Children's Hospital of Pittsburgh of UPMC

Pittsburgh, Pennsylvania

Renowned children's hospital embraces technology to change lives for the better

The new Children's Hospital of Pittsburgh of UPMC incorporates an unprecedented level of technology to improve patient care, reduce human error, and improve patient, visitor and staff safety while providing operating efficiencies to manage costs effectively. Changing lives for the better is what Children's is all about. To help achieve that goal, the hospital embraced the Johnson Controls® Technology Contracting™ model to leverage clinical, business and building systems, and infrastructure design to positively impact clinical care.

Renowned for its outstanding clinical services, research programs and medical education, Children's has helped establish the standards of excellence in pediatric care. Children and adolescents make more than one million visits to the hospital, its neighborhood locations and community pediatrics practices each year – including more than 13,500 inpatient stays, 25,000 surgeries and 77,000 emergency department visits. Children's was named to the *U.S. News* & *World Report's* Honor Roll of America's "Best Children's Hospitals" for 2011–2012, and again for 2012–2013.

Opened in May 2009, Children's is part of UPMC – a leading nonprofit health system in the United States with more than 20 hospitals and 400 clinical locations. When UPMC chose to build a new campus for Children's Hospital, it did so with the vision of being the world leader in children's health, according to Eric Hess, vice president of operations for Children's. "The benefit of building a replacement hospital was not having to tie into or reuse legacy systems. And, starting from scratch allowed us to think about the benefits of a completely integrated approach to technology with one technology contractor – a model Johnson Controls advocated early on while working with us at the former hospital," says Hess.

Johnson Controls

"Working with our design team, we put together a very large bid package based on traditional building, business and clinical systems. Johnson Controls not only understood our vision for converging them but brought the resources to bear to articulate that vision, and ultimately delivered on it."

Technological sophistication is one of five principles Children's is grounded on, which also include, family-centered care, patient safety and quality, ensuring a quiet campus, and environmental sustainability (green building).

real-time location, interactive television, telecommunications, wireless clock, intercom and paging, among others.

"By stepping away from the traditional model of multiple networks to one unified network, we've reduced administrative time needed for day-to-day management of those networks," says Harun Rashid, vice president of global health services & chief information officer." The unified network provides singular control and better visibility for us and the end-users, which positively impacts the flow of clinical care."

A better model for delivering technology

The hospital's immediate need was to install a converged network that is future-ready, cost effective, secure, always on, always available, ubiquitously accessible, technology transparent and user friendly. Under its technology contracting model, Johnson Controls helped Children's assess its technology needs, select clinical, business, and building information systems, and design a single IP-based network on which to integrate them.

The enterprise-level solution not only reduced infrastructure costs associated with multiple networks, but also provided increased flexibility for future upgrades and additions. As the technology contractor, Johnson Controls managed all related subcontractors, serving as the single point of responsibility for the design and installation of the network and technological systems across all eight facilities on campus.

The technology map comprises nearly 30 integrated systems including the Johnson Controls Metasys® building management system, P2000 security management system and IFC2-3030 fire alarm system. A variety of third-party systems include local and wireless area networks, video surveillance, visitor management, VoIP, time and attendance, nurse call, electronic medical records,

Ensuring systems meet end-users' needs

Building a replacement hospital provided the opportunity for creativity in design and infrastructure but it also presented a challenge – moving over 150 patients from one hospital to another in one day. On that day, all the new systems across the campus not only had to work but they had to meet the needs of the end-users, and those people needed to know how to use them.

"We engaged end-users early on and throughout the design process to determine what their needs were and then, with the help of Johnson Controls and their subcontractors, selected the technologies that best met those needs," says Scott Barnes, director of information services. "Through the process, we not only learned what the needs were but also new ways to get there."

A majority of the new systems were brought into the existing hospital first for testing, which minimized roadblocks during the day-in-the-life testing at the new hospital. "Johnson Controls and the other contractors were part of that testing as well as train-the-trainer sessions, which meant end-users knew how the systems worked. Having that upfront was a critical factor in our ability to support services and staff when we actually moved in," says John Casteel, telecommunications analyst. "A single

point of accountability and the flexibility Johnson Controls gave us in working directly with subcontractors during this process was very valuable. We couldn't have accomplished what we did without this partnership," adds Barnes.

Engaging Children's facilities staff early on was also key to ensuring they understood the new campus, according to Elizabeth Munsch, director of facilities and construction. "Johnson Controls recognized the value of integrating our staff into their commissioning team, not only as it relates to start up but also from a design and preconstruction aspect," says Munsch. Instead of separate operational groups for each campus, the staff of 45 maintenance technicians and two managers transitioned back and forth between the campuses over a two-year period, keeping the existing one running while becoming familiar with the new one.

"They all became part of the Johnson Controls team, working side-by-side with them and the commissioning agent on everything from design, development, construction and startup to the commissioning itself," says Munsch. "So not only did we integrate on the product side, we also did so on people side. As a result we didn't just have a startup of buildings and systems, we had a startup of a living breathing campus with multiple systems. The strength that comes out of that is not only getting the cross team input and implementation, but getting an educated workforce that took over operations of the new campus."

Converged technologies enhance healing environment

Whether it's improved clinical care and workflow, patient and staff safety and satisfaction, or more efficient facility operations – the technology infrastructure in place at Children's enhances the healing environment. The new Children's campus is a fully integrated hospital and among the first fully digital hospitals in

the country. The single IP-based network and integrated systems mean both clinical and non-clinical staff have access to the information they need when and where they need it.

The campus-wide wireless data network with 2,000 access points enables access to centralized electronic medical records, imaging, bio-medical equipment, prescriptions writing and other clinical and non-clinical applications across all venues of the hospital campus. This allows staff to work and access information in a consistent manner, and make decisions no matter where they are. The move to electronic records has nearly eliminated the need to store paper records and the associated administrative resources can be used elsewhere.

Integrated nurse call, patient monitoring and wireless phone systems mean alerts and patient vitals can be sent directly to caregivers' phones for a more timely response. All voice and paging calls from clinical and building systems are routed directly to wireless devices, virtually eliminating them from the public address system, which makes for a quieter, less stressful healing environment.

The infrastructure supports videoconferencing, either desktop or auditorium, to enable continuing medical education, patient and clinical consultation, and even telemedicine. All bedsides, lounges and waiting areas are equipped with infotainment systems that reside on the network. And, the same tracking technology used in the security system, enables Children's to offer laptops and ipads to patients to ease stress. The equipment can be monitored and when a patient is discharged, the device is collected and readied for use again.

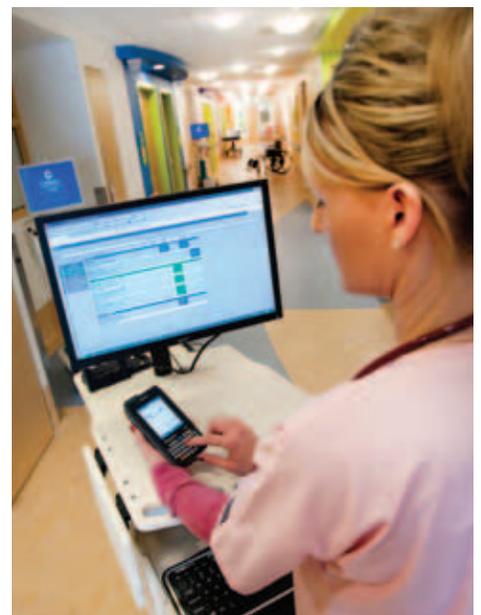## Integration supports security, operational efficiency

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security systems are remarkable. We've had regulatory agencies come through that have said we might be doing it better than anyone in the country," says Hess. The P2000 security management system serves as an integration platform for systems like video surveillance, patient/equipment locator, visitor management, fire alarm and elevator controls, and allows for the creation of different zones for access and egress privileges at nearly 800 doors.

The real-time location system integration allows for constant tracking and identification of patients, staff and medical equipment, reducing risk and ensuring people and property are where they are supposed to be. The video surveillance camera integration provides better visibility to staff and allows them to restrict access as necessary to protect patients and assets. Further integration of the visitor management system and admission discharge transfer system, virtually ties visitors carrying RFID tags to the patient on campus. If a patient gets moved, the P2000 system automatically changes access privileges so their visitors can get to them.

Integration of the P2000 system with the Metasys system means that all authorized personnel can monitor and control fire, security, and building controls systems and mechanical equipment at all facilities from a central station or remotely using any web browser, which minimizes response time.

"Operationally, we are a more productive and efficient institution because of systems integration," says Munsch. "We're managing 1.6 million square feet of space here, most of which is critical space. The integrated systems we have in place allow us to operate the entire environment of care so smoothly and effectively that people take it for granted and perhaps don't realize everything we do, which is a good thing. The systems

operate similarly in all buildings, and are reliable and easy to use. Training new people can be done with ease and the systems themselves are consistent across the campus."

Each facility on campus is designed to operate independently or be fully integrated with the others. In addition to providing individualized temperature and lighting control of operating and patient rooms, and radiology and MRI suites, the system is also used to monitor refrigerators and freezers that may be subject to inspection. Individualized temperature control, CO_2 monitoring and measurement of building utilities utilization available through Metasys are also contributors to the credits required for LEED certification. At Children's, both the hospital itself and the research center are LEED certified.

"We made a focused effort to have significant technology in the background so people can experience the campus as a whole and the world class services we offer. Forward thinking in the delivery of this network and the convergence of these systems has allowed us to provide dependability and the maximum level of support to the end-user," says Rashid. "When we do something at Children's, we do everything in our power to do it right and with the vision of being the world leader. It's a lofty goal, but the right one. This approach to our technology convergence helps us be that advanced," adds Hess.

Johnson Controls