

Tech Trends 2024

A health care perspective

As we move through 2024, the landscape of health care technology continues to evolve with rapid momentum, fundamentally transforming how health care services are delivered and experienced. This transformation is reshaping not just health care delivery but also the mechanisms behind health plan management and patient engagement.

Our health care tech trends report for this year provides a focused analysis of these revolutionary technologies, examining their potential to redefine the health care sector over the next 18 to 24 months.

Drawing on insights from Deloitte's Future of Health™ vision, which anticipates a shift from “health care” to “health,” we explore how emerging technologies highlighted in [Deloitte's Tech Trends 2024 report](#) are helping facilitate this transition. From spatial computing in the industrial metaverse to AI-driven health management systems, these trends represent pivotal opportunities for health care organizations to enhance patient care, improve operational efficiencies, streamline payment, automate claims, and navigate the complexities of modern health care ecosystems.

Relevance and readiness scale:

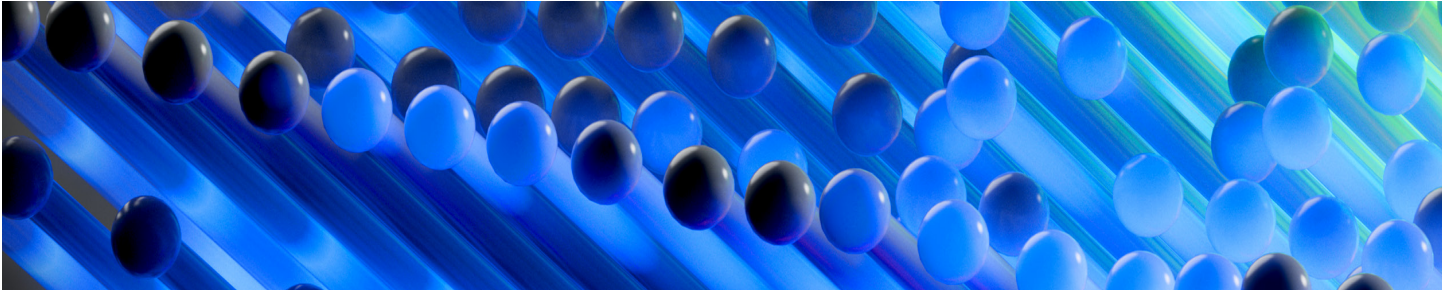
We looked at each trend and assigned a value from one (low) and five (high) based on the trend's relevance and readiness of adoption by health care providers and plans.

READINESS:

How ready is the government to adopt the trend?

RELEVANCE:

How impactful would it be if the government adopted the trend?



Interfaces in new places: Spatial computing and the industrial metaverse

Spatial computing is emerging as a game changer in the health care sector, redefining interactions within digital spaces through the integration of physical and virtual environments. By leveraging the capabilities of augmented reality (AR), virtual reality (VR), and digital twins, health care organizations can create more immersive, efficient, and patient-centric experiences. This trend is particularly impactful in areas such as medical education, behavioral health, and complex surgical procedures, where enhanced interactivity and realism can significantly improve outcomes and patient engagement.

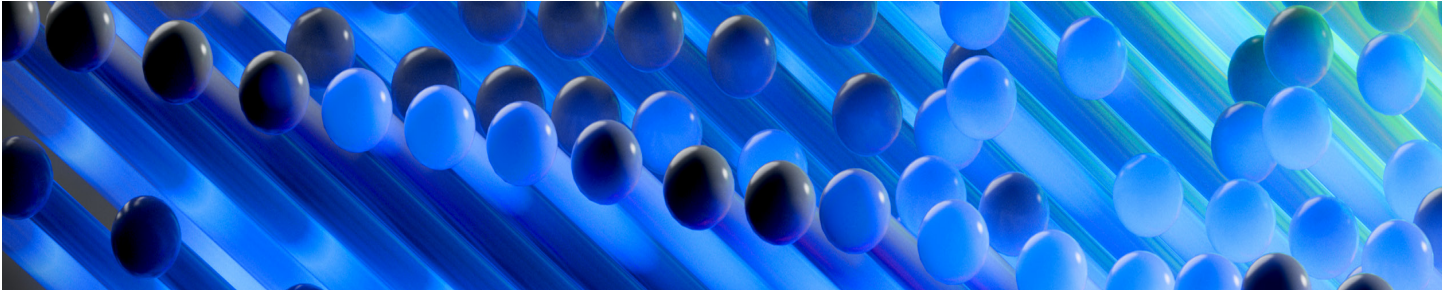
As health care continues to embrace digital transformation, the integration of spatial computing is becoming increasingly important for both providers and health plans. Health plans can utilize these technologies to create more interactive and engaging member experiences, potentially reducing the frequency of in-person consultations and enhancing care management.

By merging the physical and digital worlds, spatial computing also enables a more intuitive, natural method for doctors and clinicians to engage with digital content, be it during surgical planning with 3D models, real-time data overlays during procedures, or post-operative rehabilitation for the patient. This immersive approach is poised to radically enhance the precision and effectiveness of medical treatments, offering a new frontier in personalized treatments and patient care.

Getting started

- **Pilot immersive tech projects.** Implement pilot projects using AR and VR for medical training and patient education and engagement to gauge effectiveness and refine strategies.
- **Advance skills development.** Invest in upskilling current staff or recruiting new talent with expertise in AR/VR development, 3D modeling, and user experience design.
- **Promote ecosystem collaboration.** Form partnerships with technology providers specializing in AR and VR to leverage their platforms for scalable solutions in health care.
- **Encourage continuous learning.** Stay up to date on the latest advancements in spatial computing to ensure that the organization's use of AR and VR remains cutting edge.

- **Augmented reality (AR):** An enhanced version of reality in which digital information is overlaid onto the physical world.
- **Virtual reality (VR):** A simulated environment that can be explored and interacted with using electronic devices, typically through a head-mounted display.
- **Digital twin:** A virtual replica or digital representation of a physical object, system, or environment that allows for real-time monitoring, analysis, and simulation of its behavior and characteristics.



Interfaces in new places: Spatial computing and the industrial metaverse

Trend in action

A compelling application of spatial computing in health care is the concept of a virtual hospital. Envision a fully interactive, virtual space where patients can consult with doctors via avatars, explore treatment options, and learn about their conditions through immersive simulations.

For instance, a virtual neurology clinic could allow patients to understand the effects of neurological disorders through simulated experiences, enhancing their comprehension and engagement with treatment plans. Additionally, digital twins of physical hospitals could be used for operational purposes, such as emergency response drills or optimizing the layout to improve patient flow and safety.



This high relevance rating reflects the significant impact that spatial computing is poised to have on enhancing personalized patient care through immersive technologies.



The readiness score indicates that while the potential is recognized, widespread adoption is hindered by the need for substantial investment in AR/VR and 3D technologies, as well as the platforms needed to leverage those innovations effectively.

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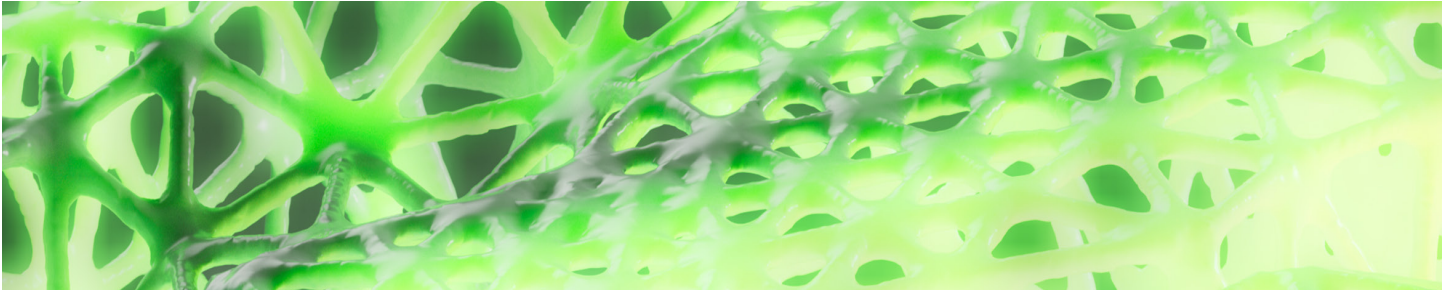
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- [Digital Twin Technology - Unlimited Reality](#)

“In pediatric care and mental health services especially, we’re leveraging spatial computing to drastically reduce anxiety for patients undergoing multiple procedures and therapies. By familiarizing these patients with the surgical environment as well as aggressive therapies through Unlimited Reality™, we’re seeing significant improvements in their comfort, preparedness, engagement, and experience.”

— **Anwasha Dutta**, Smart Hospital & Unlimited Reality Health Care practice leader and managing director, Deloitte Consulting LLP

“Our smart hospital framework is about more than just the physical infrastructure—it’s about integrating digital experiences to streamline operations and enhance patient care. By focusing on how we can merge facilities, experience, and digital capabilities, we’re enabling more effective and predictive response to care needs, both clinical and non-clinical.”

— **Haleigh Sinkewich**, senior manager, Deloitte Consulting LLP



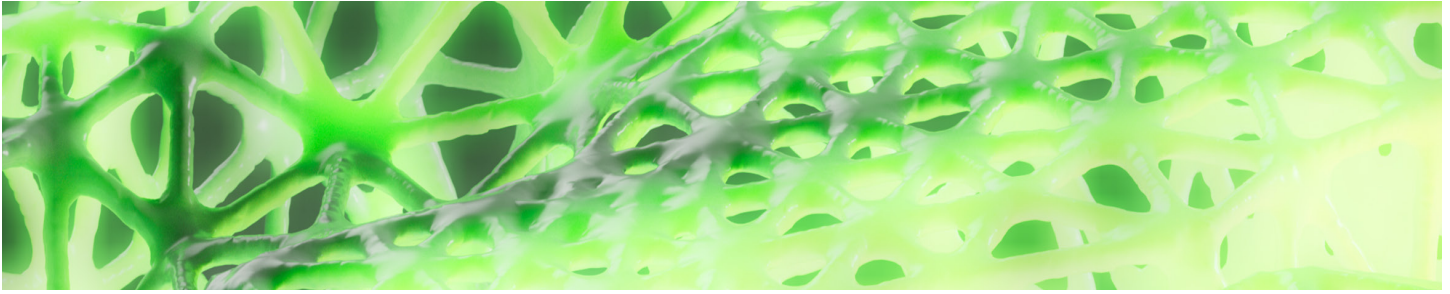
Genie out of the bottle: Generative AI as growth catalyst

In the realm of health care, Generative AI (GenAI) represents a seismic shift, likened to “letting the genie out of the bottle.” This powerful technology may revolutionize many facets of health care, from diagnosis and treatment to patient engagement and operational efficiency. By automating complex processes and offering predictive insights, GenAI has the potential to reduce costs, enhance the quality of care, and improve access to medical services. However, its integration into health care also brings challenges, including issues of privacy and bias, the need for robust data security, and the requirement for a delicate balance between machine-driven recommendations and human clinical expertise.

GenAI can transform vast data landscapes into actionable insights, supporting clinicians and health plan administrators by providing advanced diagnostic tools, personalized treatment options, and enhanced claims processing. For health plans, GenAI offers powerful capabilities to automate and refine risk assessment and fraud detection, crucial for maintaining cost efficiency and member satisfaction. However, the technology is not without its critics. There is a healthy skepticism and concern about using GenAI to automate tasks and mirror human clinical decision-making and concerns about the erosion of human elements in care. Yet, the push toward adopting GenAI in health care is driven by its potential to address long-standing inefficiencies and inequities in the system.

Getting started

- **Establish pilot projects.** Implement GenAI initiatives in areas with high data availability and clear use cases, such as administrative tasks or preliminary diagnostic support, to evaluate effectiveness and refine approaches.
- **Focus on data integrity and security.** Ensure that data used in GenAI applications is accurate, well-documented, and secure, addressing privacy concerns that are critical in the health care sector.
- **Build interdisciplinary teams.** Include clinicians, IT experts, health plan administrators, and ethicists in GenAI projects to ensure that outcomes are medically relevant, technically sound, and ethically justified.
- **Educate and train staff.** Prepare the workforce for a future where GenAI tools are commonplace by offering training that enhances their ability to interact with and oversee AI technologies effectively.



Genie out of the bottle: Generative AI as growth catalyst

Trend in action

A practical application of GenAI health care is its ability to enhance diagnostic accuracy. For example, GenAI can be integrated into electronic health records (EHRs) to analyze vast amounts of patient data, helping to identify patterns that might elude human observers.

In one instance, a health system used GenAI to sift through EHR data to identify early signs of sepsis, a condition notoriously difficult to diagnose in its initial stages. The AI system provided real-time alerts to physicians, significantly increasing the speed and accuracy of sepsis diagnosis and improving patient outcomes. This use case not only demonstrates the potential of GenAI to support clinical decisions but also highlights the necessity of keeping the clinician in the loop for final decision-making and patient management.

“I think there’s a lot of hope that instead of adding work to our human labor that there will be certain processes or tasks that are appropriate and supervised by a human that can be done more efficiently through AI.”

—**Randy Bush**, principal, Deloitte Consulting LLP



The relevance is underscored by GenAI’s capability to enhance efficiency and innovation in health care, particularly in data-intensive areas like diagnostics and patient management.



This readiness score reflects a growing adoption trend, though it remains moderate as health care organizations are still scaling up their infrastructure and expertise to fully capitalize on GenAI’s capabilities.

“With GenAI, cost of care should go down, quality of care should be better, and access to care and the consumer experience can be improved.”

—**Kumar Chebrolu**, principal, Deloitte Consulting LLP

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- [At the Nexus of Health Care and Generative AI](#)
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Smarter, not harder: Beyond brute force compute

The health care industry is increasingly focused on maximizing the efficiency and capabilities of existing technological infrastructures. For health plans, this could mean enhancing data process capabilities to better manage claims, customer services, and fraud detection without necessarily expanding raw computing power. Examples include the adoption of more efficient algorithms that can run on existing hardware, the integration of specialized GPUs to handle complex computations, and the exploration of quantum computing to potentially revolutionize data processing capabilities in health care analytics.

The shift away from brute force computing to more intelligent, adaptive systems is important as it allows health care organizations to provide faster, more accurate services while managing costs effectively. This evolution is crucial in an era for which the demand for health care services is rising and the pressure to maintain financial sustainability is ever present.

Health care's pivot toward smarter computing also includes exploring cutting-edge technologies such as quantum computing, although currently more conceptual and less applicable in everyday clinical settings. The main challenge lies in balancing the high costs and complexities of next-generation technologies with the practical needs of current health care environments. The integration of AI and machine learning into health care operations exemplifies how institutions are upgrading their technological approaches to enhance patient care, streamline operations, and tackle the perennial issue of technical debt.

Getting started

- **Evaluate and optimize current system.** Assess existing technology to identify inefficiencies and potential upgrades that can enhance performance without extensive new investments.
- **Invest in scalable solutions.** Focus on modular, scalable technologies that can grow and adapt with the organization's needs, minimizing future disuse and reducing long-term costs.
- **Prioritize data security and compliance.** Ensure that any new technologies or upgrades comply with health care regulations and standards, particularly in data security and patient privacy.
- **Foster a culture of innovation.** Encourage a workplace ethos that embraces continual learning and adaptation, which is essential for leveraging new technologies effectively.



Smarter, not harder: Beyond brute force compute

Trend in action

A prime example of this trend in action is the collaboration between [Moffitt Cancer Center](#), [NVIDIA](#), [Oracle](#), and [Deloitte](#) to revolutionize cancer care delivery through AI and machine learning. This initiative focuses on using AI to enhance the accuracy of clinical documentation and billing processes. By implementing AI-driven systems, Moffitt Cancer Center aims to improve the billing accuracy for treatments, especially for complex cases involving comorbidities, thereby reducing the time and costs associated with the appeals process with health insurance companies.

This approach can speed up administrative tasks, and it allows clinicians to devote more time to patient care rather than paperwork. The project illustrates how smart technology integration can lead to significant improvements in operational efficiency and patient service delivery in health care settings.

“In our work with Moffitt Cancer Center, we’re utilizing AI to improve the precision accuracy of medical coding. This approach not only reduces the administrative burden but also ensures that hospitals are submitting accurate information to health insurance companies, which is crucial in complex cases involving comorbidities.”

— **Chris Pasternak**, senior manager,
Deloitte Consulting LLP



This score highlights the importance of optimizing existing technological assets and integrating cutting-edge hardware to improve health care operations without the need for exponential increases in raw computing power.



The readiness indicates that while there is acknowledgment of the benefits of smarter computing solutions, many health care organizations still face significant barriers in upgrading legacy systems and embracing new computing paradigms.

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- [Quantum annealing unleashed: Optimize your business operations](#)
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From DevOps to DevEx: Empowering the engineering experience

The move from DevOps to Developer Experience (DevEx) marks a sea change in how software development teams tackle work, especially in health care. In the past 10 years, health care organizations have shifted from a dependence on mainly packaged solutions to the development of more customized software that better suits their operational needs. This evolution is often driven by the demand for more personalized patient engagement platforms and systems that can help address the complex needs of health care clinicians and their patients. As digital interfaces become increasingly essential for health care delivery, the focus has moved toward improving the developer experience to create a culture where talent and innovation can thrive.

DevEx goes beyond advancing operational efficiencies for health care organizations, including health plans. For health plans, improving the developer experience can streamline the development of customer-facing platforms and internal analytical tools, enhancing service delivery and member satisfaction. It also involves a comprehensive approach to improving the job satisfaction and productivity of developers by helping minimize obstacles in the development process. With the emergence of advanced technologies such as GenAI, there's a growing urgency to incorporate new tools that can keep up with the changing needs of care delivery. Focusing on an elevated developer experience can help attract and retain top tech talent in an industry where state-of-the-art solutions can create major impact in the areas of patient health outcomes and operational excellence.

Getting started

- **Establish clear development guidelines.** By standardizing development processes, health care organizations can help address key challenges while improving efficiency. This can allow teams to focus more on creative solutions and less on navigating development hurdles.
- **Invest in developer tools and training.** Help ensure developers are well-equipped to handle the evolving tech landscape by providing teams with the latest tools and continuous training. In turn, this can help accelerate development cycles and innovation.
- **Foster an agile culture.** Encourage an agile working environment that embraces change and experimentation. By doing so, health care businesses can help developers feel more engaged and invested in their projects.
- **Implement continuous feedback mechanisms.** Regular feedback loops between developers and end users, including clinicians and patients, can help software solutions successfully meet the real-world needs of stakeholders.



 **From DevOps to DevEx:**
Empowering the engineering experience

Trend in action

In a strategic move to accelerate the delivery time and enhance the reliability of its digital web and mobile experiences, a major US health care company undertook a significant digital transformation initiative. Collaborating with Deloitte, the focus was on creating a more automated and integrated release process that would not only help speed up deployment cycles but also operationalize new Continuous Development tools. These tools were supported through technical proofs of concept and assessments.

The impact of these changes was profound. They helped increase the productivity of developers by improving the availability of lower environments and reducing the lead time of delivery to end customers by 40%. At the same time, they were also able to ensure higher reliability. Moreover, the project is estimated to save \$4 million to \$6 million in hard dollars over a three-year period through tools consolidation. This cost savings highlights the substantial financial benefits alongside the operational improvements.

“Health care has traditionally lagged in adopting cutting-edge IT practices due to the complexity of its operations and the sensitivity of its data. However, there’s a growing recognition that enhancing developer experience can significantly impact the efficiency and quality of health care delivery.”

—**Tim Juravich**, principal, Deloitte Consulting LLP



The importance of improving DevEx in health care is highlighted by the sector’s growing dependence on sophisticated software solutions to support its clinical and operational needs.



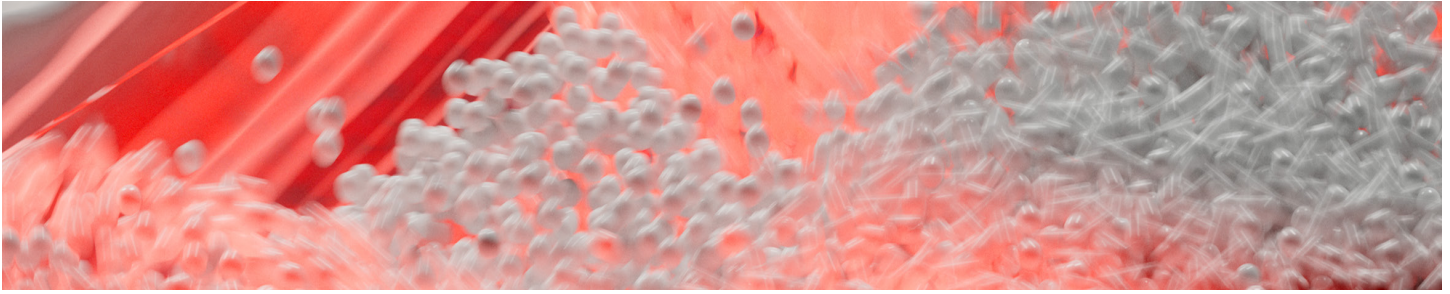
Many health care organizations know that DevEx can bring many benefits, but they require guidance and financial investment to make these practices work well with their current IT systems.

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- [The Conundrum of Retaining Tech Talent](#)
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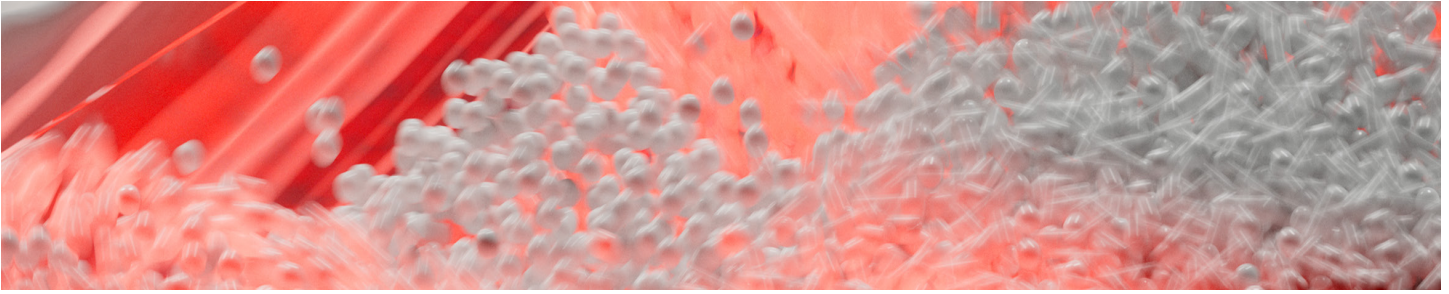
Defending reality: Truth in an age of synthetic media

In the modern digital era, the creation of fake media using advanced AI tools has opened a new dimension in the distortion of information. This has created serious problems for many different sectors, including health care. As AI technology continues to improve, it's becoming easier than ever to generate realistic but completely falsified audio, visuals, and text. The consequences for this type of misinformation are immense.

Health care organizations, which depend on the accuracy and trustworthiness of data for patients, find themselves having to protect the truth and mitigate the spread of misinformation. This trend illustrates the need for strong cyber defenses and more sophisticated methods to help detect and counter the risks posed by these technologies. For many health care providers and payers, the situation is especially critical. Health plans face unique challenges as the possibility of fake media can lead to altered claims data, resulting in financial losses and compromised member trust. Similarly, providers must safeguard clinical data to help ensure patient safety and care integrity. As such, this trend has a multitude of layers. It's not only about securing data but also about maintaining the trust and dependability of patients and providers. The challenge is in creating and implementing effective strategies to help fight evolving threats while supporting innovation and using the benefits of AI ethically.

Getting started

- **Enhance your business's cyber hygiene.** Strengthen basic cyber defense mechanisms to help protect against conventional and AI-powered threats. Regular cyber updates, rigorous phishing training, and strong password policies should remain foundational for all health care organizations.
- **Implement advanced detection tools.** Deploy AI-driven security tools that can help detect anomalies in your systems and identify potential threats from synthetic media.
- **Establish robust data governance.** Create comprehensive data governance frameworks to help ensure data integrity and monitor the flow of information, preventing the unauthorized use of sensitive data in synthetic media.
- **Promote awareness and education.** Conduct regular training sessions to help all stakeholders across your organization better recognize the signs of synthetic media and understand the implications of AI in cybersecurity.



Defending reality: Truth in an age of synthetic media

Trend in action

To help combat the spreading of synthetic media in health care, one potential useful method is to use AI-powered systems that can check the validity of medical images and patient records. By using AI tools that can examine patterns and spot changes, health care institutions can avoid the tampering of important data, making sure that clinical choices are based on reliable and unaltered information. This method can help enhance the confidence in digital systems and improve the overall security position of the organization.



RELEVANCE

The relevance of this trend is highlighted by the increasing sophistication of cyberattacks and the potentially catastrophic consequences of misinformation in health care.



READINESS

Health care organizations recognize the importance of defending against synthetic media, yet the readiness level indicates that full preparedness requires further development and integration of advanced technologies.

“Our clients are concerned about the next wave of cyberthreats, including those driven by AI, but the immediate focus remains on strengthening the basics—like securing against phishing and password hacks. There’s an acknowledgment that as AI technologies become more accessible, the complexity and frequency of AI-driven attacks will increase exponentially, requiring more advanced solutions at scale.”

—**Jimmy Joseph**, principal,
Deloitte Risk & Financial Advisory

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- [Life Sciences and Health Care Industry Faces Cybersecurity Perfect Storm](#)
- [Shield Up: 7 Strategies to Repel Health Care Cyberattacks](#)
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Core workout: From technical debt to technical wellness

The requirement to move from managing technical debt to pursuing technical wellness is intensifying as health care organizations strive to keep pace with rapidly evolving technology. At the same time, they also must deal with the limitations created by outdated legacy systems, also known as “technical debt.” The more technical debt an organization has can seriously impede its ability to provide high-quality care and innovate effectively. Technical debt can have negative impacts on the operational capabilities of health systems and health plans and their competitive advantage and market position.

The idea of a “core workout” involves a thorough assessment and improvement of existing IT infrastructure to help boost IT performance and lower risks, ultimately leading to improved patient health outcomes, experiences, and operational efficiencies.

The change to technical wellness doesn’t only depend on replacing old software or fixing systems. It also may require leveraging a comprehensive approach to help transform the technological foundation of health care organizations. By prioritizing technical wellness, health systems and health plans can make sure that their technologies enable and improve their mission, rather than limit it. This strategic shift is likely vital for organizations that want to thrive in an increasingly digital health care environment.

Getting started

- **Develop a comprehensive assessment for your business.** Conduct thorough assessments of current IT ecosystems to help identify all areas that might have technical debt, from outdated software to inefficient processes.
- **Schedule appropriate system upgrades.** Upgrade the most important areas first, based on how much they affect patient care and business operations, and how much they can improve care delivery and reduce risk.
- **Make investments in modern infrastructure.** Invest in acquiring advanced technologies that strengthen data protection, increase system compatibility, and enable scalable innovations.
- **Continuously monitor and optimize.** Establish ongoing monitoring systems to help continuously assess the performance and efficiency of IT infrastructure, ensuring that technical wellness is maintained over time.



Core workout: From technical debt to technical wellness

Trend in action

One notable example of this move to technical wellness is demonstrated by a major health care provider that embarked on a significant effort to revamp its EHR system. By moving to a cloud-based EHR platform, the organization was able to lower downtime, increase data security, and expand access to data for clinicians, which resulted in additional time for patient care and optimized workflows. This modernization helped solve long-standing technical debt and prepared the provider to seamlessly incorporate new technologies down the line.

“The shift from technical debt to technical wellness requires a shift in focus from merely keeping systems operational to enhancing the patient and provider experience through advanced technology solutions.”

—**Jerry Stacy Tucker**, specialist leader,
Deloitte Consulting LLP



This trend is highly relevant as health care providers and plans increasingly recognize the direct impact of technical wellness on their ability to deliver patient-centered care and improve efficiencies across their organizations.



Health care organizations are moderately prepared to adopt this trend, with varying levels of progress in IT modernization and alignment of resources to address technical debt.

“Health systems tend to accumulate more technical debt than other industries due to their cautious approach in making capital investments. Addressing this debt is critical for maintaining competitiveness and customer satisfaction.”

—**Kareem Syed**, managing director,
Deloitte Consulting LLP

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