

Better insights driving better health outcomes



Table of contents

Introduction: Unlock healthcare innovation in the cloud.....	3
Accelerate healthcare transformation.....	5
Enable seamless care delivery.....	8
Fuel healthcare innovation for better patient outcomes.....	11
Develop national and regional strategies that improve access and equity.....	13
Leverage new innovations like multi-omic analysis and generative AI.....	15

Introduction

In the era of personalized care, the quantity of healthcare data is rapidly increasing. This vast amount of data is critical to delivering on the promise of personalized healthcare; however, most organizations still struggle to unlock the full value of their data, with up to 97 percent of data going unused because it's trapped in silos or is in an inaccessible format.¹ Many report spending up to 80 percent of their time finding, procuring, and cleaning data, limiting the time available for answering research, clinical, or business questions.²

Additionally, data from instruments and medical devices may need to be accessed and shared with other providers or researchers to facilitate clinical collaborations and inform treatment plans. And once this data has been aggregated, organizations also need a secure and compliant way to democratize data access.

Up to

40 exabytes

of genomics data is expected to be generated in the next 10 years.³

¹ World Economic Forum [4 ways data is improving healthcare](#) December 5, 2019

² Medium [A Data Cleaning Journey](#) July 29, 2021

³ National Human Genome Research Institute [Fact Sheet](#) 2022



INTRODUCTION

Unlock healthcare innovation in the cloud

To solve these growing data challenges and create a holistic view of a patient, Amazon Web Services (AWS) is helping healthcare organizations leverage the cloud with purpose-built services such as **AWS HealthLake**, **AWS HealthImaging**, and **AWS HealthScribe**, which automatically normalize, index, structure, and analyze data.

New innovations like **multi-omic analysis** and **generative artificial intelligence (AI)** are helping to drive new discoveries, create efficiencies, and speed diagnosis. And **document classification**, **natural language understanding**, and **speech-to-text technologies** are simplifying processes to save time, reduce hospital waste, and decrease clinician burnout.

This ebook explores how leading healthcare organizations are using the cloud to create insights and processes that can address healthcare inequities, increase workforce satisfaction, streamline operations, and ultimately improve patient outcomes.



Accelerate healthcare transformation

Healthcare transformation starts with migrating critical systems like electronic health records (EHR) and medical imaging data to the cloud. With AWS, your organization has access to tools, services, and solutions that can make this effort easier, faster, and more secure, allowing you to streamline patient care, control costs, and improve clinician experiences.

95%

of healthcare providers plan to migrate over half their applications to the cloud within the next three years⁴

⁴ AWS blog [Accelerate healthcare transformation with cloudsolutions](#) June 13, 2023



Tufts Medicine realizes the full value of EHR in a digital health environment

Tufts Medicine wanted to modernize its healthcare technology to provide better care for patients by leaving traditional data centers and liberating the organization from technical debt. Tufts implemented a new EHR system and migrated 42 integrated third-party applications to AWS in just 14 months. Additionally, Tufts used [Amazon Connect](#) to power its contact center and [Amazon Lex](#) to create a patient chatbot, helping to enhance the patient experience and increase patient and clinician satisfaction. Patients are now able to communicate through a portal to caregivers, request prescriptions, access test results, and manage appointments in three languages.

With AWS, Tufts Medicine:

- Streamlined patient access through a single portal
- Transferred 4 million patient records to initialize EHR in the cloud
- Improved the patient experience, systems response, workflow, consistency, and employee satisfaction
- Continues to migrate its 800-application portfolio to AWS

[Read more >](#)

TuftsMedicine



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Using AWS, our goal at Tufts Medicine is not only to redefine healthcare, but to reinvent the way that it is delivered.”

Dr. Shafiq Rab
Chief Data Officer, System Chief
Information Officer, and
Executive Vice President
Tufts Medicine

While migrating data is a critical first step, healthcare transformation also requires healthcare organizations to ensure business continuity and access to critical healthcare data at all times, even during natural or human-made disasters. For more than 15 years, organizations have trusted AWS to raise their security posture, comply with regulations, and ensure access to critical data in times of disaster.

CalvertHealth improves EHR system resilience and shortens recovery time

CalvertHealth, a rural Maryland hospital, faced serious disaster recovery challenges due to its remote location and susceptibility to natural disasters. To address these issues, CalvertHealth collaborated with AWS and AWS Partner Healthcare Triangle to identify solutions that would reduce the EHR system's recovery time objective (RTO) and recovery point objective (RPO).

With AWS and Healthcare Triangle, CalvertHealth:

- Created resiliency in the EHR system
- Reduced disaster recovery time by 97%, from 72 hours to under 2 hours
- Improved staff morale and confidence in the system
- Reduced potential revenue losses caused by reputation damage

[Read more >](#)



97%

CalvertHealth reduced disaster recovery time by 97% with AWS and AWS Partner Healthcare Triangle

Enable seamless care delivery

Discover new ways to not only improve care, but also offer services that make you stand out. By incorporating state-of-the-art technologies like remote monitoring applications, telehealth, and wearables, you can innovate faster, improve outcomes, and drive new revenue streams. With AWS, you'll find the technology you need—like [AWS HealthScribe](#), [Amazon Comprehend Medical](#), and [Amazon Bedrock](#)—that disappears into the background so you can focus on your patients.

AWS HEALTHSCRIBE

Empower clinicians to quickly complete documentation with AI-generated clinical notes that are easier to validate for accuracy and finalize.

[Learn more >](#)



Houston Methodist transforms patient care with clinical voice technology

For hospitals that are part of Houston Methodist, completing electronic medical records was a click-heavy process that sidetracked medical staff from providing patient care. By partnering with AWS and AWS Partner Pariveda Solutions, Houston Methodist created speech recognition and voice-activated solutions, improving clinical efficiency and reducing staff workload.

With AWS and Pariveda Solutions, Houston Methodist:

- Created voice-activated solutions that automated documentation for electronic medical records
- Prototyped a voice-activated solution to present information and tasks during surgeries
- Developed a tool that uses natural language processing (NLP) to capture conversations

[Learn more >](#)



Houston Methodist will continue to break down barriers using resources like those provided by AWS and Pariveda Solutions, and it will improve the way healthcare technology is consumed."

Roberta Schwartz

Executive Vice President and Chief Innovation Officer
Houston Methodist

When healthcare organizations embrace digital capabilities, they're able to connect people with the right care for them, at the right place and time. Intelligent services from AWS allow you to streamline care and improve the patient experience at every touchpoint in their care journey.

Orion Health empowers patients with a consumer engagement platform

Orion Health is committed to giving people the freedom to access healthcare on their own terms—whenever and wherever they choose. Digital Front Door, Orion Health's omni-channel consumer engagement platform, seamlessly integrates data, tools, and services to facilitate comprehensive healthcare navigation and management. By harnessing [Amazon Kendra's](#) intelligent search capabilities, Digital Front Door efficiently connects people with relevant, curated, and trusted information. Digital Front Door enables organizations to bring new and existing patient engagement technologies together into a unified, user-friendly hub.

With AWS, Orion Health:

- Developed a comprehensive consumer platform for healthcare management, Digital Front Door
- Gained access to machine learning capabilities, enhancing patient care
- Integrated disparate data, tools, and services, improving healthcare navigation and management

[Read the case study ›](#)



Amazon Kendra was a natural fit for what we were looking for and what we were trying to do and was a perfect centerpiece for our new Digital Front Door product."

Jomo Starke
Senior Director of Innovation
Orion Health

Fuel healthcare innovation for better patient outcomes

Accessing, analyzing, and extracting insights to deliver on the promise of personalized care requires a novel approach to healthcare innovation. That's why AWS partners with leading healthcare technology companies to create new solutions to growing healthcare challenges.



MD Anderson and Philips power precision medicine with genomics

Philips is making it easier for physicians at MD Anderson Cancer Center to confirm diagnoses and determine optimal therapies for each patient—right in the clinic. Philips used AWS services to create the Precision Oncology Decision Support (PODS) solution, an expert-backed, evidence-based system that enables complex decision-making at the point of care. Using the Philips HealthSuite Platform (HSP) powered by AWS, clinicians can receive a unified view of therapies and clinical trials with the combination of genomic markers to aid in treatment decisions.

With AWS and Philips, MD Anderson Cancer Center:

- Provided clinicians a unified view of therapies, clinical trials, and genomic markers
- Allowed oncologists to utilize sequencing results in their care plans
- Gained the ability to store, process, and match genomic results to relevant literature

[Learn more >](#)

THE UNIVERSITY OF TEXAS
MDAnderson
Cancer Center

PHILIPS



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The clinical genomics world itself is evolving, so it's important for our infrastructure to be able to support that and do it at scale.”

Louis Culot

Innovation Strategy Leader
Precision Diagnosis, Philips

Develop national and regional strategies that improve access and equity

Developing a better understanding of a population's health can help policy makers and healthcare systems make data-driven decisions to care for millions of patients and improve health equity and access to care. Machine learning tools like [AWS HealthLake](#) and [Amazon SageMaker](#) provide a chronological view of medical events to help healthcare organizations analyze population health trends and outcomes. Customers can easily create a cohort of patients and their treatments, demographics, and tests, and use advanced machine learning models to understand how a population changes over time to identify the most appropriate treatment for a patient population.

AWS Health Equity Initiative

To demonstrate our commitment to health equity, AWS launched the Health Equity Initiative. Through this program, AWS has committed \$40 million over three years to support organizations globally that are inventing and scaling new ways to promote equal access to healthcare and address social determinants of health. In the initiative's first year, AWS awarded \$14 million in AWS cloud credits as well as technical expertise to help nearly 90 organizations around the world—ranging from startups to nonprofits to large enterprises.

[Learn more >](#)



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We have a great opportunity to start bringing in more data from different sources and use the power of AWS to scale massively across our system, significantly benefiting the care of our patients in Chicago.”

Anil Saldanha
Chief Innovation Officer
Rush University System for Health



Rush University System for Health creates a population health analytics platform

Rush University System for Health (RUSH), a nationally recognized healthcare leader, is tackling health disparities in Chicago using AWS. The organization developed the Health Equity Care & Analytics Platform (HECAP) that harmonizes clinical, cardiometabolic, and social data, helping identify health inequities and drive patient-centered interventions. HECAP aggregates data using AWS services like [AWS HealthLake](#), [Amazon SageMaker](#), and [Amazon QuickSight](#). RUSH aims to make HECAP a blueprint for advancing health equity across the United States.

With AWS, RUSH:

- Enabled risk stratification
- Empowered clinicians with comprehensive patient insights
- Promoted better healthcare outcomes by addressing social determinants of health

[Read the case study ›](#)



Leverage new innovations like multi-omic analysis and generative AI

New innovations fueled by cloud technology are emerging to help healthcare organizations advance research, speed diagnosis, and find new ways to deliver care to improve outcomes. From research to drug discovery, to the point of care, the unified analysis of various medical and omics data is helping researchers and clinicians generate new insights and offer more personalized care.

And the use of generative AI has the potential to create customized patient engagements, drive unprecedented levels of scientist and clinician productivity, and streamline manual clinical processes to reduce administrative burden.

With AWS, healthcare organizations can more easily unify siloed data, transform unstructured medical data, and conduct intensive querying and search.

AMAZON BEDROCK

A fully managed service to easily build and scale generative AI applications with foundation models.

[Learn more ›](#)



Genomics England turns science into healthcare with a genomic and health information platform on AWS

Genomics England (GEL) was formally established in July 2013 as part of the 65th birthday celebrations of the National Health Service (NHS). Wholly owned by the Department of Health and Social Care, GEL was tasked with a flagship project to sequence 100,000 whole genomes from NHS patients with rare diseases and their families, as well as patients with common cancers. After the successful completion of the pilot project in 2018, the NHS announced it would partner with GEL and the UK Biobank to sequence up to 5 million genomes over five years and make the data available for research.

With AWS, GEL aims to democratize access to its vast genomic datasets, providing secure and cost-effective storage and analysis capabilities for researchers.

With AWS, Lifebit, and Kainos, GEL:

- Optimized data management platforms for the unique needs of genomic datasets
- Democratized genomic research access
- Enhanced the security and durability of hundreds of thousands of genomic data samples

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99%

GEL reduced the time for researchers to perform common tasks by 99% with AWS and AWS Partners Lifebit and Kainos

Allen Institute advances treatment for brain diseases using AWS AI and ML

In a first-of-its-kind effort, scientists are using AI and ML capabilities from AWS to advance treatment for brain disorders like Alzheimer's and Parkinson's. The Allen Institute is spearheading the creation of a comprehensive brain knowledge platform. This collaborative initiative with neuroscience researchers from 17 institutes around the world will map the brain at a cellular level and establish the largest open-source brain cell data database. The ultimate goal is to create a resource that will enable better diagnosis and treatment of the mental and neurological disorders and diseases that affect more than one-fifth of America's population.

With AWS, the Allen Institute is working to:

- Standardize massive datasets on the structure and function of mammal brains
- Enable data from the brain's 200 billion cells to be stored, analyzed, and accessed as an open source tool
- Transform large, complex multimodal data into usable insights using AI and machine learning

[Read the case study ›](#)



“

Chemistry has the periodic table. Genomics has the human genome map, which has been transformative. Neuroscience needs a similar foundational resource, which the brain knowledge platform will help to create.”

Ed Lein
Senior Investigator
Allen Institute for Brain Science

Transformation is a click away

Today, the extensive volume of available health data is continually expanding, and clinicians, patients, and researchers need novel approaches for deriving insights from this vast amount of data.

By collaborating with AWS and AWS Partners, you can enhance productivity, speed diagnosis, and ultimately improve patient outcomes.

Ready. Set. Innovate.

Whether you want to revolutionize patient care, streamline operations, or develop new solutions, AWS is here to support you. Together, we can chart the course of innovation for your healthcare organization.

[Contact us to get started ›](#)

[Learn more about AWS for Healthcare and Life Sciences ›](#)

