



**Hewlett Packard  
Enterprise**

Industry overview

# A DIGITAL PRESCRIPTION FOR HEALTHCARE'S TECHNOLOGY CHALLENGES

HPE GreenLake edge-to-cloud platform for healthcare







### Global trends in healthcare demand

- In 2018, for the first time in history, adults aged 65 or older outnumbered children under five years of age globally.<sup>3</sup>
- Worldwide, the total number of adults aged 80 years or older is projected to triple from 2019 to 2050, from 143 million to 426 million.<sup>3</sup>
- Within all demographics, chronic illness is on the rise. For example, urbanization, dietary changes, and an increase in sedentary lifestyles have led to the globalization of diabetes.<sup>4</sup>
- According to the World Health Organization, obesity has grown to epidemic proportions, with more than 4 million people dying each year as a result of being overweight or obese in 2017.<sup>4</sup>

## INTRODUCTION

The global COVID-19 pandemic has been a disruption unprecedented in our lifetimes, and healthcare providers around the world have been sorely tested. But challenges within the industry were visible long before the novel coronavirus emerged.

Demographic trends—such as aging populations across the developed world and a rapid worldwide increase in the prevalence of chronic diseases like obesity and diabetes—have led to a significant rise in the demand for healthcare. But there is a growing shortage of talent: The World Health Organization projects that the world will face a shortfall of nearly 18 million healthcare workers by 2030.<sup>1</sup>

It's not just a question of human resources. As medical costs continue to increase in advanced economies, the financial sustainability of healthcare is also in question. The Organization for Economic Co-operation and Development is forecasting that health expenditures will outpace GDP growth over the next 15 years, averaging 10.2% of GDP by 2030 (from an average of 8.8% in 2018, when the United States spent 16.9%).<sup>2</sup>

Large variations in the availability and delivery of healthcare are also apparent—across nations and within their borders. Public policy solutions also vary widely, with regulatory environments, payment and reimbursement systems, and disparate political contexts further fragmenting the industry.

The healthcare industry's immense promise and performance are matched by its liabilities. And as we've seen with COVID-19, the burden is felt most at the front lines: by the medical professionals, public and private hospitals, and health systems.

The need to deliver better care and better outcomes at a sustainable cost is obvious. Healthcare models must maximize the efficiency of physicians and other medical providers—making the most of their time—without compromising the effectiveness or the experience of the care they provide. And the ability of healthcare organizations to thrive in an economically complex industry that often combines non-profit structures with intense, expensive competition for both patients and staff is critical to institutional health.

For research institutions, there's additional pressure, with basic and clinical research plus clinical trials adding further responsibility and resource demand without patient-care reimbursement.

<sup>1</sup> [who.int/health-topics/health-workforce](https://www.who.int/health-topics/health-workforce)

<sup>2</sup> [oecd.org/health/health-at-a-glance-19991312.htm](https://www.oecd.org/health/health-at-a-glance-19991312.htm)

<sup>3</sup> [who.int/gho/health\\_financing/health\\_expenditure/en/](https://www.who.int/gho/health_financing/health_expenditure/en/)

<sup>4</sup> [who.int/health-topics/obesity](https://www.who.int/health-topics/obesity)





Healthcare is in dire need of transformative advancement. One key element? Empowering, adopting, and embracing IT innovations that can improve healthcare delivery efficiency, empower better outcomes, and help turn the raw data you collect into the insights that fuel new medical understanding.

## **TRANSFORMATIONAL OPPORTUNITY**

### **The Electronic Health Record**

With no shortage of challenges to successful healthcare delivery, the next question is what to address, and how and where to begin. One area with broad potential effect and opportunity is the Electronic Health Record, or EHR.

EHRs are not a new concept. In the United States, their initial adoption was in no small part the result of a series of strategic incentives provided by the federal Centers for Medicare & Medicaid Services (CMS). By tying care reimbursement to the adoption of EHR, care providers were incentivized to move quickly to adopt digital medical records for their patients—and private payers such as insurance companies were quick to sign on. Physicians and other caregivers had, for the first time, digital access to their patients' health records at their fingertips. Many took to the systems with enthusiasm, entering examination notes and results directly into patients' EHRs through laptops or other terminals in examining rooms and other patient-care spaces.

But this first wave was far from seamless. The promise of greater efficiency through, for instance, the elimination of paper charts, argued for increased patient loads—but caregivers quickly found that EHR systems weren't necessarily saving them time. Their workloads increased, with longer hours and diminished patient experience.

The proliferation of EHR platforms was another stumbling block. In the United States alone, some 1,100 different vendors offer some version of EHR management software. In an industry rife with acquisition and consolidation, it's not uncommon to find a single organization having to mediate among multiple EHR platforms—with all the attendant challenges of compatibility, consistency, and interoperability. If it's difficult to master a single platform, imagine the challenge of having to master several and move among them repeatedly over the course of the day.

The next generation of EHR promises to address many of these challenges. Today's leading platforms (from companies such as Epic, Cerner, Meditech, and Allscripts) are designed not only to empower improved clinical, operational, and financial outcomes, but also to deliver a greatly improved experience for caregivers and their patients. Efficiency is matched by transparency; ease of communication between caregivers and patients is paired with robust protections for privacy and advanced data security.







### The future of patient experience

The foundation for a strategic evolution of the patient-care experience is in the combination of a next-generation EHR platform with the flexible, scalable compute and storage infrastructure needed to support it. Telehealth (already a major push even before the COVID-19 pandemic) is delivering on the promise to become a lasting—and major—element of the care model. App-based care—including both self-driven and automated health monitoring, and remote consultation—is another promising front, aligning the power of mobile technology, the security and portability of EHR data, and consumer demand for convenience and immediacy in a single package.

Further, these next-gen platforms are an essential part of the transition from fee-for-service to value-based care—certainly for their integration with payers' reimbursement mechanisms, but more important, for their ability to power data-driven, outcome-focused workflows by streamlining and optimizing care decisions and delivery to create the best patient outcomes.

### Electronic Health Record technological requirements

For most healthcare providers, legacy IT infrastructure is inadequate to support the next generation of EHR. Many discover the need to significantly expand the powerful database management systems required to support their growing EHR platforms and healthcare application ecosystems. The necessary new resources can include high-performance modular servers such as HPE Superdome Flex (designed for scale-up and scale-out capacity) as well as composable infrastructure platforms such as the HPE Synergy family. Hyperconverged solutions are another frequent addition, including platforms like HPE SimpliVity or, for users seeking a choice of hypervisors, the HPE ProLiant DL series of servers.

## BIGGER DATA

If medical decisions are to be driven by data—from treatment recommendations based in statistical effectiveness, to the diagnostic clarity of ultra-high-resolution digital imaging, to the predictive power of genetic testing—the accessibility and availability of that data is imperative. And when a healthcare institution's rapid annual production of new patient medical data is best measured in petabytes, the need for robust, scalable, secure data storage and access is both obvious and daunting.

To use imaging as just one example, a multi-specialty healthcare institution's picture archiving and communication system (PACS) must store each patient's scans (x-rays, CT scans, MRI, and so forth) securely and permanently—while also making them readily available for physician and specialist review and sharing.

This dual challenge—storage and access—combined with the one-way street of constantly increasing volumes of data means that identifying and deploying the right data storage, access, and backup solution for healthcare is a high-stakes, high-complexity challenge.





### **Bigger Data technological requirements**

The sheer volume, unpredictability of growth, and complexity of data—from radiology, cardiology, and wound center imaging to videos from sleep studies, gait studies, surgeries, and more—that healthcare institutions must store and manage can be daunting. Public cloud options can be tempting, but data sovereignty, security, and privacy regulations in many jurisdictions can complicate provisioning. In addition, the cost of accessing data from public cloud repositories can quickly add up.

On-premises storage (which may technically be in the organization's data center or a co-located facility) is often a better solution. Storage can be provisioned to meet different levels of needed availability, and to suit differing levels of criticality. HPE Nimble Storage Adaptive Flash Arrays are a strong starting point, suitable for primary and secondary flash workloads, and with integrated HPE InfoSight analytics capabilities, they can predict and prevent issues across the entire storage environment. In addition, features such as intelligent deduplication can deliver exceptional storage efficiency—helping to maximize storage hardware capacity.

## **POWERING GENOMIC MEDICINE**

The technological challenges of leading healthcare institutions are not limited to simply enabling the delivery of today's standard of care. Where research is part of their mission, these institutions—including medical schools and the academic medical centers where their faculties practice and conduct research—must provide the technological backbone to support scientific and medical advancement.

A major focus of such research (in the lab as well as in clinical trials) is genomic medicine. Loosely defined, this means using insights about an individual patient's unique genetic code to influence decisions about the patient's care. Also referred to as "precision medicine" or "personalized medicine," such genetic insight can be used to tailor a course of treatment or even to design a therapy that's unique to the patient's DNA.

While DNA sequencing has become almost routine, the task of making sense of it is anything but. The ability to aggregate, compare, and analyze huge volumes of DNA data—essentially mining for insights by searching for patterns and correlations within that data—requires massive computing power: specifically, artificial intelligence (AI) and its sub-category machine learning (ML). The technology stack required to support this type of work differs in important ways from general-purpose compute.







### **Genomic Medicine technological requirements**

Operationalizing a machine-learning environment can require combined hardware/software solutions—supporting containerization and self-service resource provisioning for research and development environments, and powering those environments with high-accessibility data storage and high-performance compute resources.

The HPE Apollo 6500 Gen10 platform is a prime example. Configured specifically for machine-learning and deep-learning environments, it supports high-performance GPU processing with fast interconnect and high bandwidth fabric, and it comes packaged with ten popular app images.

HPE Ezmeral for ML Ops expands the HPE offering into the software space, helping standardize processes and streamline operations through a container-based approach.

### **HPE GREENLAKE PLATFORM: INNOVATION IN DELIVERY**

While the essential role of technology in powering healthcare is not in question, there are factors in the healthcare context that can make technology investment and advancement particularly challenging.

Many healthcare institutions—even those that are household names—operate on a not-for-profit basis. This can mean that not only are financial resources scarce and competitively allocated, but the decision-making process for capital investments is often extended and complex. Further, the relationship between information technology and medicine can be strained. Physicians' attitudes toward technology and its importance are notoriously inconsistent, and with senior medical leadership often driving decision-making at the executive level, technology adoption can be slow (if not reluctant).

Consumption-based models are increasingly seen as a way for healthcare institutions to navigate these challenges—avoiding up-front capital expenditures while increasing agility and accelerating digital innovation, and paying for IT resources only as they are consumed.





## HEALTHCARE IT AS A SERVICE

HPE GreenLake platform is an as-a-service approach that's enabling businesses and organizations worldwide to adopt transformative technology faster and simplify their operations. It delivers infrastructure as-a-service and a cloud-like experience for a variety of workloads—on-premises, fully managed, and in a pay-per-use model. Because these services are maintained by HPE experts, healthcare providers can not only benefit from the latest technologies, but also reduce the time IT personnel spend on routine management tasks.

Leading healthcare providers are already adopting the HPE GreenLake approach. [Prisma Health](#) turned to HPE GreenLake platform to support the growth of their mission-critical Epic EHR system, resulting in increased flexibility and stability for patient-care excellence.

"We chose HPE because of the reliability of their equipment and their ability to help us work around operational issues and help tailor our SLAs with this conversion environment," says Greg Johnson, IT Manager of Systems Engineering. "We liked HPE GreenLake because it allowed us to expand quickly and react to our needs. With this environment, we have multiple data centers running active. It reduces downtime, increases performance, and gives overall better patient care."

### Consumption and cost transparency

Healthcare IT managers can gain visibility and control across their entire hybrid cloud estate with HPE GreenLake Central. This self-service platform centralizes operations and provides detailed dashboard views of resource consumption, system performance, compliance status, and cost.

## UPGRADE AND ADAPTATION

Many healthcare providers face an exponential increase in the scale and velocity of data being generated by new medical technologies, with existing IT infrastructure that simply was not designed for their current demand. [Flevoziekenhuis in the Netherlands](#) called upon HPE when it became clear that their aging IT storage infrastructure could no longer provide the speed and intelligence needed to manage the data growth their hospital was experiencing.

"Our as-a-service experience with HPE gave us the flexibility to plan for what we really needed," says Lex Pater, ICT Manager for Flevoziekenhuis. "It meant we could incorporate our actual storage needs into our annual budget instead of reacting to peaks every three-to-five years."

### Performance and compliance

For the healthcare industry in particular, the cloud-like agility of the HPE GreenLake platform means better data sovereignty, security, and performance with the benefits of on-premises infrastructure. These factors, along with the pay-per-use IT model, were essential for [San Vicente Fundación Hospital](#) in Colombia when they were seeking greater efficiencies in their SAP® system to speed up access to data and response times. Using a portfolio of HPE services, including the HPE GreenLake platform, has enabled the hospital to run critical operations and power its end-to-end processes across patient care and support services.

"The new solution has achieved the performance, stability, reliability, and compliance required by the hospital," says Edwin Jose Flórez Osorno, ICT Analyst, San Vicente Fundación Hospital.



## AGILITY AND ALIGNMENT

By focusing on business drivers, not IT requirements, the HPE GreenLake platform promotes competitive advantage and agility during mergers and acquisitions. When [Mohawk Valley Hospital System](#) had a year to consolidate two hospitals and four EMRs into one, a secure, compliant, and robust digital foundation was provided through HPE GreenLake.

“We were very skeptical of HPE GreenLake initially, but then we saw that it was so much more,” says Ed Hildreth, Manager of IT Distributed Systems, Mohawk Valley Health System. “Licensing, customization, and support, all bundled. At the end of the day, our CFO wants a predictable cost model and a 100% uptime in the system. HPE GreenLake gave us all of that. Our CIO has not stopped bragging about it ever since. He’s just so proud of the performance and uptime we’ve achieved.”

## WANT TO LEARN MORE ABOUT HOW HPE GREENLAKE PLATFORM CAN DELIVER EXCEPTIONAL OUTCOMES?

View the [HPE GreenLake overview](#)

### Learn more about how the HPE GreenLake platform supports specific workloads:

[General Purpose Compute](#)

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[ML Ops](#)

[General Purpose Storage](#)

[Business Critical Storage](#)

[Data Protection](#)

### Unlock value from your existing IT infrastructure assets

Making the transition to a new business model may seem daunting, but HPE Financial Services can help. We offer solutions to help fund your business transformation—recovering value from your current assets and streamlining the IT asset retirement process as you transition to HPE GreenLake. We also prioritize reuse over recycling, keeping technology in use for as long as possible, and leverage our world-class asset management capabilities to maximize recovery. With revenue sharing capabilities, this circular-economy approach delivers tangible benefits to the environment as well as your organization’s bottom line.

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