

TRENDS REPORT

The Top Emerging Technologies For Healthcare, 2025

AI Acceleration Is The Engine Behind Emerging Innovation

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Summary

This report presents Forrester's 2025 analysis of the top emerging technologies in healthcare. We categorize each technology based on its ability to deliver benefits in the short, medium, or long term. Emerging technologies that deliver short-term benefits include generative AI (genAI) for language, IoT security, synthetic data, edge intelligence, and data fabric. Those that deliver medium-term benefits include genAI for visual content, agentic AI, and federated machine learning (FML). Those that deliver longer-term benefits include digital twins and autonomous mobility technologies.

For even more insights about this topic, check out the following resources:

- Hear from our experts and your peers in an interactive online session: [The Top Emerging Technologies In Healthcare webinar](#)
- Navigate rapidly shifting market dynamics: [Industry Highlights: Healthcare research hub](#)
- Dive deeper into each technology: [The Top Emerging Technologies: By Industry research hub](#)

The Top 10 Emerging Technologies Deliver Benefits Over Three Horizons

In the face of ongoing regulatory shifts, cost-reduction demands, and staffing challenges, investments among healthcare organizations (HCOs) to become forward-looking, tech-enabled organizations are gaining momentum. [Forrester's 2025 data](#) reveals that while just 40% of business and tech pros at US HCOs said that their spending on tech products or services increased in the past year, 64% expect it to rise in the coming year. As HCOs evolve into [intelligent healthcare organizations](#) and focus on delivering exceptional experiences for patients and employees, AI is becoming the connective tissue that links a wide range of technologies. While HCOs approach AI with a healthy dose of caution, AI-powered solutions are poised to dominate the emerging tech landscape in the short and medium term. HCOs anticipate that these investments will yield significant returns, drive cost savings, and boost revenue.

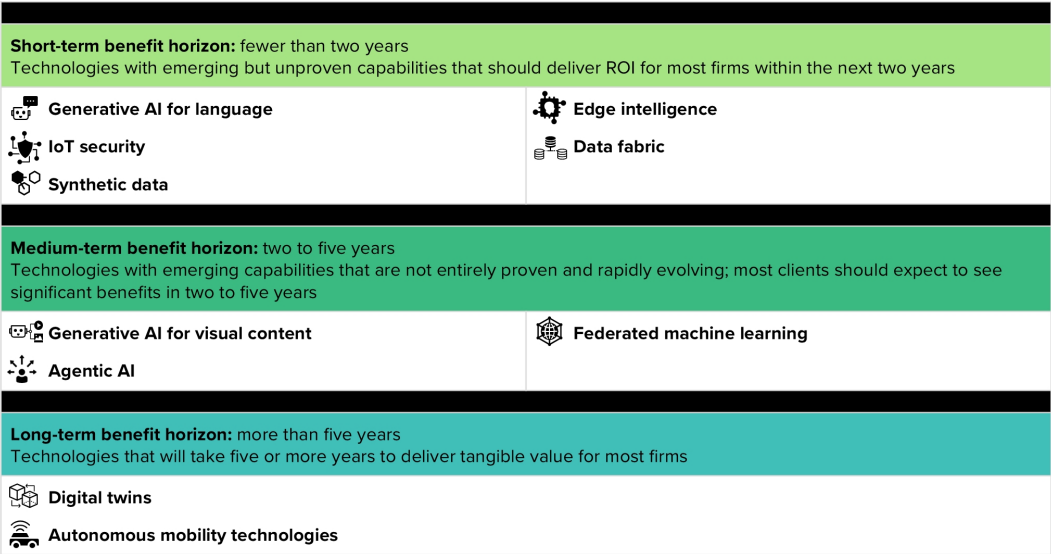
The impact of each emerging technology that we highlight in this report will depend on your firm's focus. We use the Forrester [benefit horizon framework](#) to outline when the average HCO should expect a technology to deliver the benefits required to justify sustained investment. We have organized the technologies into three groups according to these benefit horizons (see Figure 1).

- **Short term: genAI for language, IoT security, synthetic data, edge intelligence, and data fabric.** GenAI for language is rapidly advancing across diverse models, use cases, and vendors. This competitive momentum has positioned genAI as a leader in delivering short-term value for HCOs. IoT security protects connected medical devices by addressing vulnerabilities, enforcing access, and enabling real-

time threat detection. As solutions evolve and blend with broader healthcare cybersecurity platforms, these safeguards remain essential. Synthetic data limits security risk, can be a substitute for sensitive medical records in training models, and can supplement unavailable data. As remote clinics and wearable and medical devices become table stakes, edge intelligence enables rapid decision-making, improves patient safety and security, and enhances resilience at the edge of healthcare. Data fabric ensures seamless and secure access to distributed health data, allowing clinicians to gain holistic insights across systems and silos.

- **Medium term: genAI for visual content, agentic AI, and FML.** GenAI for visual content transforms patient education and clinical communication by generating intuitive visuals that enhance understanding. Agentic AI empowers healthcare professionals by autonomously coordinating tasks, streamlining workflows, and enabling faster decision-making. Federated machine learning protects patient privacy while enabling collaborative model training across institutions, accelerating innovation without compromising data security.
- **Long term: digital twins and autonomous mobility technologies (AMTs).** Digital twins create dynamic, virtual replicas, enabling predictive simulations that improve patient outcomes and operational efficiency at HCOs. Autonomous mobility technologies in healthcare will take five or more years to deliver sustained business benefits. AMTs have niche uses today for completing discrete tasks such as cleaning floors and managing linens, hospital logistics, and surgical robots. However, the limited applicability of AMTs in healthcare and their alignment with less-critical problems mean that HCOs can assign a lower priority to implementing this technology. Put AMTs on your watchlist.

Figure 1
Forrester’s Top Emerging Technologies For Healthcare In 2025



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Five Technologies Will Deliver Significant Benefits In The Short Term

GenAI for language, IoT security, synthetic data, edge intelligence, and data fabric are all poised to deliver benefits soon. Healthcare technology executives with advanced strategies should be partway through a rollout or deep into pilots of these technologies. Less technically mature HCOs should be investing in understanding their use cases and expect to see measurable benefits within one to two years of implementation.

GenAI For Language Is Accelerating Innovation Across The Board

Forrester defines genAI for language as:

A set of technologies and techniques that leverage massive corpora of data to generate new text (including code) in response to natural language prompts or other noncode and nontraditional inputs.

GenAI quickly gained traction, trust, and widespread applications in healthcare. Low-risk use cases for [insurers](#) and [providers](#) have seen quick benefits, while consumers are slowly becoming more comfortable with genAI use in their care journey. For most

HCOs, this technology will deliver a concrete ROI within one to two years, but it may take time to realize its full value as it becomes critical to adjacent technologies like agentic AI (see Figure 2).

- **GenAI for language will automate clinical workflows and clinical decision-making.** GenAI for language is being adopted by HCOs seeking quick wins in their time- and administration-intensive workflows. Many are developing large language models (LLMs) to ease administrative burdens and streamline operations. GenAI is already improving care coordination, surfacing insights, enhancing knowledge management, and supporting clinical decisions and customer service. Risks like hallucinations and model opacity are prompting HCOs to review best practices and create innovation labs that enhance LLM alignment and advance genAI's full potential.
- **With the right approach, most HCOs will realize benefits in the next two years.** Hype has driven many HCOs to rush into pilots and prototypes. But scale has been elusive due to a common pitfall: HCOs have applied genAI to existing processes without rethinking their underlying problems. Healthcare is uniquely burdened by administrative overload, fragmented data, and multiple customer touchpoints — making it fertile ground for genAI for language. The industry is also incredibly complex. The short-term potential is real, but success hinges on [function-first thinking](#), measured scaling, and a strong foundation of trust and safety.
- **Advanced digital infrastructure and high-value use cases will see the most benefit.** HCOs with advanced digital infrastructure, such as large, diverse datasets; robust clinical documentation systems; and [cloud-based](#) interoperability frameworks, are best positioned to integrate and scale genAI for language-based applications. However, the ongoing AI hype makes it difficult to identify optimal use cases, and misalignment with real-world problems can lead to poor outcomes. Applying genAI to the wrong workflows not only wastes resources but also risks undermining trust and performance. To realize its full potential, HCOs must pair strong infrastructure and selection of thoughtful use cases grounded in actual clinical and operational needs.

Figure 2
GenAI For Language Is Reshaping Knowledge And Administrative Processes



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IoT Security Is Evolving To Protect Critical Data And Devices

Forrester defines IoT security as follows:

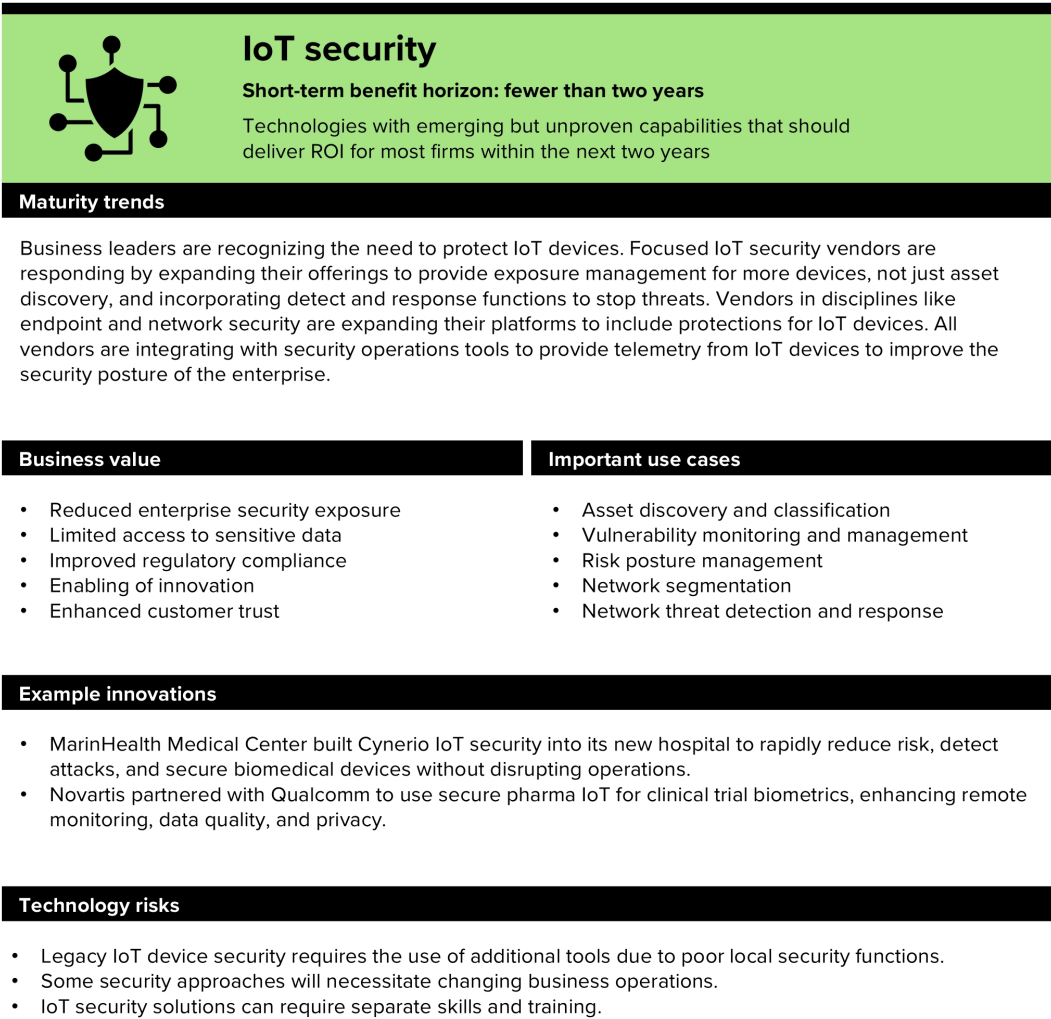
IoT security involves safeguarding IoT devices, networks, and the data they transmit from unauthorized access, cyberattacks, and vulnerabilities while ensuring the devices function as intended, data remains confidential and accurate, and privacy and system reliability are maintained.

IoT security technology includes components that are common in endpoint management and security but are tailored to the wide variety of IoT devices HCOs typically deploy. It includes asset management, [identity and access management \(IAM\)](#), data security management, [Zero Trust](#) networking, and attack surface management. For most organizations, deploying IoT security solutions will deliver a concrete ROI within one to two years as vendors increasingly offer capabilities as part of other cybersecurity platforms (see Figure 3).

- **IoT security protects devices that optimize your organization.** IoT security technologies reduce the risk of compromising critical data and can accelerate the value of edge intelligence technology. Traditional endpoint security and attack surface management solutions aren't equipped to protect these devices. Network segmentation and traffic control solutions are a component of IoT security but don't address on-device issues or completely resolve access challenges. Many security vendors are rapidly developing IoT security capabilities to help clients overcome these challenges.
- **IoT security benefits are available today, but challenges may result in delays.** IoT security solutions are evolving rapidly. As they do, they're colliding with IoT security capabilities in other cybersecurity platforms, such as IAM, leaving HCOs with tough decisions. In either form, these capabilities can help organizations better understand how many IoT devices they have deployed and how they should properly secure them. Organizations can start addressing vulnerabilities on their devices, assess the risk posture of the IoT infrastructure, institute access controls and network segmentation, and monitor IoT implementations for any threats or configuration changes. Legacy IoT devices face security risks from outdated software, proliferating devices, and emerging genAI capabilities, requiring HCOs to mitigate these risks through network segmentation, access control, and vigilant resolution of security threats.
- **Technology-integrated businesses will see the biggest benefits.** Most HCOs have already deployed IoT devices, from generic printers or cameras to facility-specific devices like infusion pumps or blood analyzers. Because both generic and specific IoT devices have been deployed for years, security leaders face the challenge of dealing with legacy devices running alongside newer, smarter devices. They will need to choose an IoT security solution that's flexible and

capable of operating within heterogeneous environments.

Figure 3
IoT Security Offers Short-Term Value For Healthcare Use Cases



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Synthetic Data Fills Real-World Data Gaps

Forrester defines synthetic data as:

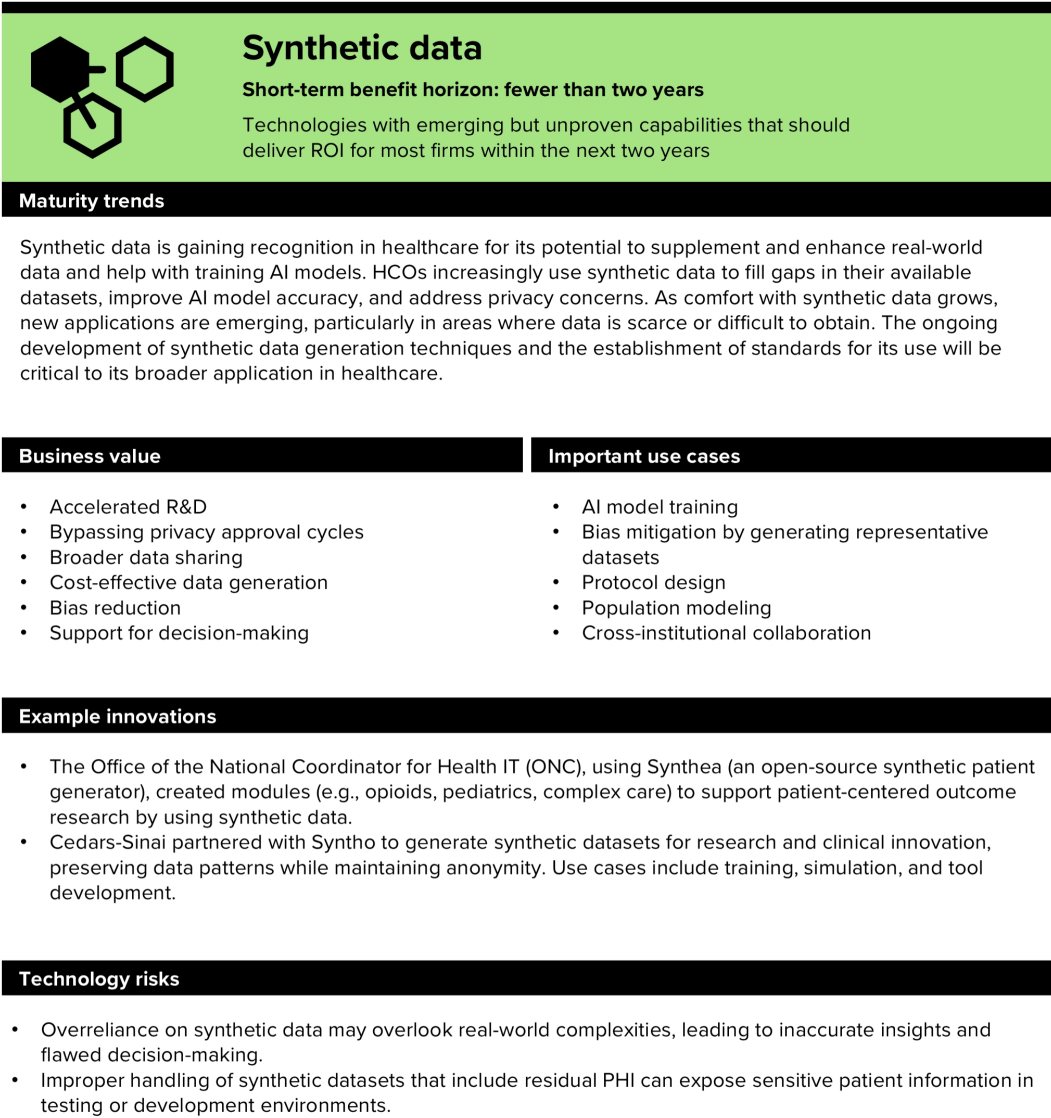
Generated data of any type (e.g., structured, transactional, image, audio) that duplicates, mimics, or extrapolates from the real world but maintains no direct link to it, particularly for scenarios where real-world data is unavailable, unusable, or strictly

regulated or where large volumes of data are needed.

Synthetic data is a transformative way to enhance data availability for traditional, AI, and genAI applications and address privacy and compliance risks. Applications span all corners of the industry, using nearly all data types. It has the potential to supplement and enhance real-world data and help with training AI models. Companies will use synthetic datasets widely not only for traditional analytics but also to train and refine AI models. For most HCOs, this technology will deliver benefits within one to two years (see Figure 4).

- **Synthetic data will increase data availability, quality, and privacy.** **Ninety-three percent** of HCOs experienced a cyberattack in the past year, and nearly 75% reported a patient care disruption due to cyberattacks. Synthetic data mimics real healthcare data while inherently fencing off protected health information. Using synthetic data bypasses long privacy approval cycles (e.g., elaborate HIPAA deidentification agreements). Synthetic data also helps HCOs maintain statistical fidelity while enabling broader data-sharing capabilities and cross-institutional collaboration. Synthetic data is available across all modalities, significantly lowering the costs and barriers for data science experiments in healthcare.
- **HCOs that invest in focused use cases will realize benefits in one to two years.** HCOs need a very large corpus of data to train their AI modules. Similarly, they crave good-quality data for testing and other analytically complex scenarios. But collecting and cleansing large volumes of data, including rare genetic data or **social determinants of health data**, is a task that most HCOs struggle with. Synthetic data will change this. Starting from a small, well-curated, and compliant sample of real data, HCOs can generate rich sets of good-quality data.
- **Regulatory oversight plays a pivotal role in shaping the future of synthetic data.** As HCOs enhance data infrastructure and accessibility as well as accelerate AI model development, oversight ensures that the outputs of innovation remain traceable, auditable, and compliant with evolving standards. Crucially, regulatory frameworks provide rollback capabilities and safeguard ethical use, reinforcing trust in scalable, secure data ecosystems. Together, these elements support a resilient, responsive HCO equipped to meet emerging challenges with **integrity and transparency**.

Figure 4
Synthetic Data Continues To Deliver Opportunities



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Edge Intelligence Integrates Diverse Data Streams, Enabling Faster
Insights

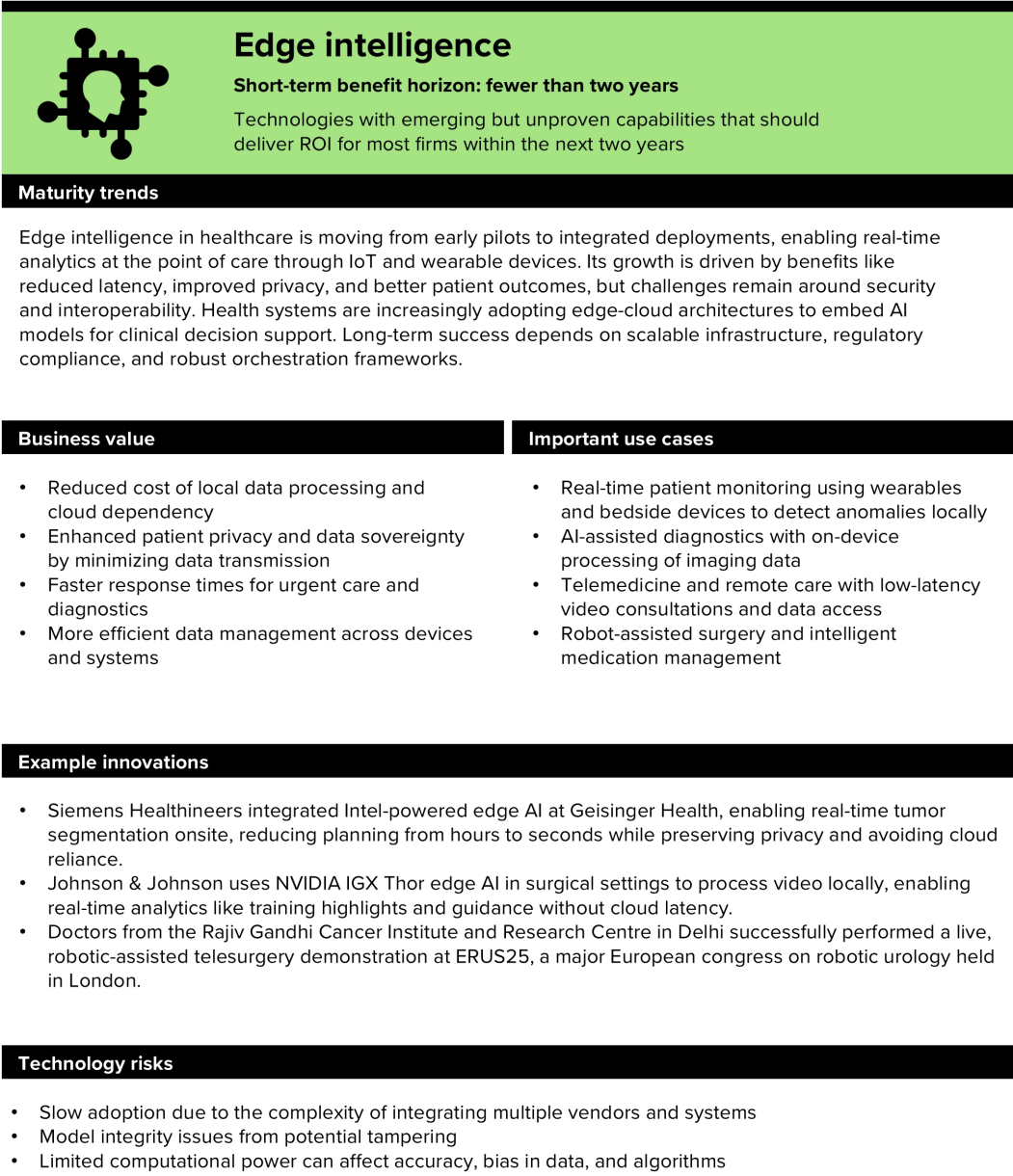
Forrester defines edge intelligence as:

Capabilities that capture data, embed inferencing, and connect insight within a timely response that is relevant, distributed, orchestrated, and contextually driven in a network of application, device, and communication ecosystems.

Edge intelligence delivers short-term benefits through faster diagnostics, improved privacy, reduced cloud dependency, and real-time patient monitoring. It also enables efficient data management and low-latency remote care across devices and systems. The quick turnaround of benefits is appealing, as 68% of decision-makers from enterprise HCOs say their organization has adopted edge intelligence or plans to do so (see Figure 5).

- **Edge intelligence will power localized, personalized experiences.** Edge intelligence will enable localized, personalized healthcare experiences by keeping data closer to the HCO and preserving patient privacy and data sovereignty. By integrating edge capabilities across imaging and sensor technologies, HCOs are exploring a shift from traditional AI to generative and agent-based models at the edge. It can anticipate patient needs, act on their behalf, and operate efficiently in context-aware environments, including IoT-enabled scenarios. Edge intelligence also has the potential to accelerate digital twin implementation by providing real-time sensor data.
- **Edge intelligence delivers benefits today but faces structural and funding hurdles.** Edge intelligence is rapidly gaining traction in high-impact areas like medical imaging and robotic surgery, where its real-time capabilities meet critical clinical needs. It offers clear business value through enhanced performance, cost efficiency, and growing acceptance driven by the proliferation of connected devices. Applications in wearables and virtual clinics demonstrate potential for remote monitoring and cost reduction. However, widespread adoption remains constrained by structural and funding challenges. Regulatory complexities and limited investment continue to slow progress, especially in scaling autonomous edge agents that could act on captured data in real time.
- **Regulatory-savvy HCOs with strong IoT security are best positioned to realize benefits.** As remote patient monitoring becomes standard, and connected devices proliferate across care environments, HCOs with strong IoT security and regulatory expertise are best positioned to benefit from edge intelligence. These organizations can more effectively manage data privacy, sovereignty, and compliance while integrating edge capabilities into evolving care delivery models. Streamlined integration processes and secure, interoperable frameworks are essential to unlocking the full potential of edge intelligence in healthcare.

Figure 5
Edge Intelligence In Healthcare Is Powering Real-Time Clinical Insights



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Data Fabric Is Essential To Leveraging Data Effectively

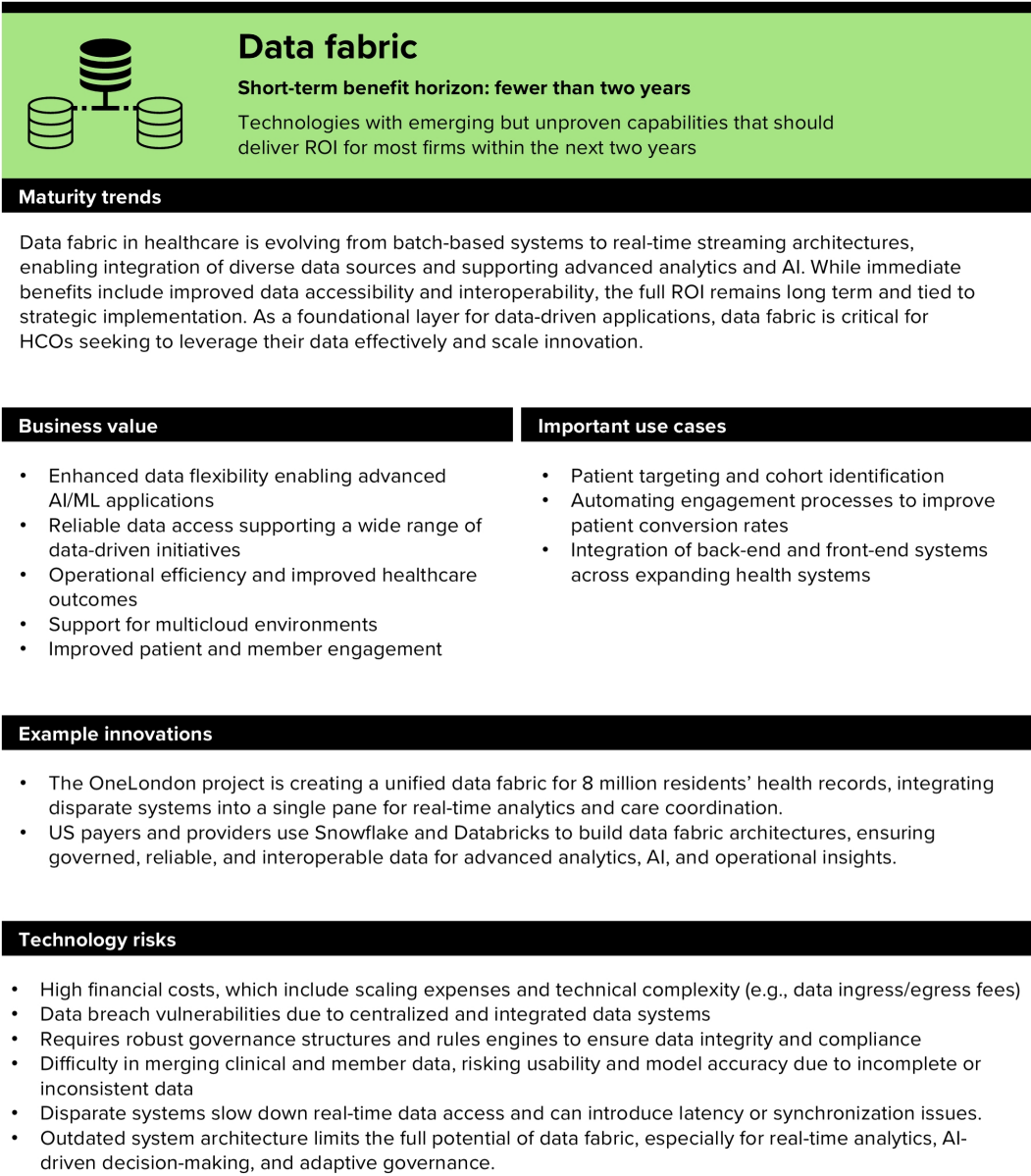
Forrester defines data fabric as follows:

Data fabric orchestrates disparate data sources on demand and in real time across hybrid and multicloud data environments. It delivers unified, comprehensive, and trusted data as a service/data product to support various use cases.

Data fabric delivers short-term benefits in healthcare by improving data accessibility, flexibility, and integration across diverse systems. It supports real-time automation, enables advanced AI and ML, and powers timely, targeted digital engagement by unifying data across multicloud and front- and back-end environments. With reliable, curated data, HCOs can streamline decision-making, reduce costs, and improve outcomes within one to two years (see Figure 6).

- **Data fabric will accelerate data delivery.** Data fabric helps HCOs accelerate data delivery, transforming weeklong analysis cycles into same-day insights. This speed unlocks significant business value, including improved operational efficiency and reduced analyst workload, allowing teams to focus on strategic, revenue-driving tasks. A federated management model further strengthens data fabric by enabling decentralized control while maintaining consistency and trust. Together, these capabilities support better healthcare outcomes and more agile, data-driven decision-making.
- **Data fabric benefits are available today, but challenges may result in delays.** Barriers such as data policies and trust issues often slow data fabric adoption. While the technology is mature, outdated workflows and fragmented governance hinder effective use of integrated data. Also, strong security protocols are necessary to manage data breach risks. Despite these challenges, data fabric can deliver short-term benefits by accelerating data delivery and improving operational efficiency.
- **HCOs with strong governance and targeted implementation will see the biggest benefit.** Data fabric will deliver benefits in healthcare by enabling trusted, real-time access to integrated data for AI training, data science, and reporting. It acts as a data governance layer that improves data quality and consistency across systems. With the right advisory structure, use case alignment, and user adoption, HCOs can reduce risks like data breaches and cost unpredictability. Though ROI remains ambiguous, short-term gains include faster insights, improved operational efficiency, and enhanced regulatory compliance.

Figure 6
Data Fabric In Healthcare Is Driving Interoperability And Accessibility



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Three Technologies Will Likely Deliver Significant Benefits In The Medium Term

It will be several years before most HCOs will be able to reap significant benefits from the next three technologies on our list: GenAI for visual content, agentic AI, and federated machine learning are all poised to deliver benefits in the medium term. HCOs should be more selective in their pilot projects, and they must set reasonable expectations of benefit delivery timing.

GenAI For Visual Content Transforms Interactions And Education

Forrester defines genAI for visual content as:

Advanced AI systems that generate, modify, or enhance images, videos, and 3D motion graphics by learning patterns from existing data, producing contextually relevant and immersive content and experiences.

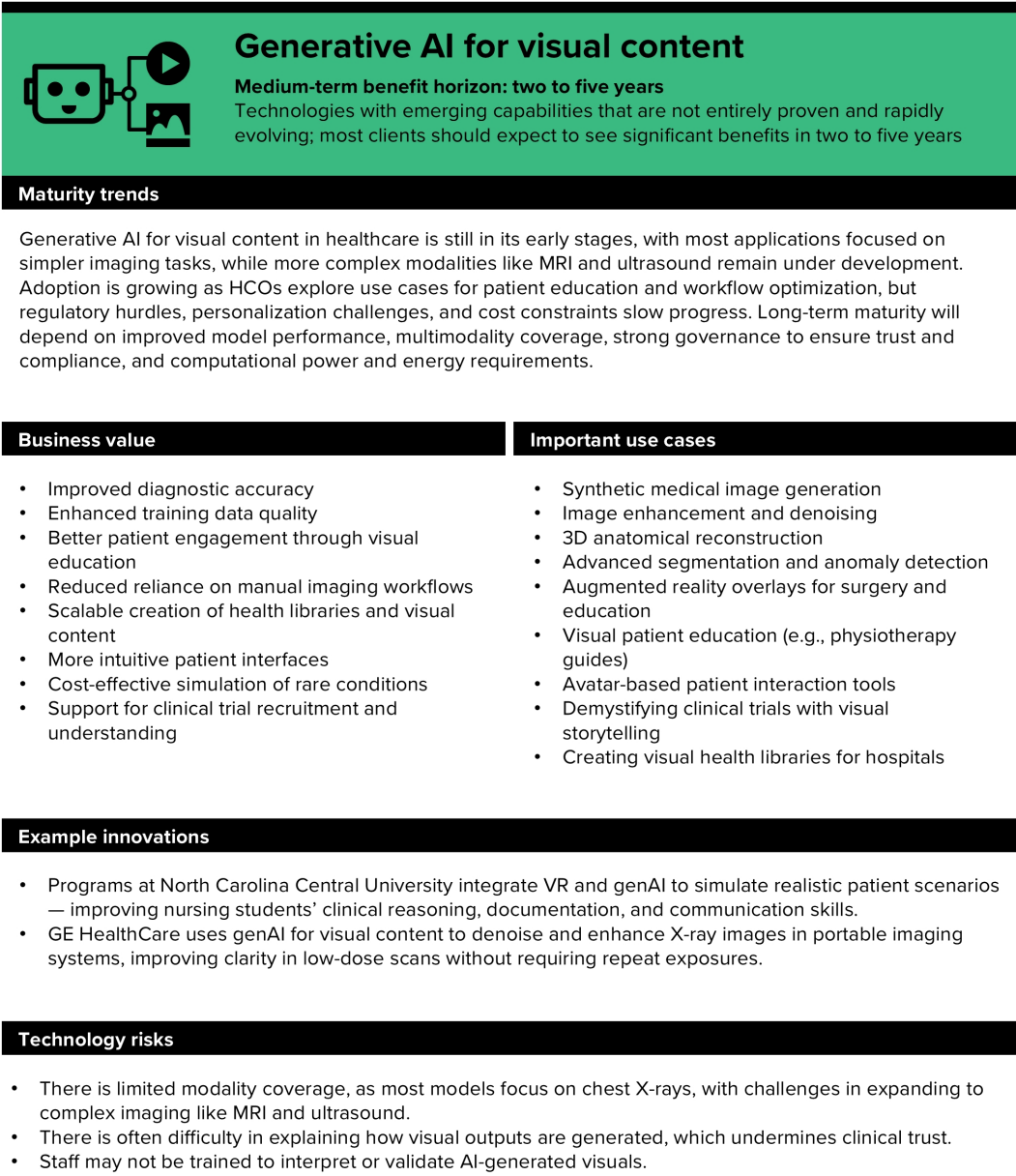
[GenAI for visual content](#) is already in use in healthcare and is expected to see rapidly increasing adoption rates. Despite early resistance, applications like avatars, human-like interfaces in patient care, and full-body imaging models are gaining traction due to their rapid acceptance in other industries. While genAI for visual content is advancing quickly, it will take two to five years to deliver its full business value (see Figure 7).

- **GenAI for visual content will improve content creation and engagement.** HCOs that adopt genAI for visual content are poised to transform the customer and employee experience. By leveraging advanced models to create personalized materials, HCOs can deliver clearer, more accessible information, tailored to individual needs, that supports better adherence to treatment plans. Leveraging genAI for visual content in complex imaging modalities, for example, will enhance practitioner comprehension and assist with diagnostic accuracy. In addition to personalization, dynamically rendering visual media and content will drive deeper engagement with both patients and healthcare professionals. As visual content becomes scalable and trusted, it will play a critical role in improving communication and outcomes across diverse populations.
- **GenAI for visual content will deliver benefits in the medium term.** While the benefits of genAI for visual content are promising, many will be realized in the medium term. Capturing personalized data to create customer-facing education materials is still murky. Cost of implementation remains a key challenge, and foundation models for things like complex imaging modalities are still evolving. However, ongoing efforts to expand coverage to more diagnostic modalities and

educational support, and improve model performance, are accelerating innovation. HCOs are actively driving demand for genAI in both language and visual domains, pushing vendors to develop new workflow solutions.

- **HCOs using robust visual data and advanced generative models will see the most value.** To unlock the full potential of genAI for visual content, HCOs must combine robust visual data, advanced generative models, and strong oversight with clinician input, patient-centered design, and rigorous performance tracking. Together, these characteristics enable scalable, effective, and trusted visual content that enhances customer education, engagement, and clinical training. In the long run, richer visual and spatial computing experiences will enhance patient interactions and demystify complex treatments.

Figure 7
GenAI For Visual Content Is Building Foundations For Full-Scale Adoption



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Agentic AI Steps In To Act On Behalf Of People And Software

Agentic AI shifts focus from AI agents, which are increasingly autonomous software systems, to the emerging techniques and architectures that are enabling the next generation of agents and systems built with them. Forrester defines agentic AI as:

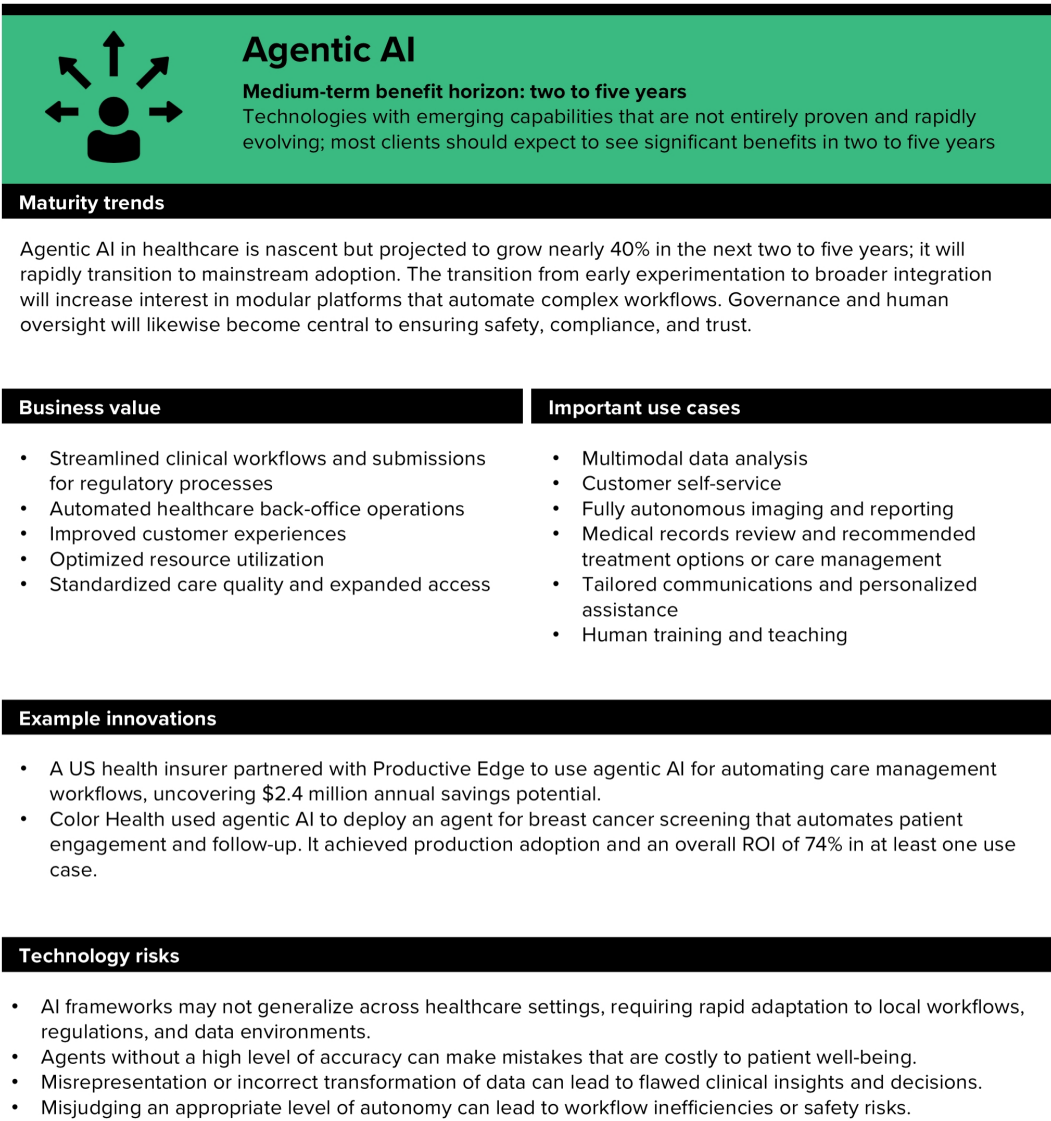
Systems of foundation models, rules, architectures, and tools that enable software to flexibly plan and adapt to resolve goals by taking action in their environment, with increasing levels of autonomy.

Agentic AI includes multiple essential components to enable its unique functions of goal-seeking, planning, and action-taking. Foundation models, more traditional ML models, code generation, software integrations, and more come together to enable agentic AI. For most HCOs, this technology will take two to five years to deliver the expected business value at scale, although early examples of AI agents are already in deployment (see Figure 8).

- **Agentic AI is emerging as a blueprint for next-gen software and automation systems.** Agentic AI shows promise as a future model for software and automation by enabling flexible, traceable decision-making and automating complex workflows. In healthcare, it will [support clinical decisions](#), optimize resources, and reduce costs through real-time analysis of multimodal data. Its architecture will allow AI agents to construct and refine plans for complex problems, adding flexibility and adaptability to business process automation. As agentic AI evolves, it could transform software design itself, shifting from static systems to dynamic, goal-driven architectures that learn and improve over time.
- **Medium-term impact depends on systems integration.** Agentic AI promises transformative gains in healthcare, but its full impact will take two to five years to materialize due to the need for high accuracy. While short-term improvements are evident in some administrative tasks, most workflows, such as clinical applications, require rigorous testing and integration. The risk of costly errors, such as misdirected referrals, means adoption must be cautious and customized to each setting. This will slow widespread deployment despite promising productivity boosts.
- **HCOs will see quick back-office task benefits; customer-facing tasks will take longer.** While most HCOs stand to benefit from agentic AI, HCOs, especially those with complex decisioning, large volumes of unstructured data, and sizable operational workforces, will see the biggest and most immediate impact. In the near term, agentic AI will automate workflow-heavy back-office tasks, improving

productivity and coding efficiency. These HCOs will first deploy AI agents internally, working alongside staff and supporting robotic and digital process automation bots. As agentic AI matures to more autonomous processes, it will expand into clinical decision support, accelerating diagnosis and treatment recommendations, and eventually to customer-facing use cases.

Figure 8
Agentic AI Will Transition From Experimentation To Broader Application In Two To Five Years



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Federated Machine Learning Reduces The Need To Share Raw Data

Forrester defines federated machine learning as:

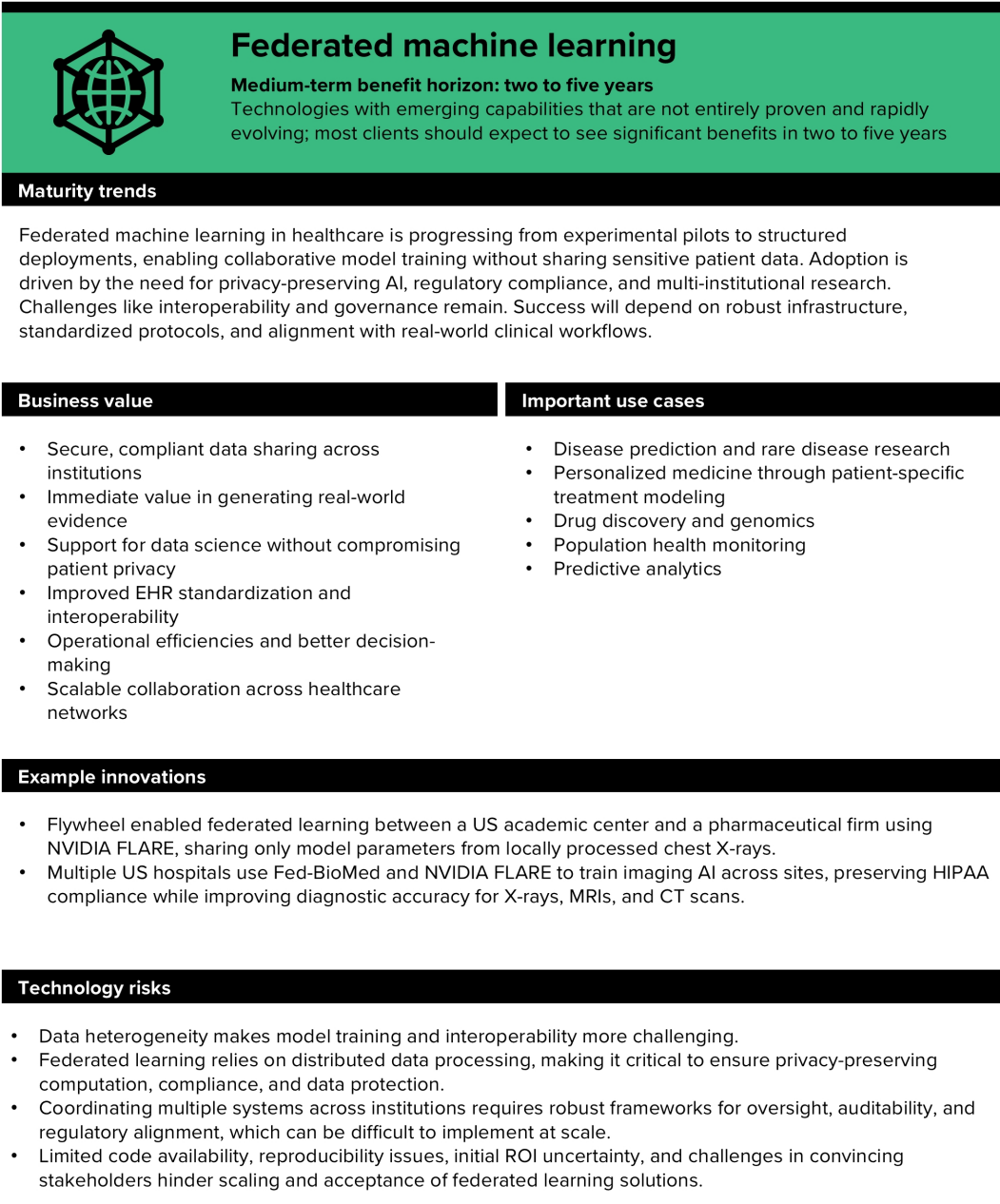
A distributed approach to training machine learning models that allows for the models to learn from data located on different devices or servers without needing to move the data itself.

FML enables multiple organizations to collaboratively train models without sharing raw data, enhancing privacy and security. It addresses data residency concerns by allowing data to remain within local systems while still supporting ML. Stricter data privacy regulations, federated real-world data, and insufficient centralized AI models are accelerating interest in FML. Initiatives like the [MELLODDY project](#) in Europe and [federated learning pilots](#) by the NCI signal growing institutional readiness. For most HCOs, it will take two to five years to deliver the expected business value (see Figure 9).

- **FML will improve real-time data analysis.** FML supports faster insights and more responsive decision-making. This is especially valuable in clinical research and public health, where timely access to diverse datasets can improve outcomes. FML enhances focus and efficiency by enabling researchers to collaborate without the delays and risks of data transfer. As HCOs increasingly rely on real-world evidence, FML will offer a secure and scalable way to unlock the value of siloed data while maintaining compliance with privacy regulations.
- **HCOs will realize benefits in the medium term, pending adoption challenges.** While FML holds significant promise, its widespread adoption in healthcare will play out over the medium term. Key barriers include limited data accessibility, regulatory uncertainty, and the complexity of coordinating multiple systems. Fragmented infrastructure and the need for strict data governance make collaboration difficult. FML can also appear opaque to stakeholders, raising concerns about explainability and trust. Without robust governance frameworks, HCOs may hesitate to invest. However, as regulations evolve and technical standards mature, FML is likely to become a cornerstone of data-driven healthcare innovation. HCOs must address FML's challenges with investments in secure compute infrastructure, federated governance models, and explainable AI techniques.
- **HCOs will have access to richer, privacy-preserving datasets.** One of the most compelling advantages of FML is its ability to unlock richer and more diverse datasets. By enabling collaborative model training across institutions, FML allows

HCOs to benefit from broader data inputs while keeping sensitive information secure and local. As these protocols and guardrails continue to strengthen, FML will empower HCOs to harness the full potential of data assets and maintain public trust.

Figure 9
Federated Machine Learning Will Overcome Governance And Interoperability Challenges



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Two Technologies Present Long-Term Potential For Risk-Takers

Digital twins and autonomous mobility technologies won't deliver substantial benefits for five years or more. Investing in these technologies should be secondary to other, more immediately impactful innovations.

Digital Twins Identify Inefficiencies And Simulate Workflows

Forrester defines a digital twin as:

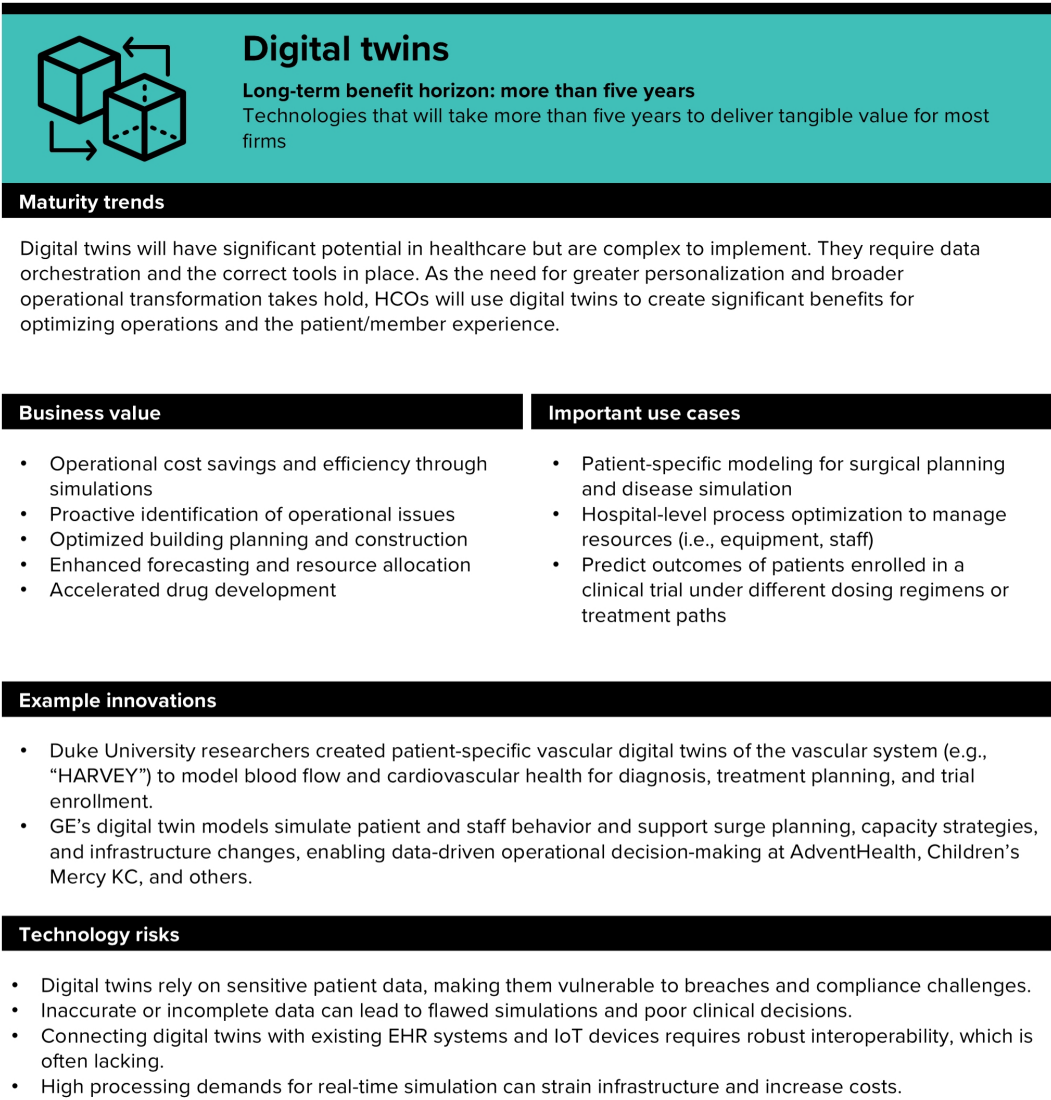
A digital representation of a physical thing's data, state, relationships, and behavior.

Benefits of [digital twin technology](#) will be realized in the long term for the average HCO. In time, digital twins will support targeted therapies, patient-specific surgical planning, and broader applications across care delivery, care management, and [physical spaces](#). There are immense complexities and challenges of accurately modeling these systems (see Figure 10).

- **Digital twins will reduce costs and enable operational forecasting.** Digital twins enable HCOs to do more than just simulate workflows. They are dynamic, live replicas of a physical asset that use real-time data from the real world. They can help identify inefficiencies and make data-driven improvements that enhance operational efficiency and patient care. Real performance data from equipment feeds into a computer simulation, enabling teams to optimize designs digitally and minimize costly rework. Digital twins support realistic simulation and training but shouldn't be confused with [digital doubles](#) or [process intelligence and simulation tools](#).
- **Digital twins will deliver operational gains before clinical transformation.** While digital twins' long-term potential in clinical care is significant, medium-term benefits will emerge first in less-complex use cases in operations, such as optimizing workflows, resource allocation, and facility management. A delay in broader adoption will stem from high data volume, integration complexity, and a need for coordination across systems (i.e., core IT and systems, clinical applications), which require other foundational investments (i.e., agentic AI, data fabric) to fully realize their value.
- **Balancing innovation with operational discipline will unearth big benefits.** The HCOs best positioned to succeed with digital twins are those that combine clinical innovation with operational discipline. Essential characteristics include real-time data access, strong integration between physical assets and digital systems, and a

commitment to simulation-based decision-making. These HCOs will have advanced analytics capabilities, cross-functional collaboration between IT and clinical teams, and leadership support for digital transformation. Success will also depend on the ability to validate models, ensure data accuracy, and align digital twin use with measurable clinical or operational goals.

Figure 10
Digital Twins Will Reduce Costs And Deliver Operational Gains



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Autonomous Mobility Technologies Drive Efficiencies And Unlock New Business Models

Forrester defines autonomous mobility technologies as:

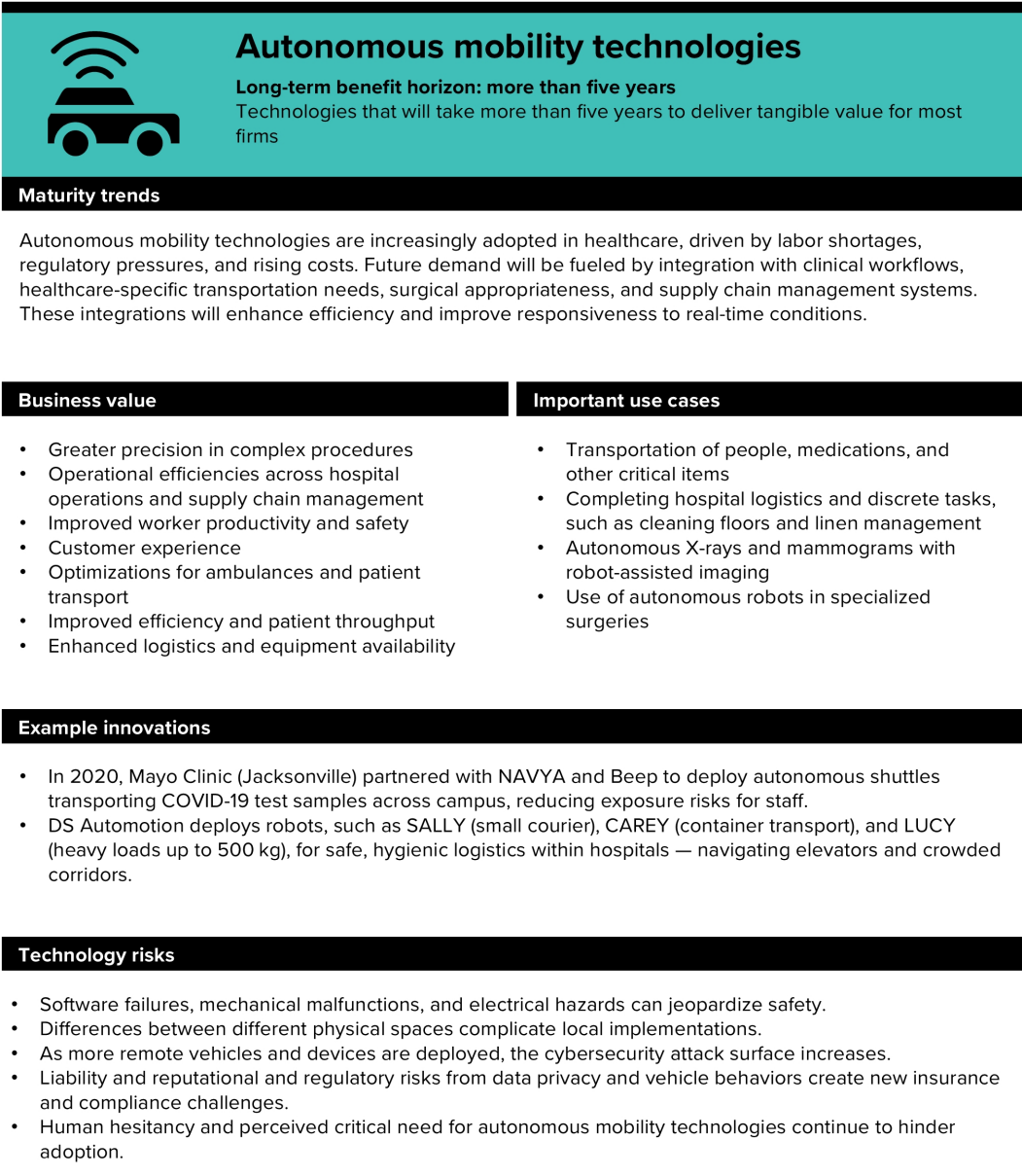
A combination of hardware, software, data, and communications infrastructure on and around vehicles enabling them to perceive and respond to their environment with little or no human input.

AMTs are increasingly being adopted in healthcare to streamline operations and reduce manual labor. These systems integrate robotics, AI, IoT, and edge computing to automate tasks traditionally performed by humans. While some applications are well established, broader use cases are still evolving. As digital twins and agentic AI mature, AMTs will play a central role in redesigning clinical workflows and enhancing operational efficiency. For most HCOs, it will take five or more years to deliver the expected business value (see Figure 11).

- **Autonomous mobility technologies will improve safety and redistribute labor efforts.** AMTs are poised to significantly improve operational efficiency in healthcare by automating labor-intensive tasks and enhancing surgical precision. From robots that deliver medications, meals, and cleaning supplies to autonomous nurse-assistive and surgical robots, AMTs will allow humans to focus on higher-value clinical care and improved outcomes. By removing arduous manual labor, AMTs help optimize workflows, reduce delays, and improve the overall patient experience — especially in environments where staffing shortages are a persistent challenge.
- **AMTs' benefits will be available to most HCOs in the long term.** Robotic surgeries have matured, but broader AMT applications like patient transport and ambulance optimization remain in early experimentation phases. Scalability is hindered by infrastructure limitations, high costs, and misalignment with immediate healthcare priorities. The risk of system failures requiring costly human intervention further slows adoption. HCOs must approach investments cautiously, as achieving returns requires changes in physical infrastructure and workflow design. Without clear ROI, widespread deployment of AMTs across HCOs will be minimal over the next five years.
- **HCOs using AMTs in controlled environments with niche uses will see the most impact.** In logistics-heavy areas like supply chain management, transportation, and surgical support, AMTs will prove their value by improving precision, reducing delays, and freeing human workers for more complex tasks. These technologies

will thrive in structured settings where workflows are predictable and safety can be tightly managed. Focused applications will offer a clear path to ROI and operational improvement without requiring large-scale transformation.

Figure 11
Autonomous Mobility Technologies Will Enhance Operational Efficiencies



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Supplemental Material

Companies We Interviewed For This Report

We would like to thank the individuals from the following companies who generously gave their time during the research for this report.

GE HealthCare

KAI Conversations

LifeArc

McKinsey & Company

Medidata

Perficient

Philips

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