Chapter 15
Digital Health Trends

Check for updates

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Meet Alex. He's 42 years old and seemingly healthy. When walking his dog, Alex is alerted about a deviation in his health condition by his wearable device and advised to see a doctor. He schedules an appointment with his family physician in one click using his smart phone. The physician reviews Alex's patient history, including the most recent information from his wearable device, performs an examination and advises Alex to see a cardiologist. Using a registry of ranking specialists, Alex receives recommendations based on his personal preference and schedules an appointment. By giving the cardiologist access to Alex's patient history, Alex enables her to review all relevant information prior to the appointment. After her examination, the specialist adds her diagnosis to Alex's patient history. Comparing Alex's patient profile against a large set of patients with the same disease and similar health profiles, she can predict that the standard surgery for this disease would be risky for Alex. The analysis shows that for Alex's specific case, a certain drug can be expected to provide the best outcomes. Because Alex has given his consent to mapping his profile against ongoing clinical studies, he is matched to a clinical trial that has shown positive results and fewer side effects than with current drugs on the market. Alex decides to enroll in the clinical trial to benefit from the new drug and to contribute his data to the research study. As part of the trial, Alex downloads an app to track specific health parameters. He uses his monitoring device to manage his physical activity, and resumes life as before, knowing that he will be notified if anything urgent arises. Meanwhile, the smart care team consisting of doctors and supporting professionals remotely monitor Alex's progress in real time through the information provided by his wearable device. They use this information to advise him on his daily plan, if necessary, and motivate Alex to continue on his prescriptions and follow his health plan. Alex has also given his consent for his data to be used by researchers

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in different organizations for the creation of new drugs and the adaption of drugs in order to help improve the lives of patients just like him.

This is the patient journey in the digital age!

With 10 billion people—that's the global population projected by 2050, and with many enjoying longer lives—the services required by healthcare systems will have to adapt and grow. No one can be certain how the industry will evolve, but with new challenges come exciting solutions. What we can be certain of is that future trends will be driven by unprecedented access to big data and a greater involvement by the patient or healthcare consumer in shaping those services to their greater benefit.

Digitalization has reached every aspect of life today and is about to change how we as a society provide and consume healthcare services. Breakthrough technologies, such as the Internet of Things, artificial intelligence, blockchain, and cloud computing, have matured and are finding broader adoption in the healthcare world. Advancements in medical technology, such as genomics, health wearables, and sensors, show increasing success in medicine. And research around nanomedicine, robotics, and medical 3D printing is promising to deliver targeted, precise, and timely healthcare services.

This new era of true digital connection is giving people greater access to health information and resources. The convergence of three main drivers is the catalyst for many healthcare organizations to start their digital transformation, with the goal to create more value for patients along the continuum of care:

- Cost pressures, demographics, and the rise of chronic diseases
- A digital, empowered, "connected" patient, who shares valuable data with the wider community
- The emergence of digital technology and advanced medical devices, sensors, and wearables for extended monitoring and prevention and more fact-based care decisions

To respond to those driving forces and capitalize on the opportunities that digitalization brings along, the traditional healthcare value chain is evolving towards a digital healthcare network. This network connects patients, professionals, and providers in real time for more responsive, patient-centric care. The digital healthcare network will be the foundation for a new, consumer-centric healthcare system in which stakeholders respond more and more to mutual, shared challenges. Its open platform for communication and integration will enable shared, connected, and fluid data among all network participants.

The transition to digital healthcare offers many opportunities for both established organizations as well as new players. All future healthcare services will need to be designed in a way that promotes the following concepts:

- Value-based care: adapting structures focusing on optimal patient outcomes at the lowest possible cost
- Patient engagement: encouraging patients to take a more responsible role in disease management and prevention

- Personalized medicine: gaining groundbreaking insights into the human body at unprecedented, highly granular levels
- Participatory research and clinical trials: including more stakeholders and a higher number of participants
- Balanced demand and supply: optimizing service offerings and eliminating waste with real-time insight and predictive

Strategic Objectives Analysis

Current healthcare models are not sustainable. For digital transformation to have a maximal impact on creating more value in healthcare, it will require quick and ongoing adaptations by healthcare providers, insurers, and life sciences organizations. What is emerging is a healthcare ecosystem, moving beyond traditional hierarchies, in which all healthcare shareholders participate and benefit. Leaders will be inspired to re-evaluate business models, business processes, and workforce structures to meet key strategic objectives, including:

- *Enhancing the patient experience*: Every patient is a consumer, and consumer expectations are bleeding into healthcare. Digital technology is changing the traditional role of patients, enabling better-informed choices regarding health and well-being. Patients can more readily access health information and diagnose their own conditions or easily obtain test results and even receive better treatment. *How can we meet the expectations of the new healthcare consumers?*
- *Optimizing outcomes for each individual patient*: Today's patients need to see value from the insight into options they have for their specific health issues, based on key performance indicators and assessments of other patients facing similar circumstances. Pure statistics are not meaningful. The demonstrated outcomes must be specifically relevant to the individual patient and his or her particular context. *How do we provide healthcare services with optimized outcomes for each individual patient?*
- *Empowering healthcare workers*: Complexity is the enemy of workforce empowerment. It can drive up costs and slow down progress. New digital tools enable the workforce to reevaluate how they work and get the most out of their professional training, freeing them from paperwork to focus on patient care. *How can we restructure and empower our workforces to allow them to perform at their best?*
- *Increasing their organization's operational efficiency*: Providers are under constant cost pressures and resource constraints. A next-generation digital core will be the foundation for a smarter business—leveraging Internet of Things (IoT) and machine learning for higher automation and offering cockpits with embedded analytics, prediction, and simulation to ensure a more agile nervous system for the entire organization. *How do we remove unnecessary cost and waste and free resources for innovation and better patient care?*

- *Applying data-driven clinical innovations*: The most dramatic change in the digital economy will be driven by hyperconnectivity and Big Data science. These will transform nearly every business model in healthcare. The ability to monitor patients, collect health data, and react early to, or even predict, medical conditions, independent from physical constraints, will massively change the healthcare value chain and the way healthcare professionals deliver care to their patients. *How can we move from a mainly experience-based healthcare model to delivering personalized medicine based on real-world evidence?*

The starting point of the digital journey is the ability to reimagine everything. To help you reimagine your organization, you can think along three core dimensions: business models, business processes, and work environment. These dimensions can be evaluated by using the concept of value-based care and asking two basic questions:

- Are we improving patient outcomes?
- Are we reducing costs?

Business Model Trends

Healthcare is evolving from the optimization of single providers to building a community of specialists that collaborates in a wider ecosystem. By harnessing the flexibility of digital and, in particular, cloud-based solutions, the healthcare industry can find new ways to help professionals and consumers jointly create more comprehensive, patient-centric, and cost-effective healthcare.

Digital technology provides an opportunity to *integrate the care continuum* to elevate quality of care and health consumer interaction by orchestrating one-dimensional, single-step care providers into communities of care. The goal is to ensure targeted and personalized responses across the spectrum of service providers. Digital services can help patients navigate the healthcare system, foster prevention and manage chronic diseases, and empower them to take an active role in monitoring and and managing their health. Real-time analytics can provide insights into the population and trends and help clinicians and researchers make good decisions atthe moment of necessity.

Healthcare providers can lead in patient outcomes through *specialization* rather than offering a wide selection of services. To adopt this business model, organizations need to know their key strengths (such as units leading in patient outcomes), and identify noncore services to shed. This could include investing in clinical research, attracting new patients seeking specialized, highquality care, leveraging economies of scale through a higher volume and exchanging specialized knowledge within the ecosystem.

By harnessing digital technologies and electronic medical records from various sources, clinics can unveil new clinical insights from large populations beyond traditional clinical trials. This will help inform patient care with lessons learned from

previous cases, optimize and personalize clinical treatment and increase transparency of clinical outcomes.

Connectivity also enables providers to offer innovative healthcare services to address the needs of the new healthcare consumers by leveraging new channels and acessing new market segments like corporate health to help companies keep the workforce healthy and productive, medical tourism aimed at offering high-quality, specialized services at attractive prices to patients willing to get healthcare abroad and retail healthcare which will offer standard services at convenient locations and office hours.

Leveraging real-time digital platforms will also create opportunities aimed at eliminating inefficiencies in healthcare delivery by brokering resources within healthcare networks. Stakeholders can connect beyond traditional channels to match supply and demand better using the digital age to close the gap. These would include amongst others, optimizing appointments.

Business Process Trends

With new business models opening the doors to increased collaboration across the digital healthcare network, processes are arising that provide solutions at every stage of healthcare—preventative, curative, and educational.

Digital technologies, such as sensors and mobile devices, help the patient and the care team to monitor conditions and behavior in real time and react faster and more effectively. We will thus be able to create effective preventive healthcare by empowering and motivating patients to take responsibility for their health. Engaging patients in disease prevention will result in better health outcomes.

With digitalized solutions, healthcare professionals can underpin clinical decisions and diagnostics with real-world evidence. They can gain new insights into our physiology, biology, and anatomy. By sharing health information over the digital health network and combining it with relevant clinical research, we can rely less on experienced-based medicine and find the root causes of diseases [1]. This includes:

- Outsourcing of highly specialized diagnostics
- Identifying and accessing relevant clinical research
- Eliminating duplicate testing
- Making patients a trusted source of valuable health information

Remote patient monitoring is among the top ten use cases that will drive IoT growth through 2020 across all industries [2]. Through delivery of telemedicine services with digital and interactive technologies, organizations can virtualize care venues, continuously track relevant biological signals, and facilitate early detection and prediction of health issues—extending their impact beyond traditional borders.

Digital technology will also help us meet health consumer expectations for individualized care. Medication and treatment can be tailored to each patient, promising

better health outcomes, for example, by matching doses and active ingredients to individual genetic profiles rather than the general population. Leveraging the digital healthcare network, patients and providers will jointly define actionable health plans, agree on individual health goals, and use technology to monitor progress and react to deviations in real time.

When live data from all critical resource categories becomes available in the digital healthcare network, physical assets, care teams, and the patient can be planned simultaneously, even across organizational borders. Data capture can be automated through machine-to-machine communication and connected medical devices in real time. Advanced resource planning combines actual status with simulations and what-if scenarios thereby enabling us to manage resources smartly, efficiently, and in real time.

Connectivity also empowers the workforce with real-time insights and communication. Organizations can enjoy full transparency and real-time insights into all care activities and across all care team roles and care venues. New technology makes it possible to eliminate repetitive hand-over of tasks and error prone manual transmission of information. Lightweight, enterprise-grade communication tools provide professionals the same level of convenience they experience in their private lives.

The Future of the Work Environment

People working in healthcare do so because they feel it is their calling, even a dream job. Yet the burgeoning healthcare infrastructure prohibits them from giving hands-on, effective care. With digital technology, they will find new opportunities to do their job better and grow in their profession. They will also be able to actively contribute to the solutions of the future, creating the next cycle of proactive care.

In the new digital healthcare network, a physician's responsibilities will go beyond one-off diagnostics to include advising and coordinating along the continuum of care. Access to relevant clinical and research information combined with advanced clinical decision-support systems will help empower physicians to evolve into a new role of trusted facilitator. Whether rule-based or through insights from smart data, the digital health network will provide a new level of clinical decision support to healthcare stakeholders to make the best decision for each patient based on real-world evidence thereby driving better outcomes.

Human interaction will continue to be key in healthcare. Digitalization will enrich this interaction for better patient outcomes and more efficient deployment of scarce medical resources. Supporting technology, such as sensors, speech recognition, and automated documentation, releases nurses from traditional, routine tasks, freeing them up for more time with patients. They can focus on value adding activities, such as interaction, providing advice, and planning recovery, making for an improved patient experience.

Employers aim to create work environments that foster open communication across specialties. Mutual knowledge sharing based on proven patient outcomes will create a new generation that questions hierarchies and assumes shared responsibility. Digitisation encourages and faciltates the easy formation of collaborative and cross-functional care teams that then create clear and patient-centric key performance indicators.

Applying data-driven innovations will also extend and accelerate clinical research. Researchers use real-time analysis of clinical and genomic data, ranging from large patient cohorts down to the individual, anonymized patient. This capability allows researchers to validate hypotheses instantly and ask the best follow-up research question based on the results. Breakthrough research results can be generated in hours rather than years.

Redesigned applications enriched with machine learning and embedded analytics will not only automate back office processes, like patient billing. They will also relieve your workforce from related tedious routine tasks and help to overcome knowledge silos across departments. The automation of processes will result in smart and efficient operations.

Conclusion

Digital health has become synonymous with disruptive innovation in health care. Proponents say it has the power to transform every aspect of health and health care delivery, from improving patients' health status to the process of paying for a medical procedure. Despite that promise, digital health has yet to become ubiquitous in the U.S. health care system.

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