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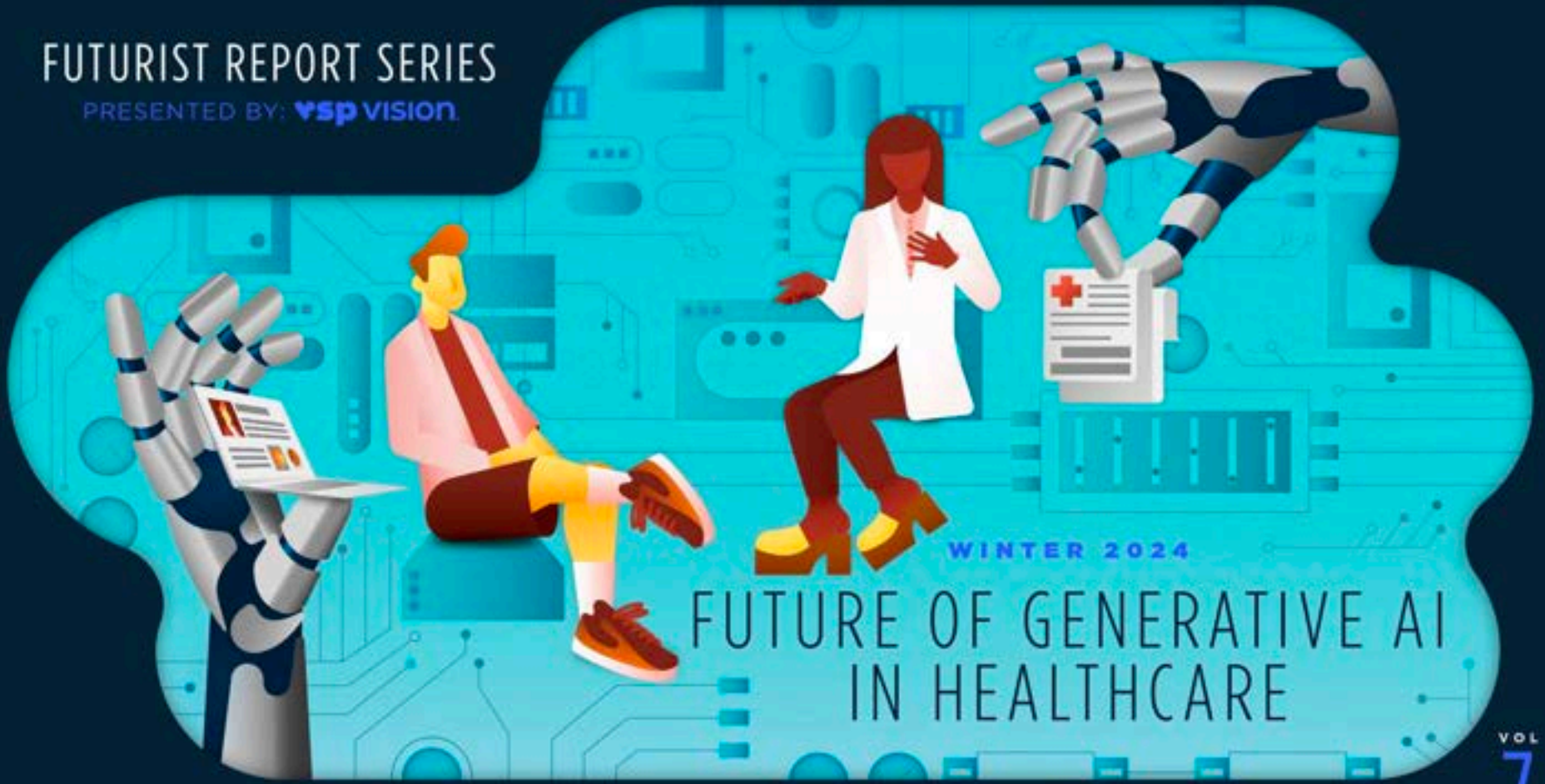

WINTER 2024

FUTURE OF GENERATIVE AI IN HEALTHCARE

VOL 7

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Introducing the Future of Generative AI

Generative AI - *artificial intelligence capable of generating text, images, video, synthetic data, and more* - exploded onto the scene the day ChatGPT was released to the public.

In its first two months, the popular generative AI model reached 2 million users, a milestone the smartphone surpassed after two years. The unprecedented level of adoption for ChatGPT birthed an entire industry; investment in generative AI exceeded $14B in 2023, up from $1.7B in 2022. This market, non-existent a few years ago, is now expected to hit $109B by 2030.

The technology's sheer growth, in both usage and valuation, has also *generated* a tremendous amount of hype.

Yet often lost amongst the platitudes of generative AI's ability to *transform industries*, are essential conversations around how to apply this form of AI within organizations. *How will generative AI integrate with existing structures*? *What new models for value creation will be introduced*? *Who will be driving this change?*

In healthcare, generative AI is already beginning to demonstrate how it can reimagine the industry in new and exciting ways.

Beyond easing administrative burdens and scaling tailored patient communication, generative AI is also accelerating drug discovery and clinical trials.

As the leader in health-focused vision care, VSP Vision is constantly monitoring the pulse of healthcare transformation. And generative AI is at the forefront, its impact reverberating across healthcare systems, providers, payers, and more. In fact, there are already several instances of the technology's presence in eye care, from scaling readings of retinal scans to personalizing eye health content.

In this latest Futurist Report, the VSP Global Innovation Center (GIC) spotlights the currents and startups behind the technology's possibilities and potential, exploring five rising trends that will shape the future of generative AI in healthcare.

Generative AI captures investor and user attention

A new frontier for venture capital investment:

- In 2023, investment in generative AI reached a record high of $14.1 billion.
- Most of the funding is going to generative interfaces, such as AI assistants and Human-Machine Interfaces (HMI).
- Over half of generative AI startups are Series A or earlier, illustrating the nascency of most generative AI applications.
- The generative AI space has already seen 18 private companies reach unicorn status (valued at $1B+), including OpenAI ($29B), Scale ($7.3B), Anthropic ($4.1B), and Inflection ($4B)

Five transformative trends of Generative AI

1

System cohesion makes shared care possible

2

Empowered patients prompt better outcomes

3

In-practice solutions alleviate provider burnout

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Embedded generative AI transforms medical devices

5

"Big, bad AI" supports good behavior

Executive summary of transformative trends

System cohesion makes shared care possible

- Generative AI translates unstructured medical data, allowing frictionless data-sharing.
- New AI solutions fuel interoperability by seamlessly integrating with existing healthcare technologies.
- Generative AI breaks down organizational silos via information synthesis and improved data management.
- Accelerating clinical trial processes is helping unify the speed in which all care can move forward.

Empowered patients prompt better outcomes

- AI bots improve the patient experience by personalizing and automating various touch points across the care journey.
- AI symptom checkers replace "Dr. Google," helping patients easily access verified health information.
- Advanced medical translation tools help improve health literacy and break down language barriers between doctors and patients.
- Generative AI supports patients with disabilities by improving access to assistive services.

In-practice solutions alleviates provider burnout

- AI-powered co-pilots assist healthcare workers in processes such as medical note-taking and disease screening.
- AI supports healthcare workers in providing tailored care with real-time guidance, without increasing cognitive load.
- Natural language processing (NLP) technology allows scientists to easily navigate large volumes of medical data and discover research.

Embedded generative AI transforms medical devices

- Generative AI powers new medical imaging tools that can identify medical conditions and predict health outcomes.
- AI technology supports medical workflows by enabling safer surgery and detecting severe blood loss.
- Advanced headsets glean brain health insights and offer tailored treatment plans.

"Big, bad AI" supports good behavior

- AI shows promise in facilitating empathetic conversations with patients, improving their experience in the healthcare system.
- AI compliance tools help organizations automate repetitive compliance processes and prevent poor AI governance.
- Using synthetic data can improve representation in medical research and protect privacy.
- Generative AI emerges as a potential solution to health inequities.

TREND 1

System cohesion makes shared care possible

How is generative AI moving us closer to shared health care?

Both data and organizational silos debilitate the quality of care and administrative efficiency across the healthcare industry. Healthcare cohesion (data sharing and collaboration between stakeholders) is crucial to overcoming these silos.

Generative AI has opened a window of opportunity to reduce fragmentation, yielding numerous benefits.

A significant opportunity for generative AI is “reducing administrative costs and eliminating unnecessary friction points between payers, providers, devices, and life sciences”, according to Rich Roth, Senior Vice President and Chief Strategic Innovation Officer of CommonSpirit Health, the largest Catholic health system in the U.S.

New AI solutions (such as Microsoft and Epic’s automated coding and billing features) will improve efficiency across the many moving parts of the healthcare system, while other startups and technologies will focus on specific components, such as accelerating clinical trials or translating unstructured data at scale.

This will have a ripple effect on the healthcare industry as a whole, making it more cohesive and less expensive to run.

“While generative AI can certainly translate and summarize healthcare data at scale, it can also make data immensely more shareable, helping driving cohesion throughout the healthcare system.”

Jay Anderson,
Head of Emerging Technology,
VSP Global Innovation Center

Where is the momentum now?

Data fragmentation across the healthcare continuum is driving a need for tools and solutions that can ease and accelerate the unification of various processes and practices.

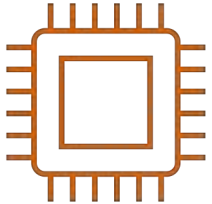
Poor connection in the healthcare system can spur redundant costs.

A study in the Journal of the American Medical Association found that "failures in care coordination" cost between $27.2 and $78.2 billion per year.

Generative AI could transform a considerable percentage of tasks.

Generative AI has high potential to automate or augment 39% of all working hours in the health industry, per an Accenture study.

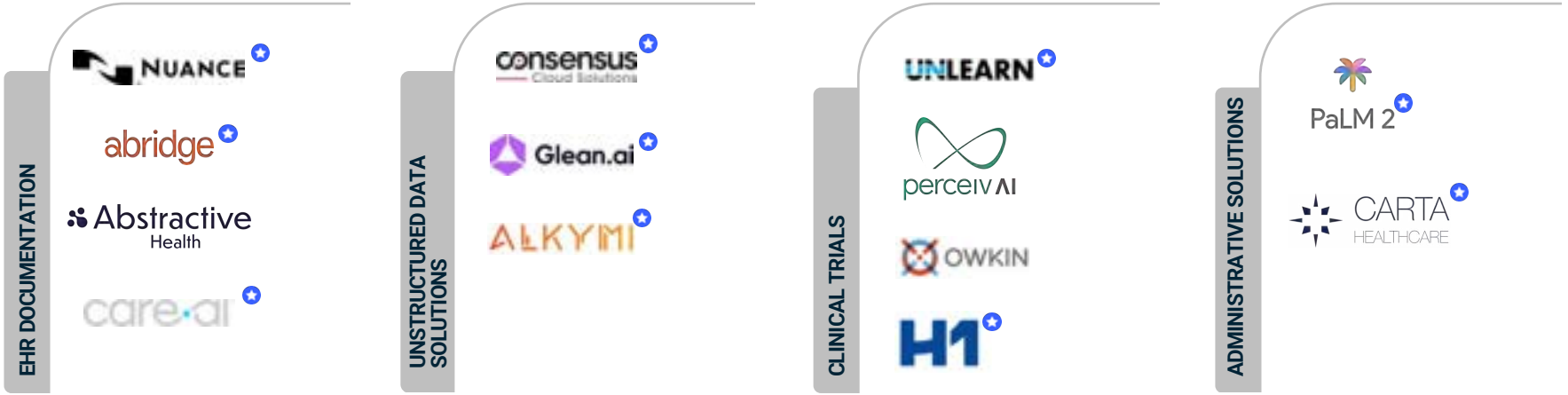
Leading electronic health vendors are adopting generative AI to advance their systems.



EHR vendor Epic has integrated with Microsoft's Azure OpenAI Service to allow healthcare providers to automatically generate replies to messages and find ways to cut costs.

AI is transforming care coordination throughout the healthcare system

The following companies, startups, and models are changing how healthcare providers manage their data, people, and patients.



Featured in the Report

Generative AI translates unstructured data enabling instant system-wide sharing across healthcare

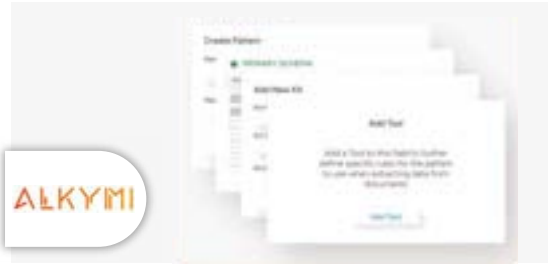
Most of the world's data is unstructured, such as emails, PDFs, and images. Advanced data platforms are able to read, extract, and summarize data from unstructured documents, allowing care providers to easily share it across multiple systems. According to McKinsey, the development of previously unstructured data via generative AI could yield up to $1 trillion in value for the healthcare industry.

Total funding: $15.7M

- Glean is an AI-powered enterprise search and knowledge discovery solution.
- The company recently introduced a suite of new features that use generative AI to synthesize and surface relevant information, including unstructured data, from across an organization.
- Glean's new generative-AI based assistant, dubbed "Glean Chat," is designed to serve as the "Power BI of unstructured data."

Total funding: n/a

- Consensus Cloud Solutions offers a solution (Clarity) that uses AI to analyze and extract information from unstructured data.
- Once Clarity extracts the data, it automatically forwards it to the patient's electronic health record (EHR).
- It uses context-based understanding, powered by machine learning, to correctly translate unstructured data into a structured document.



Total funding: $26M

- Alkymi is an unstructured data processing platform for businesses in healthcare, financial services, transportation, and other verticals.
- It extracts unstructured data from a variety of formats, including images, PDFs, emails, and slide decks.
- The data lives in a "Data Inbox" which can be exported via API, Excel, and other tools.

Supercharged electronic health record documentation and transcription expedites interoperability

AI-powered solutions integrate with EHR systems to generate summaries of clinical documentation at scale, enabling healthcare systems to better exchange and make use of health information

Acquired by Microsoft: Total funding: $69.4M before acquisition

- Nuance is an AI-powered voice recognition company that serves healthcare alongside other verticals like security and customer engagement.
- The company's automated clinical documentation app (DAX Express) uses GPT-4 and ambient, conversational AI to generate clinical notes.
- The solution works for both telehealth and in-person consultations.

Total funding: $27.5M

- Abridge is an AI-powered clinical documentation solution.
- It supports integrations with numerous EHR systems, including Epic, AthenaHealth, and others.
- Abridge listens to virtual, chat-based, and in-person conversations, then produces SOAP (subjective, objective, assessment and plan) notes and appointment summaries for patients. It also understands speakers with different accents.

Total funding: $27M

- Care.ai has developed a Smart Care Facility Platform that can be deployed in different healthcare settings, including hospitals.
- In hospitals, Care.ai can monitor patients and alert the staff in case of patient distress or discomfort.
- The platform uses NLP to capture conversations between patients and medical staff, generating structured data and automating the process of filling out medical documentation.

Breaking down silos in clinical operations and corporate functions leads to advanced collaboration

Organizational silos, created by manual processes and disconnected systems, is a barrier to collaboration across the continuum of care. By analyzing and interpreting information across silos, generative AI tools can enable more inter-department collaboration.

Total funding: $42.3M

- Carta Healthcare is a provider of clinical data management solutions.
- Cartographer (Carta's healthcare analytics platform) uses AI to look up, analyze, and interpret data from siloed systems such as EHR systems, medical imaging, pharmacies, and other sources.
- By applying natural language processing (NLP) to large volumes of patient data, Cartographer discovers patterns and offers recommendations.

Total funding: n/a

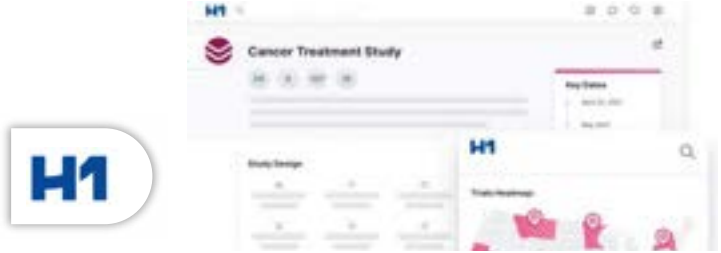
- HCA Healthcare is investigating the use of Med-PaLM in the patient handoff process between nurses. At most hospitals, this is a manual process. However, generative AI could summarize the patient's data and save the nurses time.
- HCA is currently testing the system in a cohort of 75 doctors in four hospitals, and plans to expand to more hospitals later this year as the automation improves.
- Google's Med-PaLM 2 is the company's medical version of its large language model called PaLM. While not yet publicly available, the HIPAA-compliant LLM is now being tested by several healthcare organizations.

AI enables clinical trials to move at a unified pace

Clinical trials typically take years. Innovative startups are now using generative AI to accelerate clinical trials to get life-saving treatments to market as quickly as possible. Enabling once slow-moving processes to match the speed of other elements of healthcare helps unify the entire system.

Total funding: $80M

- Unlearn uses generative machine learning to create digital twins of patients.
- Clinical trials can use these digital twins to simulate how a patient's health could change over time. It also allows for smaller control arms.
- Unlearn has partnered with Merck to use digital twins in clinical trials that are testing immunology treatments.

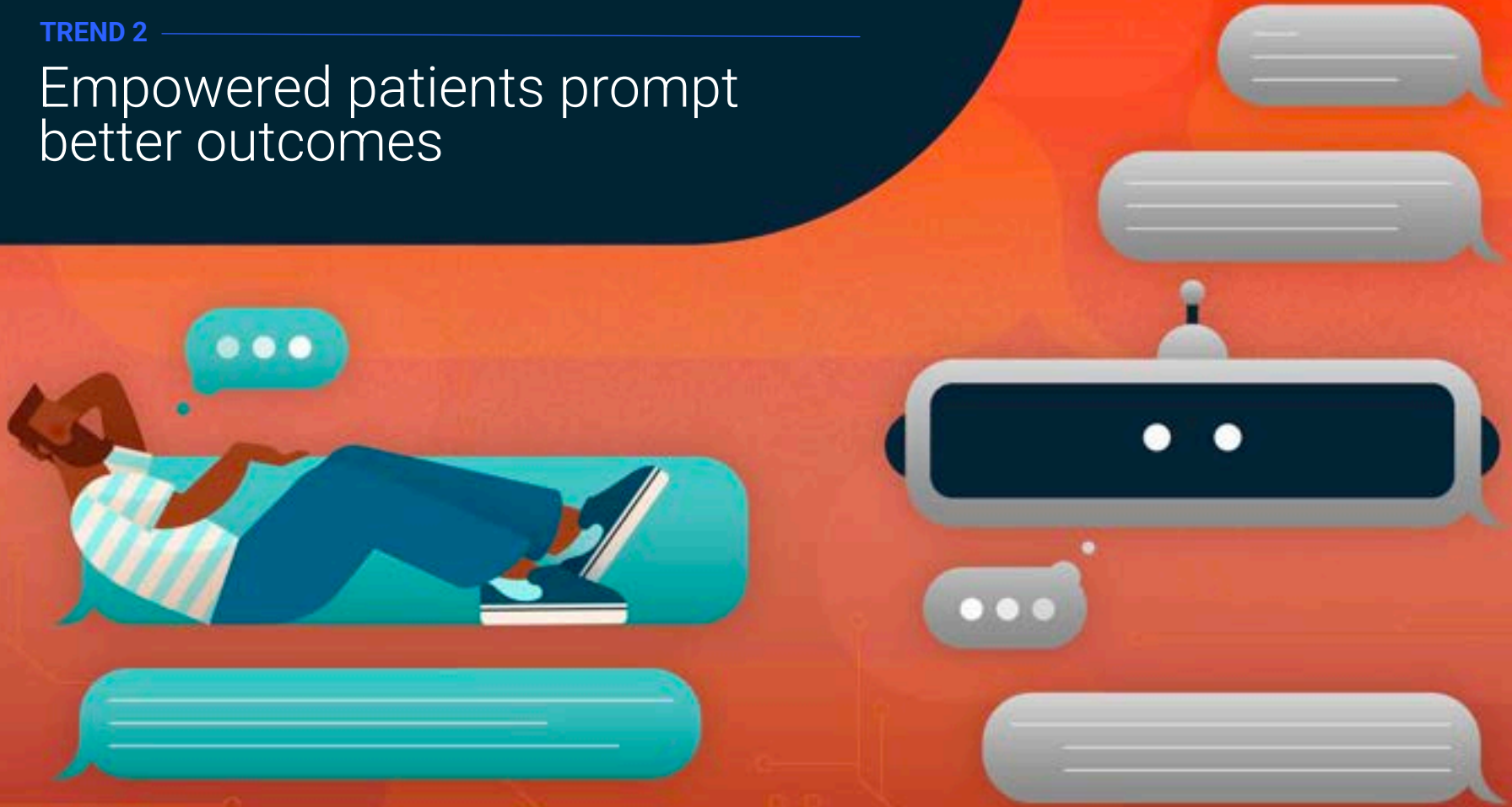


Total funding: $210M

- H1 is a global healthcare and data company leveraged by pharmaceutical companies and healthcare organizations to accelerate clinical trials and the development of drugs
- In October 2023, H1 announced GenosAI, boosting its flagship clinical trial intelligence platform with generative AI to accelerate clinical trials
- GenosAI enables pharma to look across vast data sets, simplify complex queries and accelerate clinical trial site and PI selection for faster launch.

TREND 2

Empowered patients prompt better outcomes



How is generative AI getting patients more involved in their own healthcare?

Many of generative AI's applications in healthcare are designed for providers, but patients are another core piece of the puzzle.

Supported by new AI tools, a future is possible where patients will move from being simply recipients of treatment to active participants in their care journey, leading to improved outcomes.

Next-gen chatbots will seamlessly communicate with patients about scheduling and medical bills while helping them find a healthcare provider that meets all of their needs.

AI symptom checkers will leverage and summarize vast amounts of data to help patients understand their conditions before they even set foot in a doctor's office. Generative AI models will help break down communication barriers between patients and providers, improving health literacy, and assistive technology will help patients with disabilities minimize the barriers they encounter in their day-to-day lives.

Together, these AI solutions will make it easier for patients to navigate and maximize the healthcare system, potentially deriving better engagement, experiences, and outcomes.

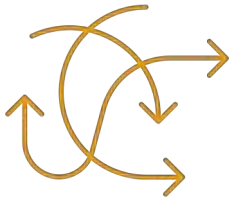
"At a time when health care costs are a growing concern for many [patients], our survey shows that they believe Generative AI may be the key to reducing costs, improving access, and leveraging it to improve their well-being."

Asif Dhar, M.D., Vice Chair and U.S. Life Sciences and Healthcare Industry Leader, Deloitte [Source]

Where is the momentum now?

As patients struggle to navigate and find support in the healthcare system, AI innovations are enhancing the patient experience.

Patients are fending for themselves over navigating healthcare systems.

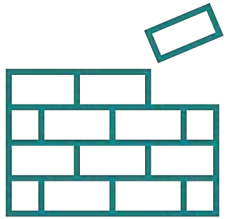


Nearly 40% of Americans feel unsupported in understanding their healthcare, while 70% say that the system is hard to navigate, per a study from Maestro Health. As a result, many patients look up their symptoms online, which may lead to misinformation.

Greater access to health information enables patients to better participate in their own care.

Patients who can review their physician's notes are more likely to adhere to their treatment plan than those who cannot.

Healthcare LLMs put patients in the center.



Hippocratic AI is building the first safety-focused large language model (LLM) for healthcare, allowing for more solutions to be designed specifically for patients.

Spotlighting key players

From helpful chatbots to patient education tools, AI startups and companies are empowering patients with knowledge and ease of access.

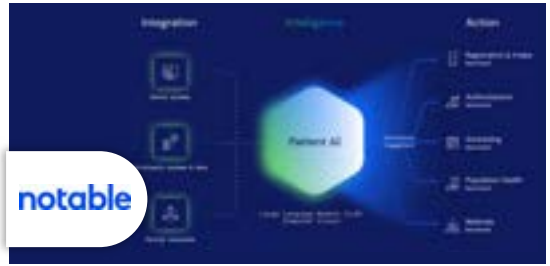
Featured in the Report

AI bots double as personalized patient assistants, tailoring navigation, access, and care

Convenient access to goods and services has become an integral part of everyday life. Naturally, patients now expect more convenience in their healthcare journey. AI chatbots facilitate easy access to health information, providers, and payors.

Total funding: $26.79M

- Sensely provides a conversational AI platform for patients, payors, pharmaceutical companies, and healthcare providers.
- The UK's National Health Service (NHS) leveraged Sensely to build an Ask NHS app. The app helps patients check their symptoms and refers them to the most appropriate next step.
- Sensely has also integrated ChatGPT into its Front Door Navigator solution, helping patients with insurance get quick answers to questions.



Total funding: $116.75M

- Notable's AI assistant helps patients pay their medical bills, schedule appointments, and navigate care.
- Patients can ask the assistant to show them a list with specific criteria, such as dermatologists in their area who speak Spanish, and the AI will return a list of providers. The patient can then either book an appointment or further refine their search with additional criteria.

Total funding: $119M

- Soul Machines is a startup designing intelligent and emotionally responsive AI avatars.
- The company teamed up with The World Health Organization (WHO) to launch the AI chatbot "Florence" to prevent the spread of false information about the COVID-19 pandemic.
- The updated version provides simple healthcare advice on nutrition, mental health, and quitting tobacco use.
- "Florence's" advice is based on verified and updated WHO information.

Dr. ChatGPT is the new Dr. Google

Search-based self-diagnosis is improving as generative AI startups, with the help of medical professionals, develop accurate, easy-to-use symptom checkers and trackers

Total funding: $66.22M

- Buoy Health's AI symptom checker is a chat-based solution that uses data points from research papers to identify potential health issues and guide patients in the right direction, such as seeing a doctor.
- Buoy has a team of medical writers and reviewers to provide accurate information.

Total funding: $2.79M

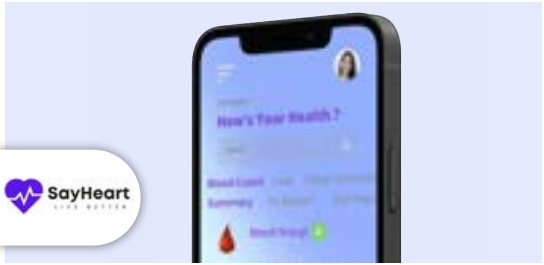
- Clearstep is a virtual healthcare assistant provider.
- One of its solutions is Virtual Triage, an AI symptom checker that boasts a triage accuracy of over 95%, according to Clearstep.
- After it checks the patient's symptoms, Virtual Triage offers online appointment scheduling if required.

Total funding: $167M

- Ada Health is a Berlin-based digital healthcare company.
- The Ada app combines symptom checking with tracking, helping patients monitor their symptoms over time.
- The app allows users to create separate profiles for multiple patients.

Generative AI breaks down communication barriers and improves health literacy

Language barriers can have a negative impact on the quality of care and decrease the satisfaction of patients. Medical jargon also creates a language barrier, even if all parties speak the same language. Patients without a medical background aren't likely to understand the clinical notes or their medical results. Generative AI breaks down these barriers by distilling complex terminology into simple sentences.

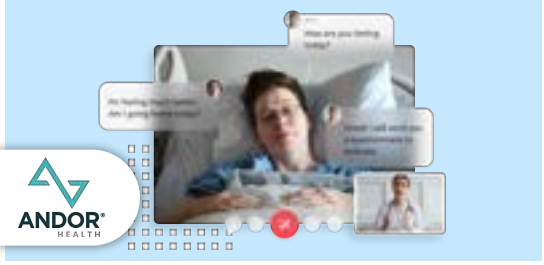


Total funding: n/a

- SayHeart is a Singapore- and Malaysia-based company that translates complex medical reports into easy-to-understand information.
- Described as a "personal AI health translator," it uses simple words and visuals to remove comprehension barriers.
- SayHeart can also analyze images such as X-rays and point out potential issues.

Total funding: $40M

- Vital has developed a medical translator that uses LLMs and NLP to break down complex terminology into simple language.
- It supports labs, clinical notes, imaging results, and other types of medical reports.
- The tool is free to use and doesn't require registration or installing an app to run.



Total funding: n/a

- Andor Health provides an interactive patient education solution.
- In addition to delivering doctor-approved educational content, AndorNow includes a virtual assistant that facilitates digital appointments.
- It can also provide important notifications and allow patients to fill out screening questionnaires.

Gen AI's closing of accessibility gaps has universal value

An estimated 1 billion people worldwide live with a disability. They may struggle to access everyday services, including healthcare, employment opportunities, and digital services. Generative AI has stepped in to improve accessibility and help all patients get the resources they need.

Total funding: n/a

- Be My Eyes is an app that allows people with visual impairments to connect with volunteers who help them complete simple tasks through a video call.
- The new Be My AI tool uses GPT-4 to analyze images and offer visual assistance.
- If it can't provide assistance, then it will offer the option to call a volunteer.

Total funding: n/a

- Our Ability is a New York-based company that helps people with disabilities find job opportunities.
- The Jobs Ability portal uses an AI chatbot to help job seekers get answers to questions about their skills, helping them get better recommendations.

Total funding: n/a

- UserWay specializes in helping companies improve their web accessibility.
- Fix My Code is the company's new generative AI tool to create accessible code.
- Developers can create accessible code by using conversational inputs or by directly pasting their code into the coding assistant.

TREND 3

In-practice solutions alleviate provider burnout

How is generative AI easing the burden on providers?

By the mid-2030s, the US will have a projected shortage of 124,000 physicians — all while the aging Baby Boomer population will need more medical care. Soon, providers will need tools to meet the demand and needs of their patients.

By using generative AI to augment operation flows within their practices, physicians will be able to streamline processes to create more time in their day to treat patients.

In a 2023 interview with the New York Times, a Tennessee-based family physician illustrated how AI streamlines his daily documentation of patient visits. Before AI, the doctor spent up to two hours on the process every day. Now, it takes only 20 minutes – an 83% decrease in time spent on documentation.

In addition to AI co-pilots, the technology supports effortless data retrieval, whether from EHR systems or vast volumes of medical literature.

These solutions contribute to workers' well-being and reduce burnout, which is threatening to deplete the healthcare system's workforce.

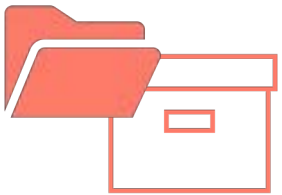
"Generative AI has the promise to revolutionize Optometry, freeing our doctors to focus more on patient care by providing insightful, data-driven diagnostics in a fraction of the time."

Kent Iglehart,
General Manager at Dr. Tavel

Where is the momentum now?

Paperwork and repetitive administrative tasks contribute to healthcare worker burnout. With AI, care providers can gain invaluable workflow improvements and can locate needed data in real time.

Providers spend excessive time on administrative tasks.



The average physician spends around 15 hours per week on administrative tasks, according to Medscape's Physician Compensation Report.

Healthcare is facing a staffing shortage as many providers consider leaving the industry.

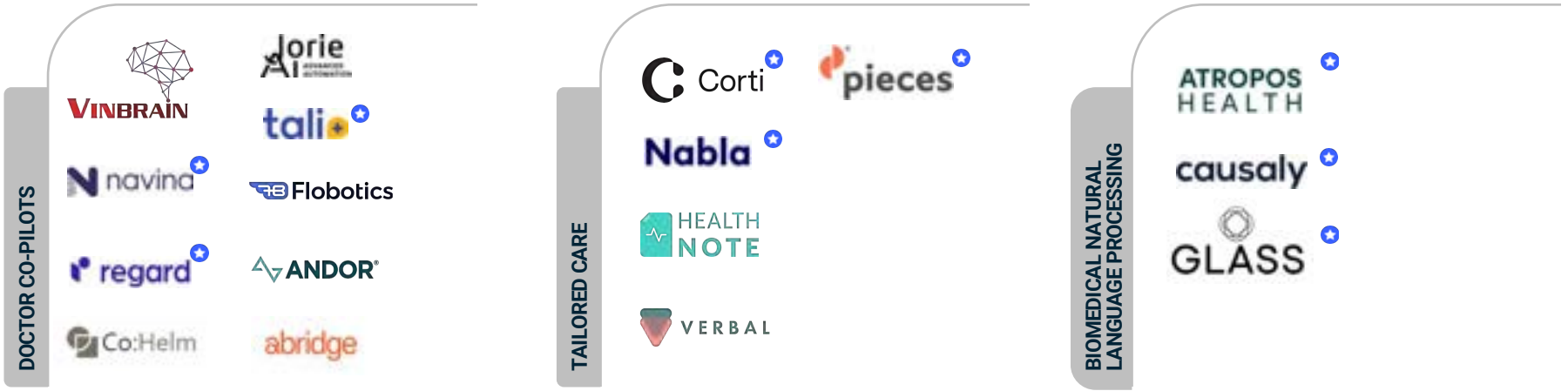
One in four clinicians is thinking about leaving the healthcare profession, with 89% naming burnout as the main reason, per a Bain and Company survey.

Workflows using generative AI let providers focus on what's most important.

In healthcare organizations that have already implemented AI, 78% of staff say that the technology has improved their workflow, according to the MIT Technology Review.

Spotlighting Key Players

Generative AI startups and companies are scaling administrative and front-of-house activities to help reduce burnout and moves us close to seamless care



Featured in the Report

Doctor co-pilots automate tedious administrative tasks

Doctors are spread thin between caring for patients and managing necessary administrative work. AI co-pilots assist in early detection screening, data retrieval, and updating medical notes.

Total funding: n/a

- Tali has developed an AI solution that can record patient conversations, take medical notes, and act as an Electronic Health Record (EHR) assistant.
- Using voice commands, physicians can ask the EHR assistant to retrieve the information they need from the patient's chart.
- Tali can also answer medical questions using data from verified sources such as OpenFDA.

Total funding: $44M

- AI company Navina uses data, machine learning, and natural language processing (NLP) to create "patient portraits."
- The portrait consists of data pulled from EHR systems, health information exchanges (HIE), claims, laboratories, and imaging.
- Healthcare providers can find all the critical patient information in one place, allowing them to be more efficient and improve the quality of care.

Total funding: $20.7M

- Regard is an LA-based company that leverages AI to streamline clinical processes.
- Its co-pilot integrates with EHR systems, analyzes patient data, provides diagnosis suggestions, and refreshes clinical notes.
- Instead of manually looking through a patient's records to better understand their condition, the co-pilot allows doctors to easily surface all relevant information.

Overworked providers leverage generative AI to deliver real-time personalized care

Generative AI is creating space for a more sustainable, tailored approach by offering personalized suggestions for next steps and automatically adjusting language to match a patient's preference.

Total funding: $87.1M

- Corti is an AI co-pilot for healthcare and emergency services.
- While listening to real-time patient calls, Corti makes suggestions for the next steps. Healthcare providers can additionally personalize Corti by selecting keywords that trigger a specific response.
- The AI automatically captures the patient consultation, allowing the doctor to tailor their approach to their precise needs.

Total funding: $20.2M

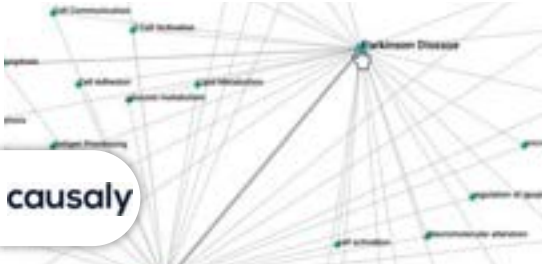
- Nabla's AI co-pilot listens to real-time virtual and face-to-face appointments, generating clinical notes.
- It also generates tailored patient notes in an easily understandable language.
- The Nabla Care Platform allows patients and doctors to communicate asynchronously over text or set up video calls. Instead of Googling an answer to a medical concern, a patient can send a message to their doctor and receive a quick response.

Total funding: $67.9M

- Pieces helps healthcare teams be more productive, reduce cognitive load, and stay aligned on a patient's status.
- It uses AI to generate a predicted discharge date, which helps lower overcrowding in hospitals and ensures there is enough staff.
- By reading a patient's EHR data, Pieces can make care suggestions, such as referring them to get an additional checkup.

Biomedical natural language processing makes it easier to access, digest, and activate vast amounts of medical data

Biomedical research generates over a million papers published in the PubMed database each year. By ingesting this data, natural language processing (NLP) makes biomedical research easily searchable, helping providers better leverage new intelligence.



Total funding: $90.7M

- Causaly is an AI-powered platform that allows providers, researchers, and scientists to quickly find the medical research they need.
- The AI ingests and interprets data from millions of documents found in medical journals and other types of research databases.
- This allows users to run efficient searches using simple keywords.

Total funding: $17.33M

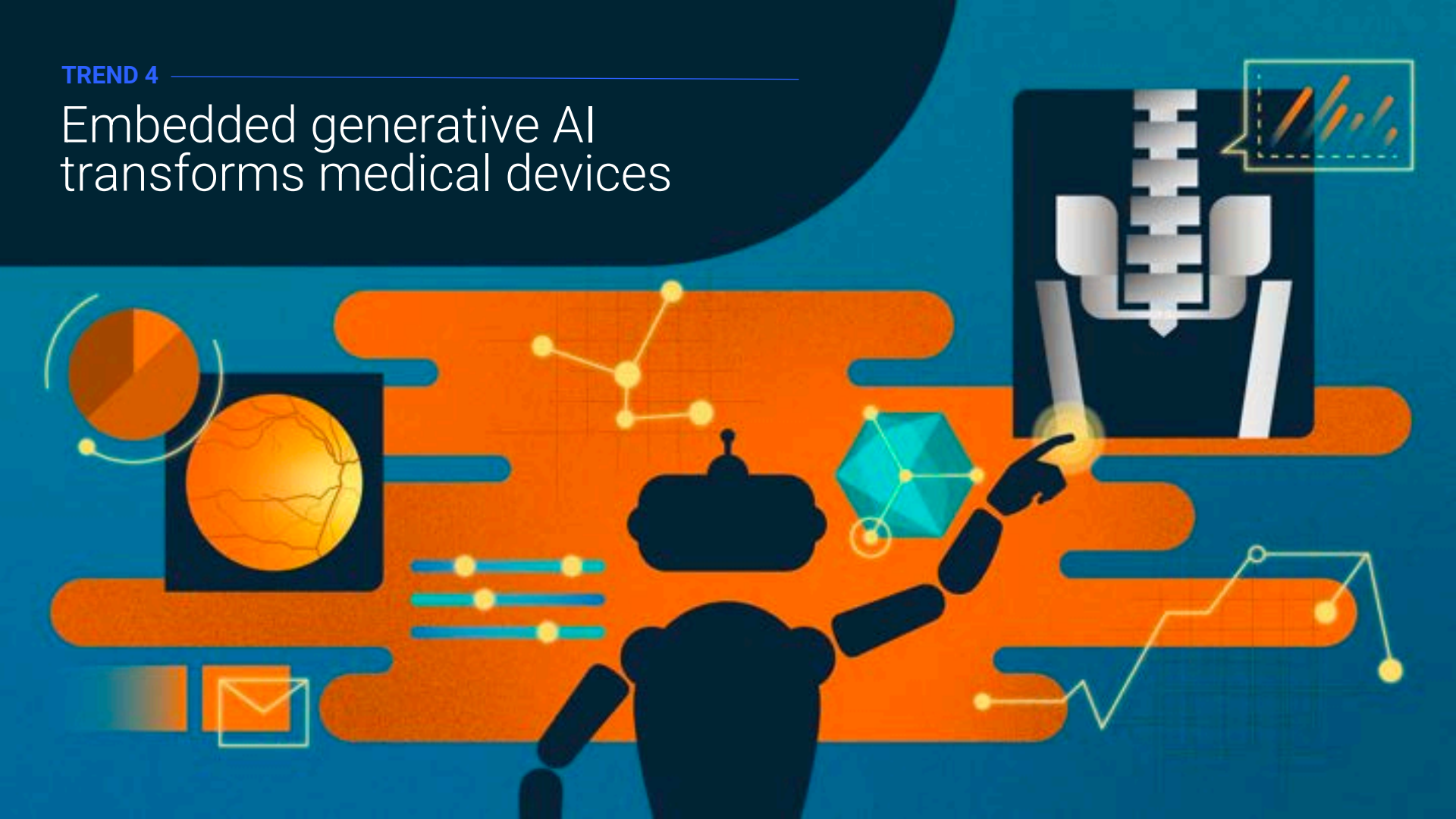
- Atropos Health develops a physician consultation service. It uses anonymized patient records and aims to help providers answer clinical questions that have fallen through the cracks of the evidence-based literature.
- Atropos Health empowers research and effective care delivery by leveraging insights from free-text notes and other non-standard data entries.

Total funding: $7M

- Glass Health provides a knowledge management system tailored to the way doctors learn, organize, and curate medical knowledge.
- The company helps accelerate clinical mastery, capture and connect learning, and share medical knowledge.
- Glass Health was part of the 2023 class of Y Combinator, the famed Silicon Valley startup accelerator.

TREND 4

Embedded generative AI transforms medical devices



How is generative AI transforming medical devices?

In healthcare, generative AI isn't limited to software solutions.

Artificial intelligence and generative AI are being embedded into medical devices to enable entirely new modalities of treatment.

Within medical imaging tools, generative AI presents opportunities to automate and improve the accuracy of medical image analysis, helping power precise diagnosis, treatment planning, and disease monitoring.

This enhancement within imaging has even extended to eye care. Earlier this year, researchers developed an AI model trained similarly to ChatGPT that can detect eye disease and risk of Parkinson's from retinal images captured by a fundus camera.

In the emergency room, generative AI is able to integrate with AI-powered surgical tools to help provide real-time, on-demand insights.

Lastly, generative AI-powered headsets are also enabling doctors to stay on top of patients' brain health and be vigorous in spotting any signs of neurodegenerative conditions.

While generative AI can help software accelerate and improve existing functionalities, it has the ability to help medical devices perform entirely new tasks and services.

"Generative AI should be as transformative to the core functions of our imaging center business as clinical or predictive AI will be to the delivery of our professional radiology services and population health screening."

Howard G. Berger, CEO with RadNet
(From Q2 2023 Earnings Call)

Where is the momentum now?

Researchers and startups are embedding AI and generative AI into medical devices to enable entirely new modalities of treatments.

Medical device companies leverage generative AI to personalize product design.

Engineers are using generative AI algorithms to adapt designs to specific patient needs. For example, Thailand-based Meticuly, a 3D printing med tech company, uses the technology to develop personalized bone implants.

Generative AI is transforming imaging, surgery, and prosthetics.

Generative AI imaging has emerged as a powerful tool in radiology, enabling the creation of detailed bio-models to assist in treatment planning and diagnosis. At the University of Hong Kong researchers have applied generative AI to create dental crowns with plans to expand to dentures and bridges.

Medical device startups continue to attract investor attention.

Throughout 2021 and in the first half of 2022, funding and deals continued to grow for AI medical device startups, even as funding activity in the rest of the market cooled, according to CB Insights.

Spotlighting key players

Startups are leveraging generative AI to develop tools across medical imaging, headsets, smart wearables, and tech that guide physician movements and analysis.

MEDICAL IMAGING

aidoc

NANOX

EXO

REWIRE AI

PHYSICIAN MOVEMENTS AND ANALYSIS

ACTIV SURGICAL

kaliber.ai

stryker

HEADSETS FOR BRAIN HEALTH

DiagnaMed

kernel

Featured in the Report

Medical imaging multiplies one test into many

In medical imaging, healthcare workers can apply generative AI to segment and synthesize images, predict health outcomes, and identify abnormalities across numerous health conditions.

Total funding: $233.6M

- Aidoc is an AI radiology company utilizing deep learning algorithms, including generative AI, to analyze medical images and assist radiologists in detecting abnormalities. The platform prioritizes urgent cases, helping clinicians get results faster.
- The AI is continuously running in the background so radiologists can remain focused on their top priorities.

Total funding: $116.74M before IPO

- Nanox has developed several products to improve the efficiency, cost-effectiveness, and accessibility of medical imaging.
- Nanox.AI uses algorithms to detect people with "asymptomatic undetected chronic disease" such as coronary artery calcification (CAC).
- In February 2023, Nanox announced a partnership with Nuance, a pioneer in conversational AI that has recently added advanced generative AI-capabilities to its portfolio of services, to improve early detection of chronic diseases with workflow-integrated AI.

Total funding: $307.6M

- Exo is the developer of a portable medical imaging device that enables care providers to take scans anywhere.
- With Exo AI, caregivers can quickly check their patient's lungs, thyroid, bladder volume, and cardiac ejection fraction. The tool can also check babies for hip dysplasia.
- The company recently released Exo Works, an intuitive point-of-care ultrasound workflow solution that streamlines documentation, billing, and quality assurance all from one platform.

AI-enabled surgical tools improve accuracy

Generative AI can be integrated into AI-enabled surgical tools to provide surgical insights. The technology can also help these tools scale training through the introduction of synthetic data.

Total funding: $102.4M

- Activ Surgical developed a digital surgery tool to help doctors avoid errors that could lead to serious complications.
- The tool uses AI and augmented reality to allow surgeons to see parts of the body that they otherwise couldn't, such as the passing of bodily fluids through tissue.
- The device also provides real-time on-demand surgical insights in the operating room, which can be augmented by generative AI.

Total funding: n/a

- Kaliber Labs is developing AI software to support arthroscopic surgery.
- One of its up-and-coming solutions will be an AI tool that supports different surgery capabilities, such as landmarking.
- Kaliber also uses generative AI to create anatomically and pathologically accurate synthetic surgical video data to improve surgery outcomes.

Smart headsets identify brain biomarkers and anomalies

Innovative startups are applying generative AI to headsets, which allows them to glean precise brain health insights from the data and generate personalized treatment plans.

Total funding: n/a

- DiagnaMed has developed CERVAI, a platform for brain health. It uses generative AI to predict and track a person's brainAGE.
- This allows care providers to stay ahead of neurodegenerative conditions or mental health issues.
- CERVAI uses ChatGPT to generate custom treatment plans.

Total funding: $153M

- Kernel is a neuroscience company that is researching biomarkers in the brain.
- The headset collects brain data, which is then analyzed using machine learning algorithms to generate new biomarkers.
- Kernel's insights help medical providers accelerate clinical trials, identify changes in brain health, and predict how a patient could respond to treatment.

TREND 5

"Big, bad AI" supports good behavior

Despite potential risks, how can generative AI promote ethical behavior and practices?

It's impossible to explore the promise of generative AI without acknowledging the potential risks, downsides, and misuses of the technology.

AI tools have been known to perpetuate bias, discriminate against certain demographics, pose privacy risks if trained on personal health information, hallucinate, or offer wrong answers with confidence.

However, AI also has the potential to do good, from improving bedside manners to protecting patient privacy. For example, Generative AI can create synthetic data that can be used as a proxy for real-world data at scale, safeguarding a patients' data privacy.

It can also support compliance processes by automating manual processes and minimizing the risk of human error. And some health systems are also testing AI to generate inclusive educational content that speaks to diverse populations, reducing healthcare inequity.

While it's critical for stakeholders across the entire healthcare ecosystem to avoid rushing to adoption before inherent risks are vetted and resolved, it's evident that generative AI can be leveraged to help catalyze ethical practices and behavior.

"These algorithms are showing us some of the biggest biases, mistakes, and challenges in modern healthcare. But by forcing us to recognize these issues, they're giving us the chance to fix and overcome them. We can build the right processes from the ground up. We can start to address bias and inequities. We can really make healthcare accessible to everyone."

Alex Lennox-Miller,
Lead Analyst at CB Insights

Where is the momentum now?

While there is skepticism regarding AI's potential to do good, startups are focusing on building and following ethical AI policies as the technology becomes more widespread.

Patients Often Prioritize Bedside Manner Over Quality of Care

According to an analysis of seven million patient reviews by Healthgrades, patients tend to focus more on personality and the quality of their relationship than the effectiveness of the care provider when assessing a doctor

Companies are working to address AI and ethical issues.

According to the Brookings Institute, roughly 75% of AI companies with over 50 employees have a policy about ethical AI.

Startups walk the talk of ethical AI policies.

Over half of companies with such a policy in place had at least one expensive business outcome (such as dismissing an employee or turning down business) as a result of following the policy, per the Brookings Institute.

Spotlighting key players

AI solutions that support algorithmic empathy, synthetic patient data, and greater compliance illustrate the power of AI to do good.

Featured in the Report

Algorithmic empathy boosts bedside manner

Many large language models are now smart enough to detect and mimic emotions such as empathy. In fact, a June 2023 NY Times story cited several physicians that are leveraging ChatGPT to improve their ability to communicate empathetically with patients.

Total funding: $14B

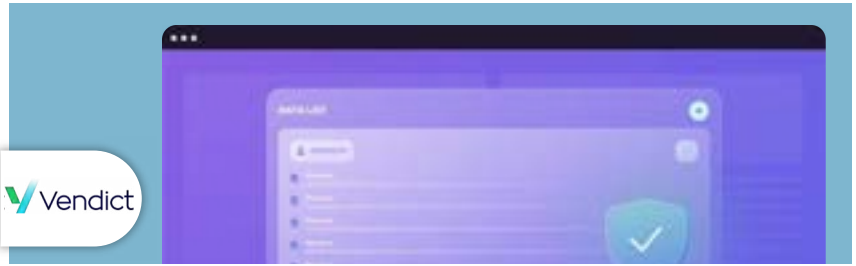
- Empathetic patient communication is one of ChatGPT's many use cases.
- A recent JAMA Internal Medicine report analyzed whether ChatGPT could answer patient questions with the same level of empathy and quality as real doctors.
- The chatbot outperformed doctors in both empathy and quality.

Total funding: $18.95M

- Hume AI provides science-backed vocal, facial, and language expression models and datasets.
- The platform gives technologies the ability to be empathic while designing expressive characters, optimizing a digital assistant or conversational artificial intelligence.
- The technology has been used in various healthcare settings, including in clinical trials.
- The startup raised $3M from the venture capital branch of Northwell Health to help its AI better understand language and nonverbal expression in healthcare.

Automated oversight may enforce existing compliance and consent requirements

Compliance procedures are key to protecting patients and healthcare organizations. Using generative AI, it's possible to automate certain compliance processes to reduce the risk of errors and remove the burden of manual tasks from employees.



Total funding: $9.5M

- Tel Aviv-based startup Vendict has built the first large language model (LLM) that can fill out security questionnaires on behalf of software vendors.
- Any digital health company that needs to complete a questionnaire to work with a healthcare provider can use Vendict to save time while avoiding errors. And on average, it makes the process 50 times faster than manual entry.
- Vendict prevents false information by creating citations for every answer it provides, enabling humans to double-check all information.

Total funding: $1.6M

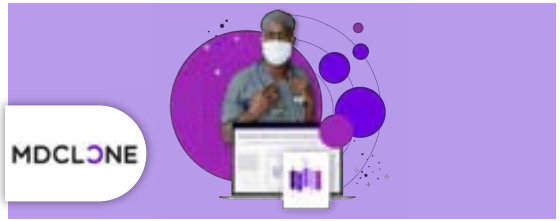
- Trustible is a platform for AI governance.
- It allows companies to build an inventory of all AI apps they are using, and categorize them by risk profile.
- AI and compliance teams can use the platform to collaborate on creating AI governance policies.
- Trustible also helps companies prepare for future changes in AI regulations by documenting their current AI policies and processes.

Synthetic patient data protects patient privacy

AI solutions that generate synthetic data, data that can be used as a proxy for real-world data, can safeguard a patients' data privacy. They are also a valuable tool for increasing the availability of data for small patient cohorts, helping advance research for rare illnesses and improving representation.

Total funding: $5.62M

- Syntegra generates synthetic patient data to accelerate clinical research and simplify data sharing while preserving privacy.
- Syntegra's AI model pulls structured patient data from EHR systems, clinical trials, and other sources.
- Statistically, the synthetic data is the same as the original data.



Total funding: $104M

- MDClone is an Israel-based healthcare data platform that offers a synthetic data solution.
- Users can compare the original data to the synthetic. Those with adequate permissions can easily access the original data on the same platform.
- Researchers found that MDClone's synthetic data is "sufficiently statistically similar" to the original data.

Total funding: n/a

- Statice is a synthetic data provider that serves the healthcare, insurance, and finance industries.
- During the generation process, Statice separates the original data set into groups and applies the most suitable deep-learning model to each group.
- It retains the statistical properties of the original data set and allows users to compare the original to the synthetic version.

Tailored health education that reflects diverse demographics reduces healthcare inequities

Health education is more effective and impactful if the audience can identify with the content. With generative AI, it's possible to personalize vast amounts of health content so that it resonates with patients from diverse populations. Doing so brings health education closer to underserved communities and reduces inequities.

Total funding: N/A

- CommonSpirit Health, a Chicago-based health system and the parent company of Mercy Healthcare, is testing out generative AI to tailor patient education.
- The health system's marketing team uses AI to generate new image designs based on the preferences of audiences in different locations.
- Beyond geographic location, generative AI could also create images that illustrate how a specific illness manifests on different skin tones or body types. When patients see themselves in educational content, it will be easier to recognize symptoms, understand their needs and illnesses, and make better choices that protect their health.

Our Call to Innovators

The trends highlighted in this report illustrate how the impact of generative AI could reverberate across the healthcare industry.

As the US population's healthcare needs increase, AI will take on the burden of time-consuming administration, assist in disease detection, and improve the quality of care. In addition, it will enable innovations that will transform access to and delivery of care.

At VSP Vision, we are constantly reimagining the way eye care and eyewear are delivered to the world. To fulfill this promise, the VSP Global Innovation Center (GIC) is actively seeking new startups and technologies to collaborate with on forward-looking innovations, especially around access to eye care. Interested in connecting? Let's talk.

GET IN TOUCH WITH US AT
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About the Producers

About VSP Global Innovation Center

At VSP Vision, our purpose is to empower human potential through sight. As the first and only not-for-profit vision benefits company in the United States, VSP has been the leader in health-focused vision care, providing affordable access to eye care and eyewear for more than 85 million members through a network of more than 41,000 providers.

The VSP Global Innovation Center (GIC) is VSP's lens into the future.

Through emerging technologies, new business exploration, and strategic connections within the innovation ecosystem, the GIC is a hub for reimagining the way eye care and eyewear are delivered to the world.

To learn more, please visit www.vspglobal.com/innovation

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