the breadth of what we do.” Unlike traditional consultancies, Evolent provides implementation as well as advice, delivering and operating a suite of services and technologies for population management and staying onboard with client for as long as needed to “de-risk” the transition. The company provides people, too: some Evolent employees are embedded on-site with client health systems.

A tour of the company’s offices in the northern Virginia suburbs of Washington, D.C., reveals the open-plan offices and young faces typical of a Silicon Valley startup, complete with a treadmill desk for fitness nuts. Seth Frazier, with a Wharton MBA and a career as a health care consultant and executive under his belt, joined Evolent early on as its “chief transformation officer,” a title redolent of the company’s ethos. “Personally, I’ve been trying to do something like this for 25 years,” he said. Population-health management, he believes, is a better model of care, and organizations have dabbled in it since the 1990s. Only recently, however, have intensifying market pressure to cut costs, the development of powerful data tools and integration systems, the government’s new payment incentives, and the existence of a what Frazier calls a “proven playbook” (an established business and medical model) combined to bring the idea to scale.

Evolent and other companies in its space represent, as it were, an infrastructure of second-order disruptors: disruptors who help incumbents adapt to disruption. MedStar Health, an integrated health care system in Washington, D.C., and Maryland, made a strategic decision to move toward population management in late 2010 and early 2011, according to Eric R. Wagner, a vice president. After testing the model with a Medicaid health plan, in 2012 MedStar signed with Evolent to scale up the model. Evolent provides data analytics to identify high-risk individuals; targeted interventions (for example, to improve medication compliance) and care coordination for those high-risk people; work-flow systems keeping everyone on the same page; help with regulatory compliance; and, not least, human expertise, coaching, and the occasional “nudge.” The use of an outside provider is itself an innovation, says Wagner. “Health providers historically have said, ‘We can do everything ourselves.’” Without an outside facilitator, “We would have had to hire a lot more people and would have made a lot more mistakes along the way.”

* * *

The significance of the companies and entrepreneurs profiled here lies not in what any one of them is doing, nor in whether any one of them succeeds or fails, but in the fact that the health-sector ecology is now able to support them and many others like them. Business models that focus on preventing illness rather than providing treatment, and on improving efficiency rather than inflating costs, now have markets; startups that form and grow at something closer to Silicon Valley speed than traditional health-care speed are becoming fixtures of the landscape; entrepreneurs

and executives who are not reluctant to shake things up—people who have titles like “chief transformation officer,” or ambitions like McArthur VanOsdale’s, or maverick ideas like Brad Stuart’s—no longer find themselves stymied at every turn.

Those, then, are mammals. As important as their rise, perhaps, is the corresponding development of an investment infrastructure to support them, to which I now turn.

IV. THE INVESTOR BASE: NURTURING MAMMALS

In his early 40s, Aneesh Chopra has a crowded resume. He took a master’s in public policy from the John F. Kennedy School of Government at Harvard, then worked for Morgan Stanley and the Advisory Board before becoming Virginia’s Secretary of Technology and then the U.S. government’s first Chief Technology Officer, a post he left in 2012 to run for lieutenant governor of Virginia. After losing in the primary, he made his next leap—into health-care investing. “This is the moment,” he said when I visited his new company’s offices in Washington, D.C. “A new era of problem-solving is upon us. Over the next five years we’ll see the birth of a new set of capabilities that will achieve commercial success while dramatically increasing value.”

Like a number of others I spoke with, Chopra cites estimates that waste in U.S. health care spending runs as high as \$1 trillion a year.¹⁶ If you believe that number, he says, “There are billion-dollar opportunities to go after in that \$1 trillion of waste.” He and two others, both of whom have backgrounds in the software and data industries, founded Hunch Analytics, which Chopra calls a “hatchery”: a combination of investment firm and business incubator that seeks to finance, build, and launch two health-care startups a year, beginning with the launch in early 2014 of a company whose business model is to help consumers shop for health plans. The second launch aims at streamlining the collection and use of patient data for population-health management.

From the point of view of sectoral change, Hunch Analytics is as interesting for who it is as for what it does: none of the three principals has a traditional health care background. Outsiders are moving in. Consider, for example, George Hamilton and his colleagues Nickolas Mark and Jeremy Porter, who in November of 2014 launched a venture-investing arm of Intermountain Healthcare, the provider organization based in Salt Lake City. Before joining Intermountain in 2011, Hamilton worked at a private equity company and then for McKinsey, the global business consultancy. Mark, recruited by Hamilton, was in management consulting and asset management; Porter did business development

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¹⁶ For the most frequently cited estimate, see Donald M. Berwick and Andrew D. Hackbarth, “Eliminating Waste in US Health Care,” *JAMA*, April 11, 2012.

with a building-materials company. “The group we’re cultivating around this,” Hamilton said, “are generally a little different.” Intermountain’s brand new, \$35 million venture arm seeks to invest in health services and products that reduce costs while improving quality. Investments will be in early-stage startups. “Absolutely it’s a bit of a culture change,” Hamilton said, when asked about the fit of a venture arm within a 22-hospital health-care provider. “There were hills to climb. This is new thinking, internally.”

Talent matters, but so do dollars, and they are flowing in, too. In 2014, new investment in digital health (that is, in high-tech, information-based products and services like IT, data analytics, and telemedicine) exceeded \$4 billion, according to the Rock Health, a company that incubates and invests in health startups. “The figure is staggering in many contexts—125-percent growth over 2013, four times the total from just three years ago, and nearly exceeding the sum of the last three years together,” Rock Health reported. “As we move into 2015, it is obvious that our health-care system is undergoing a technology-based transformation, with health reform serving as a massive tailwind. Entrepreneurs (and investors) are taking note (and advantage).”¹⁷

Venture investment in health care is hardly new. What is new is the reorientation of investment toward information technology. “Digital health has for the first time overtaken medical devices in aggregate venture funding,” Rock Health finds. Moreover, the tripling in digital-health deal volume over the past three years was “primarily driven by the growth of early deals in the seed and series-A stages.”¹⁸ In other words: investment is flowing at an accelerating rate to...mammals.

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“We made a bet some years ago that cost-effectiveness is going to be really important—as it already is in every other market,” said Paul Klingenstein, managing partner with Aberdare Ventures, a venture-capital firm in San Francisco. The firm’s focus, he said, has shifted away from technologies that develop incrementally better medical treatments and toward technologies that drive efficiencies in health care; almost all of Aberdare’s latest \$100 million investment fund is value-oriented. (By comparison, he said, a typical venture firm a decade or more ago might have invested mainly in drugs, devices, and medical services, and “the three would barely interact.”) At TPG Growth, another investment firm, partner Matt Hobart said,

“Everything that we’ve invested in for the last five to seven years has been around cost containment and quality.”

From an investor’s point of view, efficiency-seeking business models have the attraction of being comparatively efficient investments. Compared with medical drugs and devices, products and services targeting waste are cheap to develop and quick to bring to market. Bringing a new heart valve to market might take 20 years, Josh Benner, of RxAnte, notes, whereas “we took this company from launch to acquisition in two and a half years. If you’re an investor, you’re pretty happy with that deal.” Likewise, Bob Kocher, a partner in the venture-capital firm Venrock,

¹⁷ Malay Gandhi and Teresa Wang, *Digital Health Funding Year in Review 2014*, Rock Health, January 1, 2015. Available at <http://rockhealth.com/resources/rock-reports/>.

¹⁸ *Ibid.* The six biggest digital-health investment categories in 2014 were, in descending order: analytics and big data; health care consumer engagement; digital medical devices; telemedicine; personalized medicine, and population health management.

notes that commercializing a new health-IT product might cost \$20 million, versus \$200 million to take a biotech drug through phase-two trials.

The rise of a venture infrastructure for value-based business models is significant for more than financial reasons: when startups bring in investors, and when investors fund startups, the transaction is strategic as well as monetary. To a startup, an influential investor brings credibility, expertise, connections, and strategic guidance. (Investors will often take a board seat and a hands-on role.) Searching for capital last year, McArthur VanOsedale, of myNEXUS, met with a variety of private equity and venture groups and chose MTS Health Investors based on its “immediate and deep understanding of our value proposition.”

For their part, investors obviously seek returns, but another significant development is the growth of strategic venture investing: venture funds and other investment arms operated by health care providers and insurance companies that gain early access to new technologies, diversify their business portfolios, hedge against risk in traditional markets, tap into fresh talent or expertise, develop strategic partnerships with new businesses, stimulate innovation or fresh thinking within their own corporate culture, or all of the above.

An example of an insurer investing in startups is BlueCross BlueShield Venture Partners, which launched a venture fund in which various “Blues” (regional Blue Cross insurance plans) act as limited partners. “Health plans realize, especially now, with all the new regulation that has been introduced into their industry, that their core competencies are being commoditized,” Tom Hawes, a managing director of BlueCross BlueShield Venture Partners, said. “They need to figure out what else should we do so we don’t become Kodak or other big companies that fail to innovate and no longer exist.” Profit is among the fund’s goals, but so is the opportunity to get an early look at products, services, and entrepreneurs that might change the industry: “to see what else is going on in the market, even way out on the periphery.” The venture’s first fund invested \$116 million from 11 Blues plans; its second, \$189 million from about two dozen plans. The fund typically takes seats on investees’ boards, and BCBS organizations not uncommonly become customers of the companies they invest in; those relationships provide startups with experience and credibility and health plans with access to new technologies or services. Similarly, another insurance company (which requested anonymity) said its investment arm, which opened in the 2000s, is its “ear to the ground,” as an executive put it. Health insurers, he said, are investing in technological innovators because “they need to do that to survive.”

As with insurers, so with incumbent health-care providers: they, too, are investing strategically, hoping to tap into the mammalian ecology and avoid obsolescence at its hands. Hamilton’s new venture-investing group at Intermountain Healthcare is an example. “Health care is changing,” says Hamilton. “Part of the reason for doing this is to offset the uncertainty and risk that may be coming down the pike.”

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Ascension Health, another large provider; its three investment funds, which date back to 1999, now have \$550 million in assets under management, according to Matt Hermann, the senior managing director. “It’s a call option,” says Hermann. “In the old days, folks would say, ‘We can do it ourselves,’ or ‘That [startup] company won’t be around in a year.’ Now there’s an increased pace that folks realize they need to work at if they’re going to be able to survive and serve their community. They’re much more open to these new ideas.” Strategic investment offers a point of entry.

There is, of course, nothing remotely new about strategic investment by corporate America, including in health care. But dinosaurs’ rising interest in mammals appears to reflect a change in the mindset of payers and providers, while bringing startups’ business ideas and values into the health-care mainstream. No one I spoke with believed this to be a temporary development or a figment of the economic downturn. “It’s a shift in attitude and culture,” Mohit Kaushal, a general partner with Aberdare Ventures (and a Brookings guest scholar), told me about strategic investing. “These people’s job is to externally interact to help bring in the best innovations from outside the system and spin off the best knowledge from inside.”

V. CONCLUSION: A POINT OF NO RETURN

Albeit for completely different reasons, what I hear and see from the health-care insiders I interviewed sounds reminiscent of what I heard and saw from petroleum insiders at the turn of the century. The movement away from fee-for-service payment models, the burgeoning of digital technologies, and the openness to change in health care’s corporate suites are combining to create an entrepreneurial, value-seeking ecosystem that looks to have reached, or passed, a point of no return.

Fifteen years ago, people in the American oil industry glimpsed the outlines of a different future than predictions of rising prices and declining output foretold. Three-dimensional seismic imaging allowed geologists to seek oil with greatly improved precision; directional drilling and in-hole, computer-aided navigation allowed drillers to reach previously inaccessible reserves; once they got there, hydraulic fracturing allowed for the extraction of deposits from rock formations which never in the past had given them up. It took more than a decade for a multitude of elements—technological, infrastructural, financial, environmental—to come together to send vast new reserves gushing through pipelines; but even in the early 2000s, industry insiders sensed that the reinvention of petroleum extraction as an information-technology business was pointing toward a step-change.¹⁹

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As I’ve been at pains to emphasize, the mammalian ecology, though unquestionably dependent on technology and money for its sustenance, is first and foremost a human phenomenon. It represents an insurgency by change agents

¹⁹ See Jonathan Rauch, “The New Old Economy: Oil, Computers, and the Reinvention of the Earth,” *The Atlantic*, January 2001.

like Bob Kocher, the investor with Venrock. Trained as a doctor, he was appalled at how badly hospitals were run, took an MBA, and went to work for McKinsey. His thinking and writing about waste in health care brought attention from policymakers and led him to work for a time in the Obama Administration before joining Venrock in 2011. “I moved out here to create attackers in the Clay Christensen style who would gain traction and be imitated, hopefully, by the incumbents,” he said.²⁰

To re-emphasize, I cannot claim that my small and subjectively chosen sample is scientific. (For a sector as large as health care, it is hard to imagine what kind of sample would be.) Nonetheless, the following conjectures seem to me to be reasonable, if not unassailable:

1. With accountable care organizations already serving about a seventh of the U.S. population and Medicare Advantage covering almost a third of Medicare spending, the population-based, value-oriented payment model already extends broadly and deeply enough to sustain substantial profits for value-based business models, and the space for those models will only grow. So...
2. With entrepreneurs and investors moving into the niches created by new payment models and market pressures, the entrepreneurial and financial infrastructure necessary to support a diverse ecology of value-seeking business models, though still nascent, can also be considered established and is likely to grow. Thus...
3. A bootstrapping process—a virtuous cycle—may be underway as startups test and prove models that lay down paths for their successors, as some of their business models earn returns that attract new investors, and as the rise of an entrepreneurial culture beckons to business-model innovators who in the past might have written off health care.

In other words, like many a new species, health care’s mammals are not only colonizing their niche, they are actively cultivating and enlarging it.

The ultimate effects are impossible to predict. But the direction of change appears clear. Absent some unforeseen economic or regulatory setback, the vectors point toward improved value and efficiency in a sector which for half a century was a sinkhole for productivity; toward business models that profit by keeping people healthy, rather than by treating them when they’re sick; and toward an infusion of fiscal pain relief that America’s economy and government desperately need.

²⁰ Kocher is a Brookings nonresident senior fellow.

APPENDIX: INVESTORS CONSULTED FOR THIS PAPER*

Organization	Auspices	About
Aberdare Ventures	Independent	Aberdare Ventures was founded in 1999 with a focus on health care investing. The firm's current fund is around \$125 million and there are about 15 companies in Aberdare's portfolio, according to founder Paul Klingenstein. Invests in RxAnte and Jiff.
Ascension Health Ventures	Provider	Ascension Health Ventures was formed in 2001 to invest in and expand late-stage healthcare companies. Over the years, the firm has evolved its mission to also include early stage opportunities. Ascension's current portfolio includes \$550 million in capital under management, 32 companies across three funds, and approximately \$50 billion in combined annual operating revenue. Invests in naviHealth.
BlueCross BlueShield Venture Partners	Insurer	BlueCross BlueShield Venture Partners manages over \$300 million in capital across two funds and has 20 companies in its current portfolio. Founded in 2008, the fund is run by participating Blue Plans, the Blue Cross and Blue Shield Association, and Sandbox Industries. Invests in Change Healthcare and naviHealth.
Cleveland Clinic Innovations	Provider	The commercialization arm of the Cleveland Clinic, Cleveland Clinic Innovations (CCI) was created in 2000. CCI's portfolio is divided into four main areas of investment: biopharmaceuticals, devices, diagnostics, and software. In total, CCI's portfolio contains 40 companies at a variety of stages.
Intermountain Healthcare	Provider	In September 2014, Intermountain joined forces with Healthbox, a business-accelerator company, to launch a new growth and innovation model. New with this model are the \$35 million Intermountain Innovation Fund and business-incubator programs to stimulate and support employees and Salt Lake City entrepreneurs in advancing ideas that improve patient quality and service while making care more affordable.
Kaiser Permanente Ventures	Provider	An early adopter, Kaiser Permanente started its venture activity in 1998 with the goal of improving innovation in healthcare. Kaiser Permanente Ventures has approximately \$400 million in committed capital and 22 companies in its current portfolio. Portfolio companies fall under one of the firm's four main investment areas: IT, services, therapeutics, and diagnostics and drug delivery.

*By Sarah Blauner

Mayo Clinic Ventures	Provider	Currently on its third fund, Mayo Clinic launched its first venture fund in 1998. Its portfolio contains technologies in Healthcare IT and business services, diagnostics, devices, and biopharmaceuticals.
MTS Health Investors	Independent	MTS Health Investors was founded in early 2000. The firm manages private equity funds which have invested over \$500 million in companies that deliver cost-effective services within the healthcare industry. There are 11 healthcare companies in the firm's current portfolio. Invests in myNEXUS and Vital Decisions.
TPG Growth	Independent	TPG Growth is the early investment and growth platform of a larger private equity firm, TPG Capital, which was founded in 1992. TPG Growth has approximately \$3 to \$4 billion in assets under management and 57 companies in its portfolio. A TPG Growth partner estimates that, of the firm's investments, around 20 percent are healthcare-related. Invests in Evolent Health.
Venrock	Independent	Venrock became a traditional venture firm around 30 years ago, after being founded as the Rockefeller family's venture fund. Its current portfolio contains 43 active health care companies. According to a partner at the firm, a fund is raised every three years that is somewhere "in the hundreds of millions." Invests in Jiff.

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