



EHRs are just the start: See how leading hospitals and health systems are driving innovation and better care with the cloud



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For hospitals and health systems, electronic health records (EHRs) form the foundation of the digital healthcare ecosystem. EHRs play a central role in clinical workloads and care delivery, composed of data from radiology imaging systems (RIS), picture archiving and communication systems (PACS), document management systems (DMS), historical data stored in vendor neutral archives (VNA), coding systems, blood banks, and more. These data sources collate together with interface engines. As healthcare IT teams struggle to do more with less, many are turning to the cloud to help with modernizing and managing their EHRs in a secure, scalable, and cost effective way.

Amazon Web Services (AWS) offers a set of tools and services that healthcare organizations can use to implement, migrate, and manage EHRs in a secure, scalable, and cost-effective way. By running their EHRs on AWS and leveraging the services that are native to AWS, leading hospitals and health systems are transforming electronic health records into elastic health records.

The elasticity of AWS helps organizations keep pace with innovations and improve both the clinician experience and patient care. The AWS Cloud and Services help make new technology more easily available without creating burdensome technical debt. It's simple to expand and contract EHR system resources on demand.

In this white paper, we'll explore the benefits of EHR on AWS and share how leading healthcare organizations are collaborating with AWS to create a frictionless healthcare experience for providers, patients, and other key stakeholders.

Keeping patients healthy: The role of EHRs, AWS Services, and integrated applications

The value of deploying an EHR on AWS extends to every aspect of the patient journey. Most health systems have scores of downstream applications that integrate with and feed EHR systems. Based on AWS's experience with current customers in the United States, the average number of applications integrated with an EHR system typically exceeds 180.

AWS works with each customer to identify, prioritize, rationalize, and migrate their applications into the cloud. Migrating applications integrated with the EHR to the cloud creates a consistent IT operating environment that improves clinician and patient experiences, while improving operational efficiency.

Here are a few examples of how top healthcare organizations are leveraging AWS to keep patients healthy:

[eHealth NSW](#) in Australia has migrated 10 clinical applications, including their enterprise patient records application to the AWS cloud and realized a 10-fold enhancement in application performance, a 70 percent reduction in critical incidents, and faster access to clinical data for frontline clinicians. These improvements have saved up to 144,000 collective hours of productivity for frontline clinicians.



Another organization using the AWS Cloud to provide better access to clinical systems and to improve the clinician experience is [Southern Cross Healthcare](#). This 10-hospital system in New Zealand migrated its Orion Health patient record system to AWS and improved system availability from 99.5% to 99.99%—this represents an additional 43 hours per year of full access to the enterprise’s most critical patient care system. The migration to AWS took just five months and included a design that accommodates disaster recovery capabilities across multiple failover zones. This ensures high system availability, even in the face of unanticipated events.

[The NHS Royal Papworth Hospital Foundation Trust in the United Kingdom recently worked with Dedalus](#) to migrate its EHRs to AWS. This has dramatically improved system performance. Faster data retrieval means that physicians can spend more time with patients in clinical settings. Currently, Dedalus EHR products on AWS are deployed in more than 50 UK hospitals, with additional migrations planned in 2023 and 2024.

Building for the future with a disaster recovery environment on AWS

[Central East Healthcare \(CEHC\)](#) consists of seven acute care hospitals in Central East Ontario in Canada. CEHC implemented a clinical information system (CIS) that facilitates a single healthcare record for their patients across all CEHC hospitals, improving workflows and care delivery. They also chose a hybrid solution to enable their clinical transformation plan. They have their primary EHR implementation in a traditional data center, and the alternate production or disaster recovery (DR) system in the AWS Cloud. Hosting the alternate production environment on AWS gives CEHC cost savings of \$10 million projected over 10 years, security with redundancy at every layer of the infrastructure, and use of cloud-native services supporting increased innovation. CEHC was able to work with AWS and partners to build, test, and deploy their CIS in nine months.

“Working with Dedalus to migrate our EHRs to the cloud has given us a level of flexibility, resilience, and robustness, providing value at a rapid pace. It also shows our staff that we are a technology-enabled organization and that we see that as an essential element of the care we provide to our patients.”

- Andrew Raynes, Chief Information Officer, Royal Papworth Hospital NHS Foundation Trust

Empowering caregivers: Tools to personalize the healthcare experience at every touchpoint

Running an EHR on AWS is just the start of the digital transformation journey for healthcare organizations. AWS is helping hospitals and health systems modernize contact centers, transform patient interactions into valuable data, match individuals with personalized treatment options, and more.

AWS is constantly innovating with healthcare partners on initiatives like automating workflows with chatbots, engaging patients through digital front doors, and transforming data into assets using artificial intelligence and machine learning(AI/ML).

- **Contactless EHR documentation during patient visits.** Houston Methodist developed a tool that uses natural language processing and ambient listening to capture conversations, creates notes and automatically documents information in the EHR. This enables providers to focus on patients with undivided attention during office visits. This solution leverages Amazon Lex, the service behind Alexa.
- **Empowering patients with a Personal Health Records (PHR) system.** PHR, managed by the patient, stores patient data from multiple clinical providers in an inter-organizational system and promotes patient-centric care. Fujita Health University in Japan built its PHR system on AWS with fast healthcare interoperability resources (FHIR) standards compliance. Modernizing their PHR enabled access to leveraging internet of things (IoT) and other applications for helping patients live healthier lives.
- **Faster identification of pneumonia in COVID-19 patients.** [UC San Diego Health](#) created an imaging model to run against radiology images that helped identify pneumonia in COVID-19 patients. They launched this innovation in just 10 days, using AWS's secure, HIPAA-eligible services.
- **Better pandemic care through hospital capacity analytics.** [Rush University](#) created a data analytics hub that pulled together data from 17 Chicago hospitals to shed light on hospital capacity and to understand the status of patient care during COVID-19. They utilized Amazon HealthLake and AWS Lambda, a serverless computing service.

Case Study: Tufts Medicine — A frictionless healthcare experience goes beyond core clinical systems

Burlington, Massachusetts based [Tufts Medicine](#) recently created a frictionless care environment for patients, physicians, and the entire care team by migrating its entire digital healthcare ecosystem to the AWS Cloud. The organization's EHR is now an elastic health record — the system expands and contracts when needed, based on enterprise demands.

Tufts Medicine successfully launched their Epic EHR environment on AWS in April 2022, 14 months after they started running their non-production environment on AWS. The organization's comprehensive digital healthcare ecosystem consists of the Epic infrastructure, as well as the complex integration of more than 42 third-party applications running entirely on AWS. Over time, Tufts Medicine plans to migrate the remainder of its third-party applications to AWS.

By accelerating its digital healthcare transformation, Tufts Medicine is estimated to save as much as 20 percent annually — approximately \$3 million — through the modernization of its healthcare IT ecosystem using the cloud. Key benefits include a greater ability to scale, increased opportunities to use AI and other platforms to enhance care delivery, reduced redundancy, and a better environment for collaboration, research, and education.

The Tufts Medicine initiative leverages a variety of native AWS services including Amazon Elastic Compute Cloud (Amazon EC2), Amazon Elastic Block Store (Amazon EBS), Amazon Elastic File System (Amazon EFS), Elastic Load Balancing (ELB), Elastic IP address, AWS Elastic Disaster Recovery, Amazon Elastic Container Service (Amazon ECS).

"This enables our Tufts Medicine team to integrate data-driven intelligence into everyday health and care that is more secure, resilient, and simple to use."

– Shafiq Rab, MD, Chief Digital Officer and System Chief Informatics Officer, Tufts Medicine



- **Improving pediatric treatment by unifying cross-disciplinary medical research.** The [Children's Hospital of Philadelphia](#) used AWS to build the Gabriella Miller Kids First Data Resource Center (KFDRC), which coalesces cross-disciplinary medical research. By advancing genomic, clinical, and imaging data, the center derives care insights for children worldwide across a broad spectrum of diseases.
- **More rapid translation of genetic data into insights.** Seattle's [Fred Hutch Microbiome Research Initiative](#) is analyzing raw microbiome genetic data and generating insights using AWS scalable compute, storage, and orchestration. This approach reduced seven years of compute time into just seven days, delivering results to researchers much faster.

Conclusion

To support the mission of patient care and drive positive outcomes, healthcare IT teams are tasked with providing systems and applications with high levels of availability and usability. EHRs are the bedrock of the digital healthcare ecosystem and essential for care delivery. The inherent complexity of this technology, however, calls for IT teams to explore migration to the cloud to ensure their EHRs are operating in a secure, scalable and cost-effective way.

These examples highlight leading organizations are collaborating with AWS. By running EHRs on AWS and using their services, hospitals and health systems are transforming their EHRs to optimized, elastic healthcare systems that enable innovation, empower clinicians, and better serve patients. Additional benefits of AWS services include automated resource management, enhanced disaster recovery, and improved security and system monitoring.

AWS is committed to delivering operational excellence, security, reliability, performance efficiency, and cost optimization to its healthcare customers. To learn more about how AWS can help your organization transform its EHR and provide a frictionless experience for healthcare providers and patients, scan the QR code.

