

## COMMENTARY

# Health Care 2030: The Coming Transformation

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The problems in our health care systems include subpar quality and patient safety, a misplaced focus on acute care rather than on prevention and population health, inadequate person centeredness, and unsustainable cost. The next decade will see considerable transformation in how health systems are designed, propelled by opportunities such as digital health, growing consumerism, and mounting financial constraints. The Covid-19 pandemic has also necessitated and accelerated significant transformations. The authors discuss gaps and barriers in the current design of health and health systems, and the needed escalation of transformation including transition from hospital-based systems to primary care, community, and social care-based systems. They also assess the future evolution of payment systems leading toward sustainable health, changes in provider roles, and the entrance of new nontraditional players.

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*For more on this topic, watch [Health Systems in 2030](#), a free NEJM Catalyst virtual event held on March 4, 2021.*

Health care today is often characterized by mediocre quality, poor safety, and high costs.<sup>1</sup> Though change usually comes slowly, the Covid-19 pandemic has demonstrated that it is possible to rapidly retool our systems if there is a strong enough stimulus.<sup>2</sup> In this article, we examine the future of health care — how it should change over the next 10 years, and the key drivers to enable our systems to become learning health care systems, with improved outcomes.

## Challenges and Barriers to Current Design of Health

Despite considerable variation in health system design around the world, most countries suffer from similar gaps and challenges. Patient safety and quality have been a concern since the early

days of structured measurements.<sup>3-5</sup> Preventable harm to patients is all too common both inside and outside hospitals, and clinical practices are often not evidence based. Although these gaps have been thoroughly studied and many interventions have proven effective in small-scale implementations,<sup>6</sup> large-scale progress has been minimal.<sup>7</sup>

Modern health systems often fail to provide care that is focused on patient and family needs and expectations. Most systems can't consistently measure outcomes that matter to patients,<sup>8</sup> and can't improve their health-related quality of life and overall function. Furthermore, current health systems often can't effectively involve patients and their families in the care process or provide empathic care.<sup>9</sup>

Equitable access to health services is rarely achieved even in countries with universal health coverage.<sup>10</sup> The ongoing Covid-19 pandemic has highlighted gaps in accessibility and equity.<sup>11</sup>

Finally, economic sustainability is elusive, particularly in developed countries. Future health spending is expected to rise even further as new techniques and therapies become available.

These gaps have been present for decades, yet health care systems have failed to close them. Change will require a major redesign.

## Drivers of Change

Transformation requires strong drivers. One will be the digital health revolution. We expect digital transformation to change health care as it has changed banking and retailing.

Consumerism is growing, as people become more knowledgeable and active in their care. The health industry will need to become more person-centered, personalized, and more transparent.

Another major driver is unsustainable cost structures across the developed world, creating a "burning platform" for providers, insurers, consumers, and policy makers.

The health care workforce is facing fundamental changes. New specialties will require new health professions. Workforce shortages, seen in many countries, will force adoption of new technologies to stretch the available workers.

Covid-19 has brought about an incredible expansion of digital health, and specifically telemedicine.<sup>12,13</sup> It has also meant plunging revenues for providers and a more general global economic downturn. Both factors may make it a watershed moment for health care transformation.<sup>2,14</sup>

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Change in the U.S. is likely to happen first in regions in which there is a high proportion of accountable care and in organizations, such as Kaiser, that are responsible for the care of populations. In other parts of the world, it will occur in the organizations associated with leading institutions, as in the [UK's Global Digital Exemplars](#) program. The pace of digital transformation in organizations is likely to be limited by the number of people with training in informatics in these institutions. The extent to which organizations emphasize person-centered care may be governed by whether leadership values improvement in this area, and by regional availability of health information exchange allowing systems to take full accountability.

### *Our Health System Today, January 1, 2020*

Silvio thought of himself as generally well. He was 47, and a construction worker. Though he knew he was overweight, ate too much fast food, and avoided all kinds of exercise outside of work, he had never had any serious medical issues that he knew about. But today, his heart was racing, he was sweaty, the room spun, and he felt like he was going to die.

In the emergency room, the medical team diagnosed a dangerously high blood sugar. They delivered normal saline and insulin, and informed Silvio that he had Type 2 diabetes. Over the next few days, Silvio was started on insulin therapy and also diagnosed with high blood pressure. An abdominal CT scan revealed a 4.5 cm abdominal aortic aneurysm. A cardiac MR study confirmed coronary artery disease.

A few weeks later, Silvio had a follow-up visit with a diabetic specialist; he was going to need to radically alter his lifestyle. He had to inject himself with insulin several times daily, take multiple daily blood pressure medications, have periodic monitoring of the aortic aneurysm, and think about the possibility of cardiac intervention if his recently diagnosed coronary artery disease worsened. Silvio asked himself how all this could have happened so suddenly without his knowledge — and in this modern day and age?

## **Future Health Systems**

Silvio's story demonstrates that current health care systems are fragmented and care is uncoordinated, and far too many patients develop serious chronic health conditions before anyone notices or tries to intervene. Emerging systems must be designed around robust and accessible primary and community care, where multidisciplinary teams coordinate all health-related issues (Table 1). Systems should bear some financial risk for the health of the patients they see, to motivate them to provide more comprehensive and health-sustaining care.

Hospitals today are typically responsible for the largest portion of spending in health care, but we expect that within 10 years, care will move from the hospital into the community and the home. Three trends are accelerating this shift. First, hospital-at-home programs are growing, because they improve outcomes at lower cost and with higher patient satisfaction.<sup>15</sup> Second, personalized medicine will increasingly improve our ability to predict and prevent acute complication of chronic disease, thus preventing many hospitalizations. And third, advances in digital health will allow

**Table 1. Transition from Current Care to the Future State**

	Current State	Future State
Health care systems	Revolving around academic medical centers (AMCs) and large hospitals	Academic health systems that focus on the community and the continuum of care
	Siloed large academic medical centers in a spoke-and-hub model	Integrated delivery networks
		Care pushed out to home — both acute (hospital at home) as well as chronic care management
	Most surgery performed at AMCs	Surgery performed at community surgical centers
	Most care within hospital walls	Hospitals will provide most care remotely rather than on site
	Focus on cure (and maybe rehabilitation)	Focus on prediction and prevention
Payment systems	Pay per specific transaction (fee-for-service)	Pay by quality / outcomes
		Bundle services around an episode (bundled payment)
		Payment per population (such as accountable care organizations)
Sustainability of health services	Managed care; early attempts at value-based payments	Emphasis on prevention of disease
		Precision medicine
		Increasing role of artificial intelligence in decision-making
Care providers	Physician-driven care	Increasing role specialization
		Focus on multidisciplinary clinical teams
		Diminishing focus on physicians
Partnerships in health care	Provider organizations, health insurance, pharma, and med tech industry	Nonmedical tech giants (e.g., Google, Apple, Amazon, Microsoft)
		Education and social care providers
		Retail corporations and pharmacy chains (e.g., Walmart, CVS, Walgreens)
		Service provider industry (e.g., Uber, healthy food chains)

Source: The authors.

us to deliver hospital-level care in the home through telemedicine. The Covid-19 pandemic has accelerated this trend considerably.

Handing over the reins will be hard, especially for academic medical centers, which focus on tertiary and quaternary care and currently anchor many of our largest and most influential health care systems.

If health care systems are to evolve, they must shift both operations and leadership out of the hospital. New technologies such as augmented reality, surgical navigation, and tele-mentoring will enable procedures to shift to community surgical centers, and this shift can be accelerated by changes in reimbursement. Likewise, telemedicine services will enable clinicians to deliver chronic disease management programs not anchored to a hospital or clinic.<sup>16</sup>

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If we are to sustain health and prevent disease, we must focus on the healthy, predicting and preventing chronic illness. Non-MDs, such as nurse practitioners, genetic counselors, case managers, and health coaches, will be central to this shift. Under accountable care arrangements, providers must also address the social determinants of health, including socioeconomic status, education, the environment, employment, and social support networks. Providers and payers must extend their reach into the community and link health care with social care.

Finally, future health systems need to be learning systems, as described in the National Academy of Medicine roundtable on Evidence-based Medicine: “science, informatics, incentives, and culture are aligned for continuous improvement and innovation, with best practices seamlessly embedded in the delivery process and new knowledge captured as an integral by-product of the delivery experience.”<sup>17</sup> Current health care systems implement innovation in a linear fashion — from laboratory to clinical trials to clinical practice. Yet they often fail to deliver improved outcomes, even for innovations that were successful in the laboratory or trials.<sup>7</sup> Health systems represent complex dynamic systems, and implementation strategies need to adapt based on the change at hand as well as system characteristics.<sup>18</sup>

## Evolution of Payment Systems

As previously mentioned, payment systems will need to change so that the true product is total health, rather than care transactions. Value-based payment systems, such as accountable care organizations in the U.S., incentivize health providers to reduce waste and prevent complications. Early evidence suggests that value-based payment models can indeed reduce spending per beneficiary.<sup>19,20</sup>

As systems transition to value-based payment models, the provider will no longer benefit financially from increasing services, and instead will learn to focus on improving care (preventing complications and readmissions), and ultimately on delivering the best outcome for the patient.<sup>21</sup> Incentives will evolve during the transition period. For example, a provider performing joint replacements may initially receive higher reimbursement based on preventing surgery-related infections, but with time the payments will also be tied to the ultimate success of the procedure, as measured by the patient’s functional status and quality of life.

To focus on outcomes that matter most to patients and families, we must be able to measure those outcomes. Patient monitoring devices (such as wearable technology and ambient sensors) will let us measure functional status and mental status more accurately than we can now.<sup>22</sup>

Value-based payment will expand health organizations’ responsibility outside the hospital and clinic and into the community and the home. Today, we try to prevent falls and pressure ulcers in the hospital. Tomorrow, we will try to prevent falls and pressure ulcers at the patient’s home. This expansion will redefine health care organizations.<sup>23</sup>

With the transition to new payment models that incentivize value rather than volume, the market will require solutions that are more cost effective — delivering the same quality, yet at a lower cost.<sup>24</sup> Technical examples include wearable fitness monitors and remote sensors. A less technical

example would be walk-in services such as MinuteClinics that deliver care in convenient retail settings. Such disruptive innovations have been far too scarce to date in health care. As market rules change, so will the nature of innovation.<sup>25</sup>

## Sustainable Health

Our health care systems must reach sustainability. The costs of care have risen much more rapidly than gross national product for nearly all developed countries, partly because new technologies and treatments increase costs. However, there is no intrinsic reason why innovations can't also reduce costs, if we focus our energies in that direction.

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First, we must invest in prevention, which is often highly cost-effective compared with treatment yet gets little attention in most health care systems today. Prevention must start with primary care and patients themselves. Patient portals — their window into their electronic health record — can give guidance on weight management, physical activity, eating a healthy diet, not smoking, and not drinking to excess, though all these things must ultimately be managed by patients, with selective nudges and coaching to manage difficulties.<sup>26</sup>

Artificial intelligence (AI) and machine learning can introduce better decision-making tools. In clinical systems, they can help us determine what level of care a patient needs, and which patients would benefit most from which expensive new drug therapies.<sup>27</sup> On the administrative side, they can help us pick the best staffing level for a specific unit given the patient mix, or choose which device or implant to select for a specific procedure.

## Evolution of Provider Roles

We've seen dramatic proliferation of specialists and subspecialists over the past 50 years among physicians, surgeons, and other types of clinicians. We've seen hospitalists take over the care of inpatients. We've seen the new role of “physician scribe” to help physicians with electronic health record documentation.

Decades ago, a nurse was a nurse. Today, nurses are so specialized that expecting a nurse from mental health to provide care on the medical or surgical ward or clinic would be out of the question without additional education and oversight. In the next decade, if physician shortages occur in some areas, nurses may assume many responsibilities currently fulfilled by physicians to ensure that the care and treatment requirements can be effectively met.

Pharmacists' roles are expanding. They manage chemotherapy clinics and adjust medications for patients with chronic diseases.

Teamwork will become even more essential to ensure optimal outcomes from a plan of care. Clinicians will need to work together, rather than focusing on what has been their “traditional turf.”

Technology will take over some sections of traditional turf. Artificial intelligence, for example, will help radiologists be more efficient and accurate, with a possible outcome of fewer radiologists required. Similar transformation will likely happen in pathology. Over time, with the aid of AI, these specialties might evolve to become a new medical specialty — the medical diagnostician. There is also major redundancy in cancer care — most patients likely will not need to see an oncologist, an oncological surgeon, and a radiation oncologist, as often happens today. Changing reimbursement, AI, and advances in precision medicine will drive efficiency through consolidation and changing professional roles.

## Nontraditional Competitors and Partners

Health care within industrialized nations has been based on purpose-built sites of care, staffed by experienced professionals, according to highly regulated standards and payment models. The recent growth in consumer-based, digital-first, retail-driven and health/wellness-focused paradigms has propelled nontraditional entrants into the arena.

For example, big tech companies such as Apple, Google, and Microsoft are actively developing products and technologies to serve health systems and services. Stores such as BestBuy and Walmart are developing low-cost, convenient opportunities for health care consumption and delivery. Ancillary health care services such as medical transport, supply chain, and patient acquisition represent lucrative business opportunities for companies such as Uber, Amazon, and Salesforce.

While in many other countries primary care is considered the cornerstone of the health care system, gaps in availability of these services in the U.S. has brought about new private entrants looking to disrupt the market. Walmart’s convenient health supercenters, with an aggressive cash-pay pricing strategy of \$40 primary care visits and \$25 dental exams, not only bypass insurance companies, but also reduce administrative costs and represent a giddy ability to scale. Walmart operates 3,600 stores in the U.S. with 195 million weekly shoppers. Many Walmart stores are in rural locations where health system competition is sparse. CVS is opening 1,500 HealthHUBs, and Walgreens partnered with VillageMD to open over 500 primary care clinics. These options offer consumers convenience, price transparency, and a reasonably good patient experience.

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Traditional health systems are getting pushed aside. Fewer patients have a primary care physician, and they seek care at retail clinics as and when needed. Some health systems are improving their own offerings with a renewed focus upon patient experience, virtual care, and price transparency

apps, while others are looking to partner with the entities that are disrupting them, to maintain referrals for downstream specialist services.

It remains to be seen how the new entrants will disrupt the hospital-based model of care delivery, and more importantly, how they will support, or impede, the drive to achieve the triple aim of quality, access, and affordability for health care consumers. We should note that there are new opportunities for the health care workforce in this model: mid-level providers, health coaches, and care navigators may provide equivalent or even superior care delivery compared with their previous venues. For example, a virtual hypertension management program operated by care navigators (pharmacists and nurse practitioners) resulted in better controlled blood pressure in 87% of patients who completed the program over 6 weeks; blood pressure fell by an average of 34 mmHg/12 mmHg.<sup>28</sup>

### *The New World, January 1, 2030*

Silvio woke at 7 a.m. with help from Beto, his e-personal assistant. As Beto showed Silvio his schedule for the day, he reminded Silvio that his blood sugar levels had been on the rise these past few months. They were now at a level that needed medical attention. Silvio agreed to an appointment with his primary care physician, and Beto set an asynchronous consult with Dr. Katz. By the time Silvio was on the bus to work, Dr. Katz had already checked in with a video message to Silvio's smart glasses.

"I've been tracking the vitals and blood indices from your subdermal implantable patch and it seems like you are on your way to developing overt diabetes," Dr. Katz said. "That means we need to start on a low-glycemic index diet and make some other lifestyle changes. I have sent Beto all the details and he will be building a personal plan tailored to your daily schedule and your personal preferences. Please let me know if you have any questions. I will also connect you with our nurse practitioner who will be much more available to any issues you might want to bring up." Silvio recorded a brief message back to Dr. Katz with some questions.

On his way back home, Silvio negotiated with Beto on these new lifestyle changes. However, he was fine with most of them: since he was enrolled in his employer's healthy life incentive program, any points he collected keeping to his new healthy routines would convert to a financial bonus at the end of the year!

Silvio was happy he had agreed to have the subdermal patch placed 5 years ago. Without it, he was sure his diabetes would have been diagnosed much later, at a much more dangerous point. Maybe even requiring hospitalization . . .

## **Conclusions**

It will not be easy to get to this new world, and it will be realized faster in some places and domains than others. However, if payment systems reward organizations and practitioners for doing better, we believe they will find ways to innovate and successful innovations will spread rapidly. Some innovation will rely on digital technology and AI, but much of it will relate to leveraging the



techniques of implementation science — the scientific study of implementing research findings in practice, moving care away from hospitals, and bringing together health and social care.

We can let the market drive health system change in a fragmented, uncoordinated, and reactive way, or manage the change<sup>29</sup> in a coordinated and deliberate way to optimize the impact on patient outcomes and organization performance. We will need to take a proactive approach if we are to see these changes take shape earlier. All stakeholders — policy makers, payers, care recipients, and caregivers — must be at the table to enable and deliver effective transformation.

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## References

1. Schneider EC, Sarnak DO, Squires S, Shah A, Doty MM. Mirror, Mirror 2017: International Comparison Reflects Flaws and Opportunities for Better U.S. Health Care. The Commonwealth Fund. 2017 [cited Aug 17, 2020]. <https://interactives.commonwealthfund.org/2017/july/mirror-mirror/>.
2. Berwick DM. Choices for the “New Normal”. JAMA. 2020;323(6):2125-6
3. Brennan TA, Leape LL, Laird NM, Hebert L, Localio AR, Lawthers AG, et al. Incidence of adverse events and negligence in hospitalized patients. Results of the Harvard Medical Practice Study I. N Engl J Me. 1991;324:370-376

4. McGlynn EA, Asch SM, Adams J. The quality of health care delivered to adults in the United States. *N Engl J Med.* 2003;348(6):2635-45
5. Bates DW, Singh H. Two decades since To Err Is Human: an assessment of progress and emerging priorities in patient safety. *Health Aff (Millwood).* 2018;37(6):1736-43
6. Haynes AB, Weiser TG, Berry WR. A surgical safety checklist to reduce morbidity and mortality in a global population. *N Engl J Med.* 2009;360(6):491-9
7. Urbach DR, Govindarajan A, Saskin R, Wilton AS, Baxter NN. Introduction of surgical safety checklists in Ontario, Canada. *N Engl J Med.* 2014;370(6):1029-38
8. Black N. Patient reported outcome measures could help transform healthcare. *BMJ.*
9. Rozenblum R, Lisby M, Hockey PM. Uncovering the blind spot of patient satisfaction: an international survey. *BMJ Qual Saf.* 2011;20(6):959-65
10. Health for Everyone? Social Inequalities in Health and Health Systems. OECD Health Policy Studies. Paris: OECD Publishing, 2019. [https://www.oecd-ilibrary.org/social-issues-migration-health/health-for-everyone\\_3c8385do-en](https://www.oecd-ilibrary.org/social-issues-migration-health/health-for-everyone_3c8385do-en).
11. Berkowitz SA, Cené CW, Chatterjee A. Covid-19 and health equity — time to think big. *N Engl J Med.*
12. Webster P. Virtual health care in the era of COVID-19. *Lancet.* 2020;395(6):1180-1
13. Keesara S, Jonas A, Schulman K. Covid-19 and health care's digital revolution. *N Engl J Med.*
14. Khullar D, Bond AM, Schpero WL. Covid-19 and the financial health of US hospitals. *JAMA.* 2020;323(6):2127-8
15. Levine DM, Ouchi K, Blanchfield B. Hospital-level care at home for acutely ill adults: a randomized controlled trial. *Ann Intern Med.* 2020;172(6):77-85
16. Wootton R. Twenty years of telemedicine in chronic disease management—an evidence synthesis. *J Telemed Telecare.* 2012;18(6):211-20
17. Olson LA, Aisner D, McGinnis JM, eds. Institute of Medicine Roundtable on Evidence-Based Medicine. Washington, DC: National Academies Press, 2007.
18. Braithwaite J, Churrua K, Long JC, Ellis LA, Herkes J. When complexity science meets implementation science: a theoretical and empirical analysis of systems change. *BMC Med.*
19. Trombley MJ, Fout B, Brodsky S, McWilliams JM, Nyweide DJ, Morefield B. Early effects of an accountable care organization model for underserved areas. *N Engl J Med.* 2019;381(6):543-51
20. Barnett ML, Wilcock A, McWilliams JM. Two-year evaluation of mandatory bundled payments for joint replacement. *N Engl J Med.* 2019;380(6):252-62

21. Porter ME, Larsson S, Lee TH. Standardizing patient outcomes measurement. *N Engl J Med*. 2016;374(6):504-6
22. Münch M, Weibel R, Sofios A. MOBility assessment with modern TEChnology in older patients' real-life by the General Practitioner: the MOBITEC-GP study protocol. *BMC Public Health*.
23. Taneja H, Klasko S, Maney K. *UnHealthcare: A Manifesto for Health Assurance*. Philadelphia: Thomas Jefferson University Press, 2020.
24. Christensen CM, Bohmer R, Kenagy J. Will disruptive innovations cure health care? *Harv Bus Rev*. 2000;78(6):102-112, 199
25. Zimlichman E, Levin-Scherz J. The coming golden age of disruptive innovation in health care. *J Gen Intern Med*. 2013;28(6):865-7
26. Goetzel RZ. Do prevention or treatment services save money? The wrong debate. *Health Aff (Millwood)*. 2009;28(6):37-41
27. Bates DW, Saria S, Ohno-Machado L, Shah A, Escobar G. Big data in health care: using analytics to identify and manage high-risk and high-cost patients. *Health Aff (Millwood)*. 2014;33(6):1123-31
28. Fisher N, Smolinsky L, Pagliaro J. Brigham protocol-based hypertension optimization program (bp-hop). *J Am Coll Cardiol*.
29. Kanter RM. Ten Reasons People Resist Change. *Harv Bus Rev*.