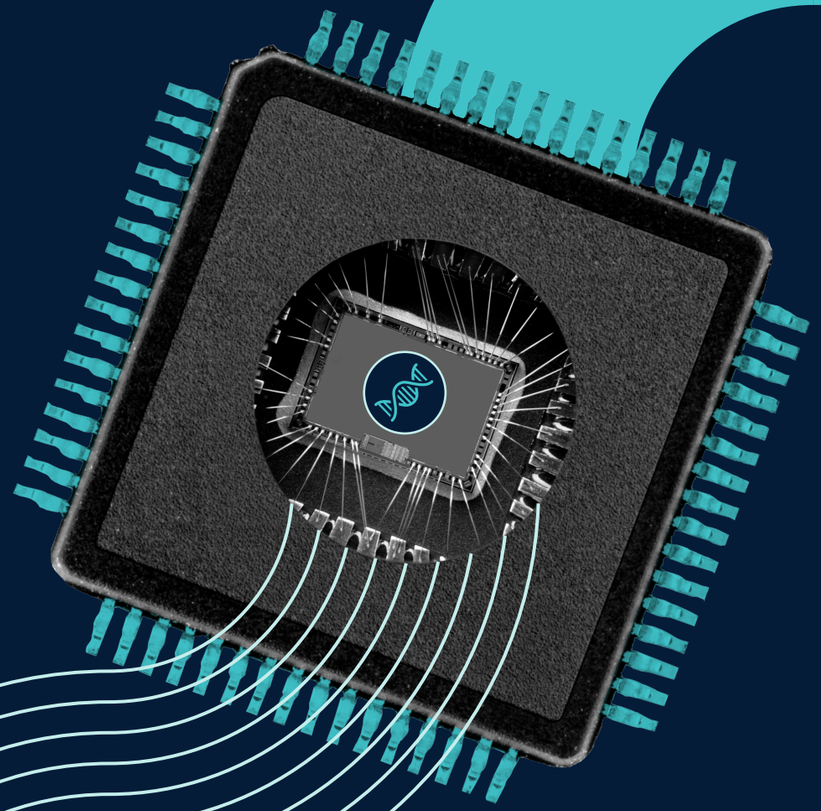
PitchBook

EMERGING TECH RESEARCH

AI Healthcare & Life Sciences VC Market Snapshot

VC trends and opportunities

2025



Contents

Institutional Research Group

Analysis

Kazi Helal, Ph.D. Senior Analyst, Biotech & Healthcare
kazi.helal@pitchbook.com
pbinstitutionalresearch@pitchbook.com

Aaron DeGagne, CFA Senior Analyst, Healthcare
aaron.degagne@pitchbook.com
pbinstitutionalresearch@pitchbook.com

Data

Collin Anderson Senior Data Analyst

Publishing

Report designed by **Drew Sanders** and **Chloe Ladwig**

Published on January 6, 2025

Introduction

AI has undergone a remarkable evolution over the past two decades, transforming industries and reshaping the healthcare & life sciences sectors. From the early days of Big Data analytics to the current era of generative AI, this progression has unlocked new possibilities for diagnostics, drug discovery, personalized medicine, and care delivery. The journey began with the Big Data era in the early 2000s, when AI focused on analyzing vast troves of electronic health records (EHRs), enabling predictive analytics for disease outbreaks and resource allocation. As deep learning techniques advanced, they were applied to medical imaging analysis, genomics interpretation, and drug target identification. This phase accelerated diagnostic accuracy and therapeutic research. The emergence of generative AI has further revolutionized healthcare. Personalized treatment plans can now be created based on individual patient data, while synthetic medical images enhance training datasets. Advanced natural language processing supports clinical decision-making, and generative models optimize drug development pipelines.

VC investment in AI-enabled healthcare & life sciences has surged since 2020, driven by these breakthroughs in data-driven therapeutics, diagnostics, and digital health platforms. Biotech firms leveraging computational biology and predictive modeling, medtech companies focused on clinical decision support and pioneering device engineering, and healthtech players offering digital care platforms have all attracted major financings. However, VC deal activity peaked in 2021 at $22 billion and has since normalized, with investors becoming more selective and emphasizing clinical validation and solid business models. Exit activity has followed a similar trajectory, with IPOs, SPACs, and acquisitions surging in 2020 and 2021 before cooling as companies now face more measured exit pathways.

AI is creating exciting opportunities across healthcare segments. In medtech, AI is enhancing remote patient monitoring (RPM), transforming disease detection and diagnosis through advanced imaging algorithms, and enabling earlier intervention. Firms are leveraging AI for surgical robotics, advanced imaging, and liquid biopsy tests. In biotech, AI is expediting drug discovery and development, with generative models creating novel molecular structures and AI-driven pharmatech companies optimizing clinical trials and pharmacovigilance. Companies such as insitro and Valo have raised mega-rounds, partnering with pharma giants to accelerate research & development (R&D). In healthtech, AI is reducing administrative burdens through ambient scribing and large language models (LLMs), personalizing mental health support, and driving more advanced adoption in areas such as clinical documentation. Players such as Transcarent and AliveCor are harnessing generative AI for patient navigation and at-home monitoring.

However, the path to realizing AI's full potential in healthcare has not been without challenges. High-profile failures such as Zymergen, Forward, Olive, Invitae, and Health IQ highlight the need for robust business models and clinical validation. Realizing AI's full potential still faces obstacles around commercialization, along with regulatory hurdles, data infrastructure limitations, and ethical concerns. The presence of Big Tech players is also intensifying competition. Industry consolidation has emerged as a response, with mergers such as Exscientia and Recursion Pharmaceuticals aiming to create global powerhouses in AI-driven drug discovery. This trend towards strategic partnerships and M&A activity underscores the importance of collaboration and resource sharing.

INTRODUCTION

Looking ahead, the true impact of AI in healthcare & life sciences will be determined by several critical factors. In pharmaceuticals, success hinges on the clinical validation of AI-discovered drug candidates. In medtech, companies must overcome regulatory challenges around data quality standards, while healthtech solutions face the ongoing challenge of establishing clinical confidence and efficacy. While these challenges exist, sustained investor interest signals enduring confidence in AI's transformative potential. The path forward requires navigating complex regulatory landscapes, solving integration challenges with existing systems, and demonstrating clear proof of real-world efficacy. With each iteration and lesson learned, the industry progresses toward meaningful AI-powered breakthroughs that enhance patient outcomes through personalized care, streamline healthcare delivery, and accelerate the development of lifesaving innovations. The fusion of artificial intelligence and healthcare expertise holds immense potential. The key now lies in channeling this potential into tangible, sustainable impacts that benefit all stakeholders across the healthcare ecosystem.

AI healthcare VC ecosystem market map

This market map is an overview of venture-backed or growth-stage companies that have received venture capital or other notable private investments as of Q3 2024.

Click to view the latest interactive map on the PitchBook Platform.

1 Medtech

Remote monitoring & portable care

BioIntelliSense, ELEMENT SCIENCE, SIBIONICS, eko, kernel, FOURIER, IMPACT VITALS, SkyLabs, nuvo, PEERBRIDGE HEALTH

Diagnostics & life sciences

TEMPUS, ULTIMA GENOMICS, Helix, DELFI, GENETRON, biodesix, 3DMed, Paige, Cytovale, Inflammatix

Surgical devices & tools

EDGE MEDICAL, monogram, Precision, restor3d, 长木谷, RONOVO SURGICAL, carlsmed, FIRE1, cortex

Nonsurgical medical treatments

ceribell, Airdoc, OVERJET, Olive Healthcare, accuryn, Pearl, Smartee, FORSIGHT ROBOTICS, Ember Labs, XP HEALTH

Medical imaging

cleerly, Lunit, 数坤科技 SHUKUN, aidoc, harrison.ai, EchoNous, InferVision, circle, Perspectum, qure.ai

2 Biotech

Traditional therapeutics (small molecules & biologics)

Recursion, Exscientia, Brii Biosciences, Generate:Biomedicines, insitro, Valo, Monte Rosa Therapeutics, Insilico Medicine, enveda

Advanced therapeutics (gene therapy & cell therapy)

OUTPACE, Taysha, CAMP4, deep genomics, arbor, Aspen, EVAXION, alltrna, 新合生物 NeoCura

Emerging therapeutics

FINCH, DEWPOINT, azitra, MANTRA BIO, BiomeBank, XBIOME, 零一生命, MYBIOTICS

Pharmatech (CRO, CDMO, CMO)

HUMAN LONGEVITY, zymergen, PRECISION MEDICINE GROUP, AbCellera, XtalPi, Schrödinger, DNAnexus, absci, SYNTHEGO, Thrive. Earlier Detection

3 Healthtech

Patients & consumers

transcarent, babylon, NOOM, Accolade, monogram health, FORWARD, Biofourmis, sword, k health

Providers/payers

eliza, SafeRide Health, Clearsense, NUNA, abacus insights, datavant, lup health, DIAGNOSTIC ROBOTICS

Healthtech providers

Olive, innovaccer, CHANGE HEALTHCARE, ABRIDGE, caresyntax, Clarify, iz.ai, inovalon, AUGMEDIX, LeanTaaS

Healthtech payers

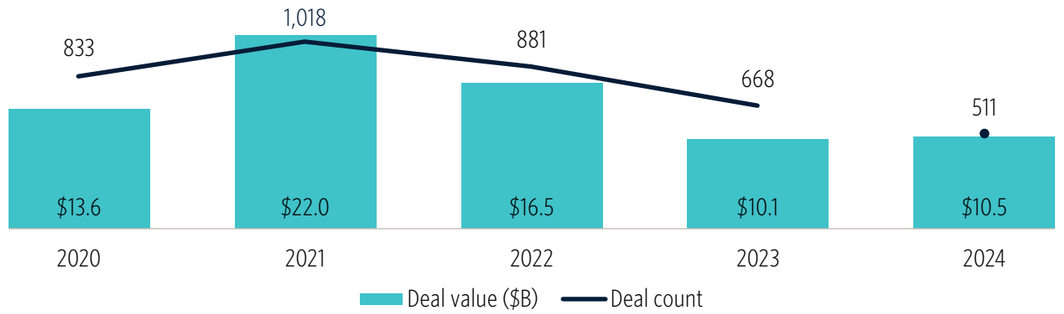
Welltok, Vi, zipari, AMS, Apixio, Clarity, CODOXO, DISCOVERY HEALTH PARTNERS, Wisedocs, SCIO health analytics

VC activity

VC activity in the AI-driven healthcare and life sciences sectors has undergone significant shifts over the past several years. These changes reflect both the enormous potential of data-driven therapeutics, diagnostics, and care models, as well as the market's natural recalibration following periods of intense optimism and capital inflow. AI healthcare VC deal activity reached a peak in 2021, when total funding hit $22 billion across 1,018 deals. Following that milestone, the industry entered a phase of normalization: Deal values declined to $16.5 billion in 2022 and then to $10.1 billion in 2023. In the first three quarters of 2024, deal values held relatively steady, though the number of deals declined, suggesting a greater concentration of capital in fewer transactions. This shift likely reflects a range of factors, including macroeconomic headwinds, the end of an exuberant funding cycle, and more discerning investor behavior that favors larger, more strategic bets. However, new opportunities may emerge in 2025 with the incoming Trump administration and a Republican-led Congress, potentially reshaping the regulatory and funding landscape for AI in healthcare.

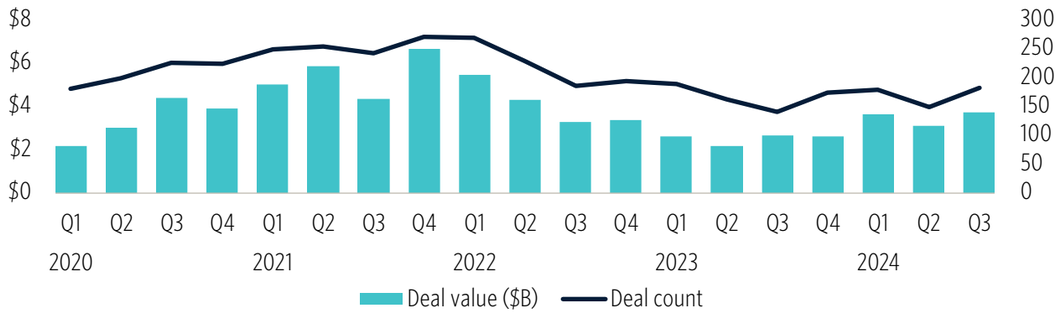
Since 2020, AI-enabled healthcare startups have attracted significant funding across key sectors. In biotech and pharma, companies such as insitro, XtalPi, Generate:Biomedicines, Zymergen, and Valo have secured massive late-stage rounds—frequently surpassing hundreds of millions of dollars—backed by major institutional investors such as CPP Investments, OrbiMed, and Baillie Gifford. These investments reflect growing confidence in computational biology and predictive modeling capabilities, with corporate venture arms such as Nvidia's NVentures and Alphabet's GV emerging as influential early-round investors. In medtech, Tempus AI has demonstrated the potential of genomic data and clinical decision support, raising multiple late-stage rounds at multibillion-dollar valuations, while Neuralink's $323.2 million Series D round from Founders Fund highlights investor appetite for frontier technologies combining AI and device engineering. The healthtech sector has seen similar momentum, with companies such as Noom securing a $540 million Series F from Silver Lake, and Monogram Health raising a $375 million Series C with participation from CVS Health and Humana—deals that underscore strategic interest in digital care delivery and care management solutions.

AI healthcare VC deal activity



Source: PitchBook • Geography: Global • As of September 30, 2024

AI healthcare VC deal activity by quarter



Source: PitchBook • Geography: Global • As of September 30, 2024

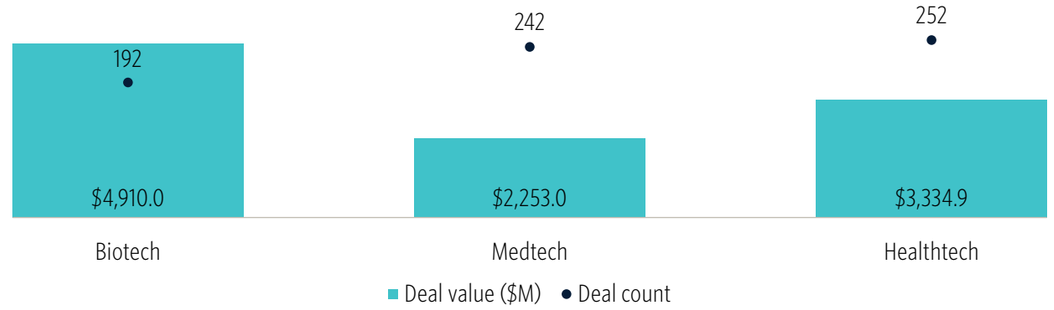
VC ACTIVITY

Segment-specific data from the trailing 12 months underscores biotech's leadership, with $4.9 billion raised across 192 deals. Medtech follows with $2.2 billion secured over 242 deals. Healthtech—encompassing RPM, care management tools, and analytics—also demonstrates strong momentum, raising $3.3 billion through 252 deals. Meanwhile, pharmatech, focused on streamlining drug R&D via AI-driven platforms, and healthcare IT, dedicated to addressing administrative and interoperability challenges, round out the sector's landscape. Although certain segments attract more capital than others, all benefit from the overarching thesis that AI will accelerate drug development, improve diagnostics, and enhance overall healthcare quality.

A similar pattern emerges in the exit environment. After negligible exit values in earlier years, healthcare VC exits surged to $24.3 billion in 2021 across 52 exits. Fueled by enthusiastic public markets, IPOs, SPACs, and a wave of acquisitions, this period provided lucrative liquidity events. Since 2021, exits have moderated. By 2023 and into 2024, exit values plummeted, and investors demanded greater clinical validation and robust commercialization strategies before enabling new exit pathways.

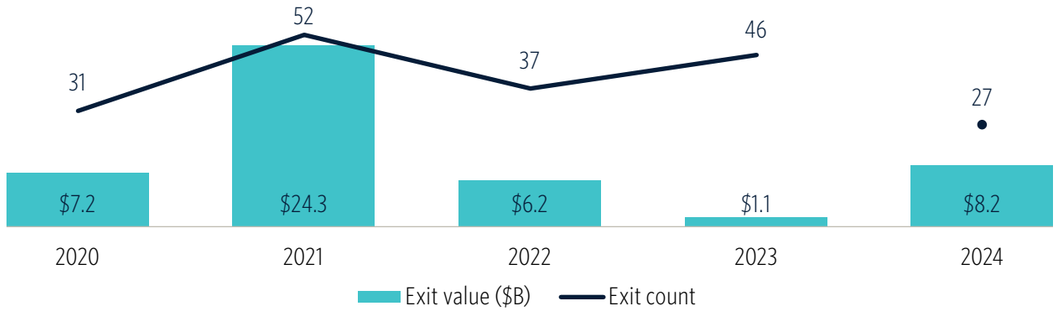
Overall, the AI-enabled healthcare sector continues to evolve along distinct trajectories. While traditional AI applications are experiencing a market rebalancing focused on fundamentals and proven outcomes, newer technologies such as generative AI are riding a wave of heightened enthusiasm and investment interest. This bifurcation suggests that companies achieving clinical validation, demonstrable scalability, and verified outcomes in established AI applications will be best positioned for long-term success, while generative AI solutions will benefit from market optimism despite being earlier in their development cycle. However, a key risk emerging in this landscape is the potential consolidation of market power among a few dominant players, which could limit innovation and competition in the future.

AI healthcare VC trailing 12-month deal activity by segment



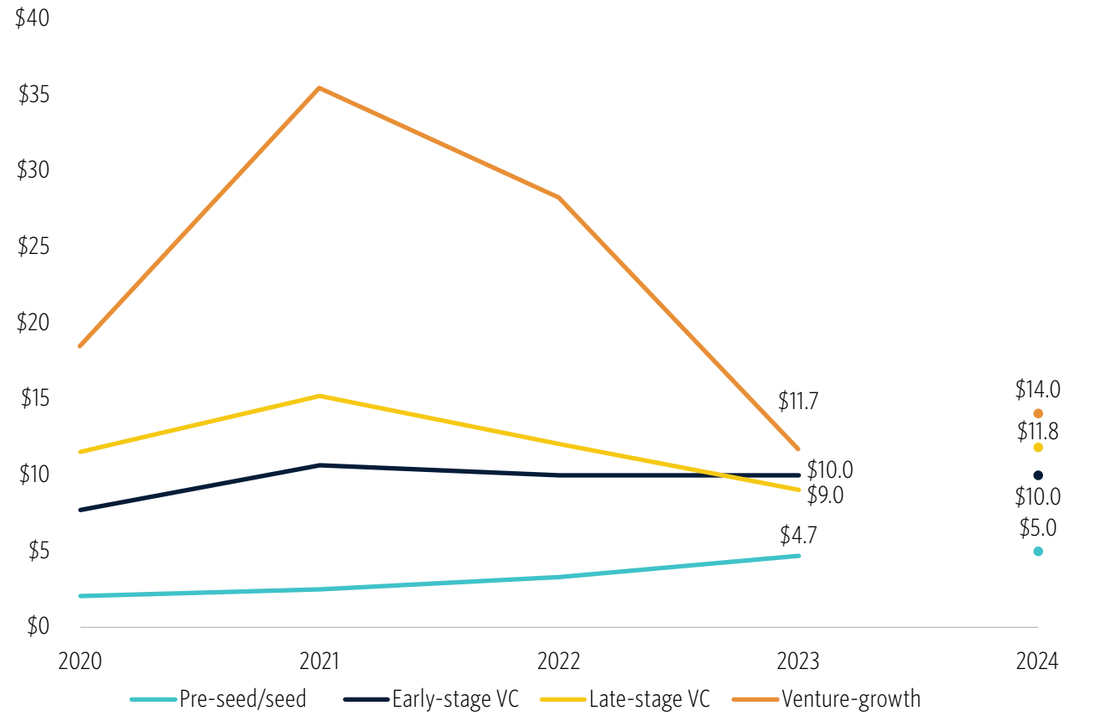
Source: PitchBook • Geography: Global • As of September 30, 2024

AI healthcare VC exit activity



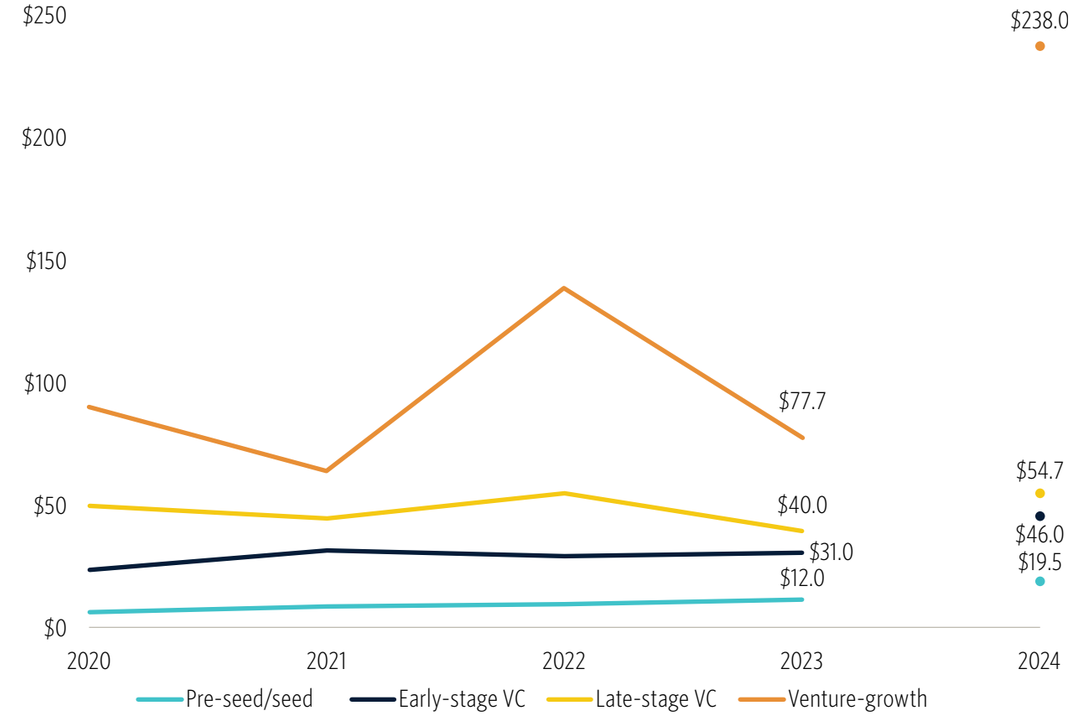
Source: PitchBook • Geography: Global • As of September 30, 2024

AI healthcare Median VC deal value ($M) by stage



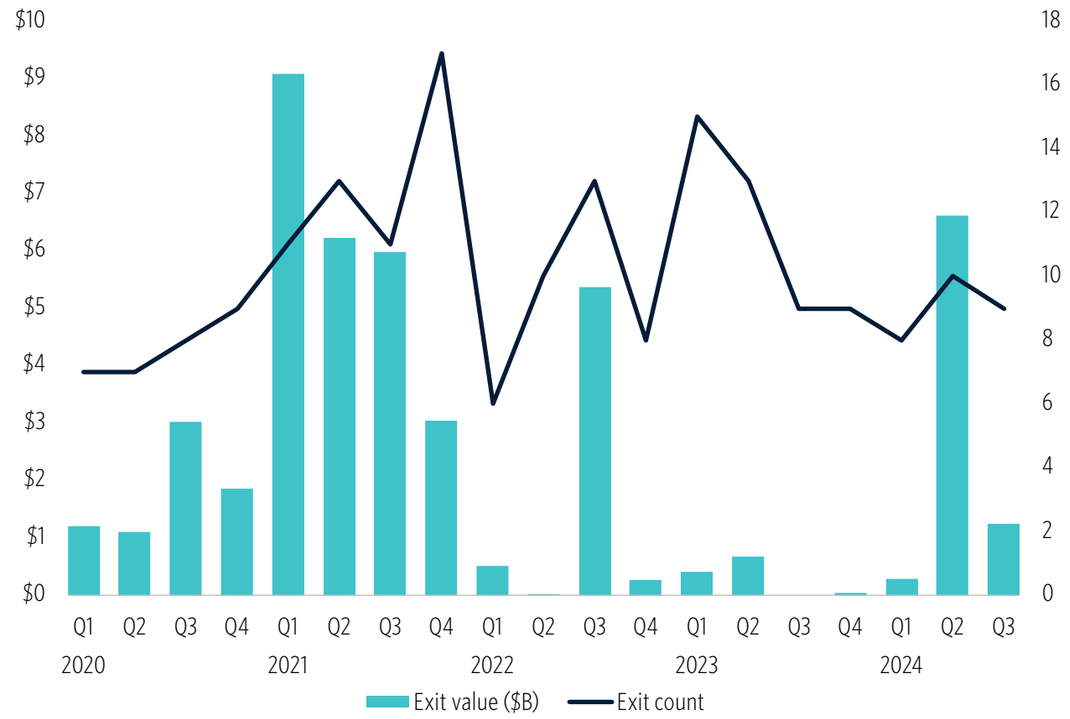
Source: PitchBook • Geography: Global • As of September 30, 2024

AI healthcare median VC pre-money valuation ($M) by stage



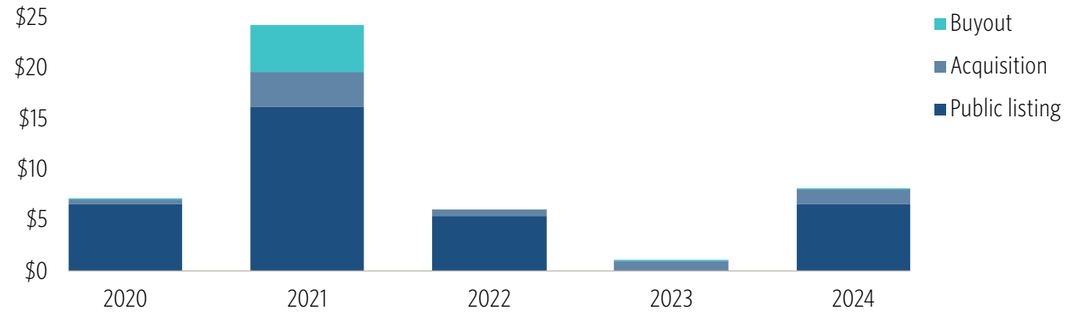
Source: PitchBook • Geography: Global • As of September 30, 2024

AI healthcare VC exit activity by quarter



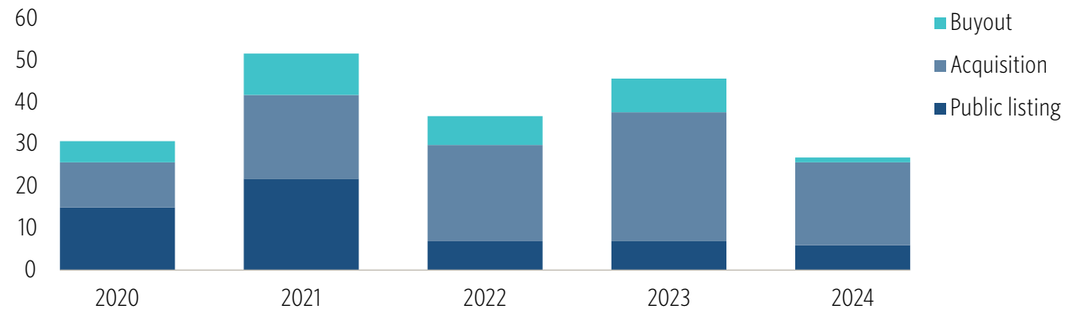
Source: PitchBook • Geography: Global • As of September 30, 2024

AI healthcare VC exit value ($B) by type



Source: PitchBook • Geography: Global • As of September 30, 2024

AI healthcare VC exit count by type



Source: PitchBook • Geography: Global • As of September 30, 2024

Top AI healthcare early-stage VC deals by value ($M) since 2020

Company	Close date	Deal value ($M)	Category	Location	Lead investor(s)
MGI Tech	April 16, 2020	$1,000.0	Pharmatech	Shenzhen, China	IDG Capital
Treeline Biosciences	August 19, 2024	$421.8	Traditional therapeutics	Watertown, US	Andreessen Horowitz
Mirador Therapeutics	March 21, 2024	$400.0	Traditional therapeutics	San Diego, US	ARCH Venture Partners
Generate:Biomedicines	November 18, 2021	$370.0	Traditional therapeutics	Somerville, US	N/A
Valo	March 11, 2021	$330.0	Traditional therapeutics	Lexington, US	Public Sector Pension Investment Board
Digital China Health	February 1, 2020	$288.6	Providers/payers	Beijing, China	N/A
Treeline Biosciences	October 11, 2022	$261.3	Traditional therapeutics	Watertown, US	Kohlberg Kravis Roberts
Thrive Earlier Detection	July 24, 2020	$257.0	Pharmatech	Cambridge, US	Casdin Capital, S32
Delfi Diagnostics	July 18, 2022	$225.0	Diagnostics & life sciences	Baltimore, US	DFJ Growth
Genesis Therapeutics	August 25, 2023	$224.0	Traditional therapeutics	Burlingame, US	Andreessen Horowitz

Source: PitchBook • Geography: Global • As of September 30, 2024

Top AI healthcare late-stage VC deals by value ($M) since 2020

Company	Close date	Deal value ($M)	Category	Location	Lead investor(s)
insitro	April 7, 2021	$400.0	Traditional therapeutics	South San Francisco, US	CPP Investments
XtalPi Technology	August 11, 2021	$380.0	Pharmatech	Shenzhen, China	5Y Capital, OrbiMed
Monogram Health	January 9, 2023	$375.0	Patients & consumers	Brentwood, US	CVS Health, Frist Cressey Ventures, Humana, KCK MedTech, Memorial Hermann Foundation, Norwest Venture Partners, TPG
Formation Bio	June 26, 2024	$372.0	Pharmatech	New York, US	Andreessen Horowitz
Neuralink	November 22, 2023	$323.2	Surgical devices & tools	Fremont, US	Founders Fund
Caresyntax	July 26, 2024	$310.0	Healthtech providers	Larkspur, US	PFM Health Sciences
Doc.com	January 5, 2024	$300.0	Patients & consumers	New York, US	N/A
Vyripharm	October 28, 2021	$300.0	Traditional therapeutics	Houston, US	N/A
XtalPi Technology	September 28, 2020	$288.8	Pharmatech	Shenzhen, China	5Y Capital, PICC Capital Investment Management, SoftBank Investment Advisers
Generate:Biomedicines	September 6, 2023	$273.0	Traditional therapeutics	Somerville, US	Durable Capital Partners

Source: PitchBook • Geography: Global • As of September 30, 2024

Top AI healthcare VC exits by value ($M) since 2020

Company	Close date	Exit value ($M)	Category	Location	Valuation step-up (post to exit valuation)
Tempus AI	June 14, 2024	$5,719.2	Diagnostics & life sciences	Chicago, US	0.6x
MGI Tech	September 9, 2022	$4,731.0	Pharmatech	Shenzhen, China	N/A
Doc.ai	February 23, 2021	$4,400.0	Patients & consumers	Palo Alto, US	N/A
Zymergen	April 22, 2021	$2,536.1	Pharmatech	Emeryville, US	1.2x
Recursion Pharmaceuticals	April 16, 2021	$2,312.0	Traditional therapeutics	Salt Lake City, US	2.2x
Exscientia	October 1, 2021	$2,298.1	Traditional therapeutics	Oxford, UK	N/A
Thrive Earlier Detection	January 5, 2021	$2,190.0	Pharmatech	Cambridge, US	3.2x
Brii Biosciences	July 13, 2021	$1,703.8	Traditional therapeutic	Beijing, China	N/A
GeneDx Holding	July 22, 2021	$1,563.0	Nonsurgical medical treatments	Stamford, US	1.4x
Relay Therapeutics	July 16, 2020	$1,337.5	Traditional therapeutics	Cambridge, US	1.6x

Source: PitchBook • Geography: Global • As of September 30, 2024

Top strategic acquirers in AI healthcare companies by deal count since 2020

Acquirer	Deal count	Investor type
Eli Lilly and Company	11	Corporation
Revelation Pharma	10	PE-backed company
Dedalus	8	PE-backed company
Biosynth	8	PE-backed company
Novartis	8	Corporation
Merck & Co.	8	Corporation
Netsmart Technologies	7	PE-backed company
Symplr	7	PE-backed company
Intelerad Medical Systems	7	PE-backed company
Thermo Fisher Scientific	7	Corporation
AbbVie	7	Corporation

Source: PitchBook • Geography: Global • As of September 30, 2024

Top AI healthcare VC investors by deal count since 2020

Company	Deal count	Pre-seed/ seed	Early-stage VC	Late-stage VC	Venture growth	Investor type
Gaingels	70	21	21	22	6	VC
Alumni Ventures	60	16	16	27	1	VC
SOSV	59	31	10	17	1	VC
Khosla Ventures	54	6	13	29	6	VC
Casdin Capital	45	1	26	13	5	VC
Andreessen Horowitz	40	7	17	13	3	VC
GV	39	1	20	10	8	CVC
HongShan	36	2	21	11	2	VC
5Y Capital	32	3	22	7	0	VC
Alexandria Venture Investments	32	4	23	4	1	VC

Source: PitchBook • Geography: Global • As of September 30, 2024

Top AI healthcare VC-backed companies by total VC raised to date

Company	VC ($M) raised to date	Segment	Category	IPO probability	M&A probability	No exit probability
Freenome	$1,352.4	Medtech	Diagnostics & life sciences	96%	2%	2%
Treeline Biosciences	$894.7	Biotech	Traditional therapeutics	78%	20%	2%
Generate:Biomedicines	$708.0	Biotech	Traditional therapeutics	93%	5%	2%
Neuralink	$687.1	Medtech	Surgical devices & tools	93%	5%	2%
Noom	$668.7	Healthtech	Patients & consumers	76%	20%	4%
insitro	$643.2	Biotech	Traditional therapeutics	83%	15%	2%
Nimbus Therapeutics	$637.0	Biotech	Traditional therapeutics	86%	12%	2%
Innovaccer	$625.6	Healthtech	Healthcare providers	82%	16%	2%
Formation Bio	$618.8	Biotech	Pharmatech	93%	5%	2%
Human Longevity	$587.8	Biotech	Pharmatech	91%	7%	2%

Source: PitchBook • Geography: Global • As of September 30, 2024
Note: Probability data is based on PitchBook VC Exit Predictor methodology.

Opportunities

Biotech

Drug discovery & development: Biotech companies increasingly rely on AI to expedite drug discovery, using generative models to create novel molecular structures and shorten lead optimization timelines. Innovators such as Insilico Medicine and Recursion Pharmaceuticals focus on de novo drug design, including complex biologics aimed at chronic diseases and challenging cancers. Partnerships between AI-driven startups and pharma giants (for example, Gilead Sciences collaborating with Genesis Therapeutics) accelerate the development and commercialization of AI-designed therapeutics.

AI pharma contract research organization (CRO) services: Within the pharmatech sector, AI is increasingly instrumental in optimizing clinical trials and strengthening pharmacovigilance. By analyzing large datasets—ranging from patient registries and EHRs to real-world evidence—AI-powered platforms streamline trial design, site selection, and patient enrollment, reducing timelines and costs. Concurrently, advanced algorithms enhance post-market safety monitoring by rapidly reviewing literature, adverse event reports, and patient feedback to identify and manage drug-related risks. As AI is more deeply integrated into the pharmatech ecosystem, it holds the promise of more efficient studies, better-informed clinical decisions, and a proactive approach to patient safety.

Medtech

RPM: In medtech, AI-driven RPM solutions enhance data analysis from connected devices and wearables, improving patient care outside clinical settings. For example, AliveCor's FDA-approved electrocardiogram (ECG) tools detect arrhythmias and predict cardiac events, while Sword Health's Phoenix platform employs conversational AI for real-time musculoskeletal therapy guidance. By integrating AI with hospital-at-home programs and chronic disease management, medtech innovators reduce readmissions and improve outcomes.

AI for diagnostics and imaging: AI is transforming how clinicians detect and diagnose diseases. Prenuvo and Ezra Health leverage AI in whole-body MRI screenings to identify conditions such as cancer at earlier, more treatable stages. In neurology, AI-enabled imaging algorithms can detect Alzheimer's disease and Parkinson's disease years before traditional methods. Furthermore, advanced precision medicine diagnostics—such as Guardant Health's Guardant360 liquid biopsy test—use AI to guide personalized cancer treatments. Tempus AI is the bellwether for the space given its recent strong IPO.

Healthtech

Healthcare IT & clinical documentation: Within healthtech, AI reduces administrative burdens and enhances clinical efficiency. Ambient scribing tools from companies such as Abridge improve documentation accuracy while freeing clinicians to focus on patient care. Emerging healthcare-specific LLMs and knowledge graphs—developed by Hippocratic AI and HOPPR—surface critical patient information and may soon offer diagnostic and treatment suggestions, driving more advanced AI adoption in healthcare IT.

Mental health care: Healthtech solutions extend AI's impact into mental health by increasing access and personalization. Chatbots from companies such as Wysa and Woebot Health provide immediate, evidence-based support to reach underserved populations. Platforms such as Spring Health leverage AI-driven patient-provider matching and personalized care pathways to improve engagement, adherence, and outcomes, making mental health care more responsive and inclusive.

Risks and considerations

Commercialization challenges: AI-driven innovations are reshaping biotech, medtech, and healthtech, but proving clear clinical superiority remains an uphill battle. In biotech, AI-generated drugs have reached late-stage clinical trials but have yet to decisively outperform traditional methods, slowing provider and investor enthusiasm. Medtech solutions—such as AI-assisted diagnostic devices or surgical planning tools—require seamless integration into existing hospital workflows and equipment, and providers may resist adopting new hardware or software platforms without evidence of improved clinical or operational outcomes. Healthtech offerings such as AI-enabled telehealth platforms or EHR add-ons must demonstrate tangible value in patient satisfaction, cost savings, and workflow efficiency to overcome provider skepticism. Across all three sectors, healthcare organizations often prefer incremental enhancements to existing systems over standalone solutions from early-stage AI startups, complicating market entry. The venture funding environment for healthcare AI—spanning biotech, medtech, and healthtech—has trended toward later-stage investments, making early capital hard to secure. Without established credibility, younger companies struggle to gain traction, especially when health systems increasingly seek robust, integrated AI solutions rather than one-off point tools.

Regulatory barriers: In biotech, AI-driven drug discovery and development face extensive regulatory scrutiny due to the complexity of validating safety, efficacy, and clinical benefit. For medtech companies developing AI-enabled implants, robotics, or diagnostics, navigating agencies such as the US Food and Drug Administration involves proving algorithmic reliability, cybersecurity safeguards, and consistent performance across diverse patient populations. Healthtech platforms that handle large volumes of patient data—whether for RPM, virtual consultations, or population health management—must comply with stringent data protection regulations (such as the US Health Insurance Portability and Accountability Act, for example) and ensure secure data handling. Lengthy regulatory approval processes may delay time to market for AI-based diagnostics and personalized therapeutics, resulting in higher R&D costs. This uncertainty makes it challenging for startups in all three segments to forecast timelines, secure funding, and maintain market momentum. However, things may dramatically change with the new US presidential administration this year.

Technical and integration challenges: Data infrastructure limitations cut across biotech, medtech, and healthtech. Biotech companies need high-quality datasets to train AI models for drug discovery or gene editing targets, but obtaining standardized, interoperable data is difficult. Medtech firms implementing AI in surgical tools, imaging systems, or wearable monitors must ensure their solutions integrate smoothly with hospital IT frameworks and clinical workflows. Healthtech solutions such as AI-enabled decision support or automated care coordination face prolonged integration cycles—often extending 12 to 18 months—due to the complexity of EHR interoperability, payer data feeds, and legacy IT systems. Moreover, payers and health systems are wary of additional cloud service and data storage costs associated with new AI applications. Traditional per-member-per-month or licensing-based pricing models may not align with the volume-based or usage-based pricing structures favored by AI vendors, causing friction in adoption and budgeting.

RISKS AND CONSIDERATIONS

Potential for bias: Biotech applications of AI, such as predictive models for patient stratification in clinical trials, must address potential biases and ensure ethical patient selection. In medtech, AI-assisted surgical or diagnostic tools raise questions about liability when errors occur: Should responsibility fall on the surgeon, the device manufacturer, or the algorithm developer? Healthtech solutions that automate claims adjudication or care pathways can face legal scrutiny if algorithms inadvertently discriminate against certain patient groups or if insurers use them to deny medically necessary treatments.

Safety concerns: Safety guardrails are critical, especially for solutions handling sensitive health data or mental health conditions. Oversight and clear governance models are necessary to ensure that human clinicians remain integral to decision-making, preventing overreliance on algorithms that may not fully capture clinical nuance.

Competitive landscape: Large tech players such as Alphabet, Apple, Amazon, Nvidia, and Microsoft are embedding AI-driven functionalities across all healthcare segments. Their forays into biotech may include tools that accelerate drug discovery through computational biology; in medtech, they partner with device manufacturers to embed AI into wearables, imaging, and robotic surgery platforms; and in healthtech, they leverage large user bases to launch AI-driven telemedicine, RPM, and clinical decision support tools. This Big Tech presence intensifies competition and sets higher standards for performance, scalability, and integration. Commoditization risks arise when multiple vendors offer similar AI-driven solutions—be it AI scribing tools in healthtech, AI-enabled imaging analysis in medtech, or algorithmic target identification in biotech. This can trigger price wars, reduce profit margins, and make differentiation challenging. Providers and payers, already overwhelmed by an abundance of point solutions, may resist adopting new entrants' offerings, pushing smaller startups to form strategic partnerships or focus on niche applications. In essence, standing out requires robust clinical evidence, validated return on investment, seamless integration, and strong data governance—factors that continue to be barriers for many AI players in biotech, medtech, and healthtech alike.

Market segmentation

AI biotech (biopharma, pharmatech)

The biotech sector is undergoing a profound transformation as AI & machine learning (ML) tools integrate with traditional laboratory science, unlocking new paths to understanding disease mechanisms, discovering therapeutics, and accelerating the journey from concept to clinic. This AI-driven revolution enables faster identification of novel targets, more accurate prediction of drug behavior, and more efficient clinical trial design. From small-molecule drugs to cell-based therapies, and from diagnostics to manufacturing, AI's analytical prowess is reshaping how the biotech industry advances precision medicine and improves patient outcomes.

Traditional therapeutics (small molecules & biologics): Traditional therapeutics, including small molecules & biologics, benefit significantly from AI-driven discovery and optimization processes. For small molecules, computational modeling and predictive algorithms can identify promising enzyme inhibitors or receptor modulators faster than ever before while also streamlining the discovery of degraders that harness the body's own protein disposal systems. AI-guided radiopharmaceutical development enables the dual use of radioactive isotopes for both diagnosis and therapy, improving targeting and safety profiles. In biologics, AI helps design antibodies, proteins, and peptides with higher specificity and stability, speeding the engineering of antibody-drug conjugates and mRNA vaccines. These tools allow researchers to predict how a biologic will behave in the human body, drastically reducing development times and costs.

Advanced therapeutics (gene therapy & cell therapy): Advanced therapies that modify genetic or cellular substrates gain tremendous insight from AI. For gene therapy, ML models can pinpoint optimal gene targets, design better RNA-based interventions (for example, siRNA or mRNA therapies), and predict how gene editing tools such as CRISPR-Cas9 will perform in different genomic contexts. In cell therapy, AI enhances the selection of donor cells, predicts how engineered immune or stem cells will function in patients, and guides tissue engineering strategies to achieve better integration and regenerative outcomes. Ultimately, AI-driven analytics help tailor these therapies to patient-specific genetic and cellular profiles, paving the way for highly personalized and effective treatments.

Emerging therapeutics: Emerging therapeutic modalities are uniquely positioned to leverage AI's predictive and analytical capabilities. In nanotech medicine, computational simulations model nanoparticle behavior at the molecular level to optimize drug delivery and minimize toxicity. For bacteriotherapies, AI-assisted microbiome analytics help identify beneficial strains that can outcompete pathogens or correct dysbiosis. Oncolytic viruses can be more precisely engineered through AI-guided gene editing and protein engineering, while exosome therapeutics benefit from algorithms that elucidate cargo selection, stability, and target specificity. As these emerging modalities mature, AI's ability to handle complex biological data accelerates their development and clinical translation.

Pharmatech (CRO, CDMO, CMO): The backbone of biotech—the ecosystem of CROs, contract development and manufacturing organizations (CDMOs), and care management organizations (CMOs)—also thrives through AI-driven insights. CROs use ML to predict patient recruitment challenges, identify ideal trial sites, and refine study protocols, improving the speed and success of clinical trials. CDMOs integrate AI into manufacturing process development, enabling more efficient scale-up, better yield optimization, and proactive quality control that detects and corrects potential issues before they escalate. CMOs rely on AI-driven analytics to ensure consistent product quality and manage supply chains in real time. By embracing AI, these service providers create a seamless, data-enabled infrastructure that supports the entire biotech value chain, ensuring that scientific breakthroughs rapidly evolve into commercially viable, patient-ready therapies.

AI healthtech (digital health, healthcare IT)

The healthtech sector is increasingly shaped by AI & ML, which fuel data-driven decision-making, streamline complex healthcare workflows, and accelerate connected-care models. By transforming how patients access care, how providers make decisions, and how organizations manage resources, AI's influence extends throughout the entire healthcare ecosystem. Intelligent triage, personalized treatment recommendations, and predictive analytics support preventative measures, enabling more accessible, value-based care. As a result, AI empowers key stakeholders—patients, providers, and payers—to achieve better outcomes, enhance efficiencies, and reinforce trust in the evolving healthcare landscape.

Patients & consumers (telehealth, digital care & treatments, sport & wellness): AI-driven technologies make care more accessible, convenient, and personalized for patients. Intelligent virtual assistants guide patients through initial symptom checks, recommending the most appropriate care options while enabling telehealth visits from home. Digital care platforms leverage data from wearables and connected health devices to tailor interventions, promote better adherence to treatment plans, and encourage healthier lifestyle choices. Whether supporting chronic disease management, guiding nutrition and exercise regimens, or enhancing athletic performance, AI continuously refines care experiences, delivering proactive support that empowers individuals to take charge of their well-being.

Providers (care management, EHRs & clinical information, analytics/clinical decision support): For clinicians and care teams, AI streamlines workflows and refines decision-making, allowing them to dedicate more time to patient care. Integrated into EHRs, ML tools reduce administrative burdens, improve documentation accuracy, and enhance interoperability. Predictive analytics platforms identify at-risk patients, facilitate early intervention, and support care coordination across multiple care settings. Meanwhile, AI-driven clinical decision support systems synthesize evidence-based guidelines and patient-specific data, enabling providers to select the most effective treatments and intervene earlier for better patient outcomes.

Payers (revenue cycle-payer-focused aspects, analytics for value-based care & population health): For payers or health plan managers, AI delivers critical insights into population health and resource allocation. Intelligent payment integrity solutions detect fraud, waste, and abuse, ensuring that resources are spent efficiently. Advanced analytics identify population-level trends, enabling payers to forecast utilization, refine value-based contracts, and encourage preventative strategies that lower costs and improve care quality. Armed with these insights, payers can collaborate more effectively with providers, promote evidence-based treatments, and foster a healthcare environment in which value and patient satisfaction define success.

AI medtech

The medtech sector is increasingly enhanced by AI, which augments a diverse range of devices, diagnostics, imaging tools, and monitoring solutions. As AI-driven algorithms process complex data in real time, clinicians gain more accurate and timely insights, enabling proactive care, precision surgery, and personalized treatment plans. From remote monitoring devices that continuously track patient vitals and mobility parameters, to advanced imaging systems that detect subtle abnormalities and guide interventions with unparalleled accuracy, AI's influence in medtech is both broad and transformative. By reducing diagnostic errors, improving workflow efficiency, and supporting minimally invasive and patient-centric models of care, AI in medtech is reshaping how healthcare is delivered, leading to better outcomes and more accessible care.

Remote monitoring & portable care: AI elevates RPM by interpreting continuous data streams from electroencephalograms, ECGs, and glucose sensors, detecting anomalies and predicting potential complications before they manifest clinically. For patients with diabetes, ML models analyze blood sugar trends and suggest insulin adjustments, while wearable sensors equipped with intelligent algorithms customize rehabilitation and mobility support. Portable therapies, guided by predictive analytics, ensure patients can receive timely interventions at home or in community settings. By bringing advanced analytics directly to patients, these AI-enabled solutions reduce hospitalizations, shorten response times, and empower individuals to manage their health proactively.

Diagnostics & life sciences: AI-driven diagnostics leverage ML to detect diseases earlier, classify tumor subtypes more accurately, and identify genetic predispositions with unprecedented speed and precision. Algorithm-based diagnostics interpret test results, genomic data, and clinical imaging to guide precision medicine strategies in oncology and other complex conditions. Rapid and point-of-care testing aided by AI ensures immediate, data-backed insights for decision-making at the bedside. Advanced computational tools predict drug efficacy, optimize dosing, and streamline lab workflows—enabling faster and more comprehensive disease profiling. Together, these technologies form the backbone of next-generation medicine, improving treatment selection, patient stratification, and overall healthcare value.

Surgical devices & tools: In the operating room, AI-enabled devices and robotics elevate surgical precision and safety. Image-guided navigation systems, enhanced by ML, help surgeons identify optimal incision sites, avoid critical structures, and achieve better patient outcomes. AI-assisted brain-computer interfaces bridge neurological gaps, while advanced cardiovascular and neurostimulation devices finely tune therapies for each patient's unique physiology. Predictive analytics in surgical robotics optimize operative strategies, reduce complications, and shorten recovery times. By integrating AI-driven insights at every step—from planning to execution—surgeons can deliver minimally invasive, outcome-focused care.

Nonsurgical medical treatments: AI improves nonsurgical care options by tailoring therapies to individual patients. In fields such as oncology, AI can predict responses to radiation or proton therapy, optimizing treatment protocols. Dental tech harnesses ML to personalize orthodontic solutions, while hearing tech uses speech recognition and noise-filtering algorithms to enhance auditory experiences. AI refines the selection of dermatological treatments and supports sleep monitoring devices that identify patterns of disruption and suggest interventions. Data-driven personalization ensures that nonsurgical treatments become more effective, user-friendly, and accessible—expanding comprehensive care to diverse patient populations and clinical scenarios.

Medical imaging: Medical imaging innovations thrive with AI's ability to detect subtle changes in scans that human eyes might miss. ML algorithms spot early signs of disease in brain and cardiac images, while radiology AI accelerates image interpretation and reduces diagnostic errors. During surgery, imaging and navigation tools equipped with real-time analytics guide precise incisions and device placements. Beyond the operating room, AI-powered imaging solutions integrate with EHRs, follow-up data, and population health metrics, continuously improving their predictive capabilities. By transforming raw imaging data into actionable insights, AI in imaging ensures that clinicians can diagnose and treat conditions more effectively, improving patient outcomes across a range of specialties.

About PitchBook Industry and Technology Research

Independent, objective, and timely market intel

As the private markets continue to grow in complexity and competition, it's essential for investors to understand the industries, sectors, and companies driving the asset class.

Our Industry and Technology Research provides detailed analysis of nascent tech sectors so you can better navigate the changing markets you operate in—and pursue new opportunities with confidence.

PitchBook Data, Inc.

Nizar Tarhuni Executive Vice President of Research and Market Intelligence

Paul Condra Head of Emerging Technology Research

Additional research

Eric Bellomo
eric.bellomo@pitchbook.com
Gaming
E-Commerce

Brendan Burke
brendan.burke@pitchbook.com
Data Analytics
Information Security
Artificial Intelligence & Machine Learning

Jim Corridore
jim.corridore@pitchbook.com
Aerospace & Defense
Airlines
Construction & Engineering

Aaron DeGagne
aaron.degagne@pitchbook.com
Medtech
Digital Health

Alex Frederick
alex.frederick@pitchbook.com
Agtech
Foodtech

Jonathan Geurkink
jonathan.geurkink@pitchbook.com
Supply Chain Tech
Mobility Tech

Kazi Helal
kazi.helal@pitchbook.com
Biopharma
Pharma Services
Pharmatech

Derek Hernandez
derek.hernandez@pitchbook.com
Enterprise SaaS
Infrastructure SaaS

Ali Javaheri
ali.javaheri@pitchbook.com
Emerging Spaces

Robert Le
robert.le@pitchbook.com
Insurtech
Crypto

John MacDonagh
john.macdonagh@pitchbook.com
Carbon & Emissions Tech
Clean Energy Tech

Rudy Yang
rudy.yang@pitchbook.com
Enterprise Fintech
Retail Fintech