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Hospital Infrastructure Affects Patient Experience and Care

Hospitals need to maximize performance on many different fronts: increase revenue, keep costs down, provide a great patient experience and attract the best professionals – all while complying with a myriad of federal and state standards. The impacts of healthcare reform, aging facilities, and increasing compliance requirements create obstacles to providing a better experience for patients, caregivers, and staff. This changing environment means that spaces are likely to be expanded, reconfigured, or repurposed. At the same time, patients and staff expect higher functionality while they are less willing to accept unsightly technology upgrades.

Today more than ever, a healthcare facility's infrastructure plays a vital role in the delivery of better care. The electrical, data communications, and energy management infrastructure supports the mission of providing a better patient experience and a more productive environment for medical professionals.



This infrastructure must:

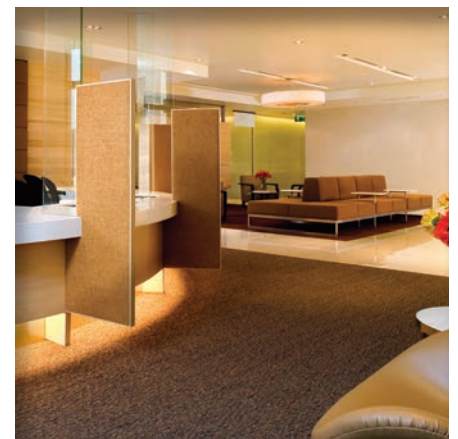
- > Maximize facility performance
- > Keep pace with changing technology
- > Reduce the cost of ownership
- > Enable fast, cost-effective moves, adds, and changes
- > Enhance sustainability

The Role of Infrastructure in Key Hospital Areas

A well planned and designed infrastructure includes energy management, flexible and adaptable power and data cabling; is aesthetically pleasing; and contributes to fast and efficient construction. Before considering ways to maximize this infrastructure, let's take a brief tour of a hospital to see how the

electrical, data communications, and energy management infrastructure is critical to the healthcare mission.

A successful healthcare facility provides physical and even emotional support for patients and the men and women who work there. Increasingly, **patient care areas** are designed to enhance the patient experience and outcome. For example, many healthcare facility designers recognize the value of natural light and pleasing open spaces. Today's hospitals increasingly include dedicated spaces with abundant natural light. Day lighting not only reduces energy consumption, but it also enhances the patient experience and has been shown to improve employee morale.



In general, aesthetics and hygiene are more important than ever in healthcare settings. Today's facilities allow fewer visible wires and cables than hospitals of old. Systems that incorporate wires and cables into furniture, provide connections in open spaces or otherwise minimize their aesthetic impact help improve the visual appeal of a facility.

Positive frames of mind create positive medical outcomes. A positive impression begins with an entrance where open floor plans from the **atrium to admissions** offer the public no-hassle access to power and communications connectivity for tablets and laptops. In patient rooms,



High-capacity power solutions are required in **imaging and operating rooms** in order to use advanced medical technology safely and reliably. Cabling and network systems must adapt easily to changing technologies, while meeting the highest standards for health and safety.



the infrastructure helps create a comfortable environment that promotes a positive frame of mind while increasing safety.

The electrical and data infrastructure also affects the ability of nurses to deliver better care. Enhanced communications, better lighting, and easy access to electronic patient information all play a key role in **nurses stations** that work better.

A robust, flexible infrastructure supports **laboratories and related functions**, providing power and network access at a technician's fingertips in a safe manner.

Data centers in healthcare facilities do more than ever. Networks require greater security and storage capabilities, and higher speed processing. A flexible and scalable approach to data center design accommodates current needs and future expansions as well as supports HIPAA and HITECH mandates.

Lastly, teaching hospitals require state-of-the-art classrooms, lecture halls, and more. And most healthcare facilities today need **meeting rooms** with video conferencing capabilities which must be supported by flexible, reliable audio/video connectivity.

Flexibility and Integrated Technology

The physical support infrastructure for electrical wiring and data, communications, and audio/video cabling is the foundation of the many systems that support the healthcare facility's mission. The conventional method of running wires and cables through the walls and utilizing fixed-position outlets makes it difficult to accommodate the inevitable changes in the physical layout.

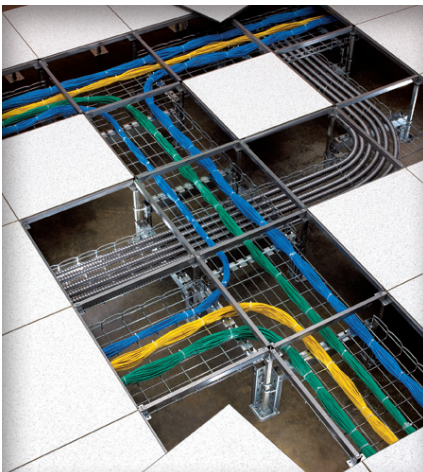
Flexible wire and cable systems provide power, and manage, organize, protect, and connect the cabling infrastructure to bring services closer to the user. Of particular importance in healthcare facilities, these systems are designed to support all appropriate grades of receptacles.

These solutions include:

- > Open space systems, such as floor boxes and poke-thru devices
- > Perimeter raceway systems that route wiring and cabling securely along walls
- > Overhead systems and vertical distribution units that bring power and data from the ceiling directly to where they are needed

These systems are specifically designed to provide the accessibility and flexibility required for efficient building function. These reusable systems allow easy access for cabling change-outs and flexibility for noninvasive and less expensive moves, adds, and changes.

Raised floor systems are an increasingly significant component of healthcare building design. These systems facilitate underfloor HVAC distribution and form a flexible pathway for wiring and cabling. Raised floor boxes and enclosures, wire mesh cable tray, and modular wiring systems all support robust and efficient raised floor systems.



Audio/video installations frequently require a specialized infrastructure that incorporates four essential values that work together to ensure system reliability: the mounting system, thermal management, cable management, and power distribution. Racks and enclosures form the primary structure of an integrated system and provide the

frame that will support not only the electronic equipment, but also power, cooling, and cable management.

Energy Management

As a large consumer of energy resources, healthcare facilities face significant operating costs and are threatened by rising and volatile energy prices. With a strong emphasis on sustainability and efficient resource use, healthcare facilities can be designed and constructed to be significantly more cost-effective than a traditional building.

Lighting controls such as **digital lighting systems, dimmers, and sensors** reduce lighting usage and significantly lower operating costs. Even more savings stem from reduced air conditioning costs, bulb replacement, maintenance expense, and the cost of power during peak hours. Building managers can program lighting from a central location using digital lighting management, an intelligent, distributed control system that automatically maximizes lighting energy efficiency that is both sustainable and cost-effective.

Plug load control or managing the amount of energy drawn by devices from an electrical outlet, is an emerging challenge for healthcare facility managers. As HVAC and lighting are made more efficient, the energy used by devices, equipment, computers, monitors, and personal electronics like tablet computers becomes a larger share of total electricity usage. There are a number of options for controlling plug load by turning off equipment.

These include:

- > Automated switching using timers and "smart" power strips to power off non-critical equipment and office equipment
- > Central power management systems that use software to perform specific tasks, such as enabling sleep settings on all computers on the network
- > Total control systems that provide fully integrated management controls



Data center energy control includes passive air control, the most efficient, cost-effective method of improving airflow and maintaining proper temperature to lower energy costs for cooling. Cable management and advanced racking solutions help facilitate cooling efficiency and reduce network downtime. Wire mesh cable tray allows for overhead or under floor cable routing and enables better airflow than solid conduit. Advanced cable management racks are designed for higher density applications where they manage intake and exhaust air, creating cold aisle/hot aisle air distribution from side, bottom, and back vented equipment. Efficient cable management also contributes to better space utilization.

Fast-Track Construction

During new construction or renovation, healthcare facility owners and managers face a combination of economic pressures and compressed schedules that can increase the costs of installation and retrofits. The careful selection of electrical infrastructure products has the potential to greatly benefit the entire project timeline.

Systems with “designed-in” productivity include:

- > [Prewired raceway](#)
- > [Modular wiring systems](#)
- > [Wire mesh cable tray with pre-assembled supports](#)
- > [Plug-and-play wiring devices](#)
- > [Pre-fabricated wiring systems](#)

The use of products and systems that have “designed in” productivity offers numerous benefits throughout the life of a building project. Products and integrated systems offer time savings in the design, assembly, and installation of the electrical and cabling infrastructure. Installation is simpler, so there are fewer errors and delays due to re-work. After initial construction, their “plug and play” capabilities make it easy to accommodate moves, adds, and changes.

Conclusions

In today’s highly competitive healthcare environment, better care involves more than supporting patients and caregivers. It’s about making sure even older facilities operate in a more sustainable manner while being easier and more cost-effective to maintain. The infrastructure of healthcare facilities is more important than ever. The building’s backbone – the wiring and cabling pathways, lighting and lighting controls, and data, audio-video, and communications systems of a building – must not only accommodate the demands of today, but also be able to adapt to the changes of tomorrow. And this infrastructure is the enabling technology for advanced healthcare facilities, whether dedicated to patient care or research. Without it, a building cannot perform at a high level and be sustainable, cost-effective, safe, secure, productive, and functional.

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