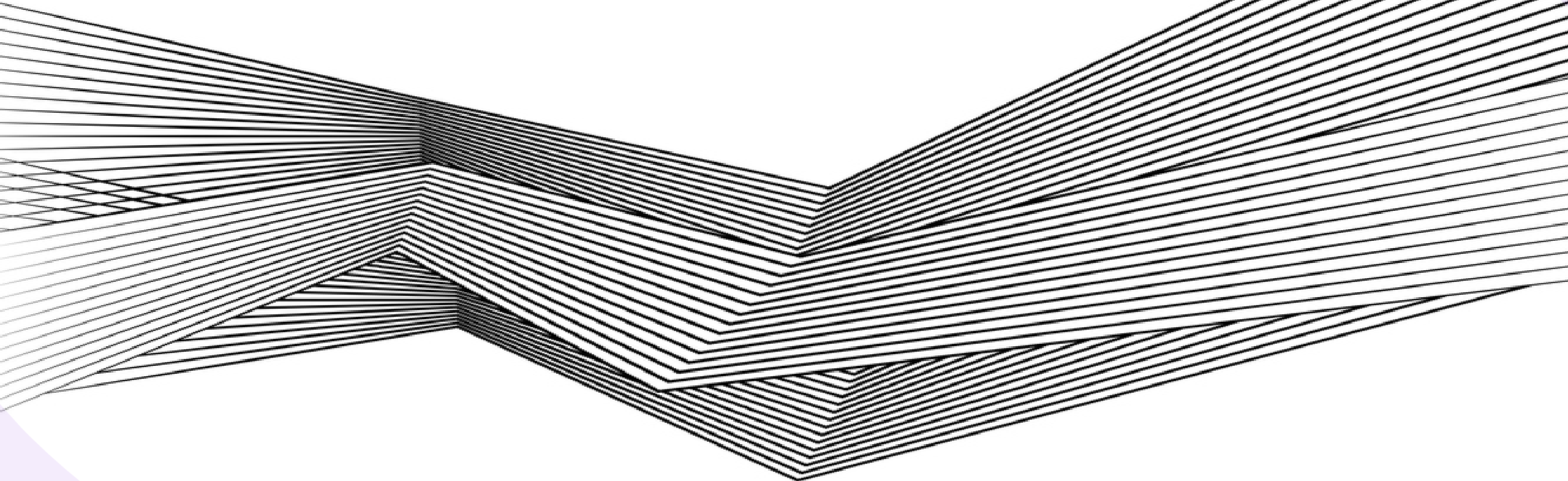




# Digital Health Highlights

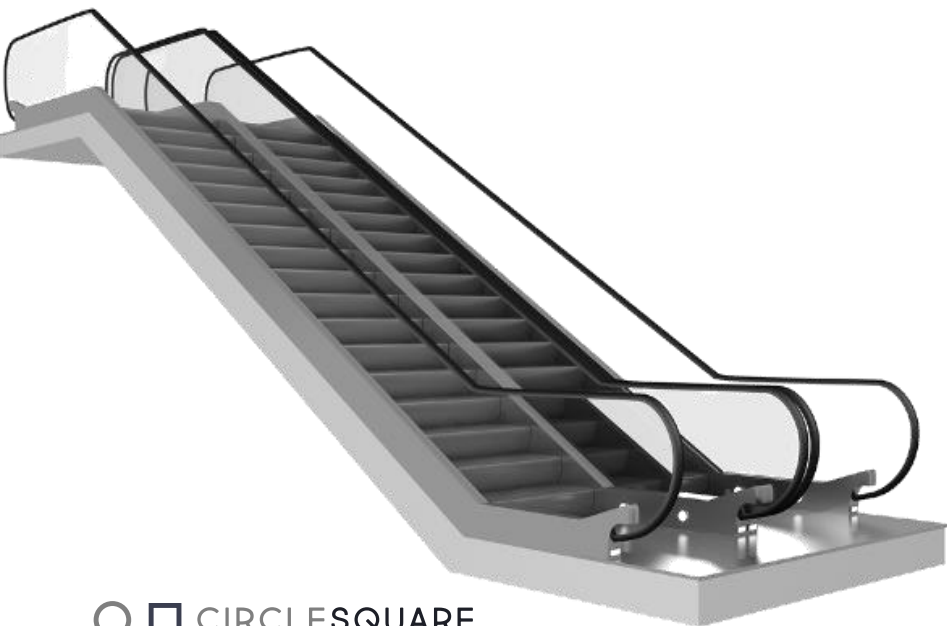
November 2023



HEALTH INFORMATION TECHNOLOGY – CONSUMER HEALTH & TECHNOLOGY

# The Ups and Downs of Digital Health

Digital Health Highlights  
November 2023



*From the co-editors...*

## Enterprise EHR Foundation

This month the focus is on interoperability with the US lagging its global peers in enabling digital health, and Australia leading significantly. The HL7 FHIR standard is up this month with Providence implementing provider-payer clinical data exchange for value-based contracting. Also in focus this month are the payers and their health IT solutions, as EY Parthenon and KLAS collaborate on an insightful study.

## Healthcare Analytics and Intelligence

In analytics trends, providers are in focus with KLAS Research showing data and analytics platforms generally performing well for providers, with Dimensional, Innovaccer, and Epic notable. Generative AI is trending again this month, as is digital pathology in a KLAS market analysis based on interviews with 14 pioneers. Also, drug discovery is up via continued investment support.

## Consumer Health and Technology

Wearables are up this month as patients are increasingly interested in sharing data from their personal health tracking devices with doctors. Other segments trending upwards include VR, smart rings, and pediatrics, which has seen venture dollars rising. Trending the other way are digital therapeutics, with a new study finding the evidence for them lacks rigor and inclusivity, while at-home testing startups have seen their funding fall and their market caps shrinking.

## Miscellany

AstraZeneca is up this month as the pharma company creates a new digital health unit to help to optimize clinical trials for biotech companies, pharma firms, and contract research organizations. The European digital health market is also up this month as funding has returned to historic growth levels after the 2021 and 2022 aberrations driven by the pandemic

*Michael Lake*

*Michael Lake and Dave Lake  
Co-editors Digital Health Trends*

# About this report, Digital Health Highlights

This report includes excerpts from our monthly corporate subscription service, Digital Health Trends.

We've flagged a handful of stories for this highlights version that we hope you find useful. We also hope you will see the value in having access to the full report, like the awesome companies listed to the right do.

If you'd like pricing information on our subscription services, which would give you and your company access to the full contents of our reporting each month, please email me at: [dave.lake@circlesquareinc.com](mailto:dave.lake@circlesquareinc.com).

Thanks, and enjoy the issue.



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## Interoperability Trends

### EHR vendors and the use of FHIR, a modern standard for health data exchange

Providence is first large system to implement a FHIR-based data-as-a-service for clinical data exchange between providers and payers for value-based care

Census-based survey shows a link between social deprivation and low interoperability

Opportunity and use of EHR portals are advancing, yet racial and ethnic disparities persist

## Healthcare Analytics and Intelligence

Adoption of advanced analytics and AI by the most wired health providers

Data and analytics platforms generally perform well for providers, with some presenting implementation challenges

Seven patterns of AI

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AI augmented clinical decision support in a patient-centric precision oncology registry

US Digital pathology 2023: Lessons from fourteen pioneers

### AI large language models learn to speak biology

Transactions in healthcare analytics focus this month on oncology, drug discovery, cardiovascular, and multi-omics

## Consumer Health and Technology

### Primary care provider Forward Health raises \$100m, pivots to AI-based, self-serve CarePods

Medicare plans that help seniors afford groceries surge, while studies show fresh produce access boosts outcomes

Nine out of ten patients are interested in sharing data from their personal health tracking devices with doctors

Smart rings get slimmer, focus on women, help predict due date

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### AstraZeneca creates digital health unit to optimize clinical trials

The European digital health market is returning to historic growth levels

In its first year, 988 Lifeline answered nearly five million contacts

# Payer tech study

## Study highlights

**Cost.** Cost optimization is the top strategic priority for ~70% of health insurance payers as their profits face pressure from deferred patient activity, increasing competition and an ever-changing regulatory landscape.

**Members.** Payers plan to increase their member centricity using a combination of tech and services, while also leveraging their healthcare IT (HCIT) solution.

**Revenue.** HCIT solutions with a through line to revenue and costs are expected to see increased investment; ~45% of payers expect risk adjustment, condition management and payment integrity solutions to be “highly significant” areas of investment.

**Partners.** Third-party vendors are an integral part of these operations currently, with ~80% of payers outsourcing a portion or all of their workflows across functions.

**GenAI.** Payers are cautiously optimistic about adopting differentiated generative AI (GenAI) capabilities within their HCIT solutions in the next two years.



## Overview of healthcare information technology solution ecosystem

Segment	Example vendors	Definition
Core admin. processing	TriZetto, Pega, Conduent, HealthEdge	Create benefits, configure plans, guide consumers
Payment integrity	Cotiviti, MultiPlan, Zelis, Equian, Elap, Optum	Finalize claims via catching errors and fraud
Network mgmt	SCIO, Ability, Envolve Pharmacy	Support network admin & manage provider contracts
Contract & performance	Edifecs, Clarify Health	Support value-based engagement
Interoperability	Edifecs, 1upHealth, Epic	Support interoperability; share patient info
Utilization mgmt	Medecision, Omada, TriZetto	Review clinical services, ensure medical necessity
Condition mgmt	Livongo, Omada	Holistically treat patients
Population health mgmt	Arcadia, Enli, Health Catalyst, Lightbeam	Holistic proactive approach to stratification
Risk & quality mgmt	Apixio, Episource, Advantmed, Inovalon	Retrospective and prospective risk adjustment
Member engagement	Virgin Pulse, Sharecare, Castlight, Rally	Engage members on their clinical journey
Health equity	Unite Us, NowPow	Support equitable access & member needs
Wellness benefits	Sleepio, Noom, Headspace	Ancillary employee assistance via digital

**Editorial:** EY Parthenon and KLAS Research collaborate on their 2023 Payer Tech Study to discover where payers are making strategic IT investments to drive growth. Payer challenges include: (1) higher than expected medical costs from rising demand for health care services and specialty drugs, (2) disruption from employers’ move to self-insurance, (3) providers taking on more risk, (4) increased competition from big tech and (5) an increasingly stringent regulatory landscape.

# EHR vendors and the use of FHIR, a modern standard for health data exchange

## Benefits of FHIR in healthcare

**Interoperability of data:** FHIR allows various healthcare IT systems and platforms to communicate with each other, regardless of which vendor the platform comes from. HCPs and other healthcare practitioners can access patient data regardless of where the data is located.

**Standardization:** FHIR establishes a standardized set of resources and data elements for exchanging healthcare information. Standardizing the format and structure of healthcare data through FHIR helps in maintaining consistency across the various systems in the healthcare industry.

**Patient-Centered Healthcare:** FHIR aids in allowing healthcare providers to have access to more information real-time. This helps them offer more personalized and effective care, enhancing the overall quality of healthcare services.

**Modern apps:** FHIR is also designed to support modern web and mobile applications, making it a suitable standard for developing patient-facing apps and other digital health tools. Through this, patients can easily access their health data and be more involved in their healthcare.

## FHIR use cases within EHR architecture

**Legacy alternative:** As an alternative to C-CDA legacy systems with FHIR to facilitate information exchange through APIs, enabling stakeholders like pharmacies, insurers, and healthcare providers to access data in real time.

**Patient portals:** Integrating FHIR as a key element in patient portals, allowing patients to access their medical records through these portals or via third-party web solutions.

**ML engines:** Employing FHIR in the development of future machine learning engines to provide uniform, accurate methods for training AI using patient data acquired through FHIR.

**Read-access:** Utilizing the FHIR standardized HL7 framework for interactions with third-party vendors seeking read-access to clinical data from EHR systems.

**Innovation testing:** Using FHIR to support proof-of-concept testing, ensuring that real patient data adheres to FHIR and HL7 standards over HTTP, and is adequately logged and monitored.

## FHIR future

FHIR will be a central feature of healthcare IT for the foreseeable future.

The challenge lies in adapting to an environment where standards and regulations are not only diverse but also continually evolving.

As EHR vendor competence in working with FHIR increases, this regulatory push and customer pull will be joined by vendors embracing FHIR as a tool for innovation and new revenue opportunities.



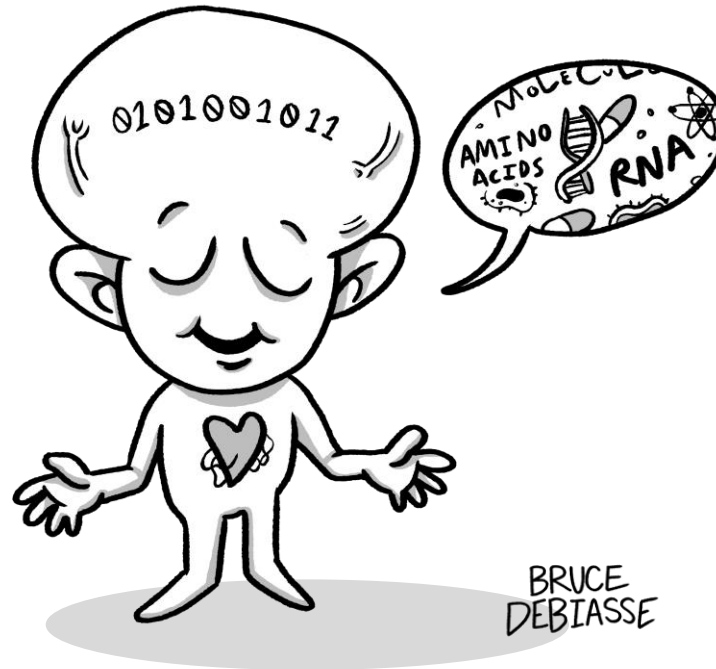
**Editorial:** Mohita Deshpande, research analyst at Signify Research released this insight after company discussions with a set of global EHR leaders about their use and plans for the FHIR health data exchange standard. She reports that FHIR has gained popularity over the last decade and has become an instrumental tool for healthcare organizations, providers, payers, and health IT vendors by making data transfer considerably faster, easier, and more efficient. FHIR is free, open source, and combines the best features of HL7's earlier standards with a common set of APIs so various healthcare platforms can communicate and share data across facilities in a way that each platform can understand. It also uses the latest web technology which helps to make it easier for developers to implement.

# AI large language models learn to speak biology

**How it works.** Humans arrange the 26 letters in the modern English alphabet into roughly about 500,000 words. LLMs are given text that they then split into characters, words or sub-words, known as tokens. The AI model then determines the relationships among these tokens and uses that information to generate original text.

**Fewer letters; more words.** The language of biology contains far fewer letters but produces many more "words" in the form of proteins. The genetic information carried in DNA is encoded in four molecules: A (adenine), C (cytosine), T (thymine) and G (guanine). Three-letter combinations of these four base pairs, called codons, give rise to 20 different amino acids, some or all of which are strung together in different orders to make up proteins.

**Lots of proteins.** There are more than 200 million known proteins. AlphaFold, an AI system developed by DeepMind, can predict the structure of a protein from its amino acid sequence — one of biology's biggest challenges and time-consuming tasks. But many orders of magnitude more proteins are theoretically possible. That leaves a vast space to explore for scientists who want to develop new proteins that have the properties they want for a novel drug or to engineer cells to perform different tasks.



**ID genomic changes.** AI models are being used to map that space to identify changes in DNA or RNA that underpin disease or alter key processes in a cell — and to use that information to design new proteins.

**New models.** It's early days for AI foundation models in biology but companies, including Profluent Bio, Inceptivo and others, and academic groups are developing models for deciphering the language of DNA and designing new proteins.

**For example.** HyenaDNA, a genomic foundation model developed by researchers at Stanford University, learns how DNA sequences are distributed, genes are encoded and how regions in between those that code for amino acids regulate a gene's expression.

**It's new.** LLMs that handle human language are speeding up what we already know how to do, but with biology, we're trying to figure out something we've never figured out ourselves. That means the burden of validation is enormous.

**Editorial:** AI systems that have already made strides learning the language of humans are being trained to decipher the language of life encoded in DNA and to use it to try to design new molecules. This dynamic, where technology is operating in a language that it will likely understand better than human speakers in healthcare and life sciences organizations, is why the Citigroup analysis, linked below, argues that pharma will be the biggest beneficiary of generative AI. *Note:* the original art is from Bruce DeBiasse, an artist we're working with to enhance our reporting and to help us research how narrative and animation can enhance patient communications. Let us know if you want to learn more.

# Primary care provider Forward Health raises \$100m, pivots to AI-based, self-serve CarePods

The company's Series E raise will fuel the launch of 25 CarePods in malls, gyms and offices, including one in Chicago's Willis Tower, with plans to double its footprint in 2024.

For \$99 per month, users can access the CarePods, which use sensors, lab tests, and vital sign measurements to enable continuous progress monitoring, identify disease risks, and provide health evaluations—all without a doctor or nurse.

Custom AI powers the diagnosis, and behind the scenes, doctors write the appropriate prescription, which is available nearly immediately.

First-time patients receive a full biometric assessment and collect up to 500 biometric data points to help Forward's systems diagnose and treat different conditions and ailments.

Forward has 19 standalone facilities throughout the US as well, which have the same tech-first approach as CarePods, however, they look and feel more like traditional healthcare facilities fused with an Apple Store. Access to these locations is \$149/month.

The company's investment strategy going forward will be focused on deploying the CarePods rather than building new clinics.

The company employs over 100 primary care clinicians. They do not accept insurance.

## How the CarePod works:

1. Users walk up to the door and unlock it with their mobile device. They step in alone and find a large touchscreen facing a chair.
2. A glowing ring on the floor indicates the location of the full-body scanner. A hidden drawer on one of the sides delivers different medical tests as needed. A friendly female voice guides the patient through the process.
3. The screen serves up different apps available to the user: full body scan, heart health, thyroid testing, blood pressure, weight management, diabetes screening, Covid-19 test, HIV screening, kidney, and liver health.
4. Each CarePod is staffed with an attendant who can answer basic questions and services the device between uses, but they do not join the patient in the pod.
5. If a patient has questions, they can speak to a doctor through the mobile app.



**Editorial:** Forward has raised over \$650 million since its 2017 founding. A similar idea from **HealthSpot** debuted at CES in 2013 and the company was defunct by mid-2016, having placed only 50 or so stations and burning through \$43 million. **Higi** offers a national network of free Smart Health Stations, but the company was acquired for nearly nothing in early 2022 by **Babylon Health**, which itself filed for bankruptcy this year. "This is not the Tesla of healthcare quite yet," said Blake Madden on his Hospitalogy blog, linked below. "I'm more inclined to believe that this is going to turn into the Bird of healthcare e.g., a really good idea, works in certain markets like Austin, Texas, but ultimately a bad business with serious logistical challenges."



# Hospitals struggle to embrace consumer-centric care

A consumer-centric healthcare model has been slow to evolve due to the way hospitals and health systems evaluate performance, according to a new report from Kaufman Hall.

Approximately half of hospital system leaders said that their institutions only tracked traditional metrics, such as patient visit volumes, unique patient counts, and inpatient market share, versus popular consumer-centric metrics like new patient acquisition and patient churn rate.

Health systems are even less likely to track advanced metrics—share of wallet, and actual and potential longitudinal value—which require more advanced data and analytic and technological capabilities to measure.

Health systems that have begun the shift toward patient-centric metrics predominantly use them to increase patient access, improve patient satisfaction, and enhance marketing. Reid Health in rural Indiana tracks new patients and patient churn, and leverages metrics like wait times and cancellations to gain insight into the underlying drivers.

The largest barrier to health systems adopting consumer-focused measurement is the lack of available data or technology (69%), followed by being unsure how to define and prioritize consumer-centric metrics (40%).

## Strategic approaches for consumer transformation

*Investing in consumer-centric measurement capabilities can positively affect business models and top-line revenue by driving these strategies to attract consumers and retain them by meeting their needs and demands*

**Services:** Deploy a broad array of services with high value to customers to create segment-specific engagement.

**Care model innovations:** Launch care models based on consumer demand, such as home healthcare, retail care, or concierge medicine.

**Operations:** Introduce operational improvements in such areas as patient access or clinical and non-clinical experience.

**Marketing/Communication:** Create advertising campaigns or launch direct-to-provider messaging.

**Digital Technology:** Offer digital conveniences like online scheduling, a health system app, or a patient portal platform.

**Pricing:** Develop strategic pricing for shoppable services and offer price transparency

**KaufmanHall**

**Editorial:** Consumer-centric transformation requires a new set of organizational skills. Health systems will need to build an organizational infrastructure and invest in staff and resources to fill the capability gap. The Kaufman Hall State of the Healthcare Consumer report draws insights from 59 survey responses from hospitals and health systems across the US and interviews with healthcare leaders. These organizations span approximately 30 states and represent various healthcare sectors, including health systems, community and rural hospitals, academic medical centers, pediatric hospitals, medical groups, and imaging centers.

# Funding has collapsed for at-home lab testing companies

Funding for at-home lab testing startups soared in 2020 and 2021 amid the Covid-19 pandemic and a broader venture funding boom.

During the boom, Everly Health and LetsGetChecked achieved unicorn status, while Cue Health IPO'd at a \$2.3b valuation in September 2021.

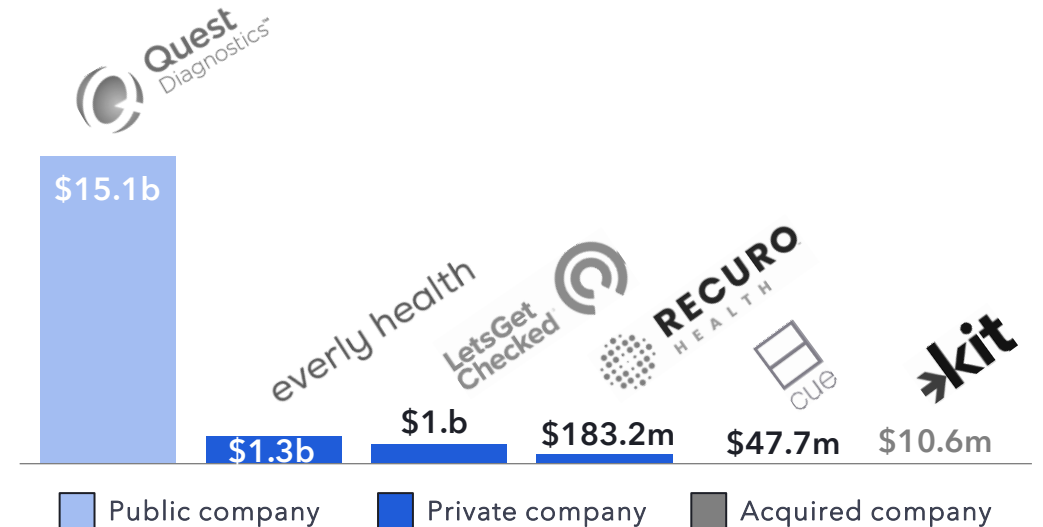
Two years later, funding for at-home lab testing has collapsed in 2023 so far.

As funding and deals have fallen, most companies in the market have seen headcount reductions over the past year, including Cue Health, which has seen its stock price sink below \$1, which translates to a market cap under \$50m.

Quest Diagnostics — founded in 1967 — dominates the market. It is deeply ingrained in the US healthcare landscape, with clients and partners ranging from NewYork-Presbyterian Hospital to Walmart. Quest also has more scale and product diversity than startups in the market. Its stock is roughly flat following the pandemic years.

Startups in the market are also zeroing in on product diversity for at-home testing. For example, Everly Health launched an at-home kidney test last month.

## Top at-home lab testing companies by valuation



CBINSIGHTS

**Editorial:** According to the report, at-home lab testing leads in all-time equity funding among 12 remote patient monitoring markets. Many venture-backed startups in the space offer Covid-19 testing products, as pandemic-era demand for these products and other at-home test kits drove funding to the category. Also this month, **Jana Care** raised a \$6 million Series B round to commercialize its self-administered blood tests for kidney and heart disease, while India's **Inito** raised a \$6 million Series A for an at-home hormone test. And the FDA approved a home test from LetsGetChecked for chlamydia and gonorrhea, the first such authorization of a home test to detect the two most common sexually transmitted infections in this US.

# AstraZeneca creates digital health unit to optimize clinical trials



AstraZeneca launched a new digital health business called Evinova to help to optimize clinical trials for biotechnology companies, pharmaceutical firms, and contract research organizations (CROs), to reduce the time and costs associated with developing new medicines

The unit's first strategic collaborations are with CROs Parexel and Fortrea, which will offer Evinova's digital health solutions to their customer bases

Evinova will operate as a separate business and offer three main categories of services: unified trial solutions, study design and planning, and portfolio management

The other key part of the platform is the ability to harness artificial intelligence and machine learning algorithms to help companies design their own trials, including access to automatic costings and the ability to assess the most suitable countries and sites in which to operate

Despite being a standalone company, Evinova will sit within the AstraZeneca group and launch with 300 team members spread among nine countries

AstraZeneca-sponsored trials have been conducted in over 40 countries

## Evinova's drug development suite:

**Unified trial solutions:** Collects clinical trial data on primary and secondary endpoints, including novel digitally-enabled endpoints. The data can come from connected medical devices and sensors located at the trial sites and patients' homes. The solutions are also meant to support telehealth, remote patient monitoring and direct-to-patient medicine delivery. Interaction occurs through a patient app, which is available in more than 40 countries and 80 languages.

**Study design and planning:** Uses technologies like AI and machine learning algorithms to design more optimal trials and to quantify various characteristics, from a study's carbon footprint to its impact on the patient experience.

**Portfolio management:** Gives a complete picture of a client's portfolio across all the phases of drug development. Uses predictive algorithms to provide future key milestones, enabling study leaders to understand deviations from plans and supporting appropriate intervention.

## Launch partners:



**Editorial:** Evinova CEO Cristina Duran believes regulators do not want each pharma company to come with their own different solutions. "So across the industry, we will go much faster together, rather than individually," she said at a launch event. A [recent Deloitte's analysis](#) found a substantial decline in the projected ROI for R&D for pharma, indicating a critical need for an overhaul in drug development. Many pharmas operate as smaller businesses or divisions. **Roche** has a diagnostics unit that accounts for more than a quarter of its annual sales. **Novartis** has been establishing its own contract manufacturing organization. **Sanofi** spun out some of its drug manufacturing into a separate entity called Euroapi. **Johnson & Johnson** spun out its consumer health unit and raised nearly \$4 billion through an IPO.

# Companies mentioned in the full report

1nhaler	BehaVR	DARVIS	Forum	Innovaccer	Lunit	Paige	Sleepio
1upHealth	Betterleave	Decode Health	Forward Health	Inovalon	Lyra Health	Parexel	Smileyscope
3DHISTECH	Bloom	Digital Diagnostics	Free Market Health	InsiteOne	Maia Oncology	PathAI	Sober Sidekick
AAPC	BRIT Systems	Dimensional Insight	Frieda Health	IntegriChain	Maven	PatientCentra	Stellaromics
Ability	Care.ai	Doccla	Fujifilm	Invitae	Medecision	Pega	SubjectWell
ActiveRADAR	Carepatron	Eargo	Gestalt	Iterative Health	Microsoft	Penda Health	Summer Health
AdaptX	Castlight	Edifecs	Get Well	Jana Care	Minded	Philips	Sunnyside
Advantmed	Cercle	Elap	Google	Jolly Good	Morf	Phreesia	Surescripts
Almouneer	Cigna	Eleos	Grace Health	Jona	Movano Health	Press Ganey	Surglasses
Amazon	CipherHealth	Elevance Health	Headspace	K Health	MultiPlan	Profluent Bio	Tabula Rasa
Amwell	Circular	Elucid	Heali	Kento Health	Mynd Immersive	Proscia	Tribun
Apixio	Clarify Health	Enli	Health Catalyst	Koya Medical	Naring Health	Quest Diagnostics	TriZetto
Apollo	ClinOne	Envolve Pharmacy	HealthEdge	Kyruus	Needed	Rally Health	Unite Us
Apple	Cloudbreak Health	Epic	Heidi Health	Kythera Labs	Nema Health	RealizedCare	UpHealth
AppliedVR	Cognilytica	Episource	Higi	Layer Health	Neteera	RepeatMD	UpLift
AQuity	Conduent	Epistemix	Hippocratic AI	Leica	Neurophet	Roche	Vida Health
Arancia	CoRead	Equian	HP	LetsGetChecked	Noom	Salesforce	Viome Life Sciences
Arcadia	Corista	ERS	Humana	Lightbeam	NowPow	Salus	Virgin Pulse
AristaMD	Cotiviti	Everly Health	HyenaDNA	Lilio	NRC Health	SCIO	Vivodyne
Artera	Covera Health	ExactCare	IKS Health	Lirio	NVIDIA	Sectra	Winnov AI
AstraZeneca	CoverSelf	Fern Health	Inceptive	Livongo	Omada	Semantic Health	XRHealth
Augmedix	Cue Health	First Stop Health	Inclusively	Luma Health	Optum	SentryHealth	YouScript
Aya Healthcare	CVS Health	Fortrea	Indica	Lumea	Oracle	Sharecare	Zelis
Babylon Health	Cytovale	Fortuna Health	Inito	Luminare	Oura	Sitka	