

Welcome to the Era of Personalized Health

aws is how

The era of personalized health is here. At the intersection of scientific discoveries and cutting-edge technologies, healthcare and life science organizations around the globe are innovating around a key focal point—the patient.

From customized medicines developed from patients' genetic codes, to technologies that bring medical care to their fingertips, these innovations are powering a personalized health movement.

Empowering patients with targeted, individualized care improves health outcomes and revolutionizes the next generation of healthcare delivery. Industry leaders leverage AWS for Health to increase the pace of innovation, unlock the potential of health data, and develop more personalized approaches to therapeutic development and care.



Genomics-Based Insights

The Right Treatment at the Right Time

Insights from patients' genetic codes enable faster and more accurate diagnoses and more effective treatment decisions.

There are more than 7 billion people on Earth, each with their own unique genetic code. Patients' genomes can answer medical questions ranging from their risk of developing a particular disease to how they will respond to treatments. This information helps organizations develop new therapeutics and providers prescribe the right treatments for the right patients at the right time.

Genomics is quickly becoming a critical piece of clinical decision-making and has become exponentially faster, cheaper, and more efficient in the past decades. The challenge now is making genomics-based care accessible to all. Industry leaders around the world rely on AWS and AWS Partner solutions to find meaning in genomics and help individuals with diagnosis and treatment decisions.

Diagnosing and Treating Rare Disease

Rare diseases affect more than **10 MILLION** children in the U.S.¹

Nationwide Children's Hospital securely analyzes population-scale genomic data to help providers understand and treat childhood diseases.

Increasing Cancer Survival Rates

When diagnosed early, the overall **5-YEAR survival rate for cancer is 4X HIGHER.**²

GRAIL is conducting what's believed to be the largest clinical study program ever pursued in genomic medicine to be able to screen for the earliest signs of cancer.

Precision Treatment Plans

44% of patients with cancer in the U.S. are eligible for immune checkpoint inhibitor therapy.³

Cofactor uses multidimensional RNA models to match patients with specialized cancer treatments that are more effective in treating their disease.

Genomics for Mental Health

As many as **2/3** people with depression are not helped by the first antidepressant they try.⁴

Myriad's GeneSight Psychotropic test analyzes how individuals' genetic variations affect their responses to various psychiatric medications, helping to guide treatment decisions for anxiety, depression, and other conditions.

Personal genomic information help with diagnosis and bring forward more informed and effective treatments.

Select innovation stories in genomics:

NATIONWIDE CHILDREN'S
"When your child needs a hospital, nothing matters"

GRAIL

COFACTOR
genomics

Myriad
genetics

¹ "Precision Medicine | Children's Rare Disease Cohorts (CRDC)", childrenshospital.org. Boston Children's Hospital, n.d. <https://www.childrenshospital.org/centers-and-services/programs/precision-medicine-service/rare-disease-cohorts>

² Nogue, AM. "SEER Cancer Statistics Review (CSR) 1993-2015: National Cancer Institute Surveillance, Epidemiology, and End Results Program, September 10, 2018. <https://seer.cancer.gov/archive/csr/1993-2015/>

³ Haslam, Alyson, et al. "Estimation of the Percentage of US Patients With Cancer Who Are Eligible for Immune Checkpoint Inhibitor Drugs." JAMA Network Open 3, no. 3 (9 March, 2020). <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2762389>

⁴ Smith Bhandari, MD. "Treatment-Resistant Depression." WebMD (Reviewed 20 June, 2019) <https://www.webmd.com/depression/guide/treatment-resistant-depression/what-is-treatment-resistant-depression#:~:text=Unfortunatel%2C%20depression%20treatments%20don't,to%20overall%20attempts%20at%20treatment>

Personalized Therapies

Custom Treatments & Care

Precision therapies act on specific targets to treat diseases at their source.

Personalized healthcare, including treatments developed from patients' own cells, custom-made prescription combinations, and personalized clinical trial matching, help patients access and benefit from treatments that are personalized to their needs.

Understanding biological systems through analytics and machine learning helps researchers find the right targets for precision treatment. Industry leaders leverage AWS for scalable solutions to discover, develop, and commercialize precision treatments.

80% of the variability in drug efficacy and adverse effects can be explained by genomic variation.⁵

Precision Immunotherapy

Immunotherapies use the body's own immune system to fight diseases including cancer.⁶

Critstone creates personalized immunotherapy injections that harness the power of patients' own immune systems to destroy tumor cells.

Personalized Vaccines

Cancer vaccines work by stimulating the immune system to attack cancer cells.⁷

Moderna uses patient's own cancer cells to create personalized mRNA-based vaccines that could treat or cure cancer.

Personal Medication Combinations

Medication noncompliance can account for up to **50%** of treatment failures, around **125,000** deaths, and up to **25%** of hospitalizations each year in the U.S.⁸

Multiply Labs combines patients' individual prescription combinations into a single daily capsule, simplifying their medication routines and boosting compliance.

Clinical Trial Matching

Inspire matches biopharma organizations with patients who could benefit from clinical studies.

Personalized therapies are designed to fight the disease at its source, maximizing efficacy and minimizing side effects.

Select innovation stories in personalized therapies:

critstone

moderna

MultiplyLabs

inspire
together we're better

⁵ Kim, Jeyran, Caccarelli, Rachel, Lu Christine. "Pharmacogenomic Biomarkers in US FDA-Approved Drug Labels (2000-2020)." Journal of Personalized Medicine 11 no. 3 (March 2021): 170

⁶ "Immunotherapy for Cancer." The National Cancer Institute. www.cancer.gov/about-cancer/treatment/types/immunotherapy. September 24, 2019.

⁷ Human Papillomavirus-Attributable Cancers — United States, 2012–2016. Centers for Disease Control. 23 August, 2019. www.cdc.gov/mmwr/volumes/68/wr/mm6833a3.htm?s_cid=mm6833a3_w

⁸ Benjamin, Regina. "Medication Adherence: Helping Patients Take Their Medicines As Directed." Public Health Reports 127 no. 1. (Jan-Feb 2012): 2-3. www.ncbi.nlm.nih.gov/pmc/articles/PMC3234535/

Expanded Access Points

New Ways of Accessing Care

Innovative interfaces connect patients and providers like never before, increasing accessibility and ensuring continuity of care.

The autonomy and convenience of consumer purchasing decisions don't always carry over to healthcare, and the industry faces increasing challenges in keeping complex consumer populations engaged in their health. Administrative issues can hinder patient-provider interactions and influence the quality of care patients seek, if they choose to seek it at all.

Simplifying the patient experience is key to providing convenient care that helps patients take charge of their health. Healthcare organizations are leveraging AWS to build and provide solutions that simplify patient-provider interactions and empower patients to access care that works best for them.

Virtual Care

MedStar Health, the largest healthcare provider for patients in the Maryland-Washington, DC, region, developed a telehealth contact center in hours to provide general medical assistance and care for patients remotely by connecting them directly with specific clinical staff.

Scheduling, Simplified

The average wait time to see a doctor in the U.S. is **24 DAYS.**⁹

Zocdoc's digital marketplace helps patients search for and schedule with providers directly, reducing the time and effort it takes to book appointments.

Video Conferencing and Online Meetings

In response to the unprecedented COVID-19 pandemic, Western Australia's leading aged care provider, Juniper, acted quickly to protect vulnerable residents at senior care facilities by connecting them with family and clinicians through video conferencing solutions.

Automated Speech Recognition

For every **1 HOUR** spent with patients, physicians spend **2 HOURS** on documentation.¹⁰

Houston Methodist leverages automated speech recognition to simplify medical documentation, allowing providers to focus more on patients.

Technology that supports more meaningful ways of connecting eases the burden on patients and providers.

Select innovation stories:

MedStar Health

Zocdoc

Juniper

HOUSTON Methodist

⁹ "2017 Survey of Physician Appointment Wait Times." Merritt Hawkins, September 22, 2017. www.merrithawkins.com/news-and-insight/thought-leadership/survey/survey-of-physician-appointment-wait-times/

¹⁰ Ardnt, Brian. "Tethered to the EHR: Primary Care Physician Workload Assessment Using EHR Event Log Data and Time-Motion Observations." Annals of Family Medicine 15 no. 5 (September 2017): 419-426. <https://doi.org/10.1370/afm.2121>

Patient-Driven Health

Answers On-Demand

Enhanced health education and interfaces empower patients to directly access the answers they need, when they need them.

Today's patients are more educated and informed than ever. With the internet at their fingertips, patients turn to online resources and each other to find answers.

Empowering patients to take ownership for their own health can lead to improved outcomes, enhanced quality of life, and the delivery of more appropriate and cost-effective services.¹¹ Leaders in healthcare technology leverage AWS to connect patients with quality information that helps them make decisions.

Responsive Educational Resources

76% of adults in the U.S. research their health online.¹²

UsAgainstAlzheimer's BrainGuide™ online tool is a personalized questionnaire that provides education and support, empowering people to understand brain health and take the next best action.

Reactive Online Chat Solutions

The healthcare chatbot industry is expected to grow **24%** by 2025.¹³

MetroPlus Health's pro bono chatbot answers questions and connects its most vulnerable members with the education and care solutions they need.

Managing Health and Well-being

The Cerner Consumer Framework™ helps engage patients with tools helping them manage their own health and well-being.

Cloud-based digital tools connect patients to the answers they need for better health decisions.

Select innovation stories:

UsAgainstAlzheimer's

MetroPlus Health

Cerner

¹¹ Bombard, Yvonne. "Engaging patients to improve quality of care: a systematic review." Implementation Science 13 no. 1 (26 July 2018). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6060529/>

¹² Stewart, Connor. "Use of digital health tools by type in US adults 2015-2019." Statista. www.statista.com/statistics/1102227/adoption-of-digital-health-tools-by-type-us-adults

¹³ "Chatbot Market by Component, Type, Application, Channel Integration, Business Function, Vertical And Region - Global Forecast to 2026." February 2021. https://www.reportslinker.com/p049895925/?utm_source=GNW

To learn more about how healthcare and life science leaders are building the Era of Personalization with AWS for Health, visit www.aws.amazon.com/health

