



WHITEPAPER: THE FUTURE OF CARE

The smart hospital digital transformation

SIEMENS



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Hospitals are caught in a perfect storm

Most hospital infrastructure was designed for a foregone era. Today's hospitals are under rising pressure to deliver high-quality care in the face of changing patient expectations and pressure to become more efficient, competitive, and sustainable.



The healthcare sector is facing widespread staff shortages with no end in sight.

The healthcare sector is caught in a perfect storm, and traditional hospital infrastructure can no longer meet current and future needs.

The aging world population is putting exponential demand on health systems because as people age, they need more healthcare services. In November 2022, the global population hit eight billion, more than three times larger than it was in the 1950s¹. The global median age has increased by 10 years since the 1970s², and this trend is expected to continue in the coming decades. In the past, hospitals increased both their human and financial resources to keep pace with increased demand, but this is no longer a workable choice.

While demand for healthcare services is increasing the healthcare sector is facing widespread staff shortages with no end in sight. The World Health Organization (WHO) estimates a global shortfall of 10 million healthcare workers by 2030³. The high workload during the pandemic only worsened pre-existing staff retention challenges. Studies have found that nurses spend 72 minutes per shift searching for needed equipment; this affects not only nurse efficiency, but also the delivery of quality care⁴. Manual, repetitive, and redundant tasks create waste in a hospital

1 <https://www.un.org/en/global-issues/population#:~:text=Our%20growing%20population,and%20%20billion%20since%201998,of%2003/15/2023>.

2 <https://ourworldindata.org/age-structure#:~:text=The%20global%20median%20age%20has,over%2030%20years%20in%202022,of%2003/15/2023>.

3 https://www.who.int/health-topics/health-workforce#tab=tab_1_of_03/15/2023

4 ROI of Locatable RTLS for Healthcare, Frost & Sullivan

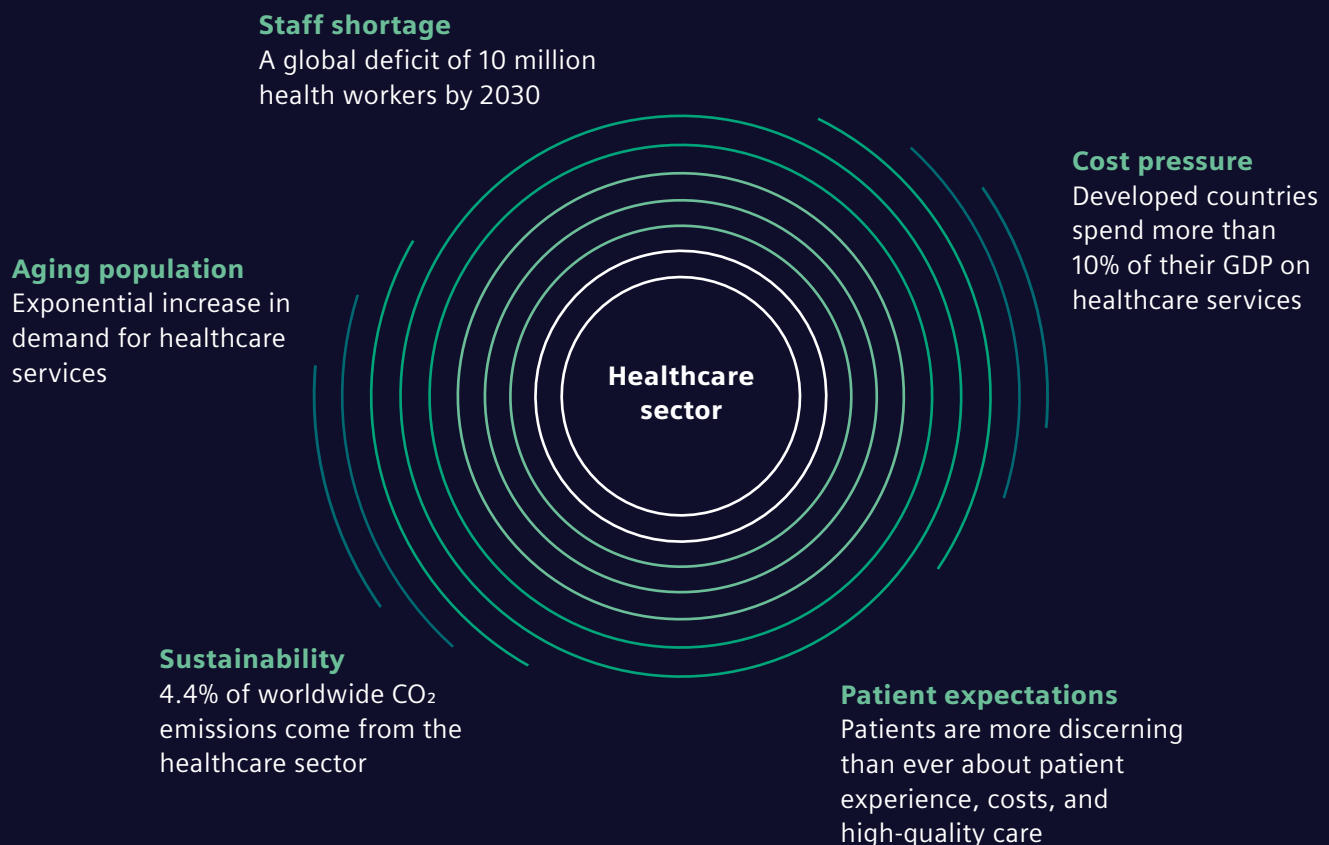
environment and lead to healthcare providers spending hours a day on inefficient processes. Healthcare workers have long since faced low wages, long hours, challenging work environments, and heavy patient loads, often leading to burnout and personal health challenges. As a result, many health care workers have left the profession for adjacent careers such as healthcare recruiting, social work, pharmaceutical sales, consulting, and health care education.

Meanwhile, hospital and health system budgets face unprecedented financial challenges from lower revenues and skyrocketing expenses from labor, drugs, and medical supplies. In 2020, global health spending rose to 10.8% of global GDP, a new high, and increased per capita as a share of GDP across all countries and income groups⁵. Although global health spending grew due to the pandemic, global health care spending has been on the rise since 2010.

Further complicating the healthcare landscape, patients and their families expect more from their care experience than ever before. Patients are increasingly the purchasers and managers of their health and wellness and are discerning about patient experience, costs, and high-quality care. Patients expect a frictionless patient

⁵ <https://apps.who.int/iris/bitstream/handle/10665/365133/9789240064911-eng.pdf> of 03/15/2023

A perfect storm: Challenges facing the healthcare sector



10%

of national emissions in industrialized countries are from the healthcare sector.

experience enabled by their preferences and the ability to choose how they interact with nurses and clinicians, customize their healthcare experience (from scheduling to food to rooms), and navigate the hospital campus. However, many healthcare buildings suffer from inflexible design choices that cannot accommodate evolutions to patient care delivery.

Finally, hospital administrators and facility managers must keep up with changing environmental regulations which introduce new climate change and sustainability standards. Hospitals are a controlled, but complex and energy intensive environment, which leads to both significant costs to the hospital's bottom line and disproportionate environmental impact by floor space. For example, in the United States hospitals are the second most energy-intensive building type; their energy use intensity (EUI) is three times the average commercial building⁶. The rising costs of energy in many regions creates an imperative for hospitals to decrease energy consumption, beyond regulatory compliance and social responsibility. More than 4% of worldwide CO₂ emissions are from the healthcare sector. In industrialized countries, this figure may be as high as 10% of national emissions, leading to significant pressure to reduce the sector's carbon footprint⁷.

The result is a confluence of pressure to improve efficiency and flexibility, costs, productivity, and patient experience and outcomes at the same time.

⁶ <https://www.energy.gov/sites/default/files/2021-06/integrating-health-ee-health-care-facilities.pdf> of 03/15/2023

⁷ Peter-Paul Pichler et al 2019 Environ. Res. Lett. 14 064004



Many healthcare buildings suffer from inflexible design choices that cannot accommodate evolutions to patient care delivery.

Smart hospitals: Doing more with less

The hospital infrastructure must digitally transform – the need for smart hospitals that can do more with fewer resources is evident.

A smart hospital offers a smooth, human-centric experience that improves patient outcomes, increases productivity and revenues, and enhances eco-efficiency. Smart infrastructure technology and expertise are the foundation of any smart hospital transformation.

What is a smart hospital?

An organization where all relevant data is gathered, analyzed, and converted into actionable insights for hospital stakeholders to improve operational and clinical outcomes.

The need for smart hospitals is clear. The emergence of smart building technology offers hospitals new ways to increase efficiency and flexibility, manage costs, maximize productivity, and offer better patient experiences by modernizing hospital operations through the collection of data from various IT, OT, and medical systems. Even newer buildings can benefit thanks to new technologies such as artificial intelligence and machine learning used in smart building technologies.



The emergence of smart building technology offers hospitals new ways to improve the patient experience.

Smart infrastructure improves hospital operations and patient outcomes

Smart infrastructure technology and expertise are the foundation of our smart hospital approach. All relevant data is gathered, analyzed, and converted into actionable insight – enabling connected care and leading to improved operational and clinical outcomes. The integration of OT, IT, and medical infrastructure is the primary enabler of this smart approach.



All relevant data is gathered, analyzed, and converted into actionable insight.

Implementing smart hospital infrastructure in a single hospital or hospital network is an intricate, multi-year commitment. Success isn't guaranteed; more than 70% of digital transformation initiatives fail⁸. Hospital infrastructure is complex; it often spreads across multiple buildings and is implemented over many years by different vendors, resulting in fragmented systems.

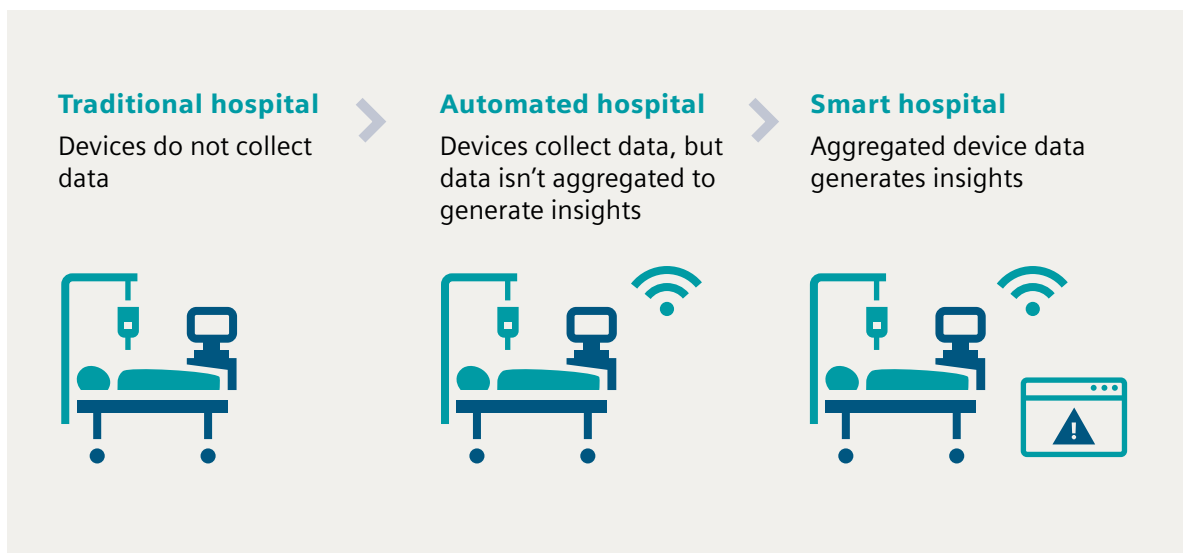
More than
70%
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Smart infrastructure implementation challenges:

- Limited or lacking IT/OT integration
- Siloed and legacy infrastructure
- Vendor lock-in
- Evolving technology
- Varied interest and involvement from stakeholders
- Overcoming past negative experiences with technology implementation
- Facilities dispersed across campuses, regions, or countries
- Lack of familiarity with innovative technology and best practices
- Optimizing the speed and cost of deploying technology in a multi-stage project

⁸ <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/about-deloitte/deloitte-uk-digital-transformation-are-people-still-our-greatest-asset.pdf> of 03/15/2023

The journey to an operationally smart hospital is a complex, multi-stage process.



The journey to an operationally smart hospital is a complex, multi-stage process. The average hospital campus may have infrastructure at varying levels of digital maturity. In a traditional hospital setting, smart devices may already exist, but they do not collect data and may be integrated with other aging infrastructure components, creating further performance limitations. Many hospitals are moving towards an automated environment where smart devices collect data, but building operations do not aggregate the data and generate insights to improve resource efficiency. The (current) end stage is a smart hospital where smart device data is aggregated, analyzed, and used to promote data-driven decisions.

Digital transformation, however, is a never-ending process, not a project, and planning for continuous improvement and the introduction of innovative technology over time is critical to long-term success.

The breadth of skill and experience needed to execute a smart hospital digital transformation is enormous, and implementation challenges often lead to one of two outcomes: 1) limited investment, or 2) disappointing returns.

Want to learn more?

Contact **our smart hospital experts** to learn more about our digital solutions for healthcare facilities.

Introducing Siemens Xcelerator

The Siemens Xcelerator framework makes digital transformation more effective and manageable.



There is no one-size-fits all solution for a smart hospital digital transformation. When you take your digitalization goals from planning to execution, the right partner can help you design and implement your unique smart hospital journey. Siemens Xcelerator is a digital transformation framework based on three principles: ease, openness, and flexibility. Our framework is designed to allow smart hospitals to connect applications in such a way that patients, visitors, and staff members have an effortless, human-centric experience that drives patient outcomes and staff productivity.

The Siemens Xcelerator framework is designed to support each part of your digital transformation strategy: Offering expertise, steps to success, and practical examples.

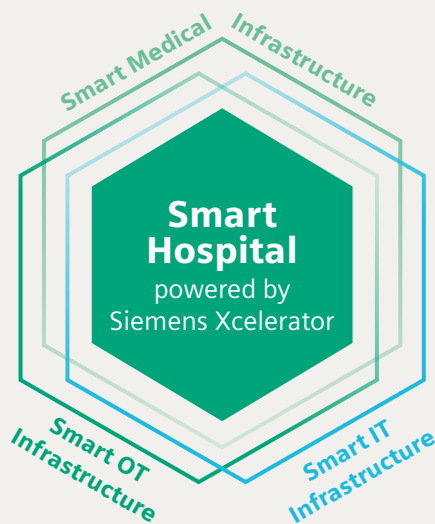
Digitally transforming your facilities and operations for more efficient, competitive and future-proof healthcare.

Siemens Xcelerator helps you deliver on such strategic goals as:

- Improve patient outcomes
- Drive staff productivity and reduce operational costs
- Protect people and assets
- Operate sustainably: be energy efficient and power resilient
- Ensure healthcare cybersecurity and comply with standards
- Reduce construction costs and shorten the time to market

Siemens' agile smart hospital implementation approach, technology, and partner ecosystem is designed to support a hospital's unique digital transformation. Together we can manage multiple, yet mutually dependent, transformation streams to achieve a hospital's desired outcomes.

Smart hospital: Data from medical, IT, and OT is brought together



Data from medical, IT, and OT is brought together and employed to optimize the patient's journey, staff efficiency, and other workflows in hospitals. An approach that focuses on ease, openness, and flexibility allows smart hospitals to connect applications in such a way that the patient, visitor, or staff member has a seamless experience.

Find out more

Check out our healthcare-specific [solution finder](#) to learn more about our smart hospital solutions and engage with our experts.

A smart approach with **proven success**

Smart hospital solutions from Siemens make Sint-Maarten Hospital an environment that intuitively cares about its patients.



Sint Maarten Hospital is an interconnected healing environment that needs to run smoothly day and night.

Sint Maarten Hospital in Mechelen, Belgium, has already taken the digital transformation journey. The newly built healthcare facility, with 643 in-patient and 96 day-patient beds, is an interconnected healing environment that needs to run smoothly day and night. Its interconnected ecosystem of people, technology, and data that collectively optimizes processes and the patient and staff experience and maximizes building efficiency is a blueprint for a smart hospital. A single integrated building management system is the technological backbone of the smart building infrastructure to increase comfort, efficiency, resilience, and safety. Six medium-voltage substations equipped with switches, power distribution boards, and



We are an interconnected ecosystem of people, technology, and data making the building itself an active part of our daily work.

Jan Ennekens, Director, Sint-Maarten Hospital

protection devices form a system for intelligent electrification to enable a safe and reliable power supply. Closed-circuit television (CCTV) with 180 cameras and SiPass for access control ensure optimal security throughout the building.

With smart infrastructure in place to create a culture of data-driven decision-making, a hospital can effectively tackle the perfect storm of challenges facing healthcare while remaining competitive.

Discover more

Visit our **smart hospital website** to explore why digital transformation is leading to more efficient healthcare, and get inspired by further references.

With smart infrastructure in place, a hospital can effectively tackle the perfect storm of challenges facing healthcare.



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