McKinsey & Company

Healthcare Systems and Services Practice

The era of exponential improvement in healthcare?

Executive Summary

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May 2019

Healthcare advances have delivered great benefits to society, bringing material improvements in average life spans and quality of life.[1] Yet these improvements have come at a cost—an ever-expanding portion of the US GDP is being consumed by healthcare expenses.[2] Could technology, enabling delivery of healthcare advances while improving affordability, be part of the solution? We have reviewed the evidence, done the math, and identified technology-enabled use cases that could create between $350 billion and $410 billion in annual value by 2025 (out of the $5.34 trillion in healthcare spending projected for that year[3]).

Technology-driven progress can be quite expensive in the early days as initial R&D costs are amortized. The next five to seven years are likely to require a sustained upshift in investment to unlock the potential of these assets, and the strategies used to pursue this potential could have significant effects on both their effectiveness and rate of adoption. Once progress gets underway and the exponential improvements seen typically with information and communication technologies take root, at-scale costs could drop rapidly. For instance, the cost of genome sequencing has dropped significantly over the past decade and a half.

Emerging technologies are reshaping healthcare in multiple ways—how consumers access it, how and which providers deliver it, and what health outcomes it achieves. We identify nine emerging technologies: connected and cognitive devices, electroceuticals, targeted and personalized medicine, robotics, 3D printing, big data and analytics, artificial intelligence, blockchain, and robotic process automation. Some of these innovations are specific to healthcare; others are more advanced in nonhealthcare sectors but hold tremendous potential in healthcare. Use cases and sources of value from these emerging technologies do not exist in isolation. Innovators are considering how to integrate them and deliver transformative change.

As we look toward the future of healthcare, there are four industry-level changes that could disrupt healthcare value pools as they exist today: modernized transaction and data infrastructure; radically more efficient medical supply chain; faster, more effective therapy development; and new, personalized, and intuitive healthcare ecosystems.

Perhaps the most significant change could be the creation of intuitive and personalized ecosystems of care centered around patients and their families, into which their community of medical and social caregivers would be integrated. Such ecosystems would make possible the delivery of the right type and amount of care, in the right setting, at the right time. The ecosystems could be enabled by a combination of:

— *holistic and longitudinal patient data sets* to integrate today's fragmented information from social systems, financial resources and systems, home-care and self-care monitoring, activities of daily life, and traditional modalities of care,

— *advanced analytics and AI personalization engines* to generate insights for patients and their community of caregivers,

— *continuum of care interaction models*, ranging from digital solutions to close-to-home services to traditional facilities, based on individual needs,

— *device-enabled, autonomous care* and cognitive engagement,

— *real-time refinement of individualized care solutions* and cognitive engagement through an AI-enabled interaction medium, and

— *seamless integration of monitoring and care* from clinical caregivers, social and community structures, and family members.

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[1] For the past three years, life expectancy has declined, largely because of a broader set of behavioral health issues. (See Murphy SL et al. Mortality in the United States, 2017. National Center for Health Statistics Data Brief, no. 328. November 2018. cdc.gov.)
[2] See Exhibit 1 in Singhal S, Coe E. The next imperatives for US healthcare. McKinsey white paper. November 2016.
[3] Office of the Actuaries in the Centers for Medicare & Medicaid Services. National health expenditure projections, 2018–2027. cms.gov.

We are aware that predictions of healthcare disruption have been made for decades. And that traditional healthcare dynamics—resulting from ingrained consumer mindsets, highly-trained clinician behaviors, entrenched stakeholder interests, a complex regulatory framework, and the fragmented nature of the market—have affected and may continue to affect adoption of progress.

Realizing this value will require disruptors—incumbents and attackers alike—to understand the technologies available today, develop clear ways to use the technologies with evidence for how they will create value, implement effective human change management strategies, and execute disciplined implementation plans. Whether they do so will answer the question of whether we are entering an era of technology-enabled disruption in healthcare.

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