Critical healthcare environments:
the backbone of healthcare delivery

Critical healthcare environments such as operating rooms, ICUs, isolation rooms, laboratories, and pharmacies are among the most crucial spaces in a healthcare facility. These spaces are highly controlled and must continuously maintain precise conditions to support patient safety, regulatory compliance, infection prevention, and uninterrupted care delivery. As healthcare organizations face growing operational complexity, workforce challenges, and pressure to improve performance, facility teams, compliance officers, and clinical staff are under increasing pressure to ensure these spaces remain safe, compliant, and operationally ready.

Why critical environments matter

- Operating rooms generate up to **70%** of hospital revenue, making availability, performance, and readiness directly tied to financial sustainability.[1]
- Critical environments account for **~35-40%** of hospital costs, creating significant pressure to improve efficiency and utilization.[2]
- **1 in 38** patients acquire a healthcare-associated infection (HAI), reinforcing the need for dependable, high-performing critical care environments.[3]

Unlocking greater resilience in critical spaces

The demands placed on critical environments continue to increase, while the tolerance for downtime, compliance gaps, and environmental deviations continues to decrease.

Autonomous critical environments leverage connected systems, real-time intelligence, and automation to help reduce reliance on manual intervention, enabling healthcare organizations to proactively identify issues, automate responses, and maintain safer, more compliant, and operationally resilient critical spaces.

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Critical care environments

Maintaining critical environments requires constant coordination between facility teams, compliance officers, and clinical staff. Siemens addresses critical environment challenges through three core use cases focused on environmental performance, compliance assurance, and operational continuity.

Critical care use cases

Maintain precise environmental conditions

Automate and continuously monitor conditions such as airflow, pressure, temperature, and humidity to help reduce risk, support infection prevention strategies, and maintain consistent room performance in critical care spaces.

Simplify compliance & documentation

Digitize environmental monitoring, documentation, and reporting processes to help simplify compliance management, improve audit readiness, and reduce the administrative burden associated with highly regulated healthcare environments.

Improve operational readiness

Connect building systems, environmental intelligence, and clinical workflows to help ensure critical spaces remain ready for use, adapt room conditions to changing clinical requirements, minimize disruptions, and support more efficient utilization of high-value clinical environments.

Connecting building operations with clinical workflows

HL7 enablement capabilities help bridge building operations and clinical workflows, allowing information to flow across healthcare environments to support coordination, visibility, and operational readiness. By enabling the exchange of non-sensitive operational and workflow data, healthcare organizations can reduce operational silos, improve resource utilization, and create a stronger foundation for autonomous critical care operations.

Your partner for human-centric critical care

In critical environments, there is no room for disruption. As a trusted healthcare partner, Siemens helps healthcare organizations reduce operational risk, strengthen patient safety, simplify compliance, and maximize the availability of critical care spaces through connected, intelligent infrastructure that reduces reliance on continuous manual intervention and supports resilient, always-on healthcare operations.

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About Siemens

Our technology empowers customers to transform the industries that form the backbone of economies: industry, transportation, buildings and grids. Our solutions accelerate the digital transformation of multiple industries, to scale sustainability impact.

Contact us

Find out how, with Siemens solutions, transform today's challenges into opportunities.

Visit our webpage to learn how to control critical environments with smart automation.

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1. Seminars in Pediatric Surgery, Volume 27, Issue 2, pg. 79-85 (2018)
2. Journal of Medical Systems, Volume 47, article 19 (2023)
3. Center for Disease Control and Prevention (CDC) (2026)

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